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Fall 2010 ENGR 3220: Human Factors in Interface Design: Course Materials: Assignment: Final Project Refinement

Lynn Andrea Stein
Franklin W. Olin college of engineering, Las@Olin.edu

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Assignment: Final Project Refinement

ENGR3220 Fall 2010

Due in lieu of a final with lots of intermediate deadlines.

You may want to take time now to schedule any user evaluations that will take place immediately after Thanksgiving break. *That week will be your last opportunity to go back to users!!*

Overview

This assignment has three main parts:

- Refinement of your prototype based on feedback from the previous phase.
- User feedback, incorporating a (pilot, i.e., small test) formal user study.
- Final refinement and presentation of your semester’s work.

The goals of this assignment are to learn how to incorporate feedback from an evaluation of a user interface into the next iteration of a prototype, to plan and pilot a formal usability study, and to produce a final iteration including a project summary and a design recommendation.

UI Redesign:

You have been given a list of heuristic violations that an "outside" group of evaluators found in your prototype. Use this list to focus your redesign work.

First fix all heuristic violations of level 3 or higher in your design. You do not need to fix any violations you cannot reasonably fix in this short period or those whose severity rankings your group disagrees with the evaluators on, but you must give a written justification for both of these cases. If you are able, fix any other violations that are easy to do.

In addition to fixing major usability problems, you should make sure your prototype will work for another round of usability feedback from real users. You will need a stable version of your interface for these tests, since participants (who are not in your group) should be able to use your interface to perform your task scenarios.

Refinement Summary

Your project web site should include a description of the changes that you made to your prototype in responding to heuristic evaluation. You may wish to include this as a
separate document rather than to incorporate it into the final project writeup; if so, it should be brief.

- Your write-up for this phase should be no more than two pages of text for the overview of UI design changes and prototype overview (plus sketches and screen shots). You may also include a screencast or movie if you think that it would be helpful. (See CourseResources/ScreencastingResources.)
- Addressing the HE usability problems can take as much space as is necessary. (Remember to include justification for any HE problems you didn't address.) The executable should also be available from the web page along with information on how to use it.
- For this portion of the assignment I am mostly looking for your responsiveness to HE feedback and overall improvement of the prototype. (Did you understand the issues raised? Did you respond appropriately to them? If you didn't, did you have good reasons for not doing so? Did you carry this out in a professionally appropriate manner?)

You may incorporate this information into your final project summary, but note that the level of detail may not fit nicely, which is why I'm suggesting possibly doing it separately. In any case, this piece of your site should be completed by 11/30 (and ideally by Thanksgiving break).

**Formal Experiment Design:**

Formal usability studies are designed to answer concrete questions about specific aspects of your design (or about some other aspect of human-computer interaction). In order to be able to gather rigorous data, you need to design an experiment that holds most things constant while varying only the element (the "factor") that you wish to test. You will then select something to measure (the "response variable") to see how changes in the factor affect that response. A suitable experiment might compare two variations on one of your design decisions or two different interfaces (but not too different or the results might not be valid).

Although there will not be time to conduct a full study, this assignment asks you to create a hypothetical formal study that you could run to evaluate your interface. You will run a pilot version of this study with two of your users.

**Problem Selection**

Identify some specific question that would be helpful in your design and for which a formal study might be appropriate. Some possible dimensions include:

- quantitative usability metrics such as response time or lostness
- observed behaviors, such as (misdirected) mouse motions or button clicks (which may best be captured through a recording viewed by a teammate who was not present at the interview)
subjective measures as reported on a quantitative questionnaire (using a Likert scale?)...see CourseResources/SurveyResources

You will probably want to set your experiment up to compare two versions of your system that differ in very specific ways such as layout, specific graphic elements, use of color, font choice, ....

Pick something that seems significant in the context of your particular design, of course. You should also choose something that is easy to change about your interface as you will likely need both versions available. If there is a particular design decision that your team has been wrestling with, this is the time to collect quantitative data on it!

Although we cannot get statistically significant measurement data with only two or three participants and a rough prototype, you should measure some important response variables to get a feel for how it is done (i.e., task time, number of errors, etc.).

Write up your Experiment Design

Your writeup can be a page or less, but it should clearly spell out the logic of your experimental design:

- Explain the hypothesis that your formal study would allow you to test.
- Describe the factor(s) (independent variable(s)) that you will vary:
  - What are the different experimental conditions that you will try?
  - What will vary and what will stay constant?
  - For each factor that you vary, what are the different conditions that you will test?
- What dependent (response) variable(s) will you observe?
- If your hypothesis is correct, what pattern would you expect to observe in the response variables?

Also explain how many subjects you would ideally test, how many iterations each would participate in, and if each participant tries multiple conditions, how these conditions would be ordered and distributed over participants. Note: if your team has no prior experience in the design of controlled experiments, please indicate that in this section.

You should put your usability study design on your team web site by Tuesday 11/30. Also see Documenting the Results of the Usability Study, below.

Usability Testing

Find three participants (volunteers who are not in your group) to work through your benchmark tasks. You should pilot your usability study on at least two of the three. In addition, you will almost certainly want to get their more general reactions to your prototype. Ideally, these can happen simultaneously. You may use the second halves of the class sessions on Tuesday 11/30 and Friday 12/3 to conduct these tests. Don't
forget to adapt your existing informed consent forms to take into account the formal usability study.

Think about what task scenarios you will use. These will likely be the ones that you have been using for the last few assignments, but you may adjust them if your design has changed enough that the old ones no longer cover the design well. If you do change them, make a note of this in the writeup and describe the new scenarios. Also plan how your general usability testing and your formal pilot study will work together. (It is possible that they will be one and the same.)

In order to facilitate your final redesign, concentrate on collecting useful process data. This will be similar to what you did for the assessment of your low-fi prototype. Instruct the participant to think aloud and make a log of critical incidents (both positive and negative events). Log when the participant begins each scenario, when s/he finishes, and optionally, when s/he completes subtasks. For most projects, the clock should be visible only to the observers, so the participant is not overly aware of the time.

If you happen to have access to a video camera, and you have the participant’s permission, it is fine to use it -- point it at the computer screen, and note the time that you start taping so that you can find your critical incidents later on tape. You may wish to use a tape recorder if you don't have a video camera, but neither is required. Still photos may also be used (with appropriate releases) to document the process, though of course they lack the chronology of video or audio.

You should conduct this process much as you did for your low fidelity prototype testing (including obtaining informed consent and records release). However, your automated prototype should be sufficient that you do not need to play computer, and your pilot formal study should certainly run without continual intervention. For your pilot study, you may also wish to collect relevant demographic information (e.g., age, gender, education level, major, experience with your type of tasks & application, etc.)

You may also want to conduct a followup interview with your participants. You can either have them answer questions in writing or have one observer interview them and another write down or record their responses. The latter technique can yield more detailed responses since people tend to speak more easily than they write. Or do a combination -- have them fill out a written questionnaire containing Likert scales, and then ask them to answer the more open-ended questions orally. You may find CourseResources/SurveyResources helpful.

**Documenting the Results of the Usability Study**

After your usability study is complete, you should add the following to the page documenting your experiment design:

1. A general overview of what you observed from both informal and formal usability testing in this round.
2. A specific report of the response variables on your formal usability pilot, i.e., the thing you said you would be measuring.
3. An interpretation of those response variables: if those results held with a larger user population, what would it mean for your system?
4. An explanation of what you intend to do in the next week (or what else you would do if you had more time) in response to what you've seen so far. This is the most important part of the write-up, since you need to think about how you would fix your system as a result of what you observed.

This should be on your web site before Tuesday, 7 December.

**Final Prototype Refinement:**

After your final user studies, you should incorporate as many of the changes suggested by this study as you can into the final version of your UI prototype. Document these changes on your web site together with their reasons/justification.

**Presentation:**

You will be presenting your project in one of the two final class sessions. The presentation should be polished and professional. Your writeup need not be complete at the time of your presentation, but will overlap substantially with it. The outline for your final writeup would be an acceptable outline for your final presentation. As in the previous presentation, you should have a story to tell and your presentation should support this story. Plan to present for fifteen minutes, with additional time for questions to follow.

**Write-up:**

The final writeup is due in lieu of a final examination on the date assigned by the registrar (Wednesday 14 December).

Your write-up should be comprehensive (including sketches and screen dumps); however, you can incorporate by reference any material on your project web page that already satisfies those elements of your summary. Your entire write-up and web page should be up to date with all of the files stored locally (so that we can just copy the site for our archives. Please make links relative.) It is ok to reuse text that you've used for other assignments, so long as it is up-to-date. These materials should include your final class presentation.

Suggested outline for writeup:

1. Problem statement.
2. Solution Overview (1 paragraph)
3. Personas and Scenarios (final versions)
4. Describe the Final Interface Design
   - Describe the functionality (i.e., what you can do with it)
   - Provide a description of the main parts of the interaction flow. This can be a flowchart. This is important because it will provide you with a record of how the UI worked or was intended to work, long after the implementation no longer works. It could in principle also act as a deliverable to hand off to an implementor.
   - What was left unimplemented?
   - Tools you used to develop the system
     - Tools used for prototyping and implementing the UI
     - Pros and cons of these tools for your project

5. Design Evolution
   - Describe how your UI changed through initial sketches, low-fi testing, HE, and final usability test.
   - Show what the major changes were and why they were made.
   - Describe which of the three evaluation technique (low-fi prototype run-through, heuristic evaluation, pilot usability test) was most valuable to your prototypes usability and why.

6. Link to class presentation.

7. Division of labour on this phase. Also make sure that this is comprehensive and complete for earlier phases.

**Other Details:**

By the registrar's final exam date, a runnable version of your prototype should be available off of your project web page along with information on how to use it (passwords, scenarios, etc), unless your project cannot be made runnable without custom hardware. (In this case, confer with Lynn and Shannon as to how to make your project available.

Also by the registrar's final exam date, please make sure that your studio area has been cleaned and stripped. Any HFID supplies should be sorted and returned to the appropriate bins in the supply rack. Paper materials should largely be put into your group folder (see next paragraph), but scraps and other items not worth saving should be thrown out explicitly rather than leaving them for someone else to deal with. Please also clear the walls and blackboards of the studio space adjacent to your work area, even if the materials there are not yours. (Student work should be salvaged and placed on the shared worktable if its creator is not present. Class-wide brainstorming post-its and similar can be discarded.)

Please preserve your paper prototypes and other design materials. Please make a folder containing your paperwork (using materials in the HFID room) and label it with your project name, your individual names, and HFID Fall 2010. You may leave it on your project table or give it directly to Lynn or Shannon.