Artificial Intelligence, Medical Engineering and Education
Z.B. Hu et al. (Eds.)

doi:10.3233/ATDE231398

Training Mode of Applied Talents in Environmental Design Based on OBE Concept – Taking Public Space Design as an Example

Peng XIAO, Yu HUANG[1]
School of Art and Design, Nanning University, Nanning, China

Abstract. Centering on the environmental design major under the concept of OBE, this paper studies the teaching reform of public space design course, the core course of the major. In the process of implementation, it closely focuses on the orientation of new liberal arts construction and the training needs of applied talents. It reshapes the teaching objectives of this course from three dimensions of knowledge exploration, ability training and value shaping, and implements the teaching concept of "one core, two tracks and three dimensions" throughout the process. It constructs a teaching content system of "knowledge + ideology and politics + art + engineering", closely links the teaching mode with three rings of "pre-class exploration, in-class guidance and after-class extension", and integrates multiple information technologies, combining online and offline, virtual reality and classroom construction. We create a good learning atmosphere and cultivate students' interest in learning through various forms such as practice speaking, student speaking and student evaluation, teacher guiding student performance. Deepen the reform of training applied talents for environmental design majors.

Keywords. OBE concept; public space design; applied talents

1. Introduction

OBE stands for results-oriented, student-centered, continuous improvement. Educators must have a clear idea of the abilities and levels that students should achieve when they graduate, and then seek to design the appropriate educational structure to ensure that students achieve these expectations. This has become the fundamental follow of the current college education reform [1]. In 2021, the Notice of the China Engineering Education Professional Certification Association on the release of the list of majors that have passed the Engineering Education Certification by the Higher Education Teaching Evaluation Center of the Ministry of Education wrote that "all colleges and universities are requested to implement the concept of "student-centered, output-oriented and continuous improvement", firmly carry out first-class professional construction, and deeply promote the "quality revolution" of higher education. We will promote high-quality development of higher education." The OBE concept has significant guiding significance in promoting the teaching reform of environmental design education in

[1] Corresponding Author: Yu HUANG, E-mail: 47428727@qq.com.

universities and improving the training quality.

2. Course Introduction

2.1. Course Overview

The public space design course is the core course of the environmental design major, and it is a crucial part of cultivating students' professional ethics and innovation ability. Its reasonable teaching arrangement is key to improving students' knowledge structure and improving students' skills and qualities [2].

This course is a required course for environmental design majors in the third year of undergraduate studies. It covers general design theories, such as introduction to design, three major components, interior design principles, 3Dmax assisted design, hand-drawn scheme design, ergonomics, etc. In addition, it also involves multi-disciplinary content such as construction technology, construction standards, and design psychology. Through the study of this course, students are required to use the basic requirements and basic design principles of public space design, jointly design creation and market orientation, to design public space design works that meet the functional needs, are full of personality, and have aesthetic value, and design and make relevant drawings to express the design works. The construction of the curriculum system, will stimulate students' consciousness of design innovation, form public space design achievements with excellent historical and cultural visual symbols, and reconstruct regional culture, national culture, and traditional culture in innovative ways to increase cultural identity [3, 4].

2.2. Course Content

With the development of technology, the post ability is constantly changing, so the teaching content is also changing. The course content is carried out in the way and process of work, and the work process is restructured in a systematic way to create a curriculum truly based on knowledge application, shown in Figure 1.

3. Learning Situation Analysis

In Figure 2, the course serves as a link between the past and the future for undergraduates majoring in environmental design. The course is for junior undergraduate students majoring in environmental design. It undertakes basic design courses such as 3Dmax assisted design, hand-drawn scheme design, and ergonomics in the early stage, lays the foundation for exhibition design, function, and space, cultural and creative space design courses, and even has an important impact on graduation design. Due to the continuous development of society, the industry, industry, and technology are also constantly updated and changed [5]. Therefore, the main and difficult points in the design of this course are that the design space should be able to meet the new spatial functional requirements and conform to the audience's behaviors and preferences [6].

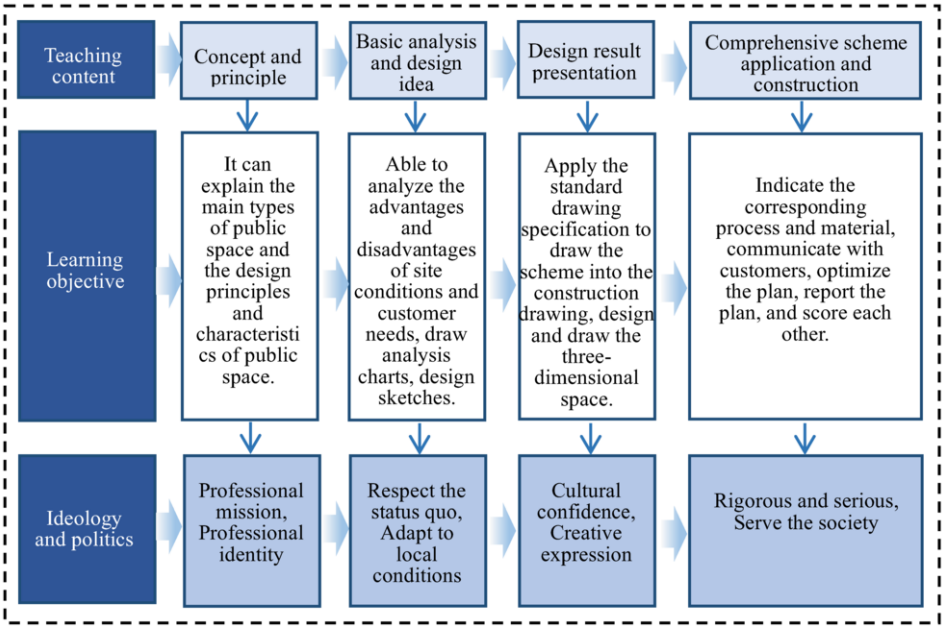

Figure 1. Schematic diagram of course teaching content system

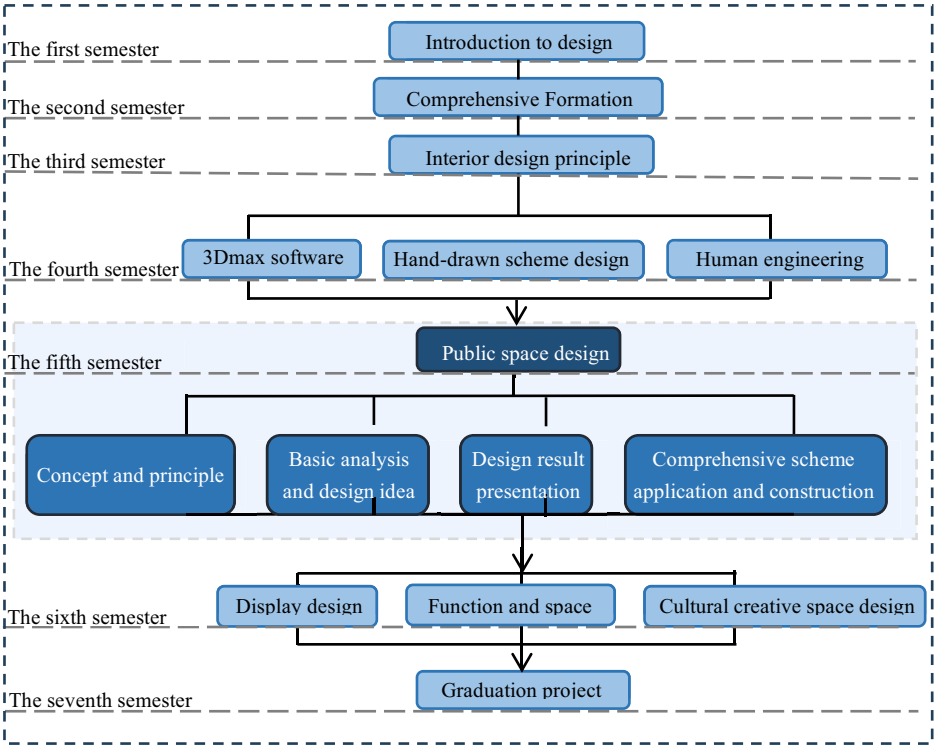

Figure 2. Schematic diagram of curriculum system

This course is offered in the first semester of junior year, so the advantages are as follows: students have a certain reserve of basic design knowledge, and have a certain ability for hand-drawing and software drawing; Unfavorable learning situation: Students' theoretical knowledge is relatively independent and unsystematic, and their performance in the comprehensive practice of the project is weak, which is reflected in the specific practice process that they do not know how to apply the content learned in the early stage to "solve" the corresponding problems, As a result, their abilities do not match the needs of employers[7].

In this period, students are nervous and confused about graduation design and internship, so they have strong learning motivation and interest. However, their preference for art aesthetics is stronger than their preference for engineering, which is not conducive to future internships and work.

4. Curriculum Construction of Application-oriented Talent Training Program Based on OBE

4.1. Course Objectives

Through visiting and investigating universities, enterprises, and industry associations, we can understand their demand for talents' ability and quality combine the school's application-oriented educational philosophy, and determine new talent training goals.

Table 1. The supporting relationship between course objectives and graduation requirements

Serial number	Course objective	Graduation requirements target points	Secondary index point
1	Objective 1. To enable students to master the basic knowledge of interpublic design; Follow and apply the requirements and principles of public space design.	Graduation Requirement 1- Design knowledge	Indicator 1.4. Familiar with environmental design engineering skills.
2	Goal 2. Be able to design a reasonable plan according to the actual project.	Graduation Requirement 2- Problem analysis Graduation Requirement 3- Design solutions Graduation Requirement4- Research	Indicator 2.2. Research, judgment and analysis of specific design problems; Indicator 3.1. Propose solutions to environmental design problems; Indicator 4. Have professional knowledge of theories and skills in the field and be able to use scientific methods to conduct basic research on complex professional problems.
3	Goal 3. Draw the corresponding construction drawings and renderings.	Graduation Requirement 5- Use of modern tools	Indicator 5.2. Use of modern information tools.
4	Goal 4. Through the project-oriented training of public space courses, students will gradually develop their ability of design project manage-ment, design team cooperation and design work communication.	Graduation Requirements 9- Individual and team Graduation Requirement 11- Project Management	Indicator 9.1: Able to independently complete the work assigned by the team; Indicator 9.2: Initiative to work with other members; Indicator 11.2: Have some technical management and economic analysis ability to find reasonable/acceptable solutions.

According to the training goals and the principles of "measurable", "supporting" and "covering", Thirteen graduation requirements were formulated, and the graduation requirement is decomposed into a graduation requirement index point that can be implemented and evaluated [8]. Each index point is supported by a course, and according to the principle of "one-to-one correspondence", the course goal of "Public Space Design" is determined by the index point of graduation requirements [9].

4.2. Teaching mode

Based on the curriculum construction of OBE's applied talents training program, the teaching model of "one core, two tracks and three dimensions" has been formed, with the training of applied innovative talents for environmental design majors as the core, and dual-track teaching and three-dimensional learning platform for enterprises and schools. Through the teaching form of jointly designing teaching content, jointly building a double-qualified team, jointly developing course resource database, and jointly conducting assessment and evaluation, students can truly learn in real projects, do real work in real environments, and truly create in real workflows on the three-dimensional learning platform of online + offline, virtual + actual, classroom + site. So as to cultivate innovative talents with the comprehensive ability of environmental design application.

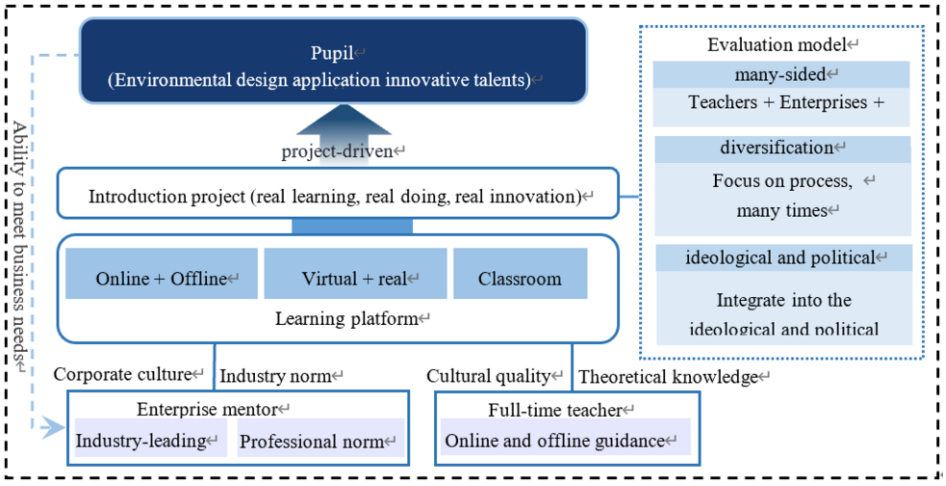

Figure 3. "One core, two tracks, three platform" teaching mode

4.3. Concrete Implementation

Considering the relative connection between profession and industry, classroom and post, curriculum and work process, based on the results-oriented, the public space design course reshapes the course objectives, reconstructs teaching content, innovates teaching mode, enriches teaching activities, resets teaching methods, and resets assessment and evaluation.

Build in-depth production-teaching integration courses [10]. Based on the three characteristics of strong comprehensiveness, strong application, and strong combination with humanity, the in-depth production and education integration mechanism is implemented to promote the industry demand to better integrate into the whole process of talent training. In the course, real projects of enterprises are used as teaching cases and

practical projects, and their working processes are completely simulated, so that students can get in touch with the working methods, requirements, and processes of the industry in advance so that the cultivated students majoring in environmental design can seamlessly meet the needs of the society. Through the follow-up and completion of the overall process of the project, the comprehensive ability of students can be improved to meet their professional needs. Course practice projects are selected for the renovation of abandoned factory buildings in Nanning City, local enterprise office space design, and striving to achieve a full range of services.

To promote the effectiveness of talent training in the way of specialized innovation and integration. By "promoting teaching by competition, learning by competition, reform by competition, integration of competition lessons, and combination of competition training", students can not only complete professional knowledge learning tasks, but also deeply polish design projects to participate in professional competitions designated by the Ministry of Education, so that students can gain a sense of achievement in a positive learning experience, and cultivate students' creative ability in the actual competition. According to the reformed assessment method, students' ability to comprehensively apply knowledge to solve practical problems should be examined. Guide students to make use of various new media platforms such as Tiktok, Kuaishou, and XiaoHongshu, which are currently popular across the country, to publicize and promote design, and to integrate professional cross-disciplines, so as to better promote the integration of mass innovation ability and professional skills. In order to create a high-level, innovative, challenging degree of gold course.

Promote the improvement of digital empowerment teaching quality [11]. The course adopts Super Star learning platform, Dingding and Rain classroom, which carries out pre-class task release, interactive teaching in class, homework collection, correction, and learning materials, online course release, online independent learning, and participatory interactive teaching activities [12]. In the part of lesson preparation and course design practice, ChatGLM (GPT artificial intelligence robot) and Wenxin large model are introduced to infer and improve ideas, and the function of digital teaching tools is deeply integrated with teaching activities [13, 14]. In the design process, CAD, 3Ds max, SketchUp, Enscape, sheencity Mars, and other software are used for modeling and rendering, so as to make the design scheme more realistic and realize technology-enhanced learning [15, 16]. In the presentation of teaching cases and design schemes, AR+VR is adopted to transform two-dimensional static pictures into three-dimensional dynamic scenes, and reshape the relationship between the elements of "human-space-art".

We will deeply carry out ideological and political reforms in the curriculum. The ideological and political elements are integrated into the teaching concept, curriculum system, teaching design, teaching content, and the reform path of practical teaching. The whole course, the whole stage, and the full range of the course are permeated with people's cultural points, so that there are thoughts and politics everywhere, and things are moistened silently, so as to cultivate students' craftsman spirit, improve students' humanistic quality, and enhance students' cultural confidence [17].

The establishment of multi-party, multiple, ideological, and political assessment points of the evaluation model [18]. Teaching evaluation has changed from the original single evaluation mode to the current multi-party evaluation of teachers, students, and enterprises, and the original result-oriented evaluation has been changed to process-oriented evaluation, and cultural, ideological, and political elements have been incorporated into the evaluation system.

5. Conclusion

Through the student-oriented and results-oriented OBE model, the teaching mode of "one-core, dual-track and three-dimensional" is practiced in the course of "Public Space Design", which promotes the in-depth cooperation between schools and enterprises, constantly improves the teaching mode of production, university and research, improves students' theoretical level and practical ability and thus increases the employment rate. And guide students to consciously inherit and carry forward the excellent traditional Chinese culture, and strengthen cultural self-confidence. We will improve teachers' ability in scientific research, improve the teaching model for production, study, and research, and strengthen schools' ability to serve society and local economies. Through curriculum reform and practice, in recent years, students' curriculum design works and participation in professional competitions designated by the Ministry of Education have gained a lot. Enterprises are highly satisfied with our professional students, and the design works of the faculty team have won several national awards in the industry. These achievements will continue to help the training of students.

Acknowledgment

This Project of Research and Practice on The Path of Ideological and Political Integration in The Curriculum of Environmental Design Major Under the Background of " Professional Integration with Innovation and Entrepreneurship" in Nanning University (2021XJJG21).

References

[1] Zheng W, Wen S, Lian B, et al. Research on a Sustainable Teaching Model Based on the OBE Concept and the TSEM Framework[J]. Sustainability, 2023, 15(7): 5656.

[2] Carmona M. Principles for public space design, planning to do better[J]. Urban Design International, 2019, 24: 47-59. Sui J, Hua Z, Zhu H, et al. Training mechanism of engineering education and innovation talent based on courses-competitions combination[J]. Nanotechnology for Environmental Engineering, 2022, 7(3): 833-841.

[3] Mao MAO, Chunbao H. Application of Leizu Culture to Interior Design[J]. Journal of Landscape Research, 2017, 9(3): 33.

[4] Wang X. RETRACTED: The practice teaching of regional cultural expression in rural landscape planning and design under the background of urban–rural integration[J]. The International Journal of Electrical Engineering and Education, 2021. https://doi.org/10.1177/0020720920984308

[5] Harris A, Jones M, Crick T. Curriculum leadership: a critical contributor to school and system improvement[J]. School Leadership & Management, 2020, 40(1): 1-4.

[6] Sangshetti J N, Deshpande M, Zaheer Z, et al. Quality by design approach: Regulatory need[J]. Arabian Journal of chemistry, 2017, 10: S3412-S3425.

[7] Nicolaescu S S, Kifor C V. Teaching methodology for Design for Six Sigma and Quality techniques–an approach that combines theory and practice[C]//Balkan Region Conference on Engineering and Business Education. 2017, 2(1): 328-336.

[8] Li J, Zhang F, Ye J, et al. A Neutrosophic Evaluation Method of Engineering Certification Teaching Effect Based on Improved Entropy Optimization Model and Its Application in Student Clustering[J]. Neutrosophic Sets and Systems, 2023, 55: 1-12.

[9] Wang J, Wang X, Weng Z, et al. Implementation Path Exploration of Innovation and Entrepreneurship Education Reform under the Background of “New Engineering” [J]. Advances in Applied Sociology, 2022, 12(4): 102-111.

[10] Chu H. Research on a New Mode of Integration of Production and Education for Applied Undergraduates [J]. economic and social development, 2022, 4(16): 68-72.
[11] Esteve-Mon F, Llopis-Nebot M, Viñoles-Cosentino V, et al. Digital teaching competence of university teachers: levels and teaching typologies[J]. International Journal of Emerging Technologies in Learning (iJET), 2022, 17(13): 200-216.
[12] Biswas R A, Nandi S. Teaching in virtual classroom: Challenges and opportunities[J]. International Journal of Engineering Applied Sciences and Technology, 2020, 5(1): 334-337.
[13] Sabbir Hossain, Rahman Sharar, Md. Ibrahim Bahadur, Abu Sufian, Rashidul Hasan Nabil, "MediBERT: A Medical Chatbot Built Using KeyBERT, BioBERT and GPT-2", International Journal of Intelligent Systems and Applications, Vol.15, No.4, pp.53-69, 2023.
[14] Jiancai Wang,Hua Liang, "Discussion on Domestic Universities Construction of Digital Teaching Platform", International Journal of Education and Management Engineering, vol.2, no.6, pp.1-6, 2012.
[15] Najat Messaoudi, Ghizlane Moukhliss, Jaafar K. Naciri, Bahloul Bensassi, "Machine Learning Algorithms for Quantifying the Role of Prerequisites in University Success", International Journal of Modern Education and Computer Science, Vol.14, No.6, pp. 1-12, 2022.
[16] Neeta Sharma, Shanmuganathan Appukutti, Umang Garg, Jayati Mukherjee, Sneha Mishra, "Analysis of Student's Academic Performance based on their Time Spent on Extra-Curricular Activities using Machine Learning Techniques", International Journal of Modern Education and Computer Science, Vol.15, No.1, pp. 46-57, 2023.
[17] Liu X, Xiantong Z, Starkey H. Ideological and political education in Chinese Universities: structures and practices[J]. Asia Pacific Journal of Education, 2023, 43(2): 586-598.
[18] Uttl B, White C A, Gonzalez D W. Meta-analysis of faculty's teaching effectiveness: Student evaluation of teaching ratings and student learning are not related[J]. Studies in Educational Evaluation, 2017, 54: 22-42.