The Importance of "Computer Aided Design" Course Reform in the Training of Applied Talents in Environmental Design

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Abstract. Based on the analysis of social needs and research results in recent years, the article takes social needs as the guide and problems as the entry point, and proposes the importance of computer-aided design for the training of applied talents in environmental design. With the development and promotion of computer software, the application of computer design software has become an important part of today's environmental design field. In such a background, computer-aided design is particularly important in the process of training applied talents in environmental design. Therefore, in the construction of environmental design teaching system, the importance of computer-aided design courses to the training of environmental design applied talents should be clarified, and the computer-aided design course system should be built to continuously improve the professional level and application practice ability of students in environmental design major.

Keywords: Computer-Aided Design, Environmental Design, Applied Talents, Applied Practical Ability

Computer-aided design technology has emerged with the development of society and scientific progress. With the popularization of computers and the continuous development and advancement of technology, computers are becoming more and more indispensable in people's daily work and life, whose powerful functions are changing all aspects of environmental design from thinking to method, from process to result. The role [1] and importance [8] of "computer-aided design" is especially crucial for environmental design majors to cultivate professionals with solid theoretical skills and practical application abilities.

1. Problems in Teaching Computer-Aided Design
At present, effectively solving the problems in computer-aided design teaching will strongly enhance and promote the effectiveness and development of computer-aided design in environmental design professional application-oriented talent training mode, specifically analyzed as follows.

1.1 The Contradiction between the Theoretical and Applied Aspects of Computer-Aided Design Persists
Failure to form a good interaction and connection between software courses and professional courses. The main teaching goal of software courses is for students to master the software, but the connection between software application and design ability cultivation is not close. The teaching content is unreasonable and not sufficiently related to practical work.

1.2 Growing Disconnects Between the Stages of Computer Design Education and the Continuity of Future Careers
In the follow-up survey of graduates, the problem we found is that although students have understood the meaning of professional knowledge during school, they lack knowledge application and professional practice cultivation due to the disconnection between knowledge and practice, and it is difficult for them to digest and absorb knowledge by themselves, and they simply memorize it. After graduation, although the application practice ability is improved, the professional theoretical knowledge lacks the support of computer-aided design knowledge. Only in social activities can the effective supplement of professional knowledge be realized.

1.3 Prominent Barrier between the Passivity of Computer Design Knowledge Generation and the Applicability of Knowledge Production Transformation
Computer-aided design is the product of combining theory and practice. It requires more practicality, and not enough to rely only on the textbook and the teacher's unilateral teaching theory in the classroom. Therefore, it is important to create a design process-centered, case-based teaching method [2] and project-driven course teaching mode [3, 4]. At present, many computer design application courses cannot carry out theoretical and practical classes in the same proportion, which makes students only one-sided theoretical computer design and its application basic operations, and weak practical operation ability. When they need to face a project or a big case alone in their work, most of the students are helpless due to the lack of practical operations.

2. Goal and Significance of Computer-Aided Design Course Reform

2.1 Reform Objectives
Students are able to acquire not only theoretical knowledge through computer design courses, but also complete the transformation from theory to application training. In this process, they get experiential and empirical knowledge and realize the effective cycle of knowledge production-knowledge application-knowledge reproduction. Specifically, the creative transformation for knowledge to application is realized through knowledge application.

Knowledge generation ----> Knowledge application ----> Knowledge reproduction
Innovative design ----> Applied transformation ----> Innovative redevelopment

2.2 Significance of Reform
The significance of the reform of computer design in environmental design professional application-oriented talent training system optimization is taking the actual local construction needs as the guide, with application-oriented talent training as the goal, through the optimization and improvement of the computer design system, to solve the key problems that need to be solved in the process of environmental art talent application ability training. Based on the actual effect, we rethink the computer design system and mode in environmental art to consolidate the actual effect of teaching work and effectively improve the quality of computer design teaching and talent cultivation.

3. Content of Computer Design Course Reform
Guided by the local construction and the ability cultivation of enterprise demand, the multidisciplinary talent cultivation system of colleges and universities is used as a platform to realize the transformation from computer design knowledge to application ability cultivation. The goal cannot be achieved by simply solving the detailed problems, and the computer design curriculum in the applied
environmental art talent training system must be optimized and improved. The reform content of the overall optimization of the computer design education system in environmental art is listed below.

3.1 To Feel the Supporting Power of Computer Design in the Process of Application Practice and to Stimulate Interest in Computer Application
For a long time, computer design courses have the characteristic of "forced classes". The apparent reason is the low interest of students in computer design courses, but the fundamental reason is the failure to apply computer knowledge in practice, the inability to clarify the internal connection, or the lack of personal application experience and feeling. Therefore, the classroom should be combined with actual projects, in-depth analysis of theory and then teaching computer design practice through specific projects, so as to establish the important position of computer design courses in the application of practical links. Through these steps, students can recognize the necessity and importance of computer design in application practice, and finally stimulate the interest in learning computer design courses and improve the application ability.

3.2 The Application of Computer Design Knowledge in Social Activities Going Beyond Mere Knowledge Instead of Innovation
The pure explanation and teaching of computer design theoretical knowledge can at most only enrich the computer design knowledge structure and improve professionalism, but not help the cultivation of computer design practical application ability and innovative computer design knowledge production. Therefore, it is necessary to establish a new scientific and reasonable computer design curriculum system and teaching and education system to change from knowledge transfer to ability application, and finally serve the social design practice activities. The specific approach is to combine the educational environment of the contemporary information age, increase the proportion of deconstruction and reconstruction, comply with the current policy guidance of creative transformation and innovative development of knowledge application, and strive to achieve the teaching reform goal of applied talent cultivation.

3.3 Cultivating Habits of Reflection and Self-Learning, and Providing Practical Opportunities to Transform Computer Design Knowledge into Application Skills
A practical problem that seriously affects professional teaching in the long-term computer-aided design teaching process is the lack of opportunities for students to transform professional theoretical knowledge into application, and the lack of awareness and methods of applying professional knowledge. Based on this, classroom teaching needs to increase the proportion of relevant course structure and provide the necessary conditions for the transformation of professional theoretical knowledge to knowledge application, so as to promote the reform and improvement of the training system of computer design application-oriented talents.

3.4 Building a Comprehensive Computer Design Education System According to Actual Needs and form a System Architecture
Computer-aided design results tracking survey found that computer-aided design class teaching can never be isolated. A single lecture on specialized courses cannot help students build a holistic body of computer design knowledge applications. As an applied discipline, it contains several artistic and technical disciplines, and these subjects are not each isolated. In particular, landscape architecture and architecture play an important role in the development of the environmental design profession, which is the backbone and main body of the development of environmental design. Therefore, in the teaching process, teachers should consciously integrate this concept into classroom lectures, so that students can obtain more information about related art and technology while gaining professional knowledge of computer design, thus forming a more complete knowledge structure and application system, and helping to cultivate applied talents in computer design.
4. Specific Measures for Reforming Computer Design Courses

4.1 The Teaching Process Adopts the Method of Project Teaching to Change the Inherent Stereotypes and the Isolated Situation of Theoretical Teaching in the Computer Design Teaching System

The classroom should be combined with local construction and actual projects of enterprises to carry out teaching research at the theoretical level. The training of application ability is then carried out in the form of a top job, as a way to design the specific application of theoretical knowledge in practice. The necessity of theoretical knowledge in applied practice and the principle of specific application can help complete the perfect conversion of professional theoretical knowledge and knowledge application.

4.2 The Teaching Process Takes a Theoretical and Practical Approach, Which Has Been Widely Recognized By Teachers and Students, and Peers in the Industry

Abandoning the narrow classroom teaching horizon, a comparative narrative is adopted to link the computer design teaching with the application of practical aspects in an organic and integrated narrative [5]. The practical sequence and steps are explained in a comparative manner with the professional theoretical knowledge at the same time [6]. Teachers should combine the experience in the work of local housing and construction system and enterprises in the past two years with classroom teaching, implement and explain effectively in the classroom to consolidate the foundation of theory and practice.

4.3 Breaking through the Limitations of the Classroom Lecture Content Site, the Establishment of the Institute of Local School Cooperation, Become A Continuation of the Classroom Teaching Off-Campus Space

Digital technologies and courses, such as microcourses and catechisms [9], are used in the teaching methods, and an off-course online platform for cooperation between local and school projects is created so that students can have the space and conditions to apply their expertise outside the classroom to compensate for the limitations of understanding and application of expertise in classroom teaching [8]. Through the application practice, students will reflect on the inadequacy of the mastery of professional knowledge to feed the classroom teaching. The choice of specific teaching software is discussed in the teaching content [10], and a good self-learning culture is created by encouraging students to learn on their own, including virtual simulation technology, BIM technology [7] and other emerging technologies, to achieve a virtuous cycle of learning-application-reflection-relearning.

4.4 Establishing a Framework of Teaching System Mainly to Cultivate Computer Design Application Ability, Improve the Knowledge Structure and Form a Complete System of Professional Theory and Knowledge Application

Architecture, landscape architecture, horticulture and other related disciplines play a very important role in the development of the environmental design profession, and are the main vein of the development of the environmental design profession. Teachers help students acquire more professional knowledge of related art and technical disciplines while gaining theoretical knowledge of environmental design majors, so that students can achieve different professional levels of proficiency, mastery and understanding in the practical application of the links, and have achieved the goal of mastering multi-disciplinary and multi-dimensional training of applied talents.

4.5 Intervening in Scientific Research Topics and Their Own Research Direction, Play A Characteristic Advantage, and Promote the Government - Industry - Academia - Research and Industrial Integration and Development of Mutual Assistance and Growth Goals

Students should actively participate in scientific research projects, social practice, design competitions and other related projects, so that environmental design teaching and learning give full play to
professional characteristics and project advantages, to ensure that research projects have both the support of the theory of science and the effective guarantee of application capacity training.

5. Conclusion
The setting of basic computer courses is an important part of the curriculum of various majors in colleges and universities at this stage, and its teaching purpose is to cultivate and improve students' comprehensive computer application ability, improve teaching quality, and continuously deliver high-quality professional talents to all walks of life. The reform practice of computer basic courses in the teaching of environmental design majors has an important role in improving the learning ability of environmental design students. The teaching of basic computer knowledge can not only provide the necessary design tools for the professional learning of environmental design students and improve the creation efficiency of art and design works, but also help to improve students' information literacy, get more inspiration when designing works and create more excellent works.

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References
[1] Liang Feng. The role of computer-aided design for environmental design profession. Computer Products and Circulation, 2017(11):221.
[2] Zhou Jia. Exploration of the reform of computer-aided design in the teaching of environmental design. Decoration, 2014(11):131-132.
[3] Cui Shijin. Computer-aided design courses in environmental design majors adaptability update. Journal of Hubei Academy of Fine Arts, 2017(01):58-61.
[4] Li Zhengwen. A new model of project-driven computer-aided design course: an example of environmental art design in universities. Design Art Research, 2019,9(01):42-46.
[5] Wang Tingting. Analysis of strategies for cultivating students' hands-on ability in computer-aided design courses--based on environmental design courses. Journal of Jingchu Institute of Technology, 2017, 32(05):58-61.
[6] Wang Haowen, Li Wei, Zhou Ling. Exploration of computer-aided design teaching for environmental design majors. Industrial Design, 2018(10):117-118.
[7] Li Ping, Wu Yiqiang, Zuo Yingfeng. Feasibility study on the application of "BIM technology" in the course of "computer-aided design" in environmental design. Popular Literature and Arts, 2016(07):227-229.
[8] Wang Hao. Exploring the teaching of computer three-dimensional design software for environmental art design majors. Modern horticulture, 2016(20):230.
[9] Shen Shujuan, Zhang Diyuan. Research on the integration of software-assisted cartography in basic cartography of environmental design in the digital age. Art Education Research, 2019(19):96-98.
[10] Gao Yingqiang. Thinking about the construction of computer courses in environmental design in colleges and universities. Art View, 2015(04):174.