

The Reconstruction Logic and Teaching Practice of Environmental Design Practice Course Driven by New Technology

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ABSTRACT

Generative artificial intelligence has begun to fundamentally reshape the visual production workflow of design majors, but the systematic response of undergraduate design courses is relatively lagging behind. This article records the complete reform cycle of the "Environmental Design Practice" course (course number 2040236) at Tianjin Renai College from 2024-2025 to 2025-2026. This reform replaced the original three module structure with a dual module framework with AIGC as the core, eliminated the content overlap with the parallel studio courses, established a clear connection between the output and input of the two modules, and took the ideological and political design of the curriculum as an internal dimension rather than an external supplement. The paper is based on teaching syllabus documents, teaching logs, and teaching reflections, analyzing the theoretical basis and core decision-making logic of the reform, as well as the practical challenges encountered in a rapidly iterating environment without textbooks to rely on and tool ecology. This article argues that "principled curriculum reconstruction rather than simple tool stacking" is an appropriate institutional response for designing education to address the challenges of AIGC.

Keywords: Curriculum reform, AIGC, Environmental design education, Applied undergraduate program, Curriculum reconstruction.

1. INTRODUCTION

The problem facing design educators today is no longer whether to integrate artificial intelligence tools into the curriculum, but how to achieve this integration in a coherent teaching logic, accurate professional positioning, and sustainable institutional way. The simple answer is additive: introducing a new tool module, demonstrating its functionality, and assessing students' ability to operate it. The more difficult and meaningful answer is a refactoring approach: starting from the course objectives, re-examining the entire course, questioning which existing content has become redundant, what new capabilities are required by the new tool ecosystem, and how the internal architecture of the course can develop these capabilities in an integrated rather than fragmented manner.

This article records the exploration of the more difficult path of the "Environmental Design Practice" course at Tianjin Renai College. This course is offered in two directions: landscape design and interior design in the third year of college, with a total of 32 class hours and a centralized teaching mode. This reform is a comprehensive reconstruction of the curriculum: abandon the three-module structure, delete the content overlapping with the corresponding curriculum, reconstruct the curriculum framework with the dual module AIGC tool chain, and integrate the curriculum ideology and politics into structural decision-making.

Three background characteristics make this case have special reference value: the reform was carried out under the condition of a complete lack of referenceable teaching models, and there are no dedicated textbooks in both Chinese and English; The course is conducted in applied undergraduate colleges, with the primary goal of cultivating

vocational practical abilities, and the design of real tasks is the top priority; The course tools cover both international and domestic AI platforms, and their tool selection logic and cultural connotations have a unique impact on teaching decisions that has not been fully discussed in international design education literature. The overall analysis framework of this article covers five levels: external drivers, course diagnosis, refactoring design, implementation observation, and theoretical contributions. The following sections are developed based on this logic.

2. TECHNOLOGICAL WAVE AND CURRICULUM CONSERVATISM: A REVIEW OF RELATED RESEARCH BACKGROUND

The design curriculum has an implicit conservatism, and the studio teaching model has formed a strong inertia norm, making clear systematic reconstruction very difficult [1] [2]. American design theorist Buchanan (1992) pointed out that the systematic expression of disciplinary definitions in design education has long been avoided, and this vulnerability is fully exposed when generative AI challenges design decisions and machine output boundaries. Research on the integration of AIGC into higher education has grown rapidly since 2022: German educational technology scholar Zawacki Richter et al. (2019) have already identified the persistent gap between AI applications in higher education and their theoretical teaching [3]; Crompton and Burke (2023), American educational technology scholars, found that this gap is most prominent in creative and practical disciplines - AI tools fundamentally shake the relationship between tool use, authorship, and professional identity.[4] Hong Kong scholars Chan and Hu (2023) pointed out that creative students have a unique contradictory attitude towards generative AI: they believe that AI can improve efficiency, but are also concerned about dependence and skill devaluation.[5]

For applied colleges, curriculum reform also faces practical dimensions that research-oriented universities often avoid: graduates must be able to enter professional positions and proficiently use the tools that practitioners are currently using. When the AI tool ecosystem undergoes drastic changes between 2022 and 2026, the urgency of reform cannot be delayed.

The dimension of ideological and political education in courses is a unique requirement of

higher education in China, which requires embedding ideological and political education into professional courses. For a course centered around AI tools and requiring students to deeply engage in regional cultural heritage, this policy is an opportunity rather than a constraint: the substantive content of the course naturally aligns with ideological and political goals, and only needs to be made explicit in the course design.[6]

3. STRUCTURAL DIAGNOSIS: SYSTEMATIC DEFECTS OF THE THREE MODULES BEFORE CURRICULUM REFORM

3.1 Internal Defects of the Three Module Structure

Before the reform, the curriculum adopted a three-module structure: Module A mainly used traditional design software applications; Module B introduces case analysis method; Module C conducts AI tool experiments, focusing on AI furniture design. The problem with the course is structural rather than sporadic.

There is a significant overlap between Module A and the prerequisite course "Digital Technology for Environmental Design A/B", both of which were completed in the sophomore year. The significant difference in skill starting points makes it difficult to efficiently utilize studio time: some students are reviewing the content they have already mastered, while others are filling the gap in real skills. The root of the problem lies in the lack of effective correspondence between the content and the overall advanced logic of the training program.

The AI experiment of Module C is forward-looking in concept, but students use AI generated furniture design as a self-contained exercise rather than being included in the promotion process of the same studio courses, resulting in AI tools appearing as extracurricular activities rather than components of professional workflows in the eyes of students - exactly opposite to the expected learning effect.

3.2 Missing Course Mainline

By comparing the three-module structure with the curriculum objectives one by one, it is found that the curriculum lacks an organizational thread that runs through all parts: the three modules are arranged in order but independent of each other,

and students can complete the subsequent modules without the output of the previous module.

The reform team identified the key ability that was overlooked: the ability to transform research and analysis results into persuasive visual communication (including dynamic images). This is at the intersection of analytical rigor and expressive infectiousness, and it is the ability with the highest professional value and the weakest academic cultivation - before the reform, there were no modules specifically designed to cultivate this transformational ability.

4. REFACTORING LOGIC: FRAMEWORK DESIGN AND TOOL SELECTION FOR AIGC DUAL MODULE COURSE

4.1 Curriculum Design Logic Constrained by Four Principles

The reform has established four guiding principles: firstly, the principle of no redundancy in the curriculum, and the abilities cultivated in each part shall not be duplicated with the previous or contemporaneous courses; secondly, the principle of sequence integrity, the output of the former module becomes the input of the latter module, and the development integration curriculum is constructed; thirdly, the principle of embedding real tasks, where all AI tool usage occurs in real professional task contexts; fourthly, the principle of natural integration of ideology and politics, where cultural and civic dimensions are embedded in substantive content choices rather than being added as independent activities.

4.2 Structural Reform Decisions

“Table 1” summarizes the comparison of course configurations before and after the reform from six dimensions, and explains the basis for each change.

Table 1. Comparison of curriculum configuration before and after reform

Reform dimension	Before the reform (2024-2025 academic year)	After the reform (2025-2026 academic year)	Basis for Reform
Course Structure	Three modules: traditional software, case analysis, AI furniture design	Two modules: AI assisted analysis chart (Module 1)+AI video narrative (Module 2)	Eliminate overlap with parallel courses and focus on AIGC core competencies
Main tools	AutoCAD 、 Photoshop 、 SketchUp; AI tool optional supplement	GPT Image-2 (Module 1); Omni/Sustainability 2.0/Jianying (Module 2)	Differentiated tool strategy; Prioritize actual performance as the primary selection criterion
Module connection	Each module is independent of each other and has no input/output connection	The A3 analysis chart produced by Module 1 directly serves as the content foundation and visual reference for Module 2	Centered around the ability to transform analysis and narrative, enforced through structural design
Assessment weight	Equal weight of each module	Module 1 20%; Module 2 70%; Attendance 10%	Weight reflects the core professional value of visual narrative in industry practice
Textbook/Reference	General Design Software Operation Manual	No official textbooks available; Teachers independently write teaching materials based on industry resources	There is currently no AIGC specific textbook designed for the environment
Ideological and political integration	Implicit existence, not formally designed	Explicit design: Establish differentiated evaluation awareness at the tool level (with video modules mainly based on domestic platforms); Content layer requires integration of regional cultural themes	Strengthening cultural confidence; Meet the requirements of national education policies

4.3 AI Tool Selection Logic: Differentiated Tool Strategy

This course adopts a differentiation strategy in tool selection, with the actual effectiveness of the tool as the primary criterion, rather than relying solely on regional attributes.

The drawing tool for Module 1 is GPT Image-2. As of the implementation of the course, there is currently no similar mapping AI in China that can compete with it in terms of the quality of complex analysis map generation. Whether it is the visual integration ability of multi-level spatial information or the accuracy of understanding Chinese regional cultural cues, GPT Image-2 has shown significant advantages. Providing students with the most effective professional tools in the absence of reliable domestic alternatives is the fundamental responsibility of applied education.

The video tools of Module 2 are mainly based on domestic platforms, not policy constraints, but driven by real performance advantages. Keling Omni and Seedance 2.0 have entered the first tier of global AI video generation by 2025, and their performance in camera motion control, long shot

coherence, and Chinese scene understanding has reached or even surpassed international competitors of the same period. By using these two tools, students can establish professional workflows on domestically produced platforms with real competitiveness, and the cultural confidence goal of ideological and political courses has practical technical support here, rather than a narrative that needs to be deliberately constructed.

4.4 From Finished Product Evaluation to Process: Reconstruction of Assessment System

The reform has substantially revised the assessment system based on two understandings: AI tools have compressed the execution gap between students with different technical levels, making it difficult to distinguish the quality of design reasoning solely based on finished products; The process of transforming analytical results into narrative videos is itself a core learning outcome, and assessments should make this process visible and assessable. "Table 2" presents the assessment framework after the reform.

Table 2. Assessment framework after reform

Assessment items	Weight	Core evaluation criteria	AI specific evaluation focus
Module 1: AI-assisted analysis chart	20%	Content integrity; Layout quality; Professional Visual Standards	Professional depth in prompt word design; The rationality of AI and traditional software collaborative workflow
Module 2: AI video works	50%	Narrative logic; Visual quality; Creating a coherent atmosphere; Production fluency	The quality of transformation from analysis to narrative; The rationality of multi tool combination strategy
Module 2: Making instruction boards	20%	Integrity of storyboard script; Accuracy of prompt word recording; Design specification clarity	Visibility of iterative decision-making process; Reflective expression on the process of using AI
Attendance and Classroom participation	10%	Attendance; Active participation in studio practice sessions	Effective prompt word sharing among peers; Constructive evaluation participation

4.5 Challenge Without Textbooks

The reform faces a practical constraint: there is currently no specialized textbook that covers both AIGC tools and environmental design practices. The courseware, prompt word engineering template, workflow guide, and grading criteria are all original works. Although this constraint increases workload, it generates a teaching asset: being forced into a continuous process of curriculum theorization, making teaching knowledge explicit and traceable. This dynamic - constraint driven curriculum

knowledge production - is likely to be a common feature of AIGC related curriculum construction in the coming years.

5. TEACHING PRACTICE: IMPLEMENTATION PATH AND CLASSROOM OBSERVATION OF DUAL MODULE CURRICULUM

5.1 Background of Implementation and Teaching Organization

The reformed curriculum will be implemented for the first time in the second semester of the 2025-2026 academic year, with approximately 110 students and three classes in two directions: landscape design and interior design. The centralized teaching mode (4 weeks, 8 class hours per week) is highly aligned with the project timeline of the studio courses during the same period, ensuring that the analysis results can directly enter the studio plan promotion process.

5.2 Module I: Classroom Verification of Prompt Word Project as an Intellectual challenge

The teaching of Module 1 confirms the core premise of the reform: using GPT Image-2 to generate culturally significant analysis maps of the venues visited by students, the analytical investment stimulated is beyond the reach of generalization exercises. Previously, students who were distant from the politeness of operation tutorials began to view the construction of prompt words as a true intellectual challenge when they needed to accurately capture the characteristics of the site with prompt words. The unexpected difficulty lies in the fact that some students are accustomed to using English to try prompt words, sometimes with better results, but at the expense of the accuracy of Chinese prompt words in regional cultural expression - the language strategy of prompt words deserves attention as independent content in subsequent iterations.

5.3 Analysis Narrative Transformation: Design and Function of Transition Workshop

The transition between the two modules - requiring students to examine the completed analysis chart and ask what kind of video narrative can grow - is the most teaching tension moment of this course. In the transition workshop (about 1 class hour), students present analysis diagrams in groups, share the most unexpected findings from the research, and receive structured feedback on

narrative potential. This stage simultaneously serves multiple functions: endowing the output of module one with real subsequent uses; Enable teachers to evaluate the quality of students' analysis and understanding before the start of video production; Make the selection of three narrative types truly distinguishable, so that students can see clearly why their content points to a certain narrative type.

5.4 The Practical Form of Ideological and Political Education in Courses

The integration of ideological and political education in the curriculum plays a role at two levels. At the tool level, the differentiation selection strategy of the course itself becomes a specific professional course: the teacher clearly presents the actual performance comparison of different tools in early classroom conversations - explaining why module one chooses GPT Image-2 (currently the most efficient), while module two chooses Keling Omni and Seedance 2.0 (domestic tools have real global competitiveness in the video field). Students thus establish a tool evaluation consciousness based on evidence, rather than blindly worshipping foreign countries or blindly worshipping the country. At the content level, students who focus on historical and cultural sites such as canal cultural heritage landscapes, traditional gardens, and regional rural settlements have found that the video narrative task endows cultural research with a communication purpose that was previously lacking: analytical work no longer ends with a single blueprint, but directly leads to inspiring cultural imagery and literature.

6. EFFECTIVENESS REVIEW AND REMAINING CHALLENGES

6.1 Intermodule Quality Relevance: Observation and Verification of the Core Hypothesis of Reform

The most direct evidence of the effectiveness of structural reform is the observable correlation between the quality of module one and module two: students who engage in more in-depth analysis in module one consistently produce more compelling video narratives. This correlation did not exist in the curriculum structure before the reform, which is sufficient to confirm the establishment of the core teaching assumption of the reform. The deletion of redundant content in module A released 8 class

hours, and after the reform, the interference of teaching rhythm caused by differences in technical starting points was significantly reduced, indicating that the new version of module A has more accurate hypothesis calibration for students' real enrollment preparation.

6.2 Three Structural Challenges and the Next Iteration Direction

The three challenges are still partially unresolved at present.

Firstly, the issue of assessment validity: The production of explanatory boards has to some extent solved the problem of process visibility, but how to evaluate the quality of prompt word engineering decisions - whether they reflect true professional judgment or accidental effects - still requires richer student work data support. Developing more detailed evaluation criteria is the clear next step.

Secondly, there is a shortage of teaching materials: Although the original teaching materials generated by this implementation have received a good response, they have not been systematically organized and peer-reviewed. Promoting the development of shareable AIGC integrated design course teaching resources will make substantial contributions to the entire field.

Thirdly, there is the issue of platform fluctuations: there has been a change in tool recommendations between the course planning and implementation stages - Seedream has been downgraded to a backup tool due to unstable network, while Seedance 2.0 has been upgraded to the main recommendation tool due to unexpected capabilities. Courses centered around specific business AI tools must accept the reality of annual tool recommendations and establish teaching logic based on transferable principles - prompt word engineering as domain specific knowledge, workflow combinations as professional strategies - rather than platform specific operational details.

7. FROM TOOL OVERLAY TO CURRICULUM RECONSTRUCTION: PATH SELECTION FOR APPLICATION-ORIENTED DESIGN EDUCATION

The reform process recorded in this article reveals a fundamental opposition worth distinguishing: the distinction between tool stacking

and curriculum reconstruction. Tool stacking is the path with the least resistance: adding an AI module to existing courses, allowing students to learn how to operate the new platform, and obtaining contemporary expressions for course introductions. Curriculum restructuring is a more laborious but meaningful choice: the curriculum is reexamined from the perspective of its goals, and the relationships and internal structural logic between each part and other courses in the training plan are examined. The addition, deletion, and reorganization of content are based on coherent teaching arguments.

Refactoring is more productive than stacking in essence for three reasons: Refactoring forces course teams to clearly articulate what students truly need and can do in a changed career environment, while stacking avoids this issue; Refactoring to generate teaching knowledge in the form of design decisions and their basis, which can be shared, criticized, and accumulated; Refactoring creates conditions for honest self-evaluation, and a course that is restructured based on goals can evaluate whether its structure has achieved those goals, while a gradually revised course cannot achieve this.

For application-oriented colleges, there is an additional layer of evidence for choosing to restructure: a course that integrates AIGC tools in real career tasks - creating analysis charts for real projects and creating video narratives that truly convey cultural or spatial thinking - is more in line with the core purpose of application-oriented education and can fully leverage the competitive advantage of application-oriented colleges in real task design than a course that uses AI tools for demonstration training.

8. CONCLUSION

This article records the diagnosis, design, implementation, and reflection of the complete reform cycle of the practical course of environmental design at Tianjin Renai College. The reform will replace the three module structure with redundant content with a dual module framework with AIGC tool chain as the core, clear sequence logic, embedded curriculum ideology and politics, and process and product oriented.

The reform process recorded in this article indicates that principled curriculum restructuring not only produces a better course, but also a form of teaching knowledge that can be verified and accumulated by peers. This knowledge form - the

complete chain from diagnosis to principles, from structural decision-making to reflective evaluation - has more enduring value than the results of any single course implementation. For design educators facing the same pressure, the reference significance of this article may not lie in the specific tool selection or module design, but in the feasibility and necessity of restructuring itself as an institutional practice.

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