

HCI Yellow Book Proposal

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1. INTRODUCTION

Assignments, case studies and projects that require the application of appropriate theory are valuable learning experiences for any student. This is particularly true for subjects such as HCI where the experience of the human user is the focus. Two of the most critical areas in HCI are the initial design of interfaces and usability evaluations. In this paper I describe models for two types of assignments I have successfully used with introductory hci courses – a design assignment and usability evaluation. First, I present the usability evaluation, because although it logically falls later in the software development life-cycle, I have found that placing usability first in a course motivates the students and they then more fully appreciate the need for careful interaction design. Then, after the description of the design assignment I briefly discuss the pedagogy related to these particular assignments.

2. USABILITY

It is unlikely that even the most experienced designers will get an interface design 'right' first-time. Usability evaluation, and in particular usability testing is an important, often neglected, part of software development. In addition there is an ever-expanding range of interaction devices for which our graduates are likely to develop systems. It is part of the role of HCI research to develop design guidelines for these devices, however often the devices are in production before such guidelines emerge. For these reasons usability evaluation methodologies are an important part of any HCI curriculum. I teach two third year introductory HCI courses, a Computer Science (CS) course that is exclusively HCI and a Software Engineering (SE) course that is half HCI. I have found that teaching usability first and getting students to complete and associated assignment motivates much of the remainder of the course. Here I describe the pattern for the usability module of the SE course and its most recent implementation.

To provide the theoretical background there are lectures on usability, heuristic evaluation and usability testing (five one hour lectures in total). For the assignment we choose to evaluate e-shopping websites as one can assume that companies care about the commercial viability of their web presents – and by inference the usability of their web presents. We select two sites that are selling the same, or very similar products: it is more instructive if one is much more usable than the other although this is not always possible. The students are grouped into pairs and half the groups are allocated to evaluate each website.

The first task is for them to design a usability test of the site. Of necessity they undertake a task-based heuristic evaluation to plan the usability test. We are deliberately non-prescriptive about the details of the usability test, it is up to them to decide on the tasks to be completed, number and types of users etc. They hand-in a complete plan including goals of the test, a detailed script of tasks to be completed, measures to be taken and an outline of the usability report. After the initial plan is handed in each group pairs up with a group testing the other website and trial their usability test, acting as users for each other. Based on their observations of their own test and experience of been a participant in a usability test they then revise their test plan and hand in the revised plan. The following week we ask each group to rank the three most significant problems they found on the website. The class then works together to compile a ranked list of the most

serious problems for each website and decide which would be most important to fix. Finally the course examination includes questions about the project: these are related to the specific project (for example 'describe three major usability issues of xxx and suggest how they may be rectified') or a reflection on the usability testing methodology (for example 'describe how you might decide on the specific tasks to set for a usability test').

Each part of this assignment adds to the students' knowledge of usability evaluation. Learning the site in detail to plan the usability test has some similarities to conducting a heuristic evaluation. The planning and trialling of their own usability test together with acting as users for another group gives them a good understanding of how important it is to carefully plan such tests. In addition we discuss the 'good user' phenomena and ask them to reflect on whether they behaved like this when they acted as a user, most acknowledge that they tried very hard to not make mistakes. When compiling the overall ranked list the 12-15 groups will usually identify about 30 different top three problems and there can be heated discussion whether the raw scores accurately reflect the importance of problems. A number of students have commented that they found this the most valuable part of the module. We do not get them to prepare a usability report, simply because of time constraints.

Most recently we chose on-line pizza ordering websites. Here the product and purpose of the site is quite simple. In our locality there were two companies offering on-line ordering. One site was very stylish and had very few usability problems; the other was both less attractive and had quite a number of severe problems. We contacted each company and explained what we were doing and asked them to sponsor the project to the tune of a \$20 voucher for each pair of students so that at some stage they could complete the buy process. In exchange we would provide them with a copy of the overall ranked list of problems with brief a explanation of each problem. Both companies agreed and were delighted with the reports that they were given.

The same assignment could be run with any similar on-line shopping site, supermarkets, books, music etc. As an alternative similar sites that don't require a buy could be used such as library catalogue, bus or train timetables. If the sites selected were large and complex the assignment would need to restrict the evaluation to a part of the site for effective comparisons between groups to be possible

INTERACTION DESIGN

In contrast to the usability project, which is based on a standard interface, we specifically set the design projects with non-standard interfaces and interaction. Detailed descriptions of this project have been reported elsewhere [1] [2].

A common complaint of user interfaces is that the programmers have designed it for themselves; therefore the key feature of this project is that the target user is definitely not a healthy 20 year old male, the archetypal computer science student (and unfortunately 80% of our student body). To limit the scope there is a single user for the project that is representative of a target user group with specific interaction needs. They are, for example, a child, elderly, or disabled in some way. The students must explore the research literature on the target user group; we provide one or two references and expect them to locate other articles and report on their findings.

To encourage them to think about a wider range of interaction techniques and devices there may be something in the user profile to indicate that 'normal' keyboard/mouse/screen interaction would be unsuitable. In this case the project requires the students to find out about alternative input/output devices. The problem domain is quite specific and a little unusual; we provide students with a few (1-3) references to the domain and a few references about software written for the domain.

The project is designed to specifically required computer science, psychology and design skills. Although all the students are computer science majors we have found that about 35% of the students have studied psychology (a few are psychology/computer science majors) and about 40% will have studied art at high school. We suggest that they form groups where they have at least one person with psychology skills, one with design skills and one 'A' programmer and then divide the tasks depending on their skills (much as would happen with a real design team). By the end of the project, however, they must have a good understanding of the whole project (and are examined on the whole project). This brings in an element of peer teaching, an effective teaching/learning strategy.

The assignment requires them to research the target user group and the domain. From this research they write a detailed persona and scenario for the user and build a paper prototype of the system. The paper prototypes are presented to the class. After the presentations they may amend the design in any way that they wish and each group then builds a software prototype which again is presented to the class. This prototype is given to another group for usability testing. Finally, as with the usability testing, the course examination includes questions about the project or methodologies employed.

The strength of this approach is that the students, while in a computer science class, experience working in a team where a variety of skills are required. The most difficult task for the teacher with this assignment is defining a user and topic that demands this blend of inputs. To summarize, the project has an atypical user requiring a non-standard interface, a strong visual component and addresses an uncommon goal.

Two example projects we have used with this model are: a drawing package for a disabled six year-old of the opposite gender of the majority of the project group, who used eye-gaze input (no keyboard or mouse); a photo-story book for a grandparent who had 'normal' age-related disabilities – one of the project deliverables was to research what these were likely to be.

PEDAGOGY

Constructivist educational psychology suggests that people learn best by experimenting, reflecting and abstracting these experiences into their personal cognitive framework. One theory for representing this is Kolb's learning cycle [3] (figure 1). Both these projects are based on this approach to learning. The students are actively involved in designing and evaluating computer-based tools and then required to reflect on the experience by way of reports, discussions and review for examination.

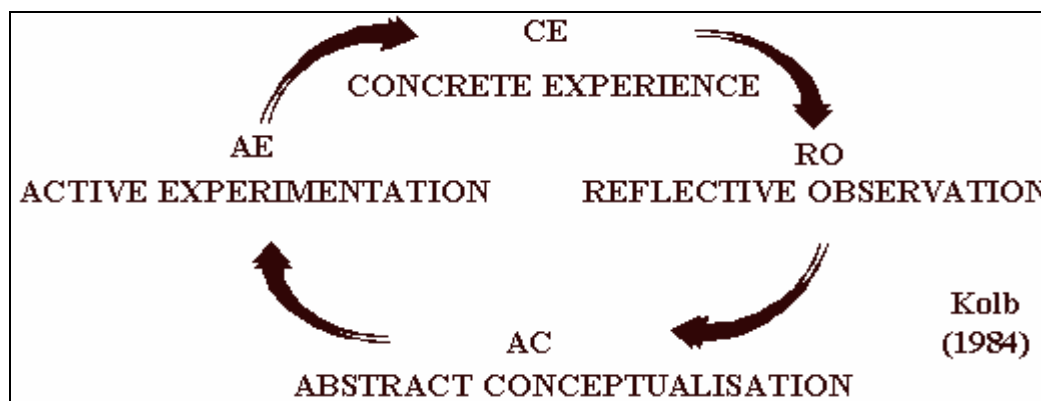


FIGURE 1: Kolb's Learning Cycle From [4]

The modules start with a presentation of the abstract concepts in the lectures. The students then actively experiment with these concepts in laboratory exercises and planning their assignment. They then complete a concrete experience (the assignment) which includes reflective observation and finally the examination preparation requires them to integrate their own experience with the concepts presented at the beginning.

The usability assignment presented here provides an opportunity for the students to experience both heuristic evaluation and usability testing in a meaningful manner. It is easy to recycle the assignment for different classes by simply replacing the target websites with other similar examples. Having the organizations sponsor the project is a little bonus that certainly adds to the students' motivation and we have found easy to organize. Both pizza companies above felt that they had received value-for-money with this project.

The design assignment is perhaps a little more unusual. The mantra 'know your users, they are not you' is often heard in usability circles. To get the students to really connect with this idea we insist that they design for a user that is quite distinctly different from themselves. Organizing an assignment like this requires quite a bit of effort, firstly thinking up the user and topic and then identifying specific resources to get the students started. Sharing these resources between HCI teachers would be beneficial to all.

In conclusion here I have presented two assignments model which I have used in HCI courses. A usability evaluation which can easily be adapted for different scenarios and a design task which is more demanding of the students, but a very effective learning experience. Supporting documents for both of these are available and can be incorporated into a corpus of HCI problems. As a final note, it occurs to me that we could take a 'patterns' approach to defining these problems.

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