D-Sketch Teaching Application of Architectural Design Major in Higher Vocational Colleges

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Abstract

D-Sketch can make up for the inherent shortcomings of some aspects of the traditional teaching mode with its powerful 3D information simulation and simulation capabilities. D-Sketch enables students to become a real participant in the virtual architectural environment by using it to integrate into the experiential scene created in the classroom. As an auxiliary teaching method, D-Sketch adopts the "task-led" curriculum model to carry out architectural design courses.

Keywords

1. Introduction

During the three years of study in higher vocational colleges, the on-campus study time lasts for two and a half years and the off-campus internship occupies half a year. I have to admit that in just two and a half years to master the skill of architectural design, both teachers and students are racing against time. In addition, it goes without saying that the traditional "self-learning" ability is the weakness of our vocational college students. Wenzhou Polytechnic has been engaged in educational reform for many years in the architectural design major of Wenzhou Polytechnic in order to form a set of efficient and intuitive teaching methods to adapt to the short school system of higher vocational colleges and the special professional teaching status of students.

Experiential learning is the most basic and natural way of learning for human beings. Experiential teaching means that in the course of teaching, teachers carefully design and create real situations and opportunities to present professional teaching content according to the cognitive characteristics and laws of the student group, so that students can gain more experience in the process of experiencing the environment. It is a kind of teaching form for intuitive perception and knowledge, and gradually recognize, understand, and construct teaching knowledge.

D-Sketch Beijing Deck Wisdom Technology Co., Ltd. introduced VR (virtual reality) technology into the design, and developed a Sketchup plug-in—D-Sketch, which enables designers to truly immerse themselves in the three-dimensional space and experience design The space effect of the design can effectively assist the designer in deliberating on the rationality of the space scale, so as to provide effective feedback on the design results. In the past, the use of VR requires a highly-equipped computer and professional VR equipment. Through the D-Sketch platform, only a mobile phone and a cardboard box can be used for VR experience.

2. The Current Situation of Architectural Design Teaching

Insufficient learning motivation of vocational students has become the focus of education. For some students, going to school is a helpless choice. The feeling of loss caused by the gap between reality and ideals, coupled with the fact that they are not adapted to exam-oriented education methods, has become a comparison. common phenomenon. Higher vocational

education, which follows the old model of student training and education, feels more and more powerless in the face of students who lack learning motivation [1]. The main reason that traditional teaching has been criticized is that traditional teaching is out of specific and real situations, which leads to insufficient knowledge transfer ability of students, low transfer rate and weak transfer consciousness.

For architectural design students or architects, the deviation of the sense of scale of space is a long-standing and difficult problem to solve. In traditional architectural design teaching, teachers will tell students this law and that modulus, but when faced with actual projects, they still have a face of doubt. Many designers really don't know what the scale is. Originally designed a small private garden, the actual built area can hold a concert of 10,000 people. Design a majestic mountain peak, and finally built a small mound (see Figure 3). The current design and teaching can only rely on the designer to draw the floor plan in the room, and the scale can only rely on the two-dimensional or quasi-three-dimensional method of elevation, section or computer modeling, and it cannot be designed in the site. , And unable to obtain the real experience of three-dimensional space, the sense of scale is prone to deviation[2].

3. Architectural Design Experiential Teaching Reform

The architectural design course is an important professional core course in the higher vocational construction engineering major, which mainly studies the spatial combination and principles of architecture. It aims to cultivate students' ability to recognize and analyze existing buildings and apply them to architectural design. It needs to be based on a certain understanding of design, cost, environmental art, and construction management, especially for students' spatial imagination[3]. However, the traditional teaching methods are basically adopted from the content of the teaching materials to the teaching mode. The teaching of architectural design lacks certain teaching conditions, and students have relatively poor spatial thinking ability. It is difficult to imagine and analyze the spaces and functions of a building. As a result, most students are still unable to master the design methods after completing the courses. The effect is not ideal. Therefore, it is necessary to break through the traditional teaching methods, try to introduce D-Sketch technology into traditional courses, integrate animation demonstration and architectural design virtual model experience into the teaching process, and form a diversified classroom of theoretical teaching, model disassembly and graphic drawing reading, and solve students The bottleneck problem of learning difficulties.

3.1. D-Sketch Simulation Promotes Experiential Teaching

Generally speaking, learning motivation is divided into internal motivation and external motivation. The internal motivation comes from the learner's pleasure and satisfaction with the activity itself [4]. Architectural design majors use the D-Sketch platform to apply experiential teaching to design courses, and promote learners' learning motivation by presenting individual characteristics, colorful media forms and stimulating dialogue. A large number of cases have proved that experiential teaching can bring positive emotions such as relaxation, joy, and interest to students, and stimulate internal motivation for learning [5]. In the field of architectural design teaching, AR, VR, BIM and other technologies have begun to be used for experiential teaching, all of which require the use of highly configured computers and expensive experience equipment, which are not suitable for large-scale use in teaching. The use of D-Sketch platform is not restricted by equipment, price and venue, and allows learners to experience anytime, anywhere, and realize teacher-student interaction.

Learning motivation is not only affected by individual internal factors of learners, but also by external factors such as learning environment. With the help of the D-Sketch platform, realistic scenes can be created, providing dynamic high-interaction settings, in which learners show high learning motivation and participation. Whether it is a virtual simulation building, a

simulation indoor space, or a digital planning and design, the platform allows students to learn in an immersive experience (Table 1). Learners, especially young learners, are often accustomed to self-representation, and will express their thoughts, thoughts, and feelings through roles. More importantly, this experiential learning stimulates the creativity and imagination of learners.

Table 1. Comparison between experiential teaching and traditional teaching--take "Chinese Ancient Architecture-Foguang Temple" as an example

stage	Experiential teaching class (experimental group)		Traditional teaching class (control group)	
	Teacher activity	Student Activities	Teacher activity	Student Activities
Before class	Publish learning tasks; D-sketch experience resources	Learning teaching videos and teaching materials; Immersive experience	Prepare teaching content, teaching materials	Preliminary textbook (basically not read by students)
In class	Ask questions Combining student experience leads to major difficulties	Study the architectural composition of Foguang Temple Participate in the discussion in groups Solving the problem: roof structure	Lecture Summarize Homework	Attend class Practice
	Situational experience		The picture is difficult to understand, lack of spatial experience	
After class	Support online	Students' online communication problems after class	none	finish homework

3.2. D-Sketch Builds a Bridge between Teachers and Students

In the teaching process, the abstraction of architectural design courses has always been a difficult point in teaching. Just as people who haven't eaten burgers can't understand the taste of burgers, people who haven't experienced space can't understand the scale of space. The students lack experience, no matter how the teacher describes the architectural space, it is futile, and the students are tired from being indoctrinated. In addition, the students' three-dimensional space imagination has not been established, the communication process between teachers and students is more difficult, and the students' interest in learning is reduced. In order to solve this difficulty, traditional teaching often uses pictures and videos to enhance intuitiveness, but neither pictures nor videos can reflect the concept of spatial scale, which affects the quality of learning and teaching to a large extent. Taking students to the construction site is too dangerous, and it is impossible to participate in the construction of the construction site in the whole process. Furthermore, it is even more unrealistic to take students to all parts of the world to see classic buildings. Therefore, with the rapid development of information technology, the active introduction of D-Sketch technology in architectural design teaching will bring new changes and new highlights to this course.

With the rapid development of network technology, in digital applications, computers are no longer the only tool to support teaching, and students are more inclined to use mobile phones to learn. Therefore, the D-Sketch plug-in and VR cloud platform are introduced into the architectural design teaching of this subject to generate panoramic views of the building.

Students can use their mobile phones to learn anytime, anywhere. Scan the code before class to enter the immersive experience preview. During class, use the platform to explain abstract two-dimensional drawings and students' questions before class, and use the D-Sketch platform for review and interaction after class. This is a brand-new teaching and learning model in the Internet era. The D-Sketch platform is not only a teaching method using network hardware, but also an independent teaching model that uses software such as a teaching platform to achieve effective human-computer interaction, information interconnection, and timely feedback. D-Sketch+VR technology has brought about the reconstruction of traditional teaching methods, teacher-student interaction, student-student interaction, interaction between media and media, interaction between teachers and students and media resources, remote interaction inside and outside the classroom, etc.

4. Conclusion

Higher vocational architectural design courses are generally long and rich in content. They play an enlightening and leading role in all majors in the School of Architecture and Engineering. The teaching effect directly affects the quality of the entire professional school. This is to put forward ideas for teaching reform, hoping to be a source of inspiration and promote the long-term development of the professional curriculum.

Acknowledgments

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