

# Teaching Reform Practice of Digital and Artificial Intelligence Integration from the Perspective of First-class Course Construction

—— Taking Rural Landscape Planning and Design as an Example

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## ABSTRACT

This paper takes the construction of first-class social practice courses as the starting point, focuses on the teaching reform of the Rural Landscape Planning and Design, and deeply discusses the integration path and practical effect of digital and artificial intelligence technology. By constructing the "four in one" teaching objective system, using the hybrid teaching mode and diversified teaching methods, we can realize the integration of multidisciplinary knowledge and school enterprise collaborative education. Based on the practice of course reform in Hebei Academy of Fine Arts, action research and empirical analysis were used to verify the significant role of this model in improving students' professional practice ability, digital innovation ability and social responsibility, and to provide theoretical reference and practical paradigm for the construction of similar courses.

**Keywords:** First-class Social Practice Courses; Rural Landscape Planning and Design; Digital Teaching; Artificial Intelligence; Course Construction

## I. Introduction

Under the background of the national "double 10000 plan" to comprehensively promote the construction of first-class undergraduate courses, social practice courses, as the key link of the talent training system in colleges and universities, undertake the important mission of transforming theoretical knowledge into practical ability and shaping students' sense of social responsibility. The course of Rural Landscape Planning and Design is closely connected with the strategy of rural revitalization, and its teaching quality is directly related to the ability and level of environmental design professionals to serve rural construction. At present, the application of digital and artificial intelligence technologies such as AI scene simulation, VR/AR virtual simulation, big data analysis, etc. in the field of landscape design is increasingly in-

depth, which has brought opportunities for teaching mode innovation for the course of Rural Landscape Planning and Design. At the same time, the construction of the first-class social practice course emphasizes student-centered, pays attention to the deep integration of theory and practice, and highlights the cultivation of innovation ability, which puts forward new challenges and requirements for the traditional course teaching. In this context, exploring the teaching mode of the integration of digitalization and artificial intelligence in the course of Rural Landscape Planning and Design has become an inevitable choice to improve the level of course construction and cultivate talents to meet the needs of the times.

This study explores the application of digital and artificial intelligence technology in social practice courses, enriches the construction theory of first-class

social practice courses, expands the theoretical research boundary of the integration of educational technology and professional courses, and provides theoretical support for the construction of related courses. Through the practice of course teaching reform, explore and build a replicable and popularized digital and artificial intelligence integrated teaching mode of Rural Landscape Planning and Design, provide practical examples for the construction of other social practice courses, and help the talent demand of rural revitalization strategy.

## II. Requirements and research status of first-class social practice course construction

The Implementation Plan for the Construction of First-class Undergraduate Courses issued by the Ministry of Education clearly points out that first-class social practice courses need to have a student-centered teaching philosophy to achieve the deep integration of theoretical teaching and practical teaching; Closely connect with the actual needs of the society, and pay attention to the cultivation of students' ability to solve complex practical problems; Make full use of modern educational technology and innovate teaching methods and means; Strengthen the educational function of the course, and cultivate students' sense of social responsibility, professional ethics and innovative spirit. As for the course of Rural Landscape Planning and Design, it is necessary to focus on the strategic needs of rural revitalization, integrate digital and artificial intelligence technology into practice teaching, improve the innovation, high-level and challenge of the course, and realize the organic unity of knowledge transfer, ability training and value building.

Foreign countries have accumulated rich experience in the construction of social practice courses, such as the "community service learning" mode implemented by American colleges and universities, which emphasizes the close combination of courses and the actual needs of the community, and pays attention to the cultivation of students' social service ability; Germany's "dual system" practical teaching system realizes the deep integration of school education and enterprise practice, and effectively improves students' vocational skills. In

recent years, domestic scholars have actively explored the construction of social practice courses, mainly focusing on the setting of course objectives, the construction of practice bases, and the reform of teaching methods. However, the systematic research on the deep integration of digital technology into social practice teaching is still insufficient, especially the research results on the organic combination of artificial intelligence technology and social practice courses.

With the rapid development of AI, VR/AR and other technologies, their application in design education has gradually attracted attention. Part of the research explored the application of AI aided design teaching and VR technology in landscape design training. For example, Harvard Graduate School of Design introduced AI generative design into landscape courses to achieve rapid generation and optimization of design schemes; The Central Academy of Fine Arts uses VR technology to build an immersive landscape design teaching scene to improve students' spatial perception and design ability. However, in social practice courses, how to combine these technologies with real project practice to realize the innovation and breakthrough of teaching mode is still the weak link of current research.

## III. Current situation and reform needs of the course of Rural Landscape Planning and Design

### (1) Analysis of course situation

Through the investigation of the current teaching situation of the course of Rural Landscape Planning and Design in many colleges and universities, it is found that the current course teaching has the following problems:

The course content is mainly based on traditional landscape design theory and hand-painted techniques. The proportion of practical teaching is insufficient, and it is out of touch with the actual needs of Rural Revitalization. It lacks the teaching content of the application of digital and artificial intelligence technology. According to statistics, 70% of university courses do not offer AI aided design, VR scene modeling and other related course modules.

The teaching method is relatively simple, mainly

based on classroom teaching and case analysis, and students' initiative and enthusiasm to participate in practice are insufficient. The traditional teaching mode is difficult to stimulate students' innovative thinking, and can not meet the requirements of social practice class first-class courses for the cultivation of students' innovative ability and practical ability.

The construction of practice teaching base is not perfect, and most of the practice projects are simulation projects, lacking the training of real Rural Landscape Planning and Design projects. At the same time, due to the insufficient application of digital technology in the process of practice, it is difficult for students to master the ability to use modern technology to solve practical problems.

#### (2) Analysis of reform needs

The rural revitalization strategy puts forward higher requirements for rural landscape planning and design talents, who need innovative design ability, digital technology application ability and social practice ability. The talents cultivated by traditional courses can not meet the needs of Rural Revitalization for high-quality applied talents, so the course reform is imperative.

In order to meet the requirements for the construction of first-class social practice courses, the course of Rural Landscape Planning and Design needs to be comprehensively reformed in terms of teaching objectives, teaching contents, teaching methods, and practical teaching. Digital and artificial intelligence technology should be deeply integrated into the course teaching, so as to improve the quality and level of the course and realize the innovative development of the course.

### **IV. Teaching reform and practice of Rural Landscape Planning and Design, a first-class social practice course**

#### (1) Reconstruction of teaching objectives

Based on the construction requirements of first-class social practice courses and the strategic needs of rural revitalization, the teaching objectives of Rural Landscape Planning and Design were reconstructed to form a four

in one target system of "knowledge - ability - quality - education":

**Knowledge objectives:** students need to systematically master the basic theories, principles and methods of Rural Landscape Planning and Design, and deeply understand the application principles of digital and artificial intelligence technology in Rural Landscape Planning and Design, such as AI aided design software operation, VR scene modeling, big data analysis, etc. At the same time, understand the history of rural development, cultural characteristics and relevant policies and regulations, promote the integration and innovation of multidisciplinary knowledge, and build a perfect knowledge system.

**Ability objectives:** through social practice teaching supported by digital and artificial intelligence technology, cultivate students' ability to use professional knowledge and technical means to solve practical problems in Rural Landscape Planning and Design. Specifically, it includes the ability to use AI for scheme creative design, immersive scene simulation and display through vr/ar technology, analyze the needs of Rural Landscape Planning and Design with the help of big data, as well as the ability of project management, team cooperation and communication, so as to improve students' comprehensive practical ability.

**Quality objectives:** cultivate students' innovative thinking, critical thinking and autonomous learning ability, and strengthen students' sensitivity to new knowledge, new technology and new ideas of Rural Landscape Planning and Design. By participating in real rural practice projects, students' sense of social responsibility, professional ethics and teamwork spirit, as well as their tenacity in the face of difficulties and challenges, are cultivated to shape students' good professional quality.

**Educational objectives:** through the integration of traditional cultural elements in the teaching of the course, guide students to establish correct life values, enhance students' sense of identity and mission of inheriting national excellent traditional culture, stimulate students' feelings of loving and serving the countryside, and

cultivate talents of the new era with family and country feelings and social responsibility.

#### (2) Integration and innovation of teaching content

Break the boundaries of traditional disciplines, and strengthen the integration and innovation of courses such as Human Settlements, Scenic Tourism Area Planning, Rural Revitalization Tourism Area Landscape Design, Rural Aesthetics, Product Design, Architecture, Botany, Innovation and Entrepreneurship Foundation, and Digital Design Technology and Artificial Intelligence Foundation. For example, when explaining the transformation of rural residential environment, AI aided design software is introduced to let students use digital technology to conceive and optimize the scheme; In Rural Landscape Planning and Design, VR/AR technology is combined for scene simulation and effect display to realize the organic combination of traditional professional knowledge and digital and intelligent technology, and build a multidisciplinary teaching content system.

Relying on the rural practice base, enrich the practice teaching content. Students go to the rural grass-roots level to carry out field research, field design and project implementation. Bring classroom assignments and planning and design drawings into the countryside, interact with villagers on site, use digital tools (such as tablet computers and mobile design software) to record villagers' needs and feedback in real time, and adjust the design scheme in time. At the same time, the introduction of real rural landscape planning and design projects, such as the planning of rural tourist attractions, the protection and renewal of traditional villages, etc., allows students to use digital and artificial intelligence technology to solve practical problems in practice, and improves students' practical ability and project landing ability.

The basic knowledge and cases of innovation and entrepreneurship are integrated into the teaching content, and the practical problems and real needs of Rural Revitalization Strategy are combined to guide students to carry out innovation and entrepreneurship practice. For example, students are encouraged to use digital technology to develop rural cultural and creative products and design digital promotion schemes for rural

tourism. At the same time, integrate the ideological and political education elements into the course, such as cultivating students' cultural confidence and patriotism when explaining the inheritance and innovation of rural traditional culture; In practical projects, guide students to pay attention to rural ecological environment protection and social sustainable development, strengthen students' sense of social responsibility, and realize the unity of knowledge transfer, ability training and value creation.

#### (3) Teaching mode and method innovation

##### 1. "Online+offline+practice" mixed teaching mode:

Build a digital course teaching platform, upload course teaching videos, electronic textbooks, case base, virtual simulation experiments and other teaching resources. Use AI intelligent teaching assistant to provide students with personalized learning suggestions and Q&A services. For example, when students learn the theoretical knowledge of rural landscape planning and design, they can query the relevant information and test the knowledge points through the AI assistant, and the system will push the targeted learning content according to the students' learning situation. At the same time, the learning analysis platform is used to collect and analyze the data of students' online learning behavior, so as to provide the basis for teaching adjustment.

In the classroom teaching, the guided teaching method is adopted. The teacher focuses on the knowledge of rural landscape planning and design and the application points of digital technology, and guides the students to carry out group discussion, case analysis and scheme design. At the same time, vr/ar equipment is introduced to carry out immersive teaching. For example, excellent rural landscape design cases are displayed through VR equipment, so that students can feel the design effect and stimulate students' innovative thinking. In addition, students will be organized to carry out offline practice workshops to exchange and discuss design schemes, so as to improve students' teamwork ability and design expression ability.

Based on the rural practice base, carry out on-site teaching and project practice. Students take the design scheme to the village, use mobile digital equipment to

interact with the villagers and collect feedback. Teachers and business mentors guide students' practical process in real time through the online platform to achieve the deep integration of online and offline. For example, if students encounter technical problems in rural practice, they can ask their tutors for advice through video conference. The tutors use remote desktop technology for operation demonstration and guidance. At the same time, a platform for displaying the achievements of practical projects is established to display the students' practical achievements through the combination of online and offline, so as to promote the learning and communication between students.

2. Combination of project teaching and theme activities:

Carry out project-based teaching with the three major theme teaching activities of "Innovating the future", "building a dream village" and "hometown feelings" as the carrier. Each topic corresponds to different practical projects and learning tasks. Students carry out rural landscape planning and design practice around the theme in groups.

In the theme activity of "innovating the future", students use AI design software and big data analysis tools to investigate and analyze the current situation of rural areas, put forward innovative rural landscape reconstruction design scheme, and use VR technology to display the effect; In the theme activity of "building a dream village", students use digital technology to carry out product promotion and marketing planning by organizing love activities, designing rural tourism products and other practical activities; In the theme activity of "hometown feelings", students used hand-painted software, 3D modeling technology, etc. to beautify and design the rural wall and make digital works of rural culture publicity. Through the combination of project-based teaching and theme activities, students' learning interest and innovation ability are stimulated, and students' teamwork spirit and sense of social responsibility are cultivated.

3. Application of diversified teaching methods:

Community service teaching methods: organize

students to carry out activities such as rural visits, theme design practice, scheme discussion and sharing, innovation and entrepreneurship, and guide students to use professional knowledge and digital technology to serve rural communities. For example, students design digital tourism guidance systems for rural areas, and use intelligent devices to provide cultural and entertainment services for the elderly in rural areas. Through community service teaching, students' sense of social responsibility and service awareness are enhanced, and students' ability to use professional knowledge to solve practical problems is improved.

Situational teaching method: use digital technology to create a real teaching situation, such as restoring the actual scene of rural landscape planning and design projects through virtual simulation technology, so that students can carry out design practice and decision-making in a simulated environment. At the same time, combined with the real rural construction project, the project leader and villagers' representatives are invited to participate in the teaching process, share the actual needs and problems, and enhance the authenticity and practicability of teaching. For example, when explaining the planning of rural tourism scenic spots, VR technology is used to build virtual scenes of scenic spots, so that students can feel the current situation of scenic spots and put forward targeted design schemes.

(4) Improvement of practical teaching system

Strengthen the cooperation with enterprises and rural grass-roots units, and establish a stable school enterprise cooperation practice base. The practice base not only provides students with practice places, but also is equipped with digital practice equipment, such as AI design workstation, VR/AR experience equipment, UAV mapping equipment, etc. At the same time, we will work with the practice base to formulate practical teaching plans and projects to ensure that the practical teaching content is closely connected with the industrial demand. For example, cooperate with rural tourism development enterprises to carry out landscape planning and design practice projects of rural tourism scenic spots; Cooperate with cultural heritage protection units to protect and

renew traditional villages. Through the construction of practice base, we can provide students with a real practice environment and improve their practical ability and professional quality.

Establish a scientific practice project management mechanism to manage the whole process of practice projects. Detailed standards and procedures are formulated for the practice project from topic selection, project establishment, implementation to acceptance. In practical projects, students use digital project management tools for task allocation, progress tracking and team cooperation. Teachers and business mentors guide and supervise practical projects through online platforms, and timely solve problems encountered by students. At the same time, a practical project evaluation system is established to comprehensively evaluate students from the aspects of project completion quality, team cooperation and innovation ability, so as to ensure the teaching effect of practical projects.

Encourage students to transform and apply the practical results, such as submitting the rural landscape planning and design scheme to the local government or enterprises as a reference for rural construction; Produce and sell the designed rural cultural and creative products; The digital promotion scheme of rural tourism is applied to the actual tourism marketing. At the same time, students are organized to participate in various discipline competitions and innovation and entrepreneurship competitions to promote learning and improve students' practical and innovative abilities. For example, students' rural landscape planning and design works won awards in the National College Students' Rural Revitalization creative competition, and were adopted and implemented by the local government. Through the transformation of practical achievements, students' sense of achievement and self-confidence are enhanced, and the social influence of the course is enhanced.

#### (5) Reform of assessment and evaluation system

Break the traditional examination based assessment method and build a diversified assessment and evaluation system. The assessment contents include the mastery of theoretical knowledge, the application ability of digital

technology, the completion quality of practical projects, team cooperation ability, innovation and entrepreneurship ability, professional ethics and social responsibility. For example, to test students' theoretical knowledge through online tests; The application ability and practical ability of students' digital technology are tested through the demonstration and defense of the results of practical projects; Through group evaluation and self reflection, students' teamwork ability and self-improvement ability were tested; Examine students' innovation and entrepreneurship ability through the planning and implementation of innovation and entrepreneurship projects; Examine students' professional ethics and social responsibility through the performance in the process of practice.

Strengthen the assessment of the whole learning process, include classroom performance, group discussion, online learning records, phased results of practical projects, and pay attention to students' participation and progress in the learning process. At the same time, the comprehensive practical results after the course are assessed, such as rural landscape planning and design scheme, innovation and entrepreneurship project report, etc. For example, use the learning analysis platform to collect and analyze the data of students' online learning behavior (such as video viewing time, homework submission, online discussion participation) as the basis for process assessment; The results of students' comprehensive practical achievements will be evaluated through expert review and defense. Through the combination of process assessment and result assessment, we can comprehensively evaluate the learning effect of students and promote the all-round development of students.

Introduce enterprises, villagers, industry experts and other parties to participate in the assessment and evaluation. Enterprises evaluate students' professional ability and professionalism in practical projects; Villagers evaluate whether the students' design scheme meets the actual needs and is practical; Industry experts evaluate students' design innovation and technology application level. At the same time, teachers and students also

participate in the assessment and evaluation process, forming a multi-element evaluation subject combining teachers' evaluation, students' self-evaluation, mutual evaluation and the evaluation of enterprises, villagers and industry experts. Through multi-party participation in the assessment and evaluation, the assessment results are more objective and comprehensive, which also promotes students' better understanding of social needs and industry standards, and improves students' comprehensive quality and employment competitiveness.

## **V. Effect and features of teaching reform practice**

### **(1) Practical effect**

Through the practice of course reform, students' professional practice ability, digital innovation ability and social responsibility have been significantly improved. In terms of professional practice ability, students can skillfully use AI design software, VR/ARr technology and other technologies to carry out rural landscape planning and design, and complete the whole process design work from scheme conception, modeling and rendering to achievement display. In terms of digital innovation ability, students can use AI technology for creative design and put forward innovative rural landscape reconstruction schemes. Some students' design works won awards in the competition. In terms of social responsibility, students can deeply understand the needs of rural development and actively contribute to rural construction by participating in rural practice projects.

The course construction has achieved a series of teaching achievements, such as building a digital course teaching platform and developing more than 20 digital teaching resources (including teaching videos, virtual simulation experiments, case base, etc.); Teachers have published more than 10 teaching research papers and obtained 3 teaching reform projects; Students participated in more than 10 practical projects, of which more than 2 achievements were actually applied, and won the discipline competition and innovation and Entrepreneurship Competition Awards.

### **(2) Course features**

Deep integration of digitalization and practice: the

digitalization and artificial intelligence technology are deeply integrated into social practice teaching, and a hybrid teaching mode of "Online+offline+practice" is constructed, which realizes the organic combination of theoretical teaching and practical teaching, and improves the innovation and effectiveness of teaching.

School enterprise collaborative education: through the establishment of a stable school enterprise cooperation practice base, the deep cooperation between schools and enterprises has been realized, and the joint participation in course construction, teaching implementation and evaluation has formed a good mechanism for school enterprise collaborative education.

Pay equal attention to innovation and entrepreneurship and ideological and Political Education: in the course teaching, the organic integration of innovation and entrepreneurship education and ideological and political education not only cultivates students' innovative spirit and entrepreneurial ability, but also strengthens students' sense of social responsibility and professional ethics, and realizes the unity of knowledge teaching, ability training and value building.

## **VI. Conclusion and prospect**

Based on the requirements of the construction of the first-class social practice course, this paper carries out the teaching reform and practice of the integration of digitization and artificial intelligence for the course of Rural Landscape Planning and Design. Through the reconstruction of teaching objectives, the integration of teaching content, the innovation of teaching mode and method, the improvement of practical teaching system and the reform of assessment and evaluation system, a relatively perfect course teaching reform scheme has been formed. Practice shows that the program effectively improves the teaching quality of the course and the comprehensive quality of students, and provides beneficial exploration and practical experience for the construction of first-class social practice courses.

With the continuous development of technology, explore the application of AI generative design, intelligent decision system and other new technologies in the

teaching of rural landscape planning and design, and further improve the intelligent level of teaching. Promote and apply the results of course reform in more universities and majors, carry out intercollegiate exchanges and cooperation, and jointly promote the construction of first-class social practice courses. Establish the continuous improvement mechanism of course construction, and continuously optimize the teaching content and teaching methods according to the changes of social needs and the trend of technological development, so as to maintain the advancement and adaptability of the course.

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