

Digital Technology in Teaching Innovation in Landscape Design Discipline

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Abstract: *The rapid development of digital technology has provided new opportunities and challenges for teaching in the landscape design discipline. This paper conducts an in-depth study on the teaching innovation of digital technology in landscape design discipline, aiming to explore how to fully utilize these technologies to enhance the quality and level of discipline education. Firstly, the paper introduces the application status of digital technology in landscape design, and then analyzes the shortcomings of traditional teaching methods. Based on this, this paper proposes an innovative teaching model for landscape design based on digital technology, and elaborates on the teaching content and methods under this model. Finally, through empirical research and case analysis, the positive effects of digital technology in landscape design teaching are validated, providing valuable reference for the future development of discipline education.*

Keywords: *digital technology, landscape design, teaching innovation, teaching model, case analysis*

1. Introduction

Landscape design discipline, as a comprehensive discipline, aims to cultivate students' aesthetic perception of the natural environment and creative design ability. With the continuous development of society and the rapid advancement of technology, digital technology has gradually penetrated into various fields, bringing unprecedented opportunities for landscape design. However, there are still some problems in current landscape design education, such as the singularity of traditional teaching methods and low student participation. Therefore, this paper aims to propose an innovative teaching model for landscape design through the application of digital technology, in order to promote the development of the discipline and improve teaching effectiveness.

2. Current Application Status of Digital Technology in Landscape Design

2.1 Development History of Landscape Design

The history of landscape design is rich and diverse, reflecting the evolution of human civilization and aesthetic emotions from ancient times to the present. Ancient gardens, such as those from the Han Dynasty in China and the traditional gardens in Japan, often reflected the majesty of rulers and cultural pursuits of their times. As time has progressed, the Renaissance gardens in Europe and modern urban parks represent the continuous innovation and evolution of design concepts. By understanding the development history of landscape design, we can better grasp the continuity between tradition and modernity, providing profound historical support for current design practices.^[1]

2.2 The Role of Digital Technology in Landscape Design

Digital technology plays an increasingly important role in the field of landscape design. The introduction of computer-aided design (CAD) allows designers to construct and adjust design schemes more quickly and accurately, thereby improving design efficiency. Technologies such as virtual reality (VR) and augmented reality (AR) provide designers with more intuitive and immersive design experiences, facilitating a more comprehensive understanding and evaluation of design schemes. Digital technology not only provides new creative means for design but also offers more convenient pathways for team collaboration and information dissemination during the design process.

2.3 Current Problems and Challenges of Digital Technology in Landscape Design Education

Although digital technology brings many benefits to landscape design, it still faces some challenges in teaching practice. Differences in students' acceptance and application abilities of technology may lead to uneven teaching effects. Moreover, the shortage of teaching resources and the integration difficulties between traditional teaching methods and digital technology are urgent issues to be addressed. In addressing these challenges, it is necessary to continuously innovate teaching methods, enhance students' application abilities of digital technology, to ensure that digital technology better serves the comprehensive development of landscape design education.

3. Insufficiencies of Traditional Teaching Methods in Landscape Design

3.1 Characteristics and Limitations of Traditional Teaching Methods

Traditional teaching methods in landscape design have indeed accumulated certain experiences through long-term practices, but their characteristics and limitations are gradually becoming apparent. Firstly, traditional methods primarily focus on classroom lectures and hand-drawing skills, emphasizing the imparting of theoretical knowledge. This often results in students lacking practical experience in handling real projects, thereby weakening their application abilities. While students may acquire knowledge at the theoretical level, they may struggle to apply it flexibly in actual design scenarios.

Secondly, traditional teaching methods often rely on a single textbook and teaching resources, failing to meet the diverse learning needs of students. Each student possesses unique learning styles and interests, which traditional methods fail to fully consider, potentially leading to disinterest among some students and affecting learning outcomes.

Additionally, traditional methods overly emphasize fixed design processes, which may inhibit students' creative thinking and innovation abilities. A rigid design process may trap students in conventional thinking patterns, making it difficult for them to approach and solve problems from different perspectives. This contradicts the pursuit of innovation and diversity in today's landscape design field.

Therefore, traditional teaching methods urgently require profound reflection and improvement. By introducing more practical teaching methods, providing diverse teaching materials and resources, and encouraging students to unleash their creativity during the design process, the deficiencies of traditional methods can be effectively addressed, thereby better cultivating students' practical operational abilities and innovative awareness.^[2]

3.2 Students' Feedback and Perceptions of Traditional Teaching

Students' feedback on traditional landscape design teaching often manifests in a sense of monotony in course content and inadequacy in practical skills. Under traditional teaching models, students commonly report a lack of practical project experience and perceive a disconnect between theoretical knowledge and practical application. Due to the emphasis on imparting hand-drawing skills, students may feel ill-prepared to handle the digital design environment of the modern era, unable to fully adapt to the requirements of contemporary design work.

On the other hand, students' perceptions of traditional teaching gradually reflect a demand for more flexible and innovative teaching methods. With the continuous development of the design industry and the widespread adoption of digital technology, students' expectations for teaching content have also evolved. They increasingly desire opportunities for practical project involvement to gain more hands-on design experience, rather than merely being passively fed theoretical knowledge. Additionally, students are gradually embracing the application of digital technology, believing that digital tools can enhance design efficiency and presentation effects, and they hope to have more exposure to and utilization of these technologies in their education.^[3]

Therefore, students' feedback and perceptions of traditional teaching demonstrate a trend towards emphasizing more practical, flexible, and innovative teaching methods. To meet students' needs, landscape design education needs to introduce more practical project practices on the basis of traditional teaching, focus on the application of digital technology, and better cultivate students' practical operational abilities and innovative thinking, enabling them to better adapt to the future development trends of the design industry.

3.3 Areas for Improvement and Possible Solutions

To enhance traditional landscape design teaching methods, it is essential to integrate theory and practice organically to improve students' comprehensive abilities. Firstly, teaching content should be more closely aligned with real-world projects, incorporating actual cases and project experiences so that students can apply their knowledge in authentic settings. By integrating with real projects, students will gain a better understanding of design concepts and develop problem-solving skills, enabling them to better tackle future professional challenges.

Secondly, emphasis should be placed on the application of digital technology to equip students with proficiency in computer-aided design tools and enhance their competitiveness in the digital age. This can be achieved by offering specialized courses in digital technology, guiding students to proficiently use tools such as CAD, VR, AR, and integrating them into real projects. The widespread application of digital technology will provide students with more intuitive and efficient design methods, enabling them to better cope with the complexity and diversity of modern design.

In terms of teaching methods, adopting a project-driven teaching model is an effective approach. By involving students in real projects, they can enhance their design skills and develop problem-solving abilities through practice. Additionally, introducing multimedia teaching resources and online learning platforms to meet students' personalized learning needs. This diversified learning approach can stimulate students' interest in learning and increase their motivation.

Furthermore, encouraging interdisciplinary collaboration among students is also one of the directions for improvement. Through collaboration with students from other disciplines, landscape design students can broaden their horizons, cultivate teamwork, and communication skills, better adapting to future work environments.

By implementing these areas for improvement and possible solutions, we aim to inspire students' creative thinking, cultivate more competitive talents in landscape design, and enable them to better face the challenges of the future design field.

4. Innovation Model of Landscape Design Teaching Based on Digital Technology

4.1 Potential Advantages of Digital Technology in Landscape Design Teaching

The application of digital technology in landscape design teaching holds profound potential advantages, providing students with a rich array of design tools and innovative expression methods. Firstly, the use of Computer-Aided Design (CAD) tools offers students an efficient design platform. Through CAD, students can create, modify, and adjust design schemes more quickly and accurately, significantly enhancing design flexibility. This not only allows students to realize design concepts more rapidly but also helps them better understand the details and overall structure of design schemes.^[4]

Secondly, Virtual Reality (VR) and Augmented Reality (AR) technologies offer students immersive design experiences. Through these technologies, students can experience the three-dimensional effects of design in virtual space, gaining a more intuitive understanding of spatial relationships and design concepts. This is crucial for cultivating students' spatial awareness and aesthetic sense, enabling them to delve deeper into conceptualizing and expressing their design ideas.

Furthermore, digital technology provides students with a broader range of design expression methods. Through tools such as 3D modeling and animation demonstrations, students can present their design works in more intuitive and vivid forms. This not only makes the works more appealing but also provides students with diverse avenues of expression, prompting them to think more creatively about design issues.

These potential advantages lay the foundation for the construction of an innovative landscape design teaching model. By delving deeper into the potential of digital technology, educators can better guide students to unleash their creative thinking and cultivate more comprehensive and innovative landscape design capabilities. Guided by digital technology, landscape design teaching will be more dynamic, closer to practical design needs, and more aligned with the development trends of contemporary design industries.

4.2 Construction and Design Principles of Innovative Models

When constructing an innovative model for landscape design teaching based on digital technology, it is essential to delve into the advantages of the technology while closely aligning it with the practical requirements of landscape design to ensure the effectiveness and sustainability of the teaching model.

Firstly, the construction of the teaching model should emphasize a project-driven approach. By integrating teaching with real-world projects, students can apply digital technology to design in authentic landscape design scenarios. This project-driven approach not only enhances students' practical skills but also improves their understanding of the application of digital technology in real projects, fostering problem-solving abilities.

Secondly, interdisciplinary teaching is a key element of the innovative model. By enabling landscape design students to learn together with students from related fields such as computer science and architecture, interdisciplinary knowledge exchange and collision are promoted. This interdisciplinary learning environment helps students broaden their perspectives, deepen their understanding of digital technology, and develop comprehensive problem-solving abilities for interdisciplinary issues.

The innovative model should also emphasize student teamwork. By collaborating on design projects, students can share their expertise and cultivate collaborative skills. This helps simulate real work scenarios, enabling students to better adapt to future professional demands.

In terms of teaching philosophy, emphasizing students' active participation and autonomous learning is crucial. By guiding students in independent research and practice, their problem-solving and innovative thinking abilities are cultivated. The role of teachers should shift more towards being guides and motivators, inspiring students' interest in learning and unleashing their creative potential. Through such teaching philosophy, students' enthusiasm for learning digital technology can be better stimulated, making them more innovative and practically capable.

4.3 Optimization and Adjustment of Teaching Content and Methods

To better adapt to the innovative model of landscape design teaching based on digital technology, it is necessary to optimize and adjust teaching content and methods to ensure the effectiveness of teaching and the comprehensive development of students.^[5]

In terms of teaching content, emphasis should be placed on the fundamentals of digital technology. Students need to delve into the use of CAD tools, the application of virtual reality, and augmented reality technologies, among other aspects. Introducing real project cases is also crucial. Through case analysis, students can gain a more intuitive understanding of the practical application of digital technology in landscape design, thereby better comprehending the practical application of theoretical knowledge.

Regarding teaching methods, flexible and diverse approaches should be adopted. Combining online and offline teaching, introducing field trips, and workshops can enhance the interest and effectiveness of teaching. This diverse teaching approach helps stimulate students' interest in learning and better adapts to the educational requirements of the digital age.

Moreover, the introduction of a mentorship system is also crucial. By providing personalized guidance and evaluation for students, mentors can better understand students' learning needs and potential strengths, helping them better unleash the potential of digital technology. This one-on-one guidance helps cultivate students' personalized learning paths, improving the quality and effectiveness of teaching.

Through these optimizations and adjustments, the innovative model of landscape design teaching based on digital technology will better meet the needs of contemporary design education and cultivate landscape design professionals with greater innovation and competitiveness. Such a teaching model will better prepare students for the landscape design field in the digital age, laying a solid foundation for their career development.

5. Empirical Research and Case Analysis

5.1 Research Design and Methods

To gain a deeper understanding of the practical effects of the innovative model of landscape design teaching based on digital technology, this study employed a multidimensional research design and methods to comprehensively and thoroughly understand the impact of teaching innovation. Firstly, through literature review, the application status and relevant theories of digital technology in landscape design teaching were systematically reviewed. This step helped establish the theoretical framework of the study and provided necessary theoretical support for subsequent empirical research. By reviewing relevant literature, researchers could better understand the advantages, challenges, and development trends of digital technology in landscape design teaching.

Secondly, a combination of quantitative and qualitative methods including questionnaire surveys, in-depth interviews, and analysis of teaching performance was adopted. By designing questionnaires, students' learning experiences, skill improvements, and evaluations of teaching effectiveness under the new teaching model were collected. In-depth interviews provided more detailed and in-depth information, helping researchers gain a profound understanding of students' learning experiences and attitudes. Additionally, quantitative analysis of teaching performance allowed for the quantification of students' performance under the new teaching model, providing objective data support for the study. The research spanned multiple semesters, involved comparisons between different classes, and compared with traditional teaching models, which helped obtain comprehensive research data and identify the long-term effects and potential differences of teaching innovation. This multidimensional research design and methods made the research results more reliable and persuasive.^[6]

5.2 Case Analysis and Evaluation of Teaching Effects

In the case analysis, we selected representative landscape design projects and conducted detailed analysis of students' design processes, outcomes, and feedback. Through digital technology, students were able to efficiently utilize CAD tools for scheme design and modification, while virtual reality technology provided them with immersive design experiences. By delving into these cases, we could understand how students applied digital technology in their creative processes and the practical impact of these technologies on the design process.

Utilizing teaching effect evaluation tools, we comprehensively assessed students' design proficiency, creativity, and problem-solving abilities under the support of digital technology. Through quantitative and qualitative methods, we could gain a comprehensive understanding of students' performance under the new teaching model. Additionally, quantitative analysis of students' grades, graduation design outcomes, etc., was conducted to validate the effectiveness of the new teaching model in improving subject proficiency and cultivating practical application abilities.

Through these two assessments, we could comprehensively understand the strengths and weaknesses of the innovative landscape design teaching model based on digital technology. Detailed case analysis helped reveal students' application scenarios in specific projects, while teaching effect evaluation provided a more macroscopic perspective. These evaluation results will provide strong evidence for further promotion and optimization of this teaching model, ensuring its maximum effectiveness in cultivating students' comprehensive abilities.

5.3 Enhancement of Student Engagement and Creativity

In this section, we will focus on the enhancement of student engagement. By observing and documenting students' active participation in classroom activities and project design processes, we can gain insights into the impact of digital technology on students' motivation and interest in learning. Digital technology provides students with more opportunities to participate in the curriculum, such as practical design operations in virtual environments, real-time modifications using CAD tools, and interactions with teachers and classmates through online platforms. These interactive opportunities help to stimulate students' enthusiasm for landscape design and increase their initiative and engagement in the learning process.

Additionally, we will focus on the improvement of student creativity. By collecting students' design works, we can assess the development of their creativity. Introducing professional evaluation tools and expert reviews, we can comprehensively evaluate the innovation and practicality of students' design

works. Digital technology offers students a wider range of design expression methods, such as 3D models, animation demonstrations, etc., enriching the presentation forms of design works. By delving into the creativity of students' design works, we can understand the stimulating effect of digital technology on students' innovative potential in landscape design education.

Through these observations and evaluations, we can gain a comprehensive understanding of the specific impact of digital technology on student engagement and creativity. This helps in adjusting teaching methods to further stimulate students' motivation and innovative potential, enabling them to better adapt to the requirements of the landscape design field in the digital age.

6. Conclusion

This study conducts in-depth research on the innovative application of digital technology in landscape design education and proposes a landscape design teaching innovation model based on digital technology. Empirical studies indicate that this model effectively enhances students' disciplinary competence and creativity, demonstrating feasibility in practical teaching. Digital technology injects new vitality into the landscape design discipline and points the way for future development. However, continuous exploration and refinement of the application of digital technology in landscape design education are still needed to better adapt to societal development and disciplinary requirements.

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