Exploration of Talent Training Mode Based on Output-Oriented Intelligent Toy Design and Development

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Abstract: The concept of output-oriented education has been introduced for many years in our country and has been widely used in the process of personnel training in Chinese universities. This paper discusses how the concept of Outcome Based Education can be fully integrated into the process of developing talents in an interdisciplinary and collaborative manner in the context of new engineering. We have made useful explorations in various aspects from curriculum system integration, online teaching resources construction, studio-style course organization mode, rich teaching project library to school-enterprise cooperation project practice, etc., which have improved students' learning effect.

Keywords: Output-Oriented; Toy Design; Talent Model

1. Theoretical basis and development status of Outcome Based Education

"Outcome Based Education (OBE) is an educational "system" that emphasizes the development of competencies: it has a comprehensive design, implementation, evaluation and assessment concept around the improvement and achievement of training objectives. Learning output-based education models first emerged in the basic education reform of the United States and Australia. From the 1980s to the early 1990s, OBE was a popular term in American education circles. “An Output-Based Education Model: Controversies and Answers" written by American scholar Spady W.D.[2], describes the characteristics of a college or university conducting an OBE:1) The school has a consensus mission statement, a commitment to make all students successful, and provides a means to translate that commitment into action; 2) Clearly promulgate the final results that students must demonstrate before graduation; 3) A curriculum system, curriculum and teaching unit outcome framework that achieve final results; 4) A multi-modal instructional support system that provides multiple opportunities for students to demonstrate achievement of requirements.5) Have a program to improve support systems (employee accountability, effective leadership and employee collaboration, etc.). He sees OBE as a paradigm shift in education[3].After the Accreditation Board for Engineering and Technology (ABET) promulgated and implemented the EC2000 accreditation standards that value student output, from the end of the last century, engineering education accreditation organizations in Europe and the United States have reformed their accreditation standards one after another. The majority of Washington Accord member countries (or regions) have adopted "outcomes-based" accreditation standards, which measure student performance as the basis for teaching outcomes and promote continuous professional improvement as the ultimate goal of accreditation.

In China, Shantou University carried out the practice and exploration of OBE engineering education mode in 2012 and built up the cultural atmosphere and organizational management system suitable with OBE education reform. The practice of Shantou University shows that the concept of OBE can be "localized" for our use,it is helpful to make the goal of talent training in colleges and universities. In 2018, Shaanxi University of Technology began to implement the professional accreditation standard of results-oriented education (OBE) concept.

2. The development of intelligent toy design and development talents training in Changsha Normal University

The higher education teaching of toys has been developed in China for many years. Changsha Normal University set up the toy design and manufacturing major in the junior college stage. In 2009, it was awarded the provincial characteristic major, and in 2010, it was awarded the China Toy Talent Training Base by the China Toy Association. After the university was upgraded to undergraduate, it became a toy design direction of Industrial Design undergraduate major and an intelligent toy direction of Electronic Information Engineering (Electronics) undergraduate major, and the two majors were trained independently. However, the actual situation is that the electronics profession is more focused on the general sense of electronic product design, embedded system development, and intelligent electronic toys are just one of the many electronic products, not very targeted. The major of Industrial Design is more oriented to the talent training of industrial design industry, and toy design is only a sub-direction of creative shape design in industrial design. In order to respond to the trend of interdisciplinary and industrial crossover, students' comprehensive abilities such as creative design, electronic engineering and mechanical engineering are cultivated to improve their interdisciplinary learning and thinking ability. The School of Information Science and Engineering of the university organized industrial design and electronic information engineering majors to carry out collaborative training of intelligent toy design and development talents with the OBE education concept as a guide. In the integration of the curriculum system, the construction of online teaching resources, the construction of professional workshops, and the practice of school-enterprise cooperation projects, guided by OBE, students are required to complete comprehensive projects oriented to practical tasks during school, and to cultivate talents with responsibility and responsibility, good communication and cooperation, who have both creative design ability[9] and engineering practice ability.

3. Cultivation model of intelligent toy design and development talents based on OBE

3.1 Curriculum system of interdisciplinary application-oriented talents training

The curriculum consists of two main sections: the theoretical system and the practical system. In the first year of college, students will be provided with professional elective courses and academic reports to build interdisciplinary knowledge and qualities related to the development history of toys, electronic technology and computer technology. Intelligent toy programming, intelligent toy development and production for Industrial Design students in sophomore and junior years, and toy design and 3D printing for Electronic Information Engineering majors. Breaking the original practice of each major working separately, students from both majors can absorb the most needed theoretical knowledge and practical skills in application. In junior and senior years, we can set up centralized practice sessions, relying on electronic innovation laboratory, robot laboratory and toy creative studio, introduce enterprise research topics, teachers' research projects and students' self-created projects, and build interdisciplinary teams to complete corresponding projects with OBE cooperation and actual toy works as the goal. According to the development and performance of students, participate in discipline competitions, declare students' innovative practice projects, expand their horizons in practice, and expand achievements in the form of competition awards, papers, projects and patents.

3.2 Interdisciplinary integration, construction of high-quality online course resources

According to the above intelligent toy design and development talent cross-professional training mode involves electronic information courses, computer programming courses, toy creative modeling and 3D printing courses. Although there are related courses in the university's electronic information engineering and industrial design majors, the construction content needs to be more focused and actionable in a course that targets the output of the specific object of smart toys based on the original curriculum. According to the organizational form of the course, we develop programs that meet the requirements of public and elective courses and create high-quality courses to facilitate the acquisition of information and the application of advanced ideas to serve teaching and learning. At present, it has built several provincial first-class courses such as "Ergonomics", "C Programming" and "Digital Electronics", etc. In addition, there are also several university-level high-quality courses such as "Innovative Toy Design and

Realization", "Toy Model Making", "Computer-Aided Industrial Design" and "Toy Materials and Technology", etc., under construction to enrich students' learning resources.

3.3 Promote the studio form of organization of interdisciplinary integration courses

To study the organization of the curriculum for inter-professional integration, the existing domestic practices include: ① Set up experimental classes, pilot classes and school-enterprise classes from multi-major enrollment students, and set up an independent training system; ② The original professional classes remain unchanged, and experimental classes are set up outside the original curriculum system to provide additional content of corresponding knowledge. For the specific situation of the school, it is adopted the second option without changing the original professional operation of the college. Relying on the projects of Toy Studio, CMF Studio and Electronic Innovation Studio, we fully carry out practical teaching in combination with public elective courses and elective courses. The studio is used to carry out teaching activities outside the classroom to improve students' practical operation ability and teamwork consciousness. The project-based teaching process helps students better digest what they have learned in class and put it into practice. We will actively carry out "Industrial Design Competition for University Students", "National Student Digital Media Technology Works and Creativity Competition", "legal Literature and Innovation", "Packaging Creative Design Competition", "Yunhe Wooden Play Creative Design Competition" and other competitions to strive for more breakthroughs.

4. Conclusion

Output-oriented talent training emphasizes the clarification of student output results, which are integrated into the professional training model, and the setting of reasonable achievement paths and output guarantees, which is a widely recognized education model. Changsha Normal College is guided by the concept of OBE education, reforming the curriculum system and course organization, refining topics to enrich the teaching project library, strengthening school-enterprise cooperation, and deepening project output practice. After years of practice, the educational concept of OBE thinking has been comprehensively penetrated, and the results are more remarkable. The migration of students' employment to the toy industry is remarkable, the innovative and practical ability of students have been enhanced, with a significant increase in the number of students winning provincial and national awards.

References

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