

The Importance of Interactivity in Twenty-first Century Design: A Call for the Creation of the Interaction Designer

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In the twenty-first century, information will become the next commodity. The distinction between “here” and “there” will be blurred. You won’t refer to an “Internet,” because everything will be the “Internet.” Communication will be enhanced. It will be easier to get in touch with people when you need to... it will also be easier for them to call on you. Networked appliances will not be seen as devices for computation, but rather as devices for communication¹. Communication will involve more than passing a set of instructions to a device with a processor. It will involve an experiential engagement with the interactive tool. Just as interactive technology will define our culture, the design of interactive technology will enable us to control our development.

Interactive technology will become ubiquitous, multi-cultural, and the emphasis will be on finding a fit between technology and human values. Processing power will be taken for granted, and the only pertinent question will be the worth of a product as defined by its ability to meet the needs of the people that interact with it. While no one doubts the importance of design in the success of a product, we have yet to define what it means to be an expert at designing interactive technology. This paper proposes that the expert will be defined as the Interaction Designer.

There are many varying opinions on what it means to be an Interaction Designer, and schools across the country have begun to provide programs, but with little coherence. Within technology companies the individuals working within this space are usually self-taught, learn from trial and error, and come from a variety of backgrounds. In addition, technology development—especially with regard to technology appliances—has become such a moving target that trying to establish guidelines for design has become entirely problematic.

¹ This distinction is more thoroughly examined in Terry Winograd’s “From Computing Machinery to Interaction Design.”

This paper does not attempt to set guidelines for the design of interactive technology. Trying to establish hard lines for design will either limit the technology, artificially retard growth and development, or simply be ignored. Instead, this paper is a call for action. A call to recognize the need for a new kind of designer: a designer with a new methodology that leverages user-centered design to create technology devices that fit human needs. This paper is a call for the birth of an interdisciplinary designer, the Interaction Designer, who will have the training and skills to drive the design of future technology devices for a culture that is rapidly exceeding its own expectations.

The discussion will begin by analyzing the existing landscape, looking at how and by whom interactive technology is currently designed. Next, the rise of Interaction Design (IAD) is explained with regard to what differentiates the Interaction Designer from those currently working in this space. Finally the current training processes for IAD is critically analyzed and future directions are presented.

The Existing Landscape versus Interaction Design

While the notion of creating experiences for others is nothing new to people, it is nonetheless challenging to think of experiences in terms of interactivity, feedback, control and other interactive mechanisms². While Steven Spielberg may be an expert at creating an experience for his viewers, the media that he creates is for the most part passive. The person at a Spielberg movie is referred to as a “viewer,” because the process unfolds before him or her, rather than a “user” who will interact with the experience. IAD is concerned not so much with creating experiences for people to engage in (as Spielberg does), as with creating experiences for people to *interact in*. The emphasis is on interactivity and on allowing for a rich dialog between the user and the device. To be sure, interactivity is not always a good thing. There are many times when people will forego control and feedback from a device for a more controlled experience. Part of the IAD training in interactivity and user-centered design is the ability to gauge the level of

² Nathan Shedroff provides a breakdown of various parts of interactivity in “Information Interaction Design.”

interactivity appropriate to the task at hand, perhaps passing a project on to a movie director.

Currently the design of mobile interactive technology products like handheld personal computers (HPCs), personal digital assistants (PDAs), and cellular phones is by teams within which there are individuals from a variety of disciplines, but very few of whom are trained in defining the overall user experience. For this reason such devices have scattered functionality and many features which do not fit together. Instead of designing the device around functionality relevant to the consumer, these devices become mere platforms for features that fail to form into a cohesive unit. Without a clear direction, the usability of such technology appliances will surely suffer, as users become increasingly weary with scattered features and interaction models. It is the role of the Interaction Designer to define a product, to identify a unified set of features and functionality that create a conceptual model of what the product is and how one should interact with it.

The Interaction Designer will be responsible for creating more than computing platforms for applications to reside on. He or she will design specialized computing devices for specific purposes. People are very comfortable with the notion of specialized devices. Toasters heat up a very limited amount of food in a specific way, but they do it well, and there is no particular desire to incorporate their functionality into a refrigerator or stove. Likewise, people will need organized, digital to do lists, and there is no reason why such a tool should have to reside inside a computing platform like a PDA as it does today.

The current trend of designing multi-functional platforms will give way in the twenty-first century to devices with a clearly defined purpose and an interaction model that complements the purpose accordingly. The creation these new devices will be one goal of an Interaction Designer.

Interaction Design and the Interdisciplinary Team

Just as successful design cannot exist without the cooperation of strong engineering, management and marketing teams, successful design of technology cannot

exist without a strong, interdisciplinary design team. It is inconceivable for a single person to have expertise in all aspects of design. As such, a team of artists, psychologists, usability experts and ethnographers will come together to create a product. Each will have empathy for the roles of the other designers while understanding their role in the creation process. Given the inevitable landscape of product development, how does the interdisciplinary Interaction Designer fit into a design team? The Interaction Designer will work cooperatively with others in the design team while maintaining expertise in decisions relating to the experiential engagement with the technology device.

The Interaction Designer will most likely work closely with members of the following disciplines:

Industrial Design

In the early 1900s Raymond Lowey, Peter Behrens and others began the Industrial Design (ID) movement. The design and implementation of mechanical products was thus separated from each other. The role of the Industrial Designer has historically been one of formgiving, designing a shell for an object to reside within. The Interaction Designer, on the other hand, is not so much concerned with formgiving as deciding how the aesthetic of a product affects its perception. Instead of creating models out of foam and polymers as an Industrial Designer would do, the Interaction Designer makes broader decisions: Does it make more sense for this device to be made of wood or plastic? Should buttons be exposed or hidden? Is this device designed to relate stability of function or novelty?

Industrial Designers will work with Interaction Designers to create aesthetics that complement the intended usage of a product.

Product Design

John Arnold in 1958 created a program in response to Industrial Design called Product Design. Product Design was an engineering-centered designed discipline with

foundations in Mechanical Engineering. Product Designers are interdisciplinary designers with an expertise devoted to finding mechanical solutions to the needs of people. Just as a Computer Scientist will find software needs for a computational problem, a Product Designer uses his or her understanding of physical apparatuses to address observed needs.

Product Designers are especially adept at design-problem solving. The Interaction Designer would work with Product Designers, though the Interaction Designer would have more influence over the SUI (solid user interface) of the physical device and other elements that relate specifically to interactivity.

User Interface Design

When the software revolution came in the 1980s Mitchell Kapor was one of the first to call himself a software designer. He did not write code, but instead focused on the user interface of Lotus 1-2-3, a spreadsheet application. Recently, with the boom of highly visually engaging Internet websites, User Interface (UI) Design has been accepted as a vital part of the development process. The availability of software (especially software that resides in the form of web pages) has taken off so quickly that companies are making great strides to set themselves apart using a strong design and branding strategy.

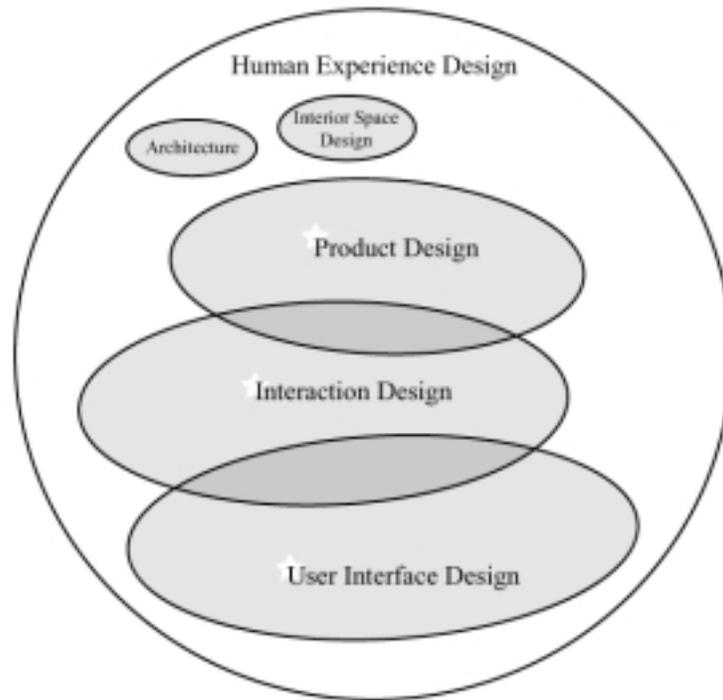
UI Designers make decisions about more than simple graphical user interface (GUI) elements or designing icons. Instead, the UI of a software application should be seen as anything that affects the user experience. Mitchell Kapor explains, “the look and feel of a product is but one part of its design” (Kapor, 6). For Kapor, designing Lotus 1-2-3 was more than a task of deciding on column widths, it involved the formulation of the spreadsheet metaphor itself. Understanding the UI of software is more than understanding the way to represent a list of objects in a GUI; it is more than providing appropriate affordances for a draggable object. To UI and Interaction Designers, the details of a GUI design are what various varnishes are to a furniture maker: an enhancement that can accentuate the product, but cannot alone compensate for poor design.

With great expertise in GUI solutions for interaction problems, UI Designers will play an increasing strong role in the design of interactive technology products that reside off of the desktop. UI Designers will coordinate efforts with Interaction Designers, who will be working on bridging the SUI with the GUI.

Graphic Design

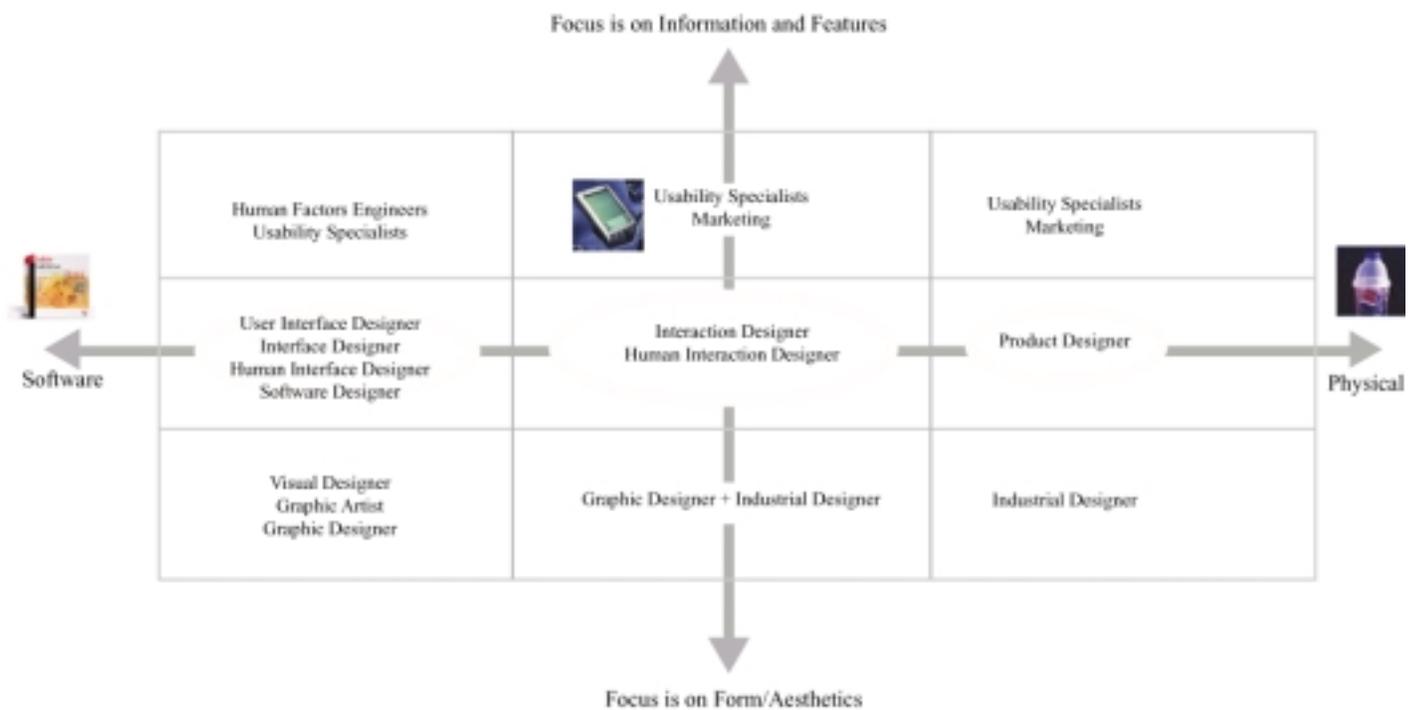
Graphic Design has widespread foundations in print and digital media. It may help to think of Graphic Design as the parallel of ID for software. Of course, Graphic Design has its history date back much farther than software design.

Ideally, the Graphic Designer will be able to help the User Interface Designer create an aesthetic for a product's digital component, similar to the way in which an Industrial Designer would shape the form of a product's physical manifestation.



As described in the diagram above, Interaction Design, as with most design disciplines, is not entirely self-contained. It falls overlaps with Product Design and UI Design because it deals with the larger issue of Human Experience Design.

Furthermore, Interaction Design falls within a spectrum of design as described in the diagram below:



Interaction Design Today

In the early 1980s, Bill Moggridge at ID2 began working on technology devices that combined software and hardware. His company designed the first laptop, the GRiD Compass, and that prompted him to search for a name that encapsulated the idea of designing devices that include software and hardware. First referred to as Softface design, Moggridge later referred to it as Interaction Design.

Currently, Interaction Designers are employed by Moggridge's new company, IDEO Product Development (after a merger with David Kelley Design), to work on devices such as e-books that download digital books into a physical device for browsing. Interaction Designers are also employed at many software companies such as EBay and Trilogy Software; however, most Interaction Designers working at software companies do nothing more than User Interface Design and are working under a title that is slightly misleading given the history of the name.

Currently, the Interaction Designer's role is ambiguous and varies from company to company. A newly developing field, the role of the Interaction Designer in a product cycle is still being defined. Ideally, it would be the role of the person within the design team that drives the definition of the interactive product.

Of course, the process of defining a product has become more problematic recently.

Form follows function has become a cliché contemporary time, but it will quickly give way to form follows purpose as the function of an object becomes increasingly less tangible. The physical form of a digital photo album may be best served by understanding its purpose. What is the form of uploading photographs? What is the form of annotating an image with an audio clip? Indeed, the convergence of software and hardware creates a blurred distinction between the ID world of form and function and the UI world of icons and metaphors. The role of the Interaction Designer is to provide solutions to such problems by designing products such that the form follows the purpose it is intended to serve. The emphasis is less on consistency with existing UI interfaces, and more on cohesiveness with the world in which people live. Keeping with the photo album example, if it is intended to be rested on the top of a television with one main photo

constantly displayed, the interface elements would be different than if it were meant to be placed in a bookshelf. Clearly, the function of uploading photos is the same, yet the purpose is different in the two cases. In one the purpose is to be an unobtrusive feature which does not detract from the aesthetic qualities of the frame. In the other it may manifest itself in a more prominent way. Such issues are left to the Interaction Designer to resolve.

A problematic application of form following function is currently manifesting itself in software applications that attempt to mimic real-life mechanisms (such as Apple Computer's QuickTime 4). As software and hardware begin to be more tightly integrated it is important for software decisions to be made for usability, and not simply for consistency with the physical model. Increasing and decreasing amounts using software gadgets in a GUI should not be made more difficult simply for consistency with the physical device within which it exists. The most important notion is internal consistency: a device behaving as one would expect, based on how other parts of its interface behave. It will be the Interaction Designers that develop metaphors and conceptual models that will standardize the integration of software and hardware, just as researchers in Xerox PARC established the desktop metaphor in 1981 with the launch of the Star system.

Training for Interaction Designers

Most importantly, the Interaction Designer is the interdisciplinary designer. Because the creation of interactive technology is so varied in nature, the Interaction Designer needs an understanding of disciplines of engineering such as electronics, computer science, and mechanical engineering, while maintaining an understanding of the social sciences such as anthropology, psychology and communication. Additionally, there is much to be learned from professional of experiential design, such as movie directors, theatrical set designers, and improvisational performers.

Furthermore, the Interaction Designer is a technology-artiste, a designer of the engineered, not a design philosopher. It is important for him or her to have a thorough understanding of art and design, with a firm grounding in subjects such as typography, sculpture, photography, and painting.

Several universities across the world have begun Interaction Design programs. The programs are different at various schools, and there is still little agreed on. Carnegie Mellon University offers a Master of Design in Interaction Design. Students are in the design division and take courses ranging from typography to information design in new digital environments away from the desktop. At Stanford University several students have designed individually designed majors in Interaction Design, an interdisciplinary program combining Product Design, Human-Computer Interaction and Psychology.

Existing programs reflect more clearly on the types of courses currently available based on faculty and university support (machine shops, graphics labs, design studios, etc.), than what is ideal for the training of an Interaction Designer. As the field grows in richness and history, it is safe to assume that academic programs will grow to offer more support to students in the program.

Looking Forward

Culture shapes humanity as much as humanity shape culture. The human experience is a reciprocation with the world, an engagement that changes everything involved. Absolute passivity is impossible. Therefore, it is crucial for a culture to be intimately aware of how it is affecting not only the world, but also its own people. The act of creation should never be done blindly or in haste, for the potential for harm is far too great.

This discussion began with an analysis of the existing landscape of our culture and critically addressed areas in which invention was driven at the forefront by technology, not by a desire to change the engagement of a man with the world for the better. Interactive technology design has become the center of “innovation,” but innovation only as understood through the eyes of an engineer. By all means, others are left skeptical. Where does engineering innovation leave humanity in the end?

Innovating culture is what humanity should seek.

The rise of the Interaction Designer is but one step. Training in the social sciences, design and technology provides a foundation for creation that is sensitive to a vision of a world in which the human experienced is fundamentally richer. Embracing the

ability of design to affect the core of human culture and training another designer as such is another step. Design is a cooperative activity, and the Interaction Designer is but a small player, but one must not allow that to slight the issue. Instead, it is better to think of it as a stepping stone step.

Design is creation. It is a means, and innovating human experience is the goal.

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Resources:

The paper has been part of a larger dialog with the following organizations and people. Their input has been central to solidifying my current philosophy, and I have listed them here in alphabetical order:

- Advance for Design Committee (<http://advance.aiga.org>)

Their web site describes their mission: "The objective of this 'Advance for Design' is to establish a new community of design practitioners who are challenged to design for a world that is increasingly digital and connected."

This paper is harmonious with the Advance philosophy. The Advance web site provides a breakup of design disciplines into various groups and attempts to define each group with respect to each other. It also provides useful links to people and organizations pushing each of the areas.

- Jonathan Bruck (jon@justarrive.com)
Co-founder, Justarrive Inc.

Jon Bruck co-created an interdisciplinary program at Stanford that focused on training a designer for the hurdles of designing future technology. His program has been affective in shaping my current understanding of how IAD as a practice fits into an academic system.

- Andrei Herasimchuk (andrei@imprese.com)
Director of Interface, Impresse

I worked with Andrei Hersaimchuk when he was the Manager of User Interface at Adobe Systems. He indirectly inspired this paper when he were discussing the problematic nature of design recently, resulting from a misunderstanding of job titles and the skills and training required to do the job.

- Barry Katz (bkatz@stanford.edu)
Professor, Stanford University Mechanical Engineering course: History and Philosophy of Design

Barry Katz has brought up many interesting issues about the current state of designing technology. In his class at Stanford University he asked students to consider what a modem should look like if its internal mechanism could fit on the head of a pin. It was this ambiguity in future design decisions that prompted me to make this call for the creation of a designer with the background to make such decisions within the larger context of human interaction with technology.

- David Kelley (dkelley@ideo.com)
Professor of Product Design, Stanford University
Co-Founder, IDEO Product Development

David Kelley provided much, if not all, the insight into Product Design. He is an advocate in academia and the corporate world of interdisciplinary design and a user-centered design methodology.

- Jared Kopf (jared@justarrive.com)
Co-Founder, Justarrive Inc.

Jared Kopf is a co-creator of the Interaction Design major at Stanford University. He raised interesting distictions between User Interface Design and Graphical User Interface Design, some of which has been incorporated into this paper.

- Bill Moggridge (bmoggridge@ideo.com)
Co-Founder, IDEO Product Development

Bill Moggridge coined the term Interaction Design when he worked at ID2 on the hardware and software design of single products.

- Nathan Shedroff (nathan@vivid.com)
Co-Founder and Chief Creative Officer, Vivid Studios

Nathan Shedroff teaches a course at Stanford University on Interaction Design and has given the field considerable thought. His personal web site (www.nathan.com) is a valuable resource for anyone interested in learning more about technology design. Specifically, his article on the next 100 years (<http://www.nathan.com/projects/1995/100.html>) inspired ideas in this paper.

- Terry Winograd
Professor of Computer Science, Stanford University

Terry Winograd runs the Stanford program on Human-Computer Interaction (HCI). His thoughts have been especially influential on forming my understanding of HCI design as it exists off the desktop.