

Position Paper on Design in HCI Education

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Abstract:

In this position paper I address issues with the integration of design, an intuitive and craft based discipline, into the scientific based disciplines of computer science and behavioural science that traditionally make up HCI education. These issues include (i) clearly defining and communicating the purpose for design in HCI education, (ii) measuring the value of interdisciplinary classes, and (iii) the role and value of qualitative evaluation for students who come from a quantitative background. While no solutions for these issues are presented, I do indicate some directions for advancement.

Keywords: HCI, education

1 Introduction

The field of Human-Computer Interaction (HCI) emerged out of long and developing relationship between computer science and behavioral science. As computer technology transformed machines from tools for highly trained engineers to tools and information/entertainment devices for a broad audience, the need for these two fields to collaborate became quite clear. And while these fields approach problems from dramatically different viewpoints and methodologies, they share a scientific approach to development of knowledge.

During the development of this relationship, some researchers and practitioners realized there is also a role for design to play. The development and rapid acceptance of Graphical User Interfaces (GUI) created a need for graphic designers' knowledge of typography, color, hierarchy and navigation, and the move towards computer devices other than PCs and terminals such as laptops, handheld computers, and mobile phones has accelerated the a need for industrial designers' knowledge of form giving and ergonomics. More recently with the growing acceptance that emotional responses to products and interfaces play a dramatic role in people's perception and evaluation of devices and services, the role for design in HCI has become a little clearer. Design is still far from being a *third leg* on the HCI *stool*, but

its theories and methods have now entered mainstream HCI education.

Designs' integration into HCI education has not been easy. One of the main impediments is the fundamentally different approach designers' take. Unlike behavioral science and computer science, *design is not a science*; it is a craft. Design does not focus on generating *reproducible results*. Instead, it explores individual relationships people have with the products and services they use. This fundamental difference generates great tension and presents one of the biggest challenges to HCI education. To successfully integrate design into an HCI curriculum; educators must address the following three issues:

- 1 Purpose for design education
- 2 Interdisciplinary classes
- 3 Qualitative evaluation

1.1 My Background

For the last year I have been teaching and conducting research at Carnegie Mellon's Human-Computer Interaction Institute (HCII) and at their School of Design. As a practicing interaction designer trained in a design school, I have had to learn my way around the HCII's interdisciplinary program that collocates computer scientists, behavioral scientists, and designers under one roof. Prior to this appointment I worked in industry doing interaction design research and product development for Philips Consumer Electronics and Philips Research. Before my tenure

at Philips I worked as a multimedia designer at Carnegie Mellon's Media Design Center and taught classes in multimedia production to information systems graduate students at Carnegie Mellon's Heinz School.

2 Design Education Purpose

In trying to better integrate design into HCI education, faculty must clearly define for themselves and for their students *why* design is important. The traditional view in interdisciplinary education has held that exposing students to many methods and processes of various disciplines holds great benefit. This approach can be found in many liberal arts colleges that encourage students to sample from a wide variety of disciplines such as History, Philosophy, Rhetoric, etc. before declaring a major. Students in interdisciplinary programs experience a variety of problem solving techniques, get exposed to the language of each discipline, and generally develop both respect and empathy for disciplines they will never practice. This is the underlying philosophy of Carnegie Mellon's Human-Computer Interaction Institute undergraduate and masters degree programs. All students must take courses in each discipline (computer science, behavioral science, and design) in order to complete the program.

While this appears a "tried and true" approach, resistance from students occurs. Some students enter the program thinking that one or two courses in design will make them designers. They are often quite disappointed when they discover that marketable design skills take years to develop. Other students do not see a direct value or even see a negative value in design education. These students see many companies who contract design work out instead of integrating designers on core product development teams. They also observe that designers are the first employees laid-off in difficult economic times. If industry does not see the value in design, why should these students? To some of these students, study of design can appear as a "coffee stain" on their resumes, making the task of finding work more difficult.

To address this problem, HCI educators should employ more case studies in their classes that clearly demonstrate how design methods directly lead to better products, better user experiences, and increased profits. In addition, educators need to focus on design not only as a process for product development but also as a communication strategy. When students focus on the *craft* as well as the *content* of their work

in all of their classes, they begin to see how effective communication increases the perceived value of their work. Design needs to move beyond individual design classes and into the presentations, demonstrations, and communication students produce in all of their HCI classes.

3 Interdisciplinary Classes

One issue that often arises during design of HCI curriculum questions the value of interdisciplinary classes. Most educators see a great value in mixing students from different disciplines together for project classes. This environment, where they often share the same grade, forces students to work together and to trust students from other disciplines. While this model works well for project classes, it is harder to measure the value of mixing students in single domain classes.

With respect to computer science and behavioral science students taking design classes with designers, there are some real benefits. Having these students work together in a design context exposes the non-design students to the actual methods of designers. Instead of merely taking input from designers, all students participate in fieldwork, concept generation, ideation, sketching, and other design processes. This approach helps the non-design students better understand the craft of design, methods for expressing creativity, and appropriate attention to detail. This approach helps them not just recognize good design, but also helps them understand the effort and resources involved in good design.

The interdisciplinary approach benefits the non-design students, but it does so at the expense of design students. When mixing students in a design course, instructors must move at a much slower pace. They must also address remedial design issues such as basic aesthetics, color, grids, typography, hierarchy, image, kinetic design, etc. The interdisciplinary approach benefits many, but not all of the students. In some cases the designers end up playing more the role of a teaching assistant than of a student. And while this is true for design, I am sure it is also true for courses specific to other HCI disciplines.

4 Qualitative Evaluation

Probably the most difficult aspect of integrating design into an HCI education program arises from qualitative evaluation. Most students coming from

engineering and scientific backgrounds have not had much exposure to subjective evaluations of their work, and they find it to be shocking and unfairly arbitrary. In addition, they are often quite disenchanted with the studio format of design classes that exposes everyone's work to a public (within the class) critique.

I experienced this problem during the last academic year when I taught interaction design to both designers in an all design course and to HCI students who mostly did not come from design backgrounds. It was very interesting for me to observe that the design students generally complained about the amount of work while the non-design students complained about a lack of clarification in grading. The non-design students needed a much more quantifiable justification for how they were performing and more detailed feedback on specifically what they could do to improve their grade. What they had trouble understanding is that design evaluation is always subjective.

In my design course I evaluate students based on their (i) design thinking, (ii) craft, and (iii) presentation. Design thinking includes the quality of the final design as well as the process that students employed. Craft includes attention to detail such as color selection, typography, and animation in the product or service designed, but it also include details such as quality of presentation slides and packaging of CD or other media containing the final design. Presentation focuses on how successfully students communicate both the design and the design's rationale. They need to not only explain how and why it works a certain way, but they must also convince the audience to want to possess their product or service. In addition to the grade, students receive detailed feedback on these three areas. Chunking the grade into three distinct pieces helps students from a more quantifiable background understand why they have received a specific grade and can help indicate where they should focus more attention. It does not, however, make the grade seem significantly less subjective.

The public nature of criticism in studio classes is also difficult to accept for non-design students. They

have no previous experience in having their work exposed to their classmate and no experience in offering public criticism. While this process is difficult for them, it does offer some benefits. Studio critiques offer a chance for all students to learn from the work of others. By opening discussions of individual design to the whole class, students do not need to personally encounter as many problems in their own work to learn from the experience. The act of offer criticism also has benefits. Critizing your classmates work trains students to focus on design elements and helps them develop a better vocabulary for discussing design. This skill will help non-design students who pursue careers in HCI by preparing them to more effectively communicate with design collaborators in the future.

While subjective grading may seem harsh to students not familiar with it; this practice does have the benefit of better preparing students for the *real world*. When they leave the classrooms and have job interviews, give presentations, and participate in industry performance reviews, they will realize that much of life is made up of subjective evaluation. In addition, as they move into HCI careers and participate in more and more user evaluations, they will realize that consumers and user are tremendously subject in their decisions of what they like and what they choose to purchase. Exposure to appropriate qualitative evaluation in school can better prepare them to be successful in their careers.

5 Conclusion

Design still has a long way to go before it has been completely integrated in HCI education, and I do not expect the journey to be uneventful. The integration of scientific methods and pursuit of an expressive craft will not be easy. However, by focusing on (i) understanding and communicating the purpose of design, (ii) evaluating the costs and benefits of interdisciplinary classes, and (iii) designing appropriate methods of qualitative evaluation, the role of design can more successfully emerge within HCI education.