

Interaction Design: A Proposal for an Individually Designed Major Bachelor of Science, Stanford University Approved August 1997

In the next fifty years, the increasing importance of designing spaces for human communication and interaction will lead to expansion in those aspects of computing that are focused on people, rather than machinery. The methods, skills, and techniques concerning these human aspects are generally foreign to those of mainstream computer science, and it is likely that they will detach (at least partially) from their historical roots to create a new field of "interaction design."

-[Terry Winograd](#),
from *Bringing Design to Software*

The computer industry, ever evolving, is entering a new era in which human needs and concerns form the backbone of product design. Software, hardware, user interfaces, in fact all technology, is shifting away from being both designed and created by engineers and is moving toward the separation of these duties. This shift demands the new profession of the "interactive designer" to be born to the industry a profession that stands with one foot in technology and the other foot in the world of human concerns. No major exists at Stanford that coalesces the disciplines that form the foundation of the interactive designer's education. While the information here is abundant, it is fragmented across the multiple disciplines of psychology, communication, product design, and human-computer interaction. The major we have created, and here proffer to the committee, entitled "Interaction Design," is an interdisciplinary curriculum that encompasses both the breadth and depth of disciplines imperative to this nascent field in the computer industry.

The notion of an interactive designer must be more clearly delineated. A comparison of the role of an interactive designer to that of an architect has been widely used to demonstrate the need for this field of study and its role in society. Today, architects design structures, from homes to office complexes, with human factors as the primary force behind their initial blueprints. Professor Winograd from the Stanford human-computer interaction department describes this: "The architect focuses on people and their interaction with and within the space being created...what is the flow of work within the office, and what kinds of communication paths does that flow depend on?" The civil engineer takes the role of the evaluator of the physical and technical plausibility of an architect's design. While the civil engineer and the architect are peers, each one's educational training is very different and, in general, the engineer takes his cues

from the architect. In technology, however, no such separation of talents existed until recently. Today's technology has been primarily developed by those who have had the least training regarding human concerns: the computer scientist and engineer. The result is technically sound applications that do what they are supposed to do but little else; just as a brick building without design would keep you protected from the elements but ignore your desired functions. The industry is filled with stories of innovative and revolutionary technologies that are unsuccessful because they do not address real human needs or perceptions. These issues shape the landscape we will explore in our major.

Even working alongside each other, traditional designers (i.e. graphic artists) and programmers cannot bridge the gaps between their respective fields. Therefore, the profession of the interactive designer is necessary because he is responsible for the conception and realization of a product. He is the architect of software, who cares for and understands best the human use of the space he designs. The interaction designer looks ahead to the desired function and brings it to the artist and programmer, coordinating the interaction among three fields. Aspects of the proposed major incorporate this new model for production: how design teams can be formed quickly and efficiently while keeping pace with technology. Interaction Design combines the essential content of psychology, communication, product design, and human-computer interaction and integrates their intellectual pith into a significant field of study acknowledging the critical nature of this role and the overall trend toward human-centered design in the computer industry. Interactive design shall become a professional field as important as computer science has been in the past two decades.

It is widely believed that in the future, the limits of today's computer technology will no longer be a concern. The new challenge is to design technology that is not only more useful to the individual, but catalytic to human life as well. A more effective interface needs to be created for every technology to be commonly used and unobtrusively accepted into society. Our coursework must prepare us for design in many media; from software, to user interfaces, to the outward appearance of devices that will become social accessories. This proposed major has a clear balance of the theoretical background and the practical application of design, as well as a fluid equilibrium between technical knowledge and the comprehension of fundamental human concerns that undergird design.

In the Product Design discipline, balance is appropriately achieved in the courses because classes bring students through the development of a product from idea to concrete reality. This is the focus of Mechanical Engineering 115A, B, and C (Human Values in Design, Expression of Function, and Design Sketching) with stress placed on understanding the human needs, aesthetic concerns, and technical knowledge. Furthermore, ME 101 (Visual Thinking), a course which we are currently taking, teaches visualization and creative problem solving in order to break traditional forms of thinking.

Product Design (web site)			
Mechanical Engineering			
	101	Visual Thinking	3
	103	Manufacturing & Design	3
		d. Engineering Drawing	1
	115	a. Human Values in Design	3
		b. Expression of Function	3
		c. Design Sketching	1
	116	a.	3
		b.	3
		c.	3
Art			
	60	Basic Design	3
	160	Intermediate Design	3
Product Design Unit Total:			29

The area of psychology which pertains to our objective, social psychology, enables the interactive designer to think from the user's perspective and factor human concerns into a product. Social psychology teaches the aspects of human-human interaction which can be transferred directly to human-computer interaction. Courses such as PSYCH 271 (Applications of Social Psychology) build on the fundamental theories presented in Psychology 70 (Introduction to Social Psychology) and teach how to apply these theories in a practical sense. While social psychology remains the core, PSYCH 40 (Introduction to Cognitive Psychology) is integrated specifically to learn more about human perception, memory, problem solving, and reasoning.

Psychology (web site)			
	1	Introduction to Psychology	5
	40	Introduction to Cognitive Psychology	4
	70	Introduction to Social Psychology	1
	110	Research Methods and Experimental Design	5
	164	The Psychology of Mind Control	6
	271	Applications of Social Psychology	4
Psychology Unit Total:			25

Like Psychology, Communications is crucial in the design of interactive technology. Through the specific and highly scientific classes in the Communications department: COMM 269 and COMM 272 (Computers and

Interfaces and Psychological Processing) we learn the importance of social interaction with media and how to directly apply this to improve interaction between people and personal technology. Professors Nass and Reeves have made huge advances in the areas of social response to technology. Their research demonstrates that when computers follow social rules, humans treat computers like other humans and find their interactions more enjoyable. ([Media Equation](#), [SRCT](#)) Additionally, their research is being incorporated into many new products; one example being Microsoft Office 97's helpful and proactive assistants.

Communications (web site)			
	269	Computers & Interfaces: Psychological & Social Issues	4
	272	Psychological Processing	4
	369	Research Seminar in Voice Interfaces	3
Communications Unit Total:			11

Human-computer interaction (HCI) is the keystone to the frame built by the other departments in our major. Currently the only two ways to focus in HCI are either in computer science or symbolic systems. Computer science teaches the technical aspects of programming that have little concern for the usability of such programs, while symbolic systems focuses on linguistics and philosophical concerns. Symbolic Systems does not truly develop the aesthetic design sense for creating such interactive systems or delving into the psychology behind human-computer interaction. Essential resources to the interactive designer are the ability to identify issues and tradeoffs in interactions design and to invent and evaluate alternative solutions to design problems. CS 147 (Introduction to HCI Design) imparts this knowledge. In higher level computer science courses, CS 247A and 247B (Interaction Design Studio and HCI Projects), this education is augmented and intensified when the usability of interfaces is addressed and psychology is considered. Personal, interpersonal, social, and organizational computer systems are focused on analyzing the process and effectiveness of design.

These classes bring formal education far beyond theory; they are project based courses in which work is performed on numerous applications. To complement the project based classes in HCI, we believe that it is imperative to take CS 377* (Topics in HCI) – because each scrutinizes one area of concern to the designer – taught by leading technological innovators. More than merely illustrating the work being done, these seminars present fresh ideas that are the vanguard of thought, and are cardinal for the designer – to think of what can become, not what is. The specificity and depth in each class represents the future of the revolutionary topics discussed in CS 547, a seminar which presents ongoing research from the world's foremost institutions on the study of media, technology and design. Although, it is important to note that we feel this major does not need any traditional CS programming to be complete, the shift is only

beginning. Therefore, we have recognized that some programming background will be a necessity. As a result, we have added CS 106x which teaches us the methodology behind programming.

Human-Computer Interaction (web site)			
	106	x. Programming Methodology and Abstraction	5
	147	Introduction to HCI Design	4
	247	a. HCI -- Interaction Design Studio	3
		b. HCI Projects -- Contextual & Organizational Issues	3
	377	Advanced Topics In HCI	3
	377	Advanced Topics In HCI	3
	377	Advanced Topics In HCI	3
	547	HCI Seminar	3
Human-Computer Interaction Unit Total:			27

Almost every technology company has a need for people who have experience and understanding in computers, design, and psychology. The innovative products today are not led by computer scientists, but by people who have diverse backgrounds yet share interests in technology and its interaction with users. "Interaction Designers are already much sought-after in interactive media and online industries – as well as in traditional interface design endeavors – and are currently in short supply." ([Nathan Shedroff, Vivid Studios](#)) Ultimately, the responsibility of the interactive designer is to design for human-needs, to bridge the gaps between programmer, engineer, and designer, in order to conceive and realize the overall product. Currently at [Stanford](#) there exists a coalition among the different departments that recognize the importance and maturity of this field, as [MIT's Media Lab](#) has already done. [Professor Winograd](#) from the [Stanford human-computer interaction department](#) and Mitch Kapur from MIT have taken the initiative in calling for the creation of a professional discipline of interaction design. We are recognizing the importance of their call in our response.