

## **INTERACTION DESIGN: Industrial Design in the Information Age**

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**Abstract:** This paper introduces a newly developed discipline in the U.S. and Europe: **Interaction Design**. As we enter the Information Age, products are no longer only electrical and mechanical, but also include computing and networked capability. Designing products highly interactive in nature becomes much more complex than before going beyond the traditional realm of Industrial Design. Moreover, the fundamental definition of “a product” is being challenged and requires a fundamental shift in thinking as well as new work methods. How people interact with products, systems or environments and its social and cultural impact is what Interaction Design is concerned about.

**Keywords:**

Interaction design, user experience, networked products, interdisciplinary, industrial design.

### **1 Introduction**

Traditional products are mechanical and electrical like toasters, shavers, walkmans etc. With today's increased computing power, miniaturized chips and the advent of the Internet, this drastically alters the meaning of traditional products. Industrial Design has always dealt with how people interact with things, designing for a product's form factor, ergonomics, psychonomics etc. Computing and networked products introduces a new dimension of interactivity beyond with its physical form, but extends to the digital arena. Now that most products are embedded computing with complex interaction, what should industrial designers design in the information and digital age? How should industrial designers innovate for these new breeds of products?

### **2 Product nature redefined in the Information Age**

#### *2.1 Products are software driven*

Traditional products are mainly physical in nature and design constrains are governed by principles of physics and mechanics. Today, many products are in fact microcomputers in disguise with computing capability storing more than 40GBs of digital information and ever increasing processing speed. Products become hybrid in nature with both hardware and software components. For example: traditional walkmans have evolved into digital MP3 music players, mechanical cameras into digital cameras, cordless phones into cellular phones etc. What defines a product is not so much dependent on the hardware when a products' function resides more in its software capability. (Figure 1)



Figure 1. Public screen phone with touch screen software interface

## *2.2 Products are networked*

Moreover, with the advent of the Internet, products can be networked and digital information stored in products can be transferred and shared. Examples of such are sending SMS messages between cellular phones, syncing contact information from a PDA to the desktop computer and downloading music from the web to an MP3 player. Products are no longer standalone objects but systems of highly dependent interacting components. As one of the prominent industrial design events in the U.S. IDSA DesignAbout: Interactive Edges summarizes: "We can no longer think about products as isolated objects that are designed, produced and inserted into people's lives, nor can we think about products consisting of hardware design and software design. Hardware and software need to become one, and products need to be thought of as part of a bigger system of objects and spaces." [1]

## **3 What is Interaction Design?**

The field of Interaction Design is at its early infancy and has only been around for the past decade or so. Since the birth of computing, designing computing systems has mainly been the role of software engineers. Parallel to the field of architecture, civil engineers focus on designing the structure of the building while architects design how people live within that structure; in the world of computing, software engineers ensures the robustness of the software while interaction designers design how people interact with computing systems and products,

The concept of computers used to be desktop computing, however as technology advances, computers evolve beyond the desktop PC and permeates into every aspect of our lives. Computers take the shape and form of everyday consumer electronic appliances such as MP3 players, car navigation systems to internet fridges. Thus the notion of designing for computer screen "interfaces" is no longer adequate. This is where Interaction Design crosses over to the field of Industrial Design. The term "Interaction" was originally coined by Bill Morridge, founder of IDEO and it describes the design of the behavior of products, its task flow and structure of information, making technology usable, understandable and pleasant for people to use. As Irene McAra-McWilliam, a forerunner of the interaction design field describes, "Interaction designers have to understand people, how they experience things, how they themselves interact, and how they learn." [2]

## **4 Relationship between Industrial Design and Interaction Design**

As products nature evolves, so does the role of its creators. Industrial designers' role in product development has been designing the form factor and ergonomics of objects. A design project usually starts with a design brief of mechanisms and electronics required of the product design. And the industrial designer generates different physical form factors and styles suitable for the user and target market.

Much of this is changing with the emerging new types of hybrid-networked products. First, with software as an integral part of the products' user experience, industrial designers can no longer design the hardware independent of the software experience. A button pushed on the hardware can trigger a screen display and without close integration between hardware and software design, the user's experience will be a frustrating one. Secondly, skills required of designers today are beyond form making. The challenge that many corporations are facing is not what technology can

do, but what technology should do. Designers' creativity can be expanded to more strategic roles in redefining what these new product typologies should be and envision how people should experience them.

A well illustrated example that Industrial Designers cannot design a product separately from its interface and context of use is the public kiosks at the Amsterdam Airport (Figure 2). The kiosk allows travelers at the airport to write email as well as access Internet information. It is composed of two parts, a touch screen input interface at waist level and a large public screen above the head. Such design did not consider the privacy aspect of the email activity as information entered on the small screen also projects to the public on the large screen above. A touch screen interface for entering email is also very cumbersome as the screen calibration of the virtual keyboard misaligns and allows for errors in typing.



Figure 2. Example of an inappropriate design of a public email kiosk at the Amsterdam Airport.

### **5 New Ways of Thinking and Working**

A paradigm shift of product nature requires new ways of thinking and working. Software driven and networked products adds complexity to product development and the old way of assigning software functions to hard buttons after a product's physical form is complete will guarantee an incoherent experience. Industrial designers need to consider the user experience as a whole beyond a product's physical form. In addition, industrial designers also need to think beyond designing standalone objects and consider systems of interdependent products.

To innovate for new products, Industrial Designers need to consider shifting the focus of designing aesthetically pleasing objects to first understanding people's behaviors and needs. By adopting a designer-researcher role to uncovering these latent needs can designers be inspired to innovate based on experiences with real people.

With added complexity to products, it is necessary for industrial designers to break away from the traditional notion of designing for hardware products and cross boundaries to work with interdisciplinary teams of interaction designers, software engineers etc. This can help ensure a more coherent user experience integrating hardware, software and distributed systems design. .

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## Author's Biography:

Elaine Ann is the founder of Kaizor Innovation. Prior to starting the company in Hong Kong, she was in the U.S. for 12 years where she studied and worked at international design consultancies such as Fitch, Razorfish, Henry Dreyfuss Associates and Philips Design. She has designed the interaction experience for products ranging from medical devices, software applications, ecommerce sites and intranets etc. Her past clients include Hewlett-Packard, Kodak, Philips Electronics, Federal Reserve, Intuit, SRI (Stanford Research Institute), PCCW (Pacific Century Cyber Works) etc.

Elaine graduated from Carnegie Mellon University (CMU) with a Master's degree in Interaction Design and also a B.F.A. in Visual Communication Design and minor in Business Management. She is also currently a visiting lecturer at the Hong Kong Polytechnic University, School of Design teaching Interaction and Experience Design. She is also an active Executive Member of the Industrial Design Society of Hong Kong (IDSHK), a member of the Hong Kong Designer's Association (HKDA) and Industrial Design Society of America (IDSA).