

Research on the Application of BIM Technology in Environmental Art and Design Discipline

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Abstract: With the advent of the Internet era, BIM technology based on human-computer interaction and network simulation is gradually applied to the field of education. For the teaching of environmental art and design in vocational colleges, teachers can use BIM technology to carry out teaching activities in the process of talent cultivation, which can visually present knowledge, guide students to practice on virtual platforms, cultivate students' professional abilities, and promote their comprehensive literacy improvement, which is conducive to enhancing students' core competitiveness. This article studies the application of BIM technology in the field of environmental art and design, and puts forward corresponding opinions on it.

Keywords: BIM technology; Environmental art design; Application; Research

I. The content and application advantages of BIM

The concept of BIM (Building Information Modeling) originated in the construction industry and has been widely applied in various fields of today's society as an advanced data-driven tool. Especially in the field of environmental design, the application of new technologies can not only greatly enhance the visualization level of design, but also optimize the coordination, simulation, and graphic output of design, thereby promoting the innovative development of the environmental design industry.

In the traditional environmental art design process, designers mainly rely on graphic software such as CAD to first complete the graphic design task, and then use 3D software such as 3D to convert these graphic design drawings into three-dimensional models. However, this design approach has many shortcomings. On the one hand, due to the segmentation in the design process, the degree of visualization and integration of drawing design is greatly reduced, making it difficult to form a complete design system; On the other hand, due to the independence between various graphics, designers often find it difficult to achieve the expected design effect when integrating these graphics, resulting in low resource utilization and even unnecessary waste.

However, with the introduction of BIM technology, the environmental design industry has undergone unprecedented changes. With the powerful database in the platform system, designers can easily simulate materials, scenes, and facilities, thereby exploring more creative design solutions. In addition, BIM technology can simplify the design process and improve design efficiency.

In the current field of education, BIM technology has also received increasing attention. Especially in the field of art and design education, new technological means support teachers to carry out targeted teaching activities, while also facilitating students' autonomous learning and practice. This can enhance the pertinence of teaching, further improve the current teaching situation, and achieve the enhancement of students' diverse abilities.

II. The necessity of integrating BIM technology into the discipline of environmental art and design

1. Facilitating the implementation of industry education integration in higher vocational education

Based on practical analysis, the integration of industry and education reflects the characteristics of higher education in the new era, and it is also an important method for further deepening higher education reform. At present, conducting professional teaching activities around job requirements is a research topic for many vocational college teachers. Schools introduce BIM technology around actual industries, improve teaching systems, and build dual teacher education teams to develop a new talent training model that is in line with enterprise development. At the same time, the new talent training program is jointly developed by vocational colleges in the context of various related industries and enterprises. It is a demonstration of the most advanced technology and processes in the industry and enterprises. Schools and teachers implement effective teaching reform measures around its content, which can further enrich professional teaching modes and improve the quality of talent training. The combination of BIM technology and environmental art design teaching can promote the connection between education and enterprises, and the combination of the two is also an important measure to deepen the integration of industry and education.

2. Beneficial for enhancing students' comprehensive abilities

Higher education should take promoting students' employment as its core goal and strive to cultivate applied talents with high quality and skills for society. As an important course in the field of vocational art and design, environmental art and design have clear requirements for students to master practical skills. However, there are still several constraints in the current curriculum teaching, such as some students having weak basic abilities and not yet forming effective study habits; At the same time, some teachers have relatively single teaching methods and overly rely on traditional knowledge explanation methods. Given that environmental art and design courses involve diverse measurement techniques, instrument operation, and drawing skills, if teachers rely solely on a single teaching method, it will inevitably limit students' willingness to learn independently and hinder their overall ability and professional competence improvement. In order to optimize

teaching quality, many vocational colleges and teachers have begun to take students' employment needs as the guide, and actively explore and introduce BIM technology to assist teaching based on the actual situation of current educational development. By guiding students to use this cutting-edge technology for learning, we hope to further improve the current teaching environment and ensure that students achieve comprehensive development in the process of learning knowledge and skills. The ultimate goal is to cultivate talents in the field of environmental art and design who can proficiently use measurement tools and independently complete measurement tasks to meet the practical needs of society.

III. The Application Strategy of BIM Technology in Environmental Art and Design Discipline

1. Building an intelligent BIM technology platform

In order to fully leverage the application value of new technologies, schools need to coordinate their efforts and resources, and build intelligent platforms. Specifically, the intelligent platform needs to cover the following modules: firstly, the basic course teaching module, which mainly assists teachers in carrying out teaching activities and provides convenient uploading of teaching materials. Students can log in to the platform to easily access the necessary information and projects, and stay up-to-date with the latest developments in the field of environmental design. Secondly, the BIM technology platform gathers a variety of software widely used in environmental art design, factory design, and infrastructure fields, such as Autodesk Revit modeling software, Bentley software, and Archi CAD software. Students need to actively try out these software and systems under the guidance of teachers, while teachers need to explain the practical process in detail to students in order to simplify teaching content and improve teaching effectiveness. Thirdly, the practical learning section. The teaching project module closely follows the standards of higher education and enterprise practice, selecting practical projects with guiding value. These projects aim to guide students to closely integrate theoretical knowledge with practical operations and enhance their practical abilities. In addition, schools can actively explore the construction of a multi-party joint virtual teaching and research room for talent cultivation in the new era. The teaching and research office will gather teachers from different majors in higher vocational education to jointly participate in the development of talent training programs and the implementation of curriculum reform plans. Fourthly, schools can also establish virtual teaching and research rooms with specific academic community characteristics. The teaching and research office will cover various aspects such as talent cultivation mechanisms, various teaching videos, teaching research, and high-quality teaching resources, providing strong support for enhancing teachers' professional and teaching abilities.

2. Strengthen the teaching staff and build a dual teacher education team

With the support of BIM technology, schools also need to pay attention to improving the comprehensive abilities of environmental art and design teachers in their development, and build a dual teacher teaching team in the new era. In talent cultivation, schools should develop a comprehensive and systematic plan to enhance their teaching staff. The leadership and management should keep pace with the development of the education era and fully recognize the key role of teachers' educational abilities in the implementation of BIM technology. Based on this, schools can organize professional teachers to deeply study the connotation of BIM technology, so that they can fully grasp its application value and teaching skills. At the same time, taking into account factors such as the current situation of professional teaching and the demand for students' comprehensive abilities in social positions, revise and improve the teaching tasks and talent cultivation plans for the new era. Moreover, schools should carry out a series of targeted training activities to enhance the teaching staff based on the needs of improving teachers' educational abilities. On the one hand, schools can encourage teachers to go to school enterprise cooperation units, environmental design engineering enterprises, etc. for on-the-job learning, in order to grasp the latest management and educational concepts, understand the employment needs and standards of enterprises. These practical experiences will help teachers combine theoretical knowledge with practical work and improve teaching effectiveness. On the other hand, schools can invite experts in the field of BIM technology application to give speeches and conduct training activities, so that professional teachers can understand the latest curriculum teaching reform standards and BIM technology pilot plans. Through communication and learning from experts, teachers can acquire more teaching skills and methods, laying a solid foundation for the smooth implementation of subsequent teaching activities. In addition, schools should regularly organize teacher research meetings to timely analyze the problems in current teaching and adjust teaching direction accordingly. Through research meetings, teachers can share their teaching experience and insights, and jointly explore how to better utilize BIM technology for teaching innovation. At the same time, schools can continuously optimize their teaching plans and curriculum based on research results to meet the demand for high-quality talents from students and society.

3. Carrying out targeted teaching activities based on BIM technology

With the support of BIM technology, teachers can carry out effective teaching activities, strengthen students' comprehensive literacy, and cultivate their practical and operational abilities in this process. Taking the course of "Principles of Interior Design" as an example, previous teaching methods focused on imparting theoretical knowledge, but lacked effective cultivation of students' practical abilities. With the help of new technological means, teachers can further break this constraint and provide students with a more realistic and intuitive learning environment. Based on an intelligent teaching platform, teachers can use methods such as 3D models and animated demonstrations to concretize and bring abstract interior design principles to life, enabling students to understand and master relevant knowledge more intuitively. At the same time, through the simulation function of new technology, teachers can also allow students to practice interior design in a virtual environment, thereby cultivating their practical and operational abilities. Not only that, the new technology can also help teachers better track students' learning progress and effectiveness. By collecting students' operational data on the BIM platform, teachers can conduct

real-time analysis of their learning situation and adjust teaching strategies accordingly to achieve more accurate teaching. In addition, new technologies can promote communication and interaction between teachers and students. On the BIM platform, teachers can collaborate with students on project design, discuss solutions, and solve problems. This interactive teaching method can achieve the goal of “exciting” teaching, and also cultivate students’ teamwork ability and innovative thinking.

4. Extracting teaching content based on job requirements

Through in-depth analysis of market demand, it can be clearly seen that environmental design students will have broad employment prospects in the future. These positions not only cover design and technical personnel, but also include multiple aspects such as engineering management. Against the backdrop of the continuous development and popularization of BIM technology in China, this trend has become particularly evident. With the rapid development of design technology, there will be an increasing number of design projects in the future. These projects not only demand higher professional skills from technicians, but also require them to be proficient in operating with the help of new technologies. BIM technology, as an advanced information tool, can greatly improve the efficiency and quality of construction projects. Therefore, for students majoring in environmental design, mastering BIM technology will become an indispensable part of their future career. In the current stage of environmental art and design teaching, teachers should keep up with the pace of the times and extract and impart new technologies as important teaching content. Teachers can integrate intelligent technology into practical teaching by combining the concept of modern apprenticeship, so that students can master and apply this technology in practice. At the same time, teachers should also strengthen the application of BIM technology in architectural design, so that students can deepen their understanding of construction technology processes through virtual reality or augmented reality methods. In practice, students can use the platform established by new technologies to understand processes such as metrological calculations and design simulations. Through these processes, they can gain a more intuitive understanding of various aspects of the construction project, thereby better grasping the key points and difficulties of construction technology. In addition, teachers can also utilize the visualization features of BIM technology to enable students to practice and design problem-solving solutions in simulated environments, thereby cultivating students’ comprehensive literacy.

Epilogue

In the new era, in order to further improve the quality of talent cultivation, vocational and environmental design teachers can apply BIM technology in teaching to achieve the goal of “exciting” teaching, deepen students’ understanding of technology and knowledge, and cultivate students’ innovation ability. Therefore, schools and teachers need to be based on reality, build teaching platforms for BIM technology, build dual teacher teaching teams, innovate teaching models, optimize teaching content, in order to construct a new curriculum teaching pattern and help talents grow in diversity.

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