The Practical Problems and Optimization Strategies of AIGC Practice Teaching of Environmental Design from the Perspective of Rural Activation

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Abstract: Under the background of rural revitalization strategy, environmental design education needs to respond to the complex needs of the real field. The intervention of AIGC technology provides new possibilities for practical teaching, but it also leads to practical difficulties such as instrumental rationality covering design thinking, teaching content deviating from the local scene, and evaluation standards lagging behind technological development. Starting from the practical dimension of rural activation, this paper analyzes the imbalance between technology application and design ontology in the current AIGC practice teaching, and proposes to construct a three-stage teaching model of " problem orientation-technology intervention-local feedback, " develop a localized teaching resource library, and establish ethical norms for technology use, so as to realize the effective connection between AIGC tools and the training of rural environmental design talents.
***Keywords*:** rural activation; environmental design; AIGC; practical teaching; locality

1. Introduction

The major of environmental design is experiencing a paradigm shift from formal aesthetic training to social problem solving. As a compound field carrying cultural memory and life production, the environmental transformation of rural space requires designers ' deep understanding of local knowledge and the improvement of scheme generation efficiency by new technical means. AIGC technology can quickly generate visual solutions and assist spatial deduction, but there is a natural tension between its standardized generation logic and the uniqueness of rural scenes. There are two tendencies in the current practical teaching : one is to use AI tools as an upgraded version of drawing software, staying at the technical operation level; second, over-reliance on generation results weakens field research and local thinking. The root of these problems lies in the lack of systematic connection between the introduction of technology and the logic of rural practice, and the failure of teaching to establish a complete chain from real problems to technology application and social verification.

2. The coupling mechanism of rural activation and environmental design AIGC practice teaching

The core of rural environmental design is to balance the relationship between protection and development, tradition and modernity, which requires designers to extract local cultural symbols and quickly verify the feasibility of space transformation. AIGC technology shows three values in this process : one is to transform the scattered architectural styles and decorative patterns into reusable design element libraries through image recognition and generation, so as to avoid the simple misappropriation of cultural symbols; the second is to use parametric modeling to assist the digital archiving and transformation of traditional dwellings, so as to form a dynamic balance between the protection and function renewal of historical buildings. The third is to use the scene generation function to enable villagers to see the expected effect of environmental transformation in the decision-making stage of the plan and reduce the communication cost. The practical teaching of environmental design major needs to organically integrate these technical capabilities with rural research, stakeholder interviews, and program implementation to form a complete closed loop from problem discovery to technical intervention and then to effect feedback. What students learn in real projects is not only tool operation, but also how to make technology serve local needs, and how to identify options that conform to the cultural logic of rural society in various schemes generated by AI. The transformation of this teaching mode is essentially to upgrade AIGC from an auxiliary drawing tool to a cognitive medium connecting virtual design and real field.

3. The realistic dilemma of AIGC practice teaching in environmental design

3.1 The separation of technical tools and design thinking

In the current teaching, there is a general tendency to equate AIGC with efficiency tools. The curriculum focuses on the operation skills such as prompt word writing and model parameter adjustment, but ignores the cultivation of design judgment. Students are accustomed to inputting keywords to directly obtain results, skipping pre-links such as venue analysis and demand research, and generating solutions that often stay at the visual level of collage. The deeper problem is that the training data of the AI model are mostly from urban buildings and commercial projects, and lack sensitivity to the hidden needs of rural space such as production and life logic, neighborhood relations, and ritual places. If students directly adopt the generated results without critical thinking, it is easy to produce form transplantation rather than local design. Some teachers worry that technology will impact the traditional teaching system and marginalize AIGC into elective content. As a result, when students face real rural projects at the graduation design stage, they will not be able to express by hand, nor can they effectively control AI tools, falling into the dilemma of both ends.

3.2 The disconnection between teaching resources and rural practice scenes

The existing AIGC teaching mostly relies on general graphics libraries and case libraries, among which the samples of vernacular architecture, traditional crafts and local materials are seriously insufficient. When students are doing rural design, AI often generates standardized pastoral style or web celebrity homestay style, which is out of touch with the historical context, climatic conditions and industrial foundation of specific villages. Although colleges and universities organize field research, there is a lack of transformation mechanism between research results and AIGC applications. It is difficult to directly input the photos, mapping drawings, and interview records into the model training. Students eventually return to the general database for reference. More importantly, the rural project cycle is long and involves many subjects, and the teaching time arrangement is difficult to cover the complete process from scheme generation to villagers ' feedback to scheme correction. At the end of the course, the plan remained on paper. Students could not see the actual effect of the design after landing, nor could they receive the user 's real evaluation. AIGC aided design became a one-time visual exercise, losing the possibility of iterative optimization.

3.3 The evaluation system 's dilemma in identifying AIGC aided design results

The evaluation standard of traditional environmental design teaching is based on clear skill assessment points such as hand-drawn sketches, solid models, and software rendering. After AIGC intervention, the generation process of results becomes blurred. A seemingly complete scheme may be 80 % generated by AI, and students only do prompt word optimization and partial modification. In this case, how to define students ' actual design ability ? Some teachers require marking the use of AI, but there is a lack of uniform norms, and students tend to weaken AI participation to obtain higher evaluation.[3] The evaluation of the effect of the rural revitalization project itself is long-term and social. Whether a square renovation plan is successful or not requires observation of the frequency of use of villagers, changes in activity types, and even the improvement of village cohesion. These indicators cannot appear in the course cycle of a semester. The current evaluation system can only assess the visual completion and technical standardization of the program, but it can not measure the degree of design to solve real problems, which leads students to regard AIGC as a shortcut to cope with homework, rather than a tool to solve complex problems.

4. AIGC practical teaching optimization strategy for rural activation

4.1 Construct a three-stage teaching model of ' problem-oriented-technology intervention-local feedback '.

The key of teaching reform is to reconstruct the relationship between AIGC and design process. The first stage is problem-oriented, which requires students to complete at least two weeks of field investigation before entering the technical operation. Through in-depth interviews, behavior observation, spatial mapping and other methods, the rural needs are transformed into specific design propositions, such as the lack of public activity space for the left-behind elderly, the degradation of traditional sunbathing function, and the conflict between the moving line of foreign tourists and the living area of villagers. The second stage is technical intervention. According to the nature of the problem, AIGC tools are used hierarchically. In the concept deduction stage, AI is used to quickly generate a variety of spatial layout possibilities. In the scheme deepening stage, parametric tools are used to test the combination of different materials and structures. In the effect expression stage, rendering tools are used to present four seasons and use scenarios. This gradient application avoids students

' excessive dependence on a single tool. The third stage is the in-situ feedback, which brings the preliminary scheme back to the village, organizes the joint review of the villagers, the village committee and the local cultural security department, and uses AIGC to carry out rapid iteration according to the feedback. In this closed loop, technology always serves the solution of real problems, and what students learn is how to find a balance between technical possibility and social reality.

4.2 Develop AIGC teaching resource library and ethical norms for rural environmental design

In order to break through the limitations of the general AI model on the cognition of rural scenes, it is necessary to establish a special teaching resource system. Colleges and universities can combine multiple rural practice bases to systematically collect data such as the facade style of regional architecture, the process flow of traditional crafts, the texture texture of local materials, and the spatial needs of folk activities, so as to form a trainable localized material library. When using AIGC, students can invoke these real cases as a reference for generation, rather than relying on the stereotype of the network library.[4] At the same time, it is necessary to establish an ethical boundary for the use of technology, including requiring students to attach an ' AI tool use statement ' when submitting the plan, marking which links use which tools, how much content is generated, and what parts are manually modified to cultivate academic integrity awareness. More importantly, it is necessary to discuss the copyright ownership of AIGC generated content, the authorization of the use of villagers ' cultural symbols, the distribution of benefits in commercial transformation and other practical issues in the course, so that students can understand that technology application is not only an efficiency issue, but also a power relationship and social responsibility. The cultivation of this ' technology-ethics ' dual literacy enables students to flexibly use new tools in their future professional practice and remain alert to the social consequences of technology.

5. Conclusion

The impact of AIGC technology on the practice teaching of environmental design should not be simplified as a tool update, but should be regarded as an opportunity to redefine the goal of design education. As a complex social practice, rural revitalization requires designers to have interdisciplinary integration ability, local problem diagnosis ability and multi-party coordination ability. The cultivation of these abilities requires embedding technical training into the complete cycle of real projects. The root of the current teaching dilemma is that the introduction of technology is out of the problem situation, and the evaluation of results is out of the social feedback. The core of the optimization strategy is to establish a closed-loop mechanism of ' research-generation-verification-iteration ', so that AIGC can become an intermediary between classroom and field, virtual and reality, rather than a shortcut to alternative thinking. This requires the localization development of teaching resources, the process reconstruction of evaluation standards, and the pre-introduction of ethical norms. Only when students learn to make a judgment between technical possibility and social reality can AIGC truly become a design tool for rural revitalization, rather than a generator of visual bubbles.

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