Research on the Application of Design Thinking in Interactive Design Teaching in Higher Education

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Abstract: Design Thinking is an innovative thinking to help solve complex problems, and also an educational method of thinking training, which is widely used in the field of higher education. At present, Chinese colleges and universities pay more attention to the training in interactive design courses and the single assessment of software learning and design presentation, and lack of thinking training and process assessment of design, which leads to students being limited to the original traditional thinking in the practice of interactive courses, lack of innovation, and lack of ability to solve practical social problems. In order to break through the traditional theoretical learning of interactive design courses in colleges and universities, this paper first introduces the basic concept and specific path model of design thinking, then analyzes the limitations of teaching mode and assessment in the current interactive design courses in colleges and universities, and optimizes the interactive design teaching scheme into four steps based on the basic model of design thinking: discovery, interpretation, conception and experiment, evolution, It is hoped that the innovative thinking ability and design practice level of contemporary college students can be improved, and the interactive design course can be really upgraded from theoretical teaching to practical ability training.

1. Introduction

The 21st century is an era from the era of knowledge economy to the era of innovation economy[1]. Design and innovation have become the theme of the new era. Innovation is not only about rational technological inventions, but also emphasizes the effective design thinking to transform technological inventions in various fields of society into products or services that can be adopted, influential and permeable. Design thinking is an innovative way of thinking capable of dealing with comprehensive and complex affairs. It was first proposed by economist Herb Simon in his book Artificial Science in 1969 [2]. In 1992, Buchanan pointed out that design thinking can be extended to all fields of social life [3] in his article titled "Problems in Design Thinking". In 2005, Stanford Law School established a school of design named D.SCHOOL to promote the educational method of design thinking, which has been popular among students of all subjects. In China, Tsinghua University, Peking University and other universities also pay attention to exploring the teaching methods of design thinking, and set up interdisciplinary courses with design thinking as the theme in their undergraduate courseDesign thinking is an innovative way of thinking and solving problems, which is widely used in various fields. In art and design courses, most of them are user-centered and pay more attention to the needs of consumers, so as to seek market for new technology and new science, requiring designers to understand the needs and ideas of users in three aspects: cognition, emotional expression and interpersonal activities[2].As for the specific implementation method of design thinking, IDEO, a design consulting company, provides a set of path model [4], which is described as follows:

1) Discovery. At the beginning of the project, we should collecting information, broadening our vision, and understanding users' needs deeply to lay the foundation for creative design plan.

2) Explanation. Designers transform their abstract statements of things into more penetrator, concreter research reports and determine the feasibility of design.

3) Conception. Take design opportunities as a starting point, brainstorm boldly, and explore ideas.

4) Experiment. Transform ideas into displays, generate visual prototype drawings, make the design

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plan concrete and feasible, and obtain user feedback through experimental tests to optimize the design scheme.

5) Evolution. The development and iteration of the design scheme are constantly promoted by tracking and recording the long-term operational testing of the design scheme in the real scene.

It can be seen that design thinking is an innovative methodology that is good at providing solution-oriented solutions [5], and plays a significant role in cultivating college students' innovative ability and solving complex problems.

In the current field of higher education of art, the application of design thinking education has been expanded from the initial independent teaching mode to the integrated teaching mode [6].

In the traditional independent mode, design thinking is generally embodied in the specific challenge task, teaching students to "learn by doing" thinking method; However, in the current mainstream integrated teaching, it is generally reflected in the interactive integration of design thinking, professional courses, STEM education and other courses, so as to improve students' ability of cooperation, problem analysis and creative thinking when they encounter problems.

2. Analysis of the status quo of interactive design teaching

As a discipline that focuses on interactive experience, Interaction Design involves multiple disciplines, such as graphic design, ergonomics, social science, information technology, etc. Knowledge in these different fields can help us better understand the response process of users and products, so as to achieve user goals. At present, various universities at home and abroad have set up interactive design courses. The Department of Information Art and Design of Tsinghua University combines design with other disciplines to explore the application of interactive design. The School of Design and Creativity of Tongji University has added open source hardware courses in undergraduate teaching, enabling students to realize interactive display by using programming technology, and actively exploring the implementation of interactive design. Through studying the teaching of leading universities in the field of interaction design at home and abroad, it is found that the teaching of interaction design is more focused on practicality and interdisciplinary attributes [7], which makes teachers have to face some problems when teaching interaction design courses:

1) The current teaching mode of interactive design in colleges and universities is more traditional and still more inclined to the training of software operation. Just because interaction design is an information age discipline that relies on software or technology like Axure, Dreamweaver, programming languages, sensors, etc., doesn't mean that improving software performance is the same as improving interaction design. Interaction design is a discipline that attaches importance to the psychological needs of "people". In the teaching process, more attention should be paid to the addition of design psychology, user experience, ergonomics and other aspects.

2) The understanding of interaction design has certain limitations. In the digital age, the combination of art design and computer technology promotes the application and development of digital media art, and the form of interaction design has also undergone an innovation process from simple human-computer interaction to immersive interaction [8]. At present, in domestic colleges and universities, most teachers still focus on interface design and web design in teaching interactive courses. As a result, students are limited to "screen" interactive design in interactive practice, and it is difficult to truly improve their interactive and innovative thinking ability.

3) The teaching assessment method is relatively simple. At present, most of the assessment methods of interactive design courses in domestic colleges and universities are calculated by weighted calculation of ordinary scores and final scores. However, due to the many times of practice in interactive design teaching, students' ordinary scores are calculated more frequently. Therefore, it is difficult for students' ordinary scores to have a great influence on the final weighted scores. As a result, some students do not pay attention to the quality of daily work, which makes it difficult to improve students' design thinking ability and ability to deal with complex problems.

3. Interactive design teaching process integrating design thinking

Combined with the characteristics of interactive design disciplines and the current teaching status of interactive design in universities, design thinking can be integrated into interactive design curriculum design in the following ways:

3.1. Discovery -- Combine the era and define the problem

At the beginning of the project, students need to collect resources, broaden their horizons, break through the shackles of "screen design", cross the inherent field of visual design, and integrate interaction design with engineering, computer science, psychology and other disciplines.

In the concrete application of design thinking, most of them have a specific and complete innovation project as the goal and direction of practice [9]. Based on the characteristics of problem-oriented and goal-oriented design thinking, teaching activities are carried out around innovative projects, so as to combine teaching practice with the background of The Times and cultivate high-quality talents who can solve practical social problems with the knowledge they have learned.

3.2. Interpretation -- data research, brainstorming

Design thinking requires teachers to guide students to immerse themselves in the project and empathize with target users, that is, to put people first and pay attention to users' feelings and needs. At this stage, students conduct research based on the background, market environment and target users of the innovation project, and have a preliminary understanding of users' behaviors, goals and expectations. At the same time, they dig out the parts of the research report that can extend innovation by drawing emotional boards, user portraits and empathy maps.

3.3. Conception and experiment -- scheme conception and prototype drawing

In the conception process of this stage, teachers need to use a variety of teaching methods and new media technologies to help students think about problems in multiple dimensions, and visually present the ideas of solving problems through sketches, tables or models. For example, KANO model analysis is used to help students quickly select existing solutions. Online documents and other collaborative apps and multimedia devices such as projectors and tablets are used to help students share ideas and brainstorm ideas. After the scheme is determined, it needs to be iterated and changed repeatedly in the actual operation to get the optimal solution of the problem.

3.4. Evolution -- output of finished products, multiple assessment

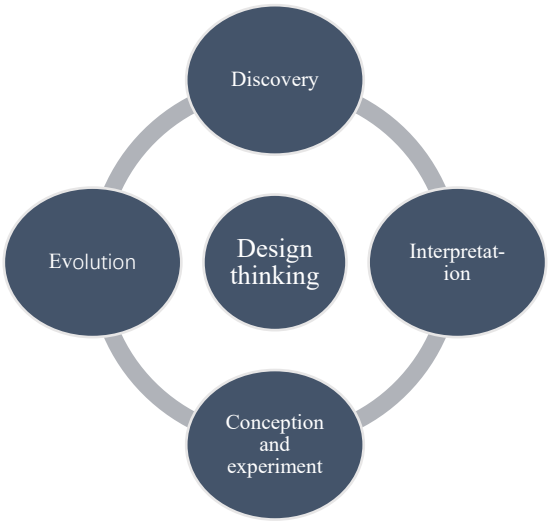

Figure 1 Interactive design teaching model based on design thinking.

At this stage, we should abandon the single linear assessment standard, refine the assessment requirements and pay attention to the process assessment. Process assessment can be divided into three parts: design research, design scheme and design effect. Design research is usually completed

within 1-2 weeks. This part focuses on students' ability to collect information, screen information and explore innovative points. The design plan needs to be deduced based on the data in the research report. The main test is to evaluate the students' logical thinking ability, the ability to solve complex problems and the ability of graphic expression. Design effect is the final reflection of students' design thinking. This part is mainly assessed from three aspects of design innovation, feasibility and social value. The above three parts complement each other, which can deeply show students' design thinking and design ability in interaction design, improve and strengthen the assessment effect, and ensure the realization of teaching objectives in interaction design courses.

4. Conclusion

In the current era of rapid development of information technology, interaction design has become a hot demand in all fields of society. The level of design education and the quality of talent training will determine the quality and contribution of future design talents, as well as the future of design [10]. At present, a large number of disciplines in Chinese universities have integrated design thinking into curriculum design. Interactive design courses can also optimize teaching mode and improve assessment methods through design thinking path model, so as to cultivate design professionals with innovative thinking ability, logical deduction ability and practical problem solving ability in undergraduate education.

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