An Extensive Research on Application of Interaction Design in Products

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Abstract. The human society has been ushered in an era of experience economy oriented by information products thanks to the booming of information technology since 1940s. The human society is featured by the fact that consumers begin to pursue spiritually satisfactory products rather than mass-produced products at functional and modelling levels. The so-called "experience" is what consumers seek for an emotionally and spiritually pleasing experience. Traditional industrial design concepts can no longer meet the needs of the customs nowadays, so new concepts to guide the design of products from the perspective of interaction are introduced by designers to solve the contradiction between customers’ need and products supplied. On the basis of the this background, this paper tends to discuss how interaction design can be applied in product development. The software and industrial products are in an attempt to provide inspirations into how to put this concept into practice.

Keywords: Human Society, Products, Interaction Design, Product Development

1. Research background
The value’s standards and users’ needs of each era are unique and appropriate to their level of productivity[1]. In the industrial age, people payed attention to representational and functional material products[2]. In comparison, the current era of information explosion is destined to be dominated by information products, which was born on the basis of advanced technologies such as computer technology, digital technology, and ergonomics[3]. They provides human beings with new, effective, and diverse means of transmitting information that have promoted exchanges dominate enhance the understandings among humankind so that human beings are more related to each other and the whole planet become a “global village”. In the information era, the society based on the transfer of information is transformed into an immaterial society where information creates value[4]. In simple terms, that is, a society based on material consumption is transformed into a society based on spiritual consumption[5]. Along with the information era is the experience economy, which is
different from the traditional economy in that the former, a new economic mechanism, achieves economic growth through creating new user experience according users’ need while the latter through material processing and sales[6]. It is one of the important characteristics of the information age.

Currently, technology is developing rapidly, and there are many kinds of goods in shopping malls. People have long been accustomed to these ordinary material goods. However, people in today’s society have long been dissatisfied with simple basic living needs, and have begun to learn to design their own lives and enjoy this process of pursuing a better life, showing that they try to pursue a higher level of spiritual needs. With the increasing diversification of needs, products have been subdivided. In the industrial era, people only focus on the function and shape of the product. It means that a design considering better function, appearance, and ergonomics guarantees a good sale. If optimizing the industrial structure and reducing the costs to make price advantage are considered, then this product will definitely bring huge benefits to the enterprise. Designers used to not dig into people's real needs at all, but only focused on product sales. However, in the era of the experience economy, consumer consumption is no longer limited to the actual functionality and aesthetics of product, but more a sense of spiritual pleasant when using the product, a non-material emotional experience.

In a well-developed information society, designs tailored for individuals’ spiritual needs have occurred for that customers are not satisfied with simple mass-produced products any more. Maslow's hierarchy of needs illustrates this point (see Figure 1).

![Maslow's hierarchy of needs](image)

**Figure 1.** Maslow's hierarchy of needs

As shown in Figure 1, Maslow believes that human needs gradually develop from the lowest level of physiological needs to the highest level to realize self-actualization. His theory shows that humans must first meet low-level needs before they can propose high-level needs. The ultimate purpose of our design is to tap the potential needs of people and propose solutions to meet them. Therefore, the continuous elevation of the level of human needs leads to higher requirements for design, which has objectively promoted the thinking and exploration of product design. The well-known concept of emotional design was born under the ever-increasing demands of modern people.

2. The justification of research

Interaction design is an avant-garde topic in the design industry today (see Figure 1), and it is one of the mainstream design genres in the information era. With the great enrichment of material life, design is no longer simple and stays at the level of formal construction. Although industrialized products have various styles, they still cannot meet people's growing individualized needs. When today's young
people attach importance to better functions of product, they also pursue enjoying the process of use, that is, people want products with their personality characteristics. Therefore, the design of today's society is not only an interpretation of aesthetic concepts, but also pays more attention to human emotions and behaviors, and interaction design is derived correspondently. It is a bridge and link between art and life, technology and fashion. The purpose of design is not only a new product, but also a comfortable and pleasant, convenient and efficient lifestyle, bringing people a new experience and fun. The research is to find new breakthroughs in product design, so that it can be better performed in the future to meet higher requirements and needs of people.

![UI/UX interaction designer market demand](image)

**Figure 2.** UI/UX interaction designer market demand

3. Advantages of interaction design in product design:

Interaction design refers to the design of communication and interaction. It is literally determined that the participants must be two or more. It is impossible for a single object to interact.

Interaction design, as a trending subject that has just emerged, was first proposed by Bill Moglile. At first, he used the word "Softface" to vaguely express the meaning of interaction design, and later changed its name to "interaction design". Thirty years later, there is still no rigorous definition of interaction design. American designer Preece proposed in his works that interaction design is an interactive product that supports people's daily work and life, and he emphasized the results of interaction design. However, American cognitive psychologist Donald Anorman believes that user experience is the focus of interaction design. He said that interaction design surpasses traditional product design because the product has good interactive functions, that is, users can have an experience when using the product, which is a result of the two-way information exchange between people and the product. It has a strong emotional approach and a unique design method. It is not only the design for use, but also focuses on user experience rather than product features, emphasizing a specific behavioural mode of interaction between the user and the product.

From the perspective of consumer use, how to create a usable and easy-to-use product and reduce the unpleasant experience of users when using the product is the highest goal of interaction design. Interaction design requires the designer to fully understand the target user, understand the user’s psychology, tap the potential expectations of the user, study the behaviour patterns of the two parties when the product interacts with people, and observe the environmental characteristics of the interaction between the two parties to propose targeted and effective interactive way to solve
problems. As a cross-disciplinary and interdisciplinary discipline, interaction design is a combination of a large number of advanced design concepts (see Figure 2).

![Figure 3. Venn diagram of interaction design as an interdisciplinary discipline](image)

From the product perspective, interaction is viewed as the interaction between a product that provides a service and a user who uses the service, and the process of information exchange between the two. In daily life, interactions are happening everywhere from time to time. For example, people use the air conditioner remote control to adjust the indoor temperature, use mobile phones to send messages, make phone calls, use DVDs to play movies, use ATMs to withdraw money, and take photos with digital cameras. In all these scenes, users are interacting with products. As soon as people use the product, interactions happen. The use process is inseparable from information exchange and feedback, so interactivity is closely related to the product. The behavioural process of these series of interactive behaviours is shown in figure 4. After the user decomposes the task in detail, the information is passed to the product through different input methods (buttons, voice, etc.), and analysed and processed by the corresponding module of the product. For example, we need to change channels when watching TV programs. We pass the information of changing channels to the TV through the button of the remote control. After receiving the signal of changing channels, the TV sets the program we want to watch after processing.

![Figure 4. A series of interactive behavioral processes](image)

4. Application of interaction design in products
Industrial design that introduces the idea of interaction design is essentially a design method for
people, products and usage behaviour. This design method is no longer limited to product modelling, product function implementation, product process, etc. It is more about paying attention to the way users use products. By designing and planning, the purpose is to give users pleasant emotional experience in using the product.

4.1. Research of application of interaction design in software
Nowadays, in the application of interaction design in software design, new methods and means are constantly explored. In the future, interaction design should be continued to apply in software design and be used in accordance with scientific and reasonable simulation methods. In particular, different improvements under restrictive conditions should be made. On the other hand, the application of interaction design practice in software design requires continuous maintenance of various tasks. Interaction design cannot stay on the inherent level for a long time. It is necessary to enhance the comprehensive effectiveness of the design to improve the comprehensive experience of the software and achieve a richer effect.

4.2. Research of application of interaction design in industrial product
With the development of interaction design, some industrial designers have begun to consciously apply interaction design ideas to industrial product design, and the products designed can also allow users to obtain a pleasant emotional experience in the natural and efficient use of products. However, it must be acknowledged that there are still quite a few products that do not pay attention to the efficiency of users completing the tasks, let alone the emotional experience components that the product should carry. To achieve efficiency and emotional experience, the idea of interaction design must be introduced and the consciousness of initatively designing products based on users should be cultivated.

5. Summary
At this stage, there are more interaction design methods used in software design and fewer applications in industrial hardware products. However, with the development of interaction design, the applicability of interaction design will continue to be improved. It is believed that in the future interaction design will be widely adopted both in the hardware and software fields.

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