

HCI at Stanford University

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STANFORD UNIVERSITY is creating a new multidisciplinary educational program in design, informally known as the “d.school,” which will incorporate human-computer interaction design as one of its core elements. It does not yet have formal university status but has obtained initial funding and we have begun plans to renovate a main-campus building as its home. In its initial stages, the focus will be on professional master’s degree students.

The basic premise of the d.school is that students need two complementary kinds of training. The disciplinary training provided by conventional departments provides them with depth in the concepts and experience of a specific field. This gives them intellectual tools, but often misses the larger context of relevance and integration with other kinds of knowledge, which are required to innovate effectively in the “real world.” The d.school will complement traditional education with intensive interdisciplinary team project experiences to foster the learning of *design thinking*.

The model for a d.school course is that a substantive project serves as a focus for students from multiple departments to work together in a dedicated project space. These project courses provide a context for students to learn the process issues of user-centered iterative integrative design and to apply and refine the skills brought by the various members of a team. A key component of the teaching method is active coaching, in which individuals and teams get

ongoing detailed reviews of their work from someone with relevant experience. This is like the “crit” of traditional design education and although it is relatively high labor compared to conventional course methods, we are able to enlist coaches (or “mentors”) from local industry, to complement the faculty teaching resources.

For a number of years we have collaborated with David Kelley of the Mechanical Engineering Design Division in the course “Interdisciplinary Interaction Design.” Students from CS, ME, Communications, Business and other departments have joined for team projects that combined physical and interaction design for a variety of product types. Some years we have had sponsorship and participation of experienced designers from industry (e.g., Motorola and Electronic Arts) to set directions for the project and to give ongoing feedback to provide students the benefit of their experience. This, along with other similar one-to-one collaborations across departments and schools, inspired us to develop a unified program in the d.school.

History of the Program. The HCI program in Computer Science was initiated with a single course in 1990, and has grown to include programs at all levels. There is no distinct HCI degree, but there are HCI concentrations for the MS and PhD in Computer Science, and for the undergraduate degree in the interdisciplinary Symbolic Systems program. The curriculum is oriented primarily to the CS master’s program, which is a practice-oriented, rather than a research-oriented, degree. There is also a variety of HCI-related research and teaching in a number of other departments at Stanford, including Communications, Education, Management Science and Engineering, and Mechanical Engineering.

We began with a strong focus on design, developing the program under an NSF curriculum development grant that sponsored a workshop leading to the book *Bringing Design to Software* [1]. The majority of courses at all levels are

built around team projects in user-oriented design, iterative prototyping, and evaluation of interactive systems. There are relatively few courses on specific technologies and tools, and a strong emphasis on the processes of design and innovation.

From the beginning, the program was strongly shaped by our fortunate location, close to a wealth of product firms, research labs, and consultants doing HCI work in Silicon Valley. With the addition of a second CS faculty member this year, we can offer more courses, but still depend heavily on the availability of outside resources.

In a way we have been bending the conventional education of our department towards the kind of learning that goes on design-oriented schools, such as art, architecture, and some of the recent schools of interaction design, such as the Interaction Design Institute Ivrea, the Royal College of Art in London, the ITP program at NYU, and TU/Eindhoven. Those programs position themselves in the design tradition, centering the education on critiques of design project work, and guiding students in the production of “portfolios” rather than publications. They are structured to lead students to develop the tacit knowledge that goes into doing their profession, much more than to give them the explicit articulation of knowledge of the kind in textbooks.

We believe there is a role in the mainstream university for an HCI program that is inspired by the ideals of design, but is also grounded in the technical competence of computing, operating within the structures and constraints of a computer science department. Our challenge is to bridge the gap between these two cultures, to produce an environment in which students can combine technical depth with integrative design thinking.

REFERENCES 1. Winograd, Terry, with John Bennett, Laura De Young, and Bradley Hartfield (eds.), *Bringing Design to Software*, Addison Wesley, 1996.



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the Human-Computer Interaction Group and the teaching and research program in Human-Computer Interaction Design (<http://hci.stanford.edu>). He is also a founding faculty member of the new Stanford Institute of Design (<http://dschool.stanford.edu>). He is a regular consultant to Google, a search engine company founded by Stanford students from his projects.



Scott Klemmer is an assistant professor of Computer Science at Stanford University, where he co-directs the Human-Computer

Interaction Group. He is also a member of the new Stanford Institute of Design. His research addresses interaction techniques and design tools for integrated interaction with physical and digital artifacts. He received a dual BA in Art-Semiotics and Computer Science from Brown University in 1999, and an MS and PhD in Computer Science from UC Berkeley in 2001 and 2004, respectively.



The HCI Program at the School of Information at the University of Michigan

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HUMAN COMPUTER INTERACTION is one of the specialties in the School of Information at the University of Michigan. The school is entirely user centered. All our work begins with understanding what the user needs and wants (where the user is either an individual, a group, a family unit, an organization, a market, or a society). Building on the service and human rights philosophy of traditional librarianship and the user-centered design of those in HCI, we developed a school that strives to both

research fundamental issues in the digital world and *get involved* in developing or designing for that world. Thus we have many projects that are both changing the world (e.g., experimenting with auction mechanisms on eBay so that it is fair for both the seller and the buyer; developing communication tools so that AIDS researchers in Southern Africa communicate well with those in Oxford and Harvard) and developing fundamental knowledge about that world (e.g. Furnas' MoRAS; the Collaboratory for Research on Electronic Work (CREW) research on what makes remote work successful).

The School of Information has a large master's program (about 120 students admitted each year) for its two-year program, with nearly half the students majoring in HCI. Additional majors include Information Economics, Management and Policy; Library and Information Studies, Archives and Records Management, and a tailored degree that a student and mentor can co-develop. HCI students are required to take five courses in HCI in addition to the school-wide four required foundations courses, one of which is basically contextual inquiry (user needs analysis). HCI students are required to have two semesters of programming by the time they graduate (which may be fulfilled by previous coursework) and a course in statistics. Since the degree requires 48 credits, this allows students to get a broad background beyond HCI, getting grounding in information economics, pricing, policy and ethics, as well as courses in other schools like psychology, anthropology, and organizational behavior. The employers of our graduates mention how well grounded our students are and how well they work in project teams. Working in project teams and in the real world, through Practical Engagement courses and activities, is a hallmark of SI.

The school also has a strong PhD program. PhD graduates are employed by academic departments such as Psychology, Information Science, and

