Available Online: 14 May 2025 DOI: 10.54254/2753-7080/2025.22903

Analyzing the development laws of interface interaction design from the perspective of Design Praxiology (Shili-Xue)

Yangbai Qi

College of Fine Arts, Henan University, Kaifeng, China

1164359687@qq.com

Abstract. This paper analyzes the internal and external factors of the development of interface interaction design from the perspective of design science, so as to discover the kernel law of things changing. It adopts "theoretical research method" to collect, understand, analyze and summarize the relevant data to complete the interpretation of the core of interface interaction design. When we start to study the interface interaction design, we will find that the interface interaction design is not only as a design form, but also as a kind of form, which reflects the progress of science and technology, humanistic migration and historical development. The reason for the rapid development of interface interaction design in the digital age is inextricably linked to the current communication technology, industrial manufacturing process, application materials, and modern users, environment, conditions, and economy.

Keywords: Design Praxiology, interface interaction design, laws of development

1. Introduction

In recent years, the proposal of design matter theory has provided a more humanized theoretical research method for the field of design. In Design Praxiology (Shili-Xue), the understanding of design (or anything) can be carried out along two trajectories: a historical trajectory, i.e., the "source" of development, and an abstract trajectory, i.e., the original "source" of design. The first is the historical trajectory, the "source" of development, and the second is the abstract trajectory, its original "element" [1]. The historical trajectory enables us to clearly recognize the evolution of things, the historical background of morphological changes; the abstract trajectory is from the surface to the inside of things through the surface phenomena to see the core of its essence, is the metaphysical thinking [2]. In this paper, we will analyze the development law of interface interaction design with the theoretical research method of design science. Intelligent devices and mobile networks have become the important living aids for people in modern society, and the interface interaction based on intelligent devices has changed people's behavioral habits and lifestyles. To interpret the development of interface interaction design, it is necessary to discover the core law of things changing in its development trajectory.

2. Internal factors in the development of interface interaction design from the perspective of Design Praxiology (Shili-Xue)

2.1. Technology for internal factors

With the information transfer and technological innovation into a high-speed development stage, new media, new technologies continue to emerge, the digital era has become the mainstream of today's development, and the interface interaction design is the professional technology "translation" for the application of the bridge, therefore, the development of technology is also promoting the development of the interface interaction, bringing us a faster and more convenient Therefore, the development of technology also drives the development of interface interaction, bringing us faster and more convenient experience. For example, the research and development of geographic APP, which is closely related to our traveling, is inextricably linked to the technological breakthroughs of GIS system in recent years. With the promotion of geographic information and the continuous powerful function of GIS software, more and more people find the convenience and practicability of geographic information and GIS software, and all walks of life begin to use geographic information data as a means of supporting work and research [3]. Geographic information data implanted in the software system, to the software interface interaction design puts forward higher requirements for the user, the interface is the most direct means of their operation of the GIS software, so the interface design is responsible for the obscure

and difficult to understand the professional functions of the "translation" for easy to understand the important task of the application of services. Therefore, technology is one of the internal factors in the development of interface interaction design.

2.2. Internal factors such as materials and processes

The product design process is the process of materializing materials. Consideration of materials throughout the entire process of product design. Different materials have different processing requirements, and different material processes can make the same material produce different performance, function and texture. The innovation of material and process technology makes it more convenient for people to use smart devices, and also revolutionizes the interface interaction between man and machine. For example, smart devices applied to the touch screen and virtual keyboard, are the use of FPC (Flexible Printed Circuit) technology, this technology is also known as flexible circuit boards, is the circuit printed on polyimide or polyester film material to achieve [4]. The generation of touch screen and virtual keyboard, instead of the previous way of using communication devices through the keys, the market was replaced by intelligent touch screen electronic devices, the rise of intelligent touch screen electronic devices has also completely changed the interface interaction of electronic devices, so that the interface interaction design has gradually become a professional branch of the discipline.

3. External factors in the development of interface interaction design from the point of view of Design Praxiology (Shili-Xue)

3.1. Economy of external factors

Based on the systematic cognition of design science, economic development continues to promote the iterative evolution of interface interaction design through the three-dimensional power mechanism of resource supply, demand upgrading and policy guidance. As the world's largest developing country, the systematic improvement of China's economic strength provides a basic guarantee for the innovation of electronic devices: the continuous growth of national income has given rise to a large-scale digital consumer market, and users' demand has gradually shifted from basic functional satisfaction to the pursuit of emotional experience; at the same time, the policy inclination of the national strategy on scientific and technological innovation has accelerated the breakthroughs in the research and development of interaction technology and industrial transformation.

The economic theory of demand presents a dynamic evolution: when the material base reaches a specific threshold, the user's expectation of the interaction system will undergo a hierarchical leap, extending from the optimization of operational efficiency to higher-order needs such as personalized expression. This shift forces the design paradigm to shift from "technology-oriented" to "experience-driven", which is typically manifested in the shift of touch interaction from accuracy improvement to tactile simulation innovation. The institutional design at the policy level further strengthens the innovation ecosystem, and promotes breakthroughs in eye tracking, voice interaction and other technologies through industrial planning and resource allocation. At present, the deep integration of digital economy and real economy is reshaping the boundary of interaction design possibilities through infrastructure upgrading, forming a two-way empowerment pattern of economic factors and technological innovation.

3.2. Users of external factors

The user, as the name suggests, is the user of the interface interaction design of an electronic device. With the development of social and economic forms, human beings have stepped into the "experience economy era". On the basis of consuming material products, consumers pay more attention to a feeling, an emotional, intellectual and even spiritual experience. As the carrier of economy, science and technology and humanism of the times, interface interaction design also pays more and more attention to user experience. More and more interface interactions incorporate humanized design into their design principles. All designs are human-centered, consumer demand has become the dominant market, and in the consumer group, after the individual economic base reaches a certain level, people generally begin to pursue higher spiritual enjoyment, and a part of the people will pursue the function, interface, and usage feeling of electronic equipment as the materialization of their spiritual enjoyment of the product, and the market will call this part of the people as the electronic equipment of the The market called this part of the people electronic equipment "enthusiasts". With the competition in the market and the pursuit of user experience of electronic devices by "enthusiasts", the manufacturer of electronic devices will inevitably enhance the competitiveness of products in all aspects of the product, and the interface interaction is the most direct way of communication between many product features and users. When you open an electronic device, the interface interaction is the first part of the user's eyes, which is directly related to the user's feeling of using this electronic device, therefore, the user is one of the external factors for the development of interface interaction design.

3.3. Culture of external factors

Design is an organic part of social culture, which unfolds and completes under the participation and constraints of culture, and reflects the style of culture at that time. Different cultures have different spiritual customs and cultural psychological structure or cultural psychological logic, reflecting different values and aesthetic concepts. They play an indispensable role in the process of interface interaction design [5]. Throughout the history of design development, we can find that the design of any era is closely linked with the culture at that time. Designer Chermayeff once said, "The design of history is the history of design [6]."

The influence of cultural tradition on interface interaction design is mainly manifested in the following ways: cultural tradition influences the design principle, cultural tradition influences the way of thinking of interface interaction designers and audiences, cultural tradition influences the form system of design, and cultural tradition influences the evaluation standard of design. Design is not affected by cultural traditions everywhere and at all times. Although some avant-garde designers claim to abandon all traditions and consider their works "traditionless", the actual situation is impossible, and design can never exist as a purely personal behavior. Design can never exist as a purely individual act. Every designer is influenced by explicit traditions in terms of media, tools, language, and methods of expression, as well as implicit traditions in terms of cultural mentality, way of thinking, and aesthetic viewpoints on the understanding of design. Meyer's assessment is extremely accurate: "The modern artist and designer cannot be completely detached from custom. He cannot suddenly claim to be a neo-prehistoricist merely because he has decided to break away from custom [7]."

3.4. Environment of external factors

As early as the 1990s, John M. Carrol1, a professor at the University of Pennsylvania in the field of human-computer interaction, proposed the concept of scenario-based design [8]. Scenario-based design is a scenario-centered system design methodology, which includes the user in the system design, gives all the roles of the interaction process (people, devices, data sources and systems, etc.) [9], assumptions of various scenarios, descriptions of plots, and a certain form of human-computer dialogues in detail from the user, and provides a large amount of shared knowledge and information for the participants in the system design to envision the possible future tasks of the system users. tasks.

An early use of the scenario approach was the voice messaging system developed by IBM for the Los Angeles Olympics. Since then, scenarios have appeared in various forms in software development. Some scholars have proposed a context-aware approach to interactive system design, using modularized scenario composition as the mechanism [10]. The design information framework is used as a common information platform to integrate different information expression formats by combining modular scenarios and contextual content models to explicitly represent the context, triggers, and effects on users. Scenarios and user environment become important factors influencing interface interaction design.

4. Conclusion

Interface and interaction design has been in our life since the arrival of the digital age. Nowadays, interface interaction design has become an emerging hot professional direction. Analyzing its development law through the research method of design science, it is not difficult to find that the reason for interface interaction design to become an emerging hot professional direction is the result of the joint action of internal factors (technology, process materials) and external factors (economy, users, environment). Although the style and form of interface interaction design is constantly changing, its abstract meaning is the same: better service for human-computer interaction. The result of the development of this form is the improvement of "efficiency", the complexity of "system" and the convenience of "operation". On the surface, the development of interface interaction design is the progress of science and technology, while its essential law is the pursuit of more comfortable quality of life and more excellent spiritual quality.

References

[1] Liu, G. (2006). Outline of the Theory of Matter. Zhongnan University Press.
[2] Liu, G. (2007). A Series of Studies on the Ancient Chinese Design and Physics. Higher Education Press.
[3] Han, C., Li, A., & Xu, W. (2019). Theoretical research on interface design requirements and principles under GIS system development. *Geospatial Information, 17*(5), 86-90+6.
[4] Wu, Y., & Huang, Y. (2007). Discussion and practice of software interface design technology. *Journal of Engineering Graphics,* (6), 52-55.
[5] Wang, Z. (2016). Application of Chinese traditional cultural elements in visual communication design. *Popular Literature and Art,* (13), 141-142.
[6] Mao, J., & Dai, D. (2005). Modern industrial design innovation based on traditional culture. In *Proceedings of the 2005 International Conference on Industrial Design* (pp. 107-109). Hubei Mechanical Engineering Society, Hubei Institute of Industrial Design, Wuhan University of Science and Technology, Hubei University of Science and Technology.
[7] Wang, A., & Song, D. (2020). Inheritance and innovation of Chinese traditional culture in visual communication design. *Media Forum, 3*(21), 146-147.

[8] Wu, Y. (2019). Situational thinking: A scenario-based design approach. *Design, 32*(11), 105-107.
[9] Yang, M., & Wang, H. (2007). Perceptual analysis in human-computer interaction interface design. *Packaging Engineering,* (11), 11-13.
[10] Luo, S., Zhu, S., Ying, F. (2010). Context-based user experience design in mobile interfaces. *Computer Integrated Manufacturing Systems, 16*(2), 239-248.
[11] Chen, X. H. (2020). Research on the development of visual design aesthetics of mobile application interface and its design method. *Decoration,* (1), 92-95.
[12] Ying, Z., & Liu, G. (2019). The application of matter science in the design of product service system model. *Packaging Engineering, 40*(2), 122-127.
[13] Fu, J. (2021). From designing "things" to designing "matters"-On Liu Guanzhong's methodology of design matters. *Design, 34*(1), 96-98.