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The Teaching Content and Method Innovation of Industrial Design Open Course under the OBE Concept

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ABSTRACT

This paper discusses the application of the concept of Outcomes-based Education (OBE) in the industrial design open course, and aims to improve the practical ability and innovative thinking of industrial design students through the innovation of teaching content and methods, so that students can better adapt to the needs of society and industry. By guiding the updating of teaching content and the improvement of teaching methods, the OBE concept can effectively improve students' learning motivation and practical working ability. To achieve the teaching innovation, universities need to work closely with industry to update curriculum content, adopt diverse teaching methods, and establish effective evaluation systems. Future researches will further explore ways to optimize the teaching model in order to train more high-quality industrial design talents to meet the needs of future social and economic development.

KEYWORDS

industrial design; OBE concept; teaching content innovation; educational reform

Outcomes-based Education (OBE) emphasizes student learning outcomes as the core, and presents new challenges and opportunities for industrial design education. The OBE concept requires that the education system be organized based on the experiences that ensure that students achieve substantial success, and the education system should promote the transformation of education from teaching centered to learning centered, and from a knowledge system to the goal to ability achievement. In the field of industrial design, the application of OBE concept emphasizes the combination of theoretical knowledge and practical ability, as well as the cultivation of innovative thinking. It provides a framework for designing curricula and teaching activities to ensure that students achieve predetermined learning outcomes. A variety of teaching tools, such as the project-driven, case study and teamwork, encourage students to comprehensively apply knowledge to solve practical problems. The teaching reform under the guidance of OBE concept should go beyond the traditional knowledge teaching and pay attention to the all-round development of students' ability. The innovation of teaching methods should focus on the research-based teaching model, personalized teaching and self-referential evaluation to promote students' active learning and in-depth understanding. The reconstruction of the curriculum system and the determination of teaching strategies are also important aspects of the application of OBE concept, which requires the students' learning process to be divided into stages, setting learning goals from primary to advanced, and finally achieving the peak result.

The OBE concept provides a framework for industrial design education with clear teaching

objectives and learning outcomes, promotes the innovation of teaching content and methods, and provides an effective education model and practice path for training innovative design talents to meet the market demand.

1 Analysis of Related Concepts

1.1 OBE Education Concept

OBE (Outcomes-based Education) is an educational model with student learning outcomes as the core[1]. It requires that the educational process should be closely centered around the predetermined learning outcomes to ensure that students can achieve clear abilities and qualities after completing their studies. The implementation of the OBE concept requires educational institutions to clarify educational objectives, design results-oriented curriculum systems, adopt effective teaching methods, and establish continuous evaluation and feedback mechanisms to ensure that students are able to acquire key knowledge and skills, high-quality talents meeting the needs of social and economic development can be cultivated.

1.2 Application of OBE Concept in Industrial Design Education

The core of applying the concept of OBE (Outcomes-based Education) to industrial design education is to shift the focus of education from traditional knowledge to the cultivation of students' practical ability and innovative thinking[2]. This shift requires that the industrial design course remain closely linked to the needs of the industry to ensure that what students learn can be directly applied to their future careers. Through the project-focused teaching method, the OBE concept in industrial design education can make students learn and apply theoretical knowledge in the process of solving practical design problems. This approach encourages students to explore, work in teams, and develop key skills as projects are completed.

In this study, the research team has successfully completed a comprehensive investigation and research on "industrial design education practice and talent training". This survey adopts a variety of research methods, including field observation, in-depth interview and questionnaire. In the preliminary stage of the survey, the team collected a wide range of opinions and suggestions from different stakeholders. On this basis, the research sample was precisely selected, with a particular focus on three leading companies in the field of industrial design and two higher education institutions that have made a significant impact on the industry. The field research activities of this study include direct site visits, in-depth face-to-face interviews, field visits, and the distribution of questionnaires, with detailed discussions with participants, and aim at exploring the vocational competency needs of industrial designers and the strategy implementation of educational practice.

1.3 Innovation of Teaching Content and Methods

Under the guidance of the OBE concept, the innovation of the teaching content and methods of the industrial design open course should focus on how to better achieve the educational objectives and learning results, which includes innovating teaching content, updating course content to reflect the latest design trends and technologies, integrating interdisciplinary knowledge, and increasing case studies relevant to industry practice. A variety of teaching methods, such as the flipped classroom, collaborative learning, and design thinking workshop, are adopted to promote the improvement of students' active learning and practical ability. Digital tools and platforms such as computer-aided design (CAD) software, virtual reality (VR) and augmented reality (AR) are used to

enrich the teaching methods and improve the learning efficiency. A results-oriented evaluation system should be designed, including project works, design proposals, peer reviews, etc., so as to comprehensively evaluate student' learning outcomes.

The feature of this study is to combine the OBE concept with the online and offline teaching model to innovate industrial design education. The study is demand-driven, adjusts the professional curriculum, and adopts one course or the course group as the reform framework. Through the cooperation with Guangzhou Guanyue Network Technology Co., Ltd., and with the application of Yihu network and offline enterprise mentor resources, we implemented a two-year joint training program, which covers courses from fundamentals of industrial design to user experience evaluation, and adopted the blended teaching method to optimize the traditional teaching structure.

The study optimizes the instructional design through the stages of scheme proposal, prototype verification, re-evaluation and design expression. The online learning relies on Yihu network cloud classroom.

The offline learning combines enterprise tutors and laboratory resources to verify the effectiveness of the teaching model through real cases. The study finally formed a research report, which summarized the teaching ideas, including advance experiment, problem-based learning (PBL), argumentation teaching, cloud classroom learning, simulation prototype production, online and offline instructor evaluation and user evaluation, in order to explore the industrial design teaching mode combing online and offline activities.

In addition, through the combination of online and offline teaching mode, this research stimulates students' learning enthusiasm, meets diversified and personalized learning needs, and establishes an effective goal achievement path and a procedural assessment record. It provides a new perspective for the study of online courses for the industrial design major, and complements the insufficient review of the system structure and teaching function in the existing studies.

In terms of cooperation, this project has carried out the teaching design of the online Yihu network cloud platform with Guangzhou Guanyue Network Technology Co., Ltd. and related enterprises, and realized the "flipped classrooms" of question type, project type, case type and discussion type, which is combined with offline teaching problems, so as to promote the deep integration of teaching and practice.

1.4 Continuous Improvement and Feedback

Under the guidance of the OBE concept, the continuous improvement mechanism of the industrial design open course requires educational institutions to proactively collect feedback from students, teachers and industry experts in order to make necessary adjustments and optimizations to the course content and teaching methods.

This mechanism typically involves regular instructional evaluation meetings, student satisfaction surveys, industry demand analyses, and peer reviews among teachers. Through this multi-channel feedback, educational institutions can identify strengths and weaknesses in teaching, update curriculum content to reflect the latest industry trends and technological advances, and improve teaching methods to increase students' engagement and learning effectiveness.

In addition, the continuous improvement process includes a review of assessment tools and standards to ensure that they can effectively measure the extent to which students are achieving learning outcomes.

This circular feedback and improvement process help to ensure the continuous improvement of educational quality and that the curriculum is always in line with the learning needs of students and the evolving requirements of the industry.

2 Industrial Design Open Course under the OBE Concept

2.1 Course Orientation and Objectives

The industrial design open course under the concept of OBE (Outcomes-based Education) is oriented towards students' learning outcomes and ensures that students can achieve established academic performance and ability improvement after completing the course through clear learning objectives and evaluation criteria [3]. This educational model emphasizes the close combination of course content and actual design needs, as well as the diversification and innovation of teaching methods, in order to promote the all-round development and the cultivation of innovative ability of students.

2.2 Characteristic of the Open Course

Under the guidance of the OBE concept, the characteristic of industrial design open course is oriented towards the learning outcomes [4]. Course design and teaching activities take the concrete results that students can eventually achieve as the core, and focus on students' needs and growth. The industrial design open course recognizes individual differences among students, provides customized learning programs and utilizes diverse teaching resources and methods to meet the needs of different students.

3 Enhance the Relevance and Practicality of Education

Under the guidance of the OBE concept, the industrial design open course is closely connected with the needs of the industry, and introduces actual cases and projects of enterprises into the teaching [5], so that the educational content can keep pace with the development trend of the industry. This model not only gives students access to the latest design concepts and technologies, but also enhances students' practical skills and innovative ability through practical operations and project practice.

3.1 Enhance Students' Employment Competitiveness

Through school-enterprise cooperation, students majoring in industrial design at Foshan University can accumulate practical experience and enhance their employment competitiveness by participating in real enterprise projects. Foshan University cooperates with a number of well-known enterprises to ensure that students are qualified for practical jobs when they graduate. A similar collaborative model is also being used in the teaching of industrial design at Qilu University of Technology. This university combines project-driven and OBE models to enhance students' competitiveness in the design industry.

3.2 Promote the Innovative Development of Education and Teaching

The implementation of OBE concept requires educational institutions to reform the traditional teaching mode and adopt more open and flexible teaching methods. This reform encourages teachers to explore new teaching strategies, such as flipped classrooms, collaborative learning, online courses, etc., to adapt to different students' learning needs and styles. At the same time, students are encouraged to engage in active learning and innovative practice. This process of interaction and exploration helps to develop students' critical thinking and problem solving skills.

In this study, the concept of outcomes-oriented education (OBE) is integrated into the teaching

of industrial design course, and the teaching strategy of combining online and offline activities is adopted to improve students' practical skills and innovative thinking. Through a series of teaching activities, such as experiment first, problem raising, argumentative teaching and cloud classroom, this study aims to build a three-dimensional teaching system and strengthen students' interdisciplinary research ability.

In specific design tasks, such as the design of a downlight radiator, the interdisciplinary research method of design studies and fluid mechanics are explored. The principles of fluid mechanics are applied to construct thermal fields and the principles of design studies are combined to optimize the appearance of products. This research demonstrates the potential for interdisciplinary collaboration and room for improvement.

In the innovation of the course content, the project-centered teaching model is adopted, and the enterprise multi-department and user evaluation mechanism is introduced. This mechanism enables students to fully participate in all stages of the project, including market research, design strategy development, design positioning, scheme conception, sample production and feedback collection. This process not only ensures the practicality and marketability of the design proposal, but also motivates the students to continue the project research after the end of the course.

In terms of training talents for practical courses to meet the needs of enterprises, a teaching team with the participation of industry experts and university teachers has been set up to provide students with rich learning resources and practical opportunities. The training program of innovative talents has been adjusted by specific design practice and scientific research teaching to meet the individual training needs and ensure the close combination of teaching content and the actual needs of enterprises. Through this teaching model, innovative talents who can quickly adapt to market changes are cultivated.

4 Conclusion

Based on the concept of OBE (Outcomes-based Education), this paper discusses the teaching content and method innovation of industrial design open course. Through diversified teaching strategies, such as the introduction of school-enterprise collaborative education model, combining online and offline teaching, modern experimental teaching, innovation and entrepreneurship training programs, and encouraging students to participate in discipline competitions, this paper puts forward a comprehensive talent training model. This model optimizes the teaching framework of the course from many aspects, in order to improve students' professional quality and practical ability, and cultivate industrial design talents with strong professional quality and practical skills. Facing the needs of the design industry, this paper emphasizes the importance of cooperation between the industrial design major and enterprises, and focuses on the translation of teaching results into enterprise projects, and the combination of professional education and vocational education. Through the construction of a student-centered talent training system with the goal of improving students' comprehensive quality, the teaching content and method innovation of the industrial design open course under the OBE concept can not only improve the quality and effect of education, but also meet the actual demand of the industry for design talents. Through continuous practice and exploration, this model is expected to bring a profound impact on the field of industrial design education, and deliver more design professionals with innovative ability and practical experience to the society.

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