

Research on Virtual Simulation Experiment Teaching Mode of Landscape Architecture Specialty Under The Training Mode of Innovation and Entrepreneurship Talents

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Abstract: Due to the progress of science and technology, the digital age had arrived, which brought new changes to the garden planning and design methods, and brought new requirements to the garden professional innovation and entrepreneurship talent training. Virtual simulation experiment teaching method could use virtual technology to simulate the scene, and could realize the application of digital technology in the garden. According to the requirements of the innovation and development of landscape architecture, the teaching method of virtual simulation experiment was tried in this paper, and the teaching characteristics, teaching contents and teaching methods of the simulation experiment were explored. The important role of digital technology in garden practice were focused on in this paper, which played an important role in improving students' enthusiasm, design ability and problem-solving ability.

1. Introduction

At present, virtual simulation technology has been widely used. In landscape architecture teaching, many colleges and universities have also explored the introduction of courses into virtual simulation for teaching [1], but the content of teaching has not changed much, only the teaching methods have been adjusted. But now the digital age has caused a series of "tool reforms" in the whole field of planning and design, ranging from drawing board to computer drawing, from theodolite to remote sensing and 3D scanning, from scheme sketch to programming realization, from manual model to 3D printing, etc. The development of digital technology has brought about the change of landscape architecture planning and design methods [2]. The teaching methods of landscape architecture are also facing the "tool reform" of teaching methods, from PPT, to quality courses, MOOC courses, virtual simulation teaching, etc., and virtual simulation teaching can really introduce the latest technology into the classroom. For example, the current site survey has been widely used unmanned drone (UAV) photography technology + automatic generation technology of three-dimensional real image to complete and the current environment survey was used sensor equipment + timing data transmission, and the human activity survey uses UAV photography technology + Arc GIS software for analysis. Advanced equipment and powerful software make the investigation of the whole situation automatic, scientific and visual.

2. Features of Virtual Simulation Experiment Teaching

2.1 Innovation of Landscape Architecture Experimental Contents

In the virtual experiment, all the technical equipment and software were used with the form of virtual. In the teaching, virtual simulation technology is used to reproduce the experimental environment (including the investigated site and computer laboratory), instruments and equipment (including UAV, computer, various software, etc.) necessary for the current situation of the site. Students immersed themselves in it, and carry out online experiments such as UAV, 3D real-world image generation, environmental sensor detection, pedestrian activity monitoring, etc. It is of great significance for students to develop scientific design thinking and meet the needs of the society for

the major.

2.2 Expand the Design Ideas of Students Majoring in Landscape Architecture

The changes brought by the development of tools are not only the changes of design approaches and means, but also reflected in the design ideas and cognitive depth. Digital technology has greatly improved the accuracy of planning, design and research. In virtual teaching, virtual reality technology is combined with the teaching of landscape specialty courses. By using real-time interactive and cross space-time virtual experience, students can complete research, data collection, analysis of environment and other work in the background analysis stage, can design the site more reasonable and scientific according to comprehensive, objective and visual data in the scheme stage, and can judge the scheme with immersive experience in the scheme in-depth stage. Therefore, virtual simulation experiment can provide designers and students with a new perspective, so that students realize that detailed data, scientific analysis, quantitative research and experience were all needed in the design. At the same time, the students also learn how to use new equipment, master the operation of various software, cultivate the students' innovative consciousness and professional quality corresponding to social needs, train the students to establish a scientific experimental method system, open up a new vision of knowledge, and improve the comprehensive quality of personnel training.

2.3 Cultivate Students' Subjectivity and Enthusiasm in Experimental Teaching

Most of the traditional teaching methods are always taught by teachers in class which are boring, empty imagination, and the teachers and students seldom interact in the classroom, so that the students' initiative learning enthusiasm is not high. But UAV, GIS, real 3D and so on are novel, knowledge-seeking and challenging for students. Therefore, grasping students' interest points and combining with experimental projects, students will have a comprehensive understanding these novel knowledge with a strong subjectivity in the learning process, and the enthusiasm of participation will be very high. Therefore, in the virtual teaching, the immersive interactive experience scene teaching is used to organically combine the theoretical knowledge with the students' on-the-spot feelings through scene interaction. The students can realize the landscape design teaching of "what you think is what you see" by implementing the steps of model modification, real-time space experience, real-time scheme elaboration, etc. Experimental courses can also be shared, and can be operated online through laptops and other mobile devices at any time, with high flexibility. In the future, practical work will also contact with the relevant experimental content, but also through repeated experimental operations, the efficiency of the actual operation will be greatly improved.

3. Characteristics of Virtual Simulation Experiment Teaching Concept of Landscape Architecture

With the rapid development of science and technology, there are many technologies and software, such as remote sensing technology, aerial survey technology, 3D scanning technology, interactive behaviour observation system, INRS behaviour analysis system, OSM open source map, DEM elevation data, McHang overlay method, DethMap, Arc GIS and so on. Therefore, in the virtual teaching, it is very important to introduce the concept of digital technology widely, use virtual technology to let students experience the application of new technology, understand the relevance of various kinds of software and the final effect, which is conducive to the cultivation of innovative talents. In the teaching process, the teaching concept of teaching students was innovated according to their aptitude and training at different levels. Students at all levels had free room to play, so that the education process could truly become students' independent activities.

4. Characteristics of Virtual Simulation Experiment Teaching for Landscape Architecture Major

4.1 Cultivation of Garden Knowledge

Scene exploration stage -- investigate site environment with the help of digital earth technology; understand operating principle and operation technology of unmanned drone, Master the principle and method of collecting spatial information by using unmanned drone in urban space environment; understand the fundamentals of photogrammetry.

Data analysis and modelling stage -- Master the method of processing the aerial picture, master the creation method of 3d real model and the modeling method of digital elevation model, master the collection method of environmental indicators obtained by sensors, master the method of extracting information from digital images.

Plan design stage -- master the application method of spatial information; Grasp the methods of behavior analysis (including morphological aesthetics, social recreation, etc.); Master the simulation methods of ecological analysis (such as ecological sensitivity analysis, construction suitability analysis, etc.), master the simulation experiment of scheme (such as waterscape parametric design, road selection design, color design, space design, etc.).

Results display stage -- to understand the working principle of the virtual simulation platform; Master the method of importing design scheme model into real 3d model; Ability to demonstrate solutions in a variety of ways such as digital construction virtual experiment, etc.

4.2 Cultivation of Comprehensive Quality and Ability

Through the virtual simulation experiment, students could intuitively, objectively and comprehensively understand the methods of garden design. In the process of completing the experiment, students should actively use their brains to think about problems, actively learn theories, learn to cooperate with team members, and have a high sense of responsibility and professional ethics. In this process, the students' abilities in various aspects were improved, mainly including: data analysis ability; ability to innovate; critical thinking skills; theoretical research ability; comprehensive design capability; ability to identify problems and solve them; the ability to obtain effective information.

4.3 Assessment Method and Evaluation System

Combined with the virtual simulation experiment teaching platform, the assessment content and evaluation index of process and result are established. The total score of the assessment is 100 points, including 60 points for operation ability in virtual experiment, 30 points for experiment report and 10 points for knowledge question and answer. In the part of virtual operation, students can complete the whole experiment independently on the computer, and the students who can complete the experiment quickly get high scores. The experiment report is reviewed by the teacher. The knowledge question and answer generates the test paper after class. The system automatically scores and gives the standard answer.

The evaluation system of this experiment includes the evaluation of teaching objectives, teaching resources and teaching management. Students and teachers can make their own evaluation on the actual effect of the three aspects, and then adjust the teaching content appropriately according to the evaluation feedback.

5. Characteristics of Teaching Methods of Virtual Simulation Experiment

5.1 The Combination of Virtual and Real and Combination of Online and Offline

The teaching methods of virtual simulation experiment were mainly consisted by heuristic teaching method, task-driven teaching method, experiential teaching method, exploratory teaching method, micro teaching method, etc. Compared with the traditional teaching method, teachers no longer blindly explained knowledge but gave necessary guidance when the students themselves were carrying out the experimental operation exercises. The teacher only gave them the necessary

basic knowledge teaching and basic operation method training and he students complete the virtual simulation experiment independently. In view of the problems in the experiment, the teacher answered the questions in time. After the experiment was completed, the students' experimental results were evaluated according to the requirements.

5.2 Teaching Application Plan for Colleges and Universities

The whole experiment included contents, precautions, evaluation reports, etc. which could be publicly applied. Teachers could simulate learning, evaluation, statistics and analysis, so as to further improve the teaching quality of virtual training.

5.3 Continuous Construction and Update

The virtual simulation experiment of landscape specialty could be carried out step by step, first was the investigation of the current situation and environmental status, then would continue to build analysis and simulation experiment of data (such as ecological sensitivity analysis [3], construction suitability analysis, behaviour data analysis [4]), next would be simulation experiment of scheme (such as water feature parametric design [5], road selection design, colour design [6], space design, etc.), and last would be scheme landscape virtual display based on digital construction.

6. Conclusion

The virtual simulation experiment of landscape architecture specialty is based on the PC and mobile terminal, which makes the experiment teaching have the advantages of mobility, openness, interactivity and ease of operation and get rid of the limitations of traditional teaching time and space conditions. Students can learn independently before and after class, which greatly improves the learning efficiency. Based on the principle of "combination of virtual and real", the experiment curriculum is designed with "student-centered" and "demand-oriented". Through the virtual experiment, students learn the real meaning of people-oriented design, know that landscape design is a design for the purpose of serving people, and experience all aspects of the actual operation.

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