Research on Optimization of Interactive Design Course for Industrial Design Specialty Based on Interdisciplinary Integration

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Abstract: *With the development of society and the progress of science and technology, the demand for products of people is getting higher and higher. The appearance and function of products can no longer meet their needs, and user experience has become an important measure. Therefore, as a new discipline, interactive design has gradually attracted people's attention. Interactive design is not only a combination of aesthetics and technology, but more importantly, it takes human factors into account in product design. As one of the main fields of product design, industrial design specialty also needs to integrate the theory and practice of interactive design into the curriculum to cultivate high-quality talents that are more in line with market demand. In this thesis, the optimization approach of interactive design course for industrial design specialty based on interdisciplinary integration is discussed.*

Keywords: *interdisciplinary integration; Industrial design; Interactive design; Teaching optimization; curriculum design*

1. Introduction

Under the traditional teaching mode, industrial design and interactive design are often separated, the curriculum and teaching methods also have certain limitations. As a result, it is particularly to study the optimization of interactive design courses for industrial design majors based on interdisciplinary integration. Through the cross-integration of industrial design specialty and interactive design specialty, the theory and practice of the two disciplines are combined, which improves the teaching quality of interactive design course and cultivates high-quality talents who are more in line market demand.

2. The Teaching Status of Interactive Design in Domestic Universities

At present, with the higher education in China implementing the plan of improving the innovation ability of colleges and universities, colleges and universities are facing challenges and opportunities in improving the level of discipline construction. Multidisciplinary cross-integration has become a hot explored by many comprehensive universities in China, which provides strong support for improving innovation ability and competitiveness of universities. Under the guidance of woodworth, a a at Columbia University, the word interdisciplinary has been widely used in academic and educational fields, and most people understand it as "cooperative research" [1]. According to the relevant personnel the Ministry of Education of China, interdisciplinary integration can be divided into two ways. One is "multi-disciplinary integration" mode explored by Peking University and Fudan University, which combines science, engineering, medicine and life sciences to jointly build platforms and laboratories, has achieved remarkable results. The other is the "interdisciplinary approach" explored by the of Science and Technology of China, which puts the interdisciplinary parts of physics, chemistry, biology and other disciplines together to cultivate interdisciplinary talents and achieve results and progress, which has broad prospects and development space. Under this background, colleges and universities need to improve the level of discipline construction through interdisciplinary integration, as to promote the development of academic research and personnel training.

3. The Teaching Status of Interactive Design Course for Industrial Design Majors in Schools

In recent years, interactive design course has become one of the popular courses in colleges and universities. However, although many colleges and universities have begun to offer interactive design courses, there are relatively few achievements and experiences about the teaching content, teaching methods and teaching models of this course. Most of the discussions about this course are carried out from the aspects of teaching mode and talent training mode of design specialty. In fact, the diversified innovation of interaction design, including teaching, training, evaluation and other modes, is closely related, and ultimately points to fundamental talent training.

3.1 Single teaching mode

There are many basic courses involved in industrial design specialty, but these courses are often independent of each other and lack of sufficient connection and integration, which affects the overall penetration of industrial design specialty. This situation leads to students' excellent performance in single subject, but there is often no way to start when carrying out comprehensive design. As an important direction in industrial design, interactive design involves a very rich discipline system, and the direction of interactive design covers a wide range of contents, and the practical application scope is also very flexible and broad. However, at present, the content involved in the teaching of most interaction design courses is still the teaching of specific content such as interaction design, and there is a lack of targeted and systematic teaching content and practice of multi-disciplinary and cross-disciplinary integration [2].

3.2 Assessment form and content is single.

At present, the assessment content of industrial design major is usually based on the arrangement of basic knowledge and the reproduction of design ability, and because of the influence of standardized assessment methods, students' ability of comprehensive thinking and practical application is reduced. This situation will easily weaken students' enthusiasm for autonomous learning, which is not conducive to students' mastery of curriculum system knowledge and hinders the cultivation and development of innovative thinking.

4. The Concept of Interactive Design and Its Importance in Industrial Design.

Interactive design refers to the design process that designers establish contact and communication between users and systems or products through man-machine interface, so that users can complete their goals quickly and accurately, and meet their needs and expectations at the same time. Its core lies in improving user experience and user satisfaction through human-computer interaction. Interaction design not only involves graphic design and interface design, but also includes information structure, interaction process, user experience and many other aspects.

In industrial design, interactive design has become an indispensable part. Because the main goal of industrial design is to design products with good usability, operability, aesthetics and sustainability. And interaction design can just meet these requirements. For example, a smart speaker is not only a simple sound output device, but also includes many functions such as speech recognition and intelligent control, which requires interaction designers to design an easy-to-operate interface and smooth interaction process, thus improving the user experience and use feeling [3].

5. Research on the Optimization of Interactive Design Course for Industrial Design Specialty Based on Interdisciplinary Integration.

From the analysis of the teaching characteristics of interactive design courses for industrial design majors and the current teaching mode in China universities, it is found that only adding relevant courses cannot effectively cultivate outstanding talents suitable for market demand. Therefore, in the teaching process of interactive design course, it is necessary to optimize the curriculum structure from the perspectives of teaching mode and industry demand, so as to improve the teaching effect of interactive design course in this major.

5.1 The use of "project-based" teaching methods.

Interaction design pays attention to the process and effect of interaction between people and products, and needs to go through market research and concrete cases to carry out practical links such as coordination analysis of interaction between people and products, coordination analysis of product function configuration and coordination analysis of technology application. If the traditional "course-based" teaching method is adopted, the scope of teaching is too wide, and it is difficult for students to understand it vertically. Therefore, adopting the "project-based" teaching mode can better solve this problem. In the "project-based" teaching, the "project" is brought into the classroom, so that students can go deep into each specific case, including market investigation and analysis, design positioning, design conception, model making, user experience, marketing and other processes, so that students can master a continuous and complete design process and realize the role of comprehensive utilization of various basic knowledge in product interaction design. In the "project-based" teaching, teachers can set different topics or projects for students, let students participate in real projects, conduct market research and practical operations, so as to cultivate students' practical ability and comprehensive quality [4]. At the same time, teachers should also encourage students to think creatively and practice, and guide students to explore new interactive design modes and methods in the process of practice. In addition, in the "project-based" teaching, teachers can also provide students with relevant practical resources and support, such as guiding students to participate in competitions and project practice, or providing students with online courses and resources in professional fields. Through these practical links and resources, students can better understand and master the theoretical knowledge and practical skills of interaction design, and lay a solid foundation for becoming excellent interaction design talents in the future.

5.2 The formation of interdisciplinary cross-integration model

Interaction design is a highly comprehensive interdisciplinary subject, so its teaching methods should also be diversified. In the specific teaching process, we can adopt the way of cross-interaction between industrial design specialty and multi-disciplines, such as interacting with courses of design specialty, information management specialty, computer specialty, visual communication specialty and so on, and inviting teachers and industry professionals of related majors to teach and share knowledge and design projects. In this way, we can provide students with more comprehensive and in-depth interactive design teaching content and practical experience, and enhance their professional and practical abilities. At the same time, in the teaching process of interactive design specialty, multidisciplinary teams can be used to form interactive design discipline teams. Students take basic courses in their respective departments in the first and second academic years. From the third academic year, multi-disciplinary students can form their own interactive design professional teams according to the needs of projects or courses, focusing on analyzing topics or solving specific cases. This way allows students from different professional backgrounds to communicate and cooperate, thus enhancing students' ability to quickly adapt to and complete projects, and training students' teamwork ability. Different professional backgrounds, angles of concern and starting points of creation will be different, which will bring new blood fusion to the designed products and provide a broader space for students' career development and future innovation.

In a word, diversified teaching methods and interdisciplinary teamwork can provide richer and deeper teaching content and practical experience for students majoring in interactive design, enhance their practical ability and teamwork ability, and provide a more solid foundation for future career development and innovation.

5.3 Improve the evaluation criteria

In order to improve the teaching effect of interactive design course, it is necessary to establish a perfect evaluation system, set up a corresponding multidisciplinary expert evaluation team for specific cases or projects, and form a course evaluation system with professional characteristics. In the design of the evaluation system, we should fully consider the factors of students' participation, encourage students to participate in innovation, improve the evaluation system, and evaluate the practical effect reasonably and scientifically, so as to provide students with a more comprehensive and in-depth teaching experience. In addition, in the design of evaluation system, it is necessary to adopt an open evaluation method. For example, professionals such as off-campus designers or enterprises will participate in the evaluation of curriculum design works, so that students can experience the qualities

that professional designers should have, such as communication skills, team management skills and design expression skills. This can not only enhance students' practical ability and professional quality, but also provide students with richer and more practical career development paths and innovative thinking. In the teaching process, the author constantly innovates the rationality of the evaluation system, the novelty of the content, the effectiveness of the organization, etc. Through the new evaluation model, teachers and students can understand the purpose and significance of curriculum evaluation innovation, thus improving the teaching quality. Through continuous practice and improvement, the teaching effect of interactive design course can be further improved, and interactive design talents with more practical ability and innovative thinking can be cultivated.

5.4 Focus on interdisciplinary integration

Interactive design is an interdisciplinary field, involving many disciplines, such as industrial design, psychology, computer science and so on. In the course of interactive design, it is necessary to integrate these disciplines interdisciplinary to form a complete knowledge system. This integration can make designers gain a more comprehensive and in-depth understanding, and at the same time, it can also improve the quality of interactive design.

First of all, knowledge of industrial design can help interaction designers design ergonomic interfaces and products. This includes knowledge of ergonomics and human physiology, such as body size, flexibility of fingers and visual angle of eyes. By understanding this knowledge, designers can better design ergonomic interactive interfaces. Secondly, knowledge of psychology can help interaction designers understand the characteristics of human cognition, behavior and emotion. For example, human knowledge of color, shape and size, attention distribution, thinking mode and so on. Designers can understand this knowledge, design an interactive interface that is easier to understand and use, and improve the user experience. Thirdly, the knowledge of computer science can help interaction designers realize the function of interactive interface. This includes algorithms and programming techniques, such as JavaScript, HTML, CSS, etc. Designers need to understand these technologies before they can turn the concept of interactive design into actual products. Finally, the course of interaction design should also involve the practical process of interaction design. This includes user research, user testing and other aspects of knowledge. Designers need to understand user needs and feedback, constantly improve the interactive interface and improve the user experience.

To sum up, interaction design is an interdisciplinary field, which requires interdisciplinary integration of multiple disciplines to form a complete knowledge system. The course of interaction design should cover the knowledge of industrial design, psychology, computer science and so on, and also pay attention to the practical process of interaction design to improve the quality of interaction design.

5.5 Curriculum Practice Optimization

Based on the perspective of interdisciplinary integration, the practical optimization of interactive design courses for industrial design majors can be started from the following aspects:

(1) Theme design of project practice: According to the characteristics of interdisciplinary integration, design a comprehensive practice project covering multidisciplinary knowledge. For example, we can design an interactive interface design project based on users' psychological characteristics, which involves the knowledge of psychology, computer science and industrial design.

(2) The formation of teamwork: In project practice, teamwork among students should be encouraged. Students can be divided into different teams, and each team includes students from different disciplines, so that they can learn and cooperate with each other in collaboration, thus forming teamwork ability.

(3) Management of design process: In project practice, we should strengthen the management of design process, including project plan, design scheme, design evaluation and improvement. Through scientific management, the efficiency and quality of project practice can be improved.

(4) Resource sharing: In order to promote the sharing of interdisciplinary knowledge, an interdisciplinary resource sharing platform can be established. By sharing the resources of various disciplines, students can better understand the knowledge and skills of other disciplines, thus promoting the exchange and integration of interdisciplinary knowledge.

(5) Collection and processing of student feedback: In the project practice, it is necessary to strengthen the collection and processing of student feedback. Through students' feedback, we can know the problems and improvement directions in project practice in time, thus improving the quality and efficiency of project practice.

It is not difficult to see that the practical optimization of the interactive design course project of industrial design specialty based on the perspective of interdisciplinary integration should start from the aspects of project theme design, team collaboration, design process management, resource sharing and student feedback collection and processing, so as to continuously improve the quality and efficiency of practical projects.

6. Conclusion

With the advent of the digital and intelligent era, interactive design, as an important design discipline, has attracted more and more attention. In the major of industrial design, interactive design has become an indispensable part. The core of interactive design is to establish a good interactive relationship between users and products, so as to enhance the user experience and market competitiveness of products. Therefore, the position and function of interactive design in industrial design specialty is self-evident. However, there are some problems in the interactive design course of industrial design specialty, such as lack of interdisciplinary comprehensiveness and practical experience. In order to solve these problems, this study puts forward the optimization strategy of interactive design course based on interdisciplinary integration, in order to improve students' interactive design ability and practical experience.

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