

# Application of Environmental Protection Concepts in Postgraduate Landscape Design Teaching

ZHAO Meihong

(Zhongyuan University of Technology, Zhengzhou, Henan 450000, China)

**Abstract** With the progressive development of ecological civilization, the importance of environmental protection concepts in the landscape design discipline has become increasingly pronounced. Focusing on postgraduate landscape design teaching, this study analyzes the theoretical logic underpinning the integration of environmental protection concepts with professional education. By incorporating contemporary teaching case studies, the paper systematically investigates the specific application pathways of environmental protection concepts in curriculum design, teaching methods, and evaluation mechanisms. The objective is to offer both theoretical insights and practical guidance to facilitate the ecological transformation of postgraduate landscape design education in China.

**Keywords** Environmental protection concept, Landscape design, Postgraduate education, Teaching reform, Sustainable development

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Contemporary landscape design education is confronted with unprecedented ecological challenges and environmental opportunities. Issues such as global climate change, biodiversity loss, and increasing pressure on natural resources and environments are intensifying. Consequently, landscape designers must not only demonstrate proficiency in aesthetic design but also possess a deep understanding of environmental ethics and ecological wisdom to effectively mediate the relationship between humans and nature. In this context, the concept of environmental protection has transitioned from a peripheral professional concern to a central tenet of landscape design education, prompting the discipline to shift its value orientation from “form following function” to “design aligned with nature”.

The current postgraduate landscape design education in China demonstrates notable deficiencies in incorporating environmental protection concepts. Consequently, although some postgraduates understand certain ecological design concepts, they frequently encounter difficulties in developing solutions that are both ecologically sustainable and environmentally adaptive when addressing complex real-world environmental issues. Hence, it is imperative to embed environmental protection concepts as a fundamental element of postgraduate landscape design education in practical teaching.

## 1 Integration logic of environmental protection concepts and landscape design education

The integration of environmental protection

concepts into landscape design education is not merely a simple accumulation of knowledge, but rather a multidimensional reconstruction of value ethics, methodologies, and professional targets. This integration is fundamentally based on the recognition of landscapes as “ecological infrastructure”, necessitating a shift in design education from traditional emphases on form and function to a more holistic approach that synergistically promotes ecological services and human well-being.

### 1.1 Ethical dimension: from anthropocentrism to ecocentrism

The ecological transformation of landscape design education commences with a fundamental shift in value ethics. Traditional landscape design education often embodies anthropocentric perspectives, perceiving nature primarily as an object to be modified and aesthetically enhanced, with an emphasis on its instrumental value for human benefit. The incorporation of environmental protection concepts has facilitated a transition in design ethics toward ecocentrism, which prioritizes respect for nature’s intrinsic value and ecological processes. This shift manifests in teaching by encouraging students to critically reflect on the environmental impacts of design practices and cultivating a sense of responsibility for “designing for ecology”. In the author’s landscape design teaching, the introduction of landscape sustainability science theory facilitates students’ understanding of the relationship between ecosystem services and human well-being, thereby exemplifying this ethical transformation.

### 1.2 Methodological dimension: from endpoint governance to full-process integration

At the methodological level, the incorporation of environmental protection concepts has prompted a transition in landscape design from an endpoint governance model to a comprehensive, full-process integration model. In traditional education, environmental considerations are frequently regarded as an afterthought—merely a supplementary checkbox added post-design completion—rather than as a fundamental element embedded throughout the entire design process.

Environmental protection concepts necessitate the incorporation of ecological factors at every phase of the design process, including site analysis, concept development, technical strategies, and material selection. The author’s introduction of five principal strategies for “carbon-neutral landscaping” in postgraduate landscape design and environmental protection curriculum reform exemplifies this comprehensive methodology. This approach underscores a holistic integration throughout the entire process, encompassing the enhancement of carbon sinks, the adoption of low-carbon materials, and the establishment of community collaboration mechanisms<sup>[1-3]</sup>.

### 1.3 Target dimension: from single skills to comprehensive competencies

Regarding educational targets, the incorporation of environmental protection concepts has prompted a transition from focusing solely on isolated design skills to fostering comprehensive ecological competencies (Table 1). An

environmentally conscious landscape designer is required not only to master the technical methods of ecological design but also to cultivate systematic thinking, critical analysis, and interdisciplinary integration skills. The author has established a novel talent cultivation framework that integrates the four dimensions of “sky, earth, body, and emotion” within the postgraduate curriculum for landscape design and environmental protection. This innovative approach synthesizes ecological cultural concepts, digital and intelligent technologies, and regional characteristics to enhance students’ comprehensive competencies in addressing complex environmental challenges<sup>[4-8]</sup>.

## 2 Application pathways for environmental protection concepts in postgraduate landscape design education

### 2.1 Reconstruction of the curriculum system: from disparate knowledge points to systematic integration

To incorporate environmental protection concepts into postgraduate landscape design education, it is essential to systematically restructure the existing curriculum framework. This process necessitates moving beyond the conventional curriculum framework, which primarily centers on design skills, to develop a curriculum module that comprehensively integrates ecological knowledge with design practice.

(1) The construction of interdisciplinary course clusters constitutes a fundamental strategy in the reconstruction of curricula. Due to the complexity of ecological challenges inherent in landscape design, it is imperative to synthesize knowledge from various disciplines, including ecology, environmental science, and geography, to develop a comprehensive theoretical framework that underpins ecological design competencies.

(2) The progressive course system design supports the incremental enhancement of students’ ecological design skills. In the context of teaching reform for landscape design and environmental protection courses, the author established a three-stage curriculum system comprising: Reading Nature, Translating Nature, and Cultivating Nature. The first stage, Reading Nature,

is dedicated to fostering ecological awareness. Utilizing approaches such as ecological surveys and environmental monitoring, this stage facilitates students’ comprehension of the functional mechanisms underlying natural systems. The second stage, Translating Nature, centers on the application of ecological knowledge to design strategies. Through specialized training in ecological restoration design, low-carbon landscape design, and similar subjects, it enhances students’ abilities to address specific environmental challenges. The third stage, Cultivating Nature, focuses on integrated practice within real-world contexts. Through participation in actual or simulated projects, it cultivates students’ capacity to synthesize diverse requirements and develop innovative solutions.

(3) Integrating advanced topics with regionalism constitutes a fundamental principle in curriculum design. Specifically, curricula should encompass contemporary issues such as “carbon neutrality and carbon peaking” goals, biodiversity conservation, and nature-based solutions (NbS). For example, the author’s investigation of “carbon-neutral landscaping” within the landscape design and environmental protection course exemplifies this approach. Additionally, curricula must address regional ecological and environmental characteristics, such as sponge city construction in urban areas and water-sensitive design in arid regions, thereby fostering students’ capacity to address environmental challenges rooted in local contexts.

### 2.2 Innovation in teaching methods: from theoretical instruction to practical empowerment

The comprehensive incorporation of environmental protection concepts requires concurrent innovation in teaching methods. By employing diverse instructional strategies, students’ intrinsic motivation is enhanced to actively engage in exploring ecological design solutions.

(1) Project-based learning (PBL) constitutes an effective approach for integrating ecological theory with design practice. Through the implementation of authentic or highly simulated design projects, students actively apply principles and methodologies of environmental protection throughout the entire design process.

(2) Critical case studies constitute an essential method for fostering students’ ecological critical thinking. Through the systematic analysis of both exemplary and problematic design cases, students are encouraged to critically evaluate the ecological consequences of design choices and to understand the underlying factors contributing to their success or failure.

(3) Digital technology empowerment has introduced novel opportunities for the instruction of ecological design.

(4) Collaborative teaching mechanisms constitute an essential approach to addressing the complexities inherent in ecological issues. In courses on landscape design and environmental protection, the author has implemented a “dual-instructor model”, engaging industry experts alongside faculty members to leverage the complementary strengths of academic theory and professional practice. Furthermore, interdisciplinary faculty teams collaborating in instruction represent another critical form of collaborative teaching. For example, the collaboration between ecology instructors and design educators facilitates the development of a comprehensive cognitive framework that connects ecological principles with design strategies.

### 2.3 Reform of the evaluation mechanism: transitioning from an outcome-oriented approach to one that emphasizes both process and outcomes

Traditional landscape design education evaluation has predominantly concentrated on the form and presentation of final design outcomes. However, the incorporation of environmental protection concepts requires a transformation in evaluation mechanisms to equally prioritize both the design process and the final results, thereby enabling a comprehensive assessment of students’ ecological literacy and sustainable design competencies.

(1) Formative assessment emphasizes students’ ecological thinking and decision-making during the design process. By utilizing design journals, periodic presentations, and targeted ecological analyses, educators are able to monitor students’ recognition of environmental issues, application of ecological principles, and modifications to their design strategies.

**Table 1 Value shift of integrating environmental protection concepts into landscape design education**

Dimension	Traditional teaching model	Environmental protection concept-driven model	Core of transformation
Value ethics	Anthropocentrism	Ecocentrism	From conquering nature to respecting nature
Design method	Endpoint governance	Full-process integration	From remediation to prevention
Educational target	Skills training	Competency development	From instrumental rationality to ecological rationality
Knowledge structure	Disciplinary isolation	Interdisciplinary integration	From professional differentiation to system integration

(2) Multidimensional capability assessment entails transcending the singular criterion of formal aesthetics to develop an evaluative framework that incorporates multiple dimensions, including ecological, social, and economic factors.

(3) Multi-stakeholder participation enhances the comprehensiveness and practicality of evaluations. In addition to teacher assessments, incorporating perspectives from industry experts, community representatives, and other stakeholders is beneficial.

### 3 “Low-carbon campus” development initiative of Zhongyuan University of Technology

The School of Art and Design at Zhongyuan University of Technology implemented a practical activity focused on “low-carbon campus” planning and construction within its curriculum reform for the postgraduate course of landscape design and environmental protection. Emphasizing the theme of “low-carbon energy conservation”, the event featured 10 original miniature campus low-carbon garden designs developed by postgraduate students.

Practical features: firstly, it emphasizes authentic construction by requiring students to engage in the entire process, from conceptual design and material selection to on-site assembly, thereby providing them with direct experience of the relationship between design and construction. Secondly, it centers on environmental themes, with projects exploring micro-space ecological design strategies across six themes, including “low-carbon healing”, “recycled rebirth”, and “vertical green environments”. Thirdly, it prioritizes the integration of campuses with urban contexts, whereby exemplary design concepts are implemented in real urban scenarios, such as the transformation of community vacant lots and the enhancement of greenery around residential properties.

Practical outcomes: firstly, it enhanced students’ practical skills and ecological awareness. Participating students noted that, unlike traditional design assignments, this project necessitated a transition from “theoretical contemplation” to “hands-on construction”. Although the process was challenging, it proved to be highly rewarding. Secondly, the project investigated the ecological significance of micro-spaces, highlighting the importance of low-carbon gardens as “micro-cells within the urban ecosystem”. Thirdly, it established a model for pedagogical innovation, offering a reference framework for incorporating environmental concepts into university landscape

design curricula.

## 4 Reflections and prospects

### 4.1 Challenges facing curriculum reform

Although the integration of environmental protection concepts into postgraduate landscape design education has yielded preliminary success, it continues to encounter several challenges.

(1) The principal challenge arises from the contradiction between disciplinary barriers and faculty structure. The comprehensive integration of environmental protection concepts necessitates the synthesis of knowledge across multiple disciplines, but most university faculty members possess expertise confined to a single discipline and often lack experience in interdisciplinary teaching and research. Furthermore, the existing disciplinary frameworks and administrative systems within universities hinder the development and implementation of interdisciplinary curricula. Although Chongqing Jiaotong University has partially mitigated this issue through a collaborative mechanism involving “government, university, and enterprise”, the enhancement of faculty interdisciplinary competencies remains a widespread challenge.

(2) Insufficient teaching resources and conditions present significant practical challenges. Instruction focused on environmental protection frequently demands supplementary field monitoring equipment, analytical software, and laboratory facilities, thereby imposing elevated requirements on institutional teaching resources. Concurrently, small-class and highly interactive teaching models require adequate faculty and spatial support. Although Liaocheng University has partially mitigated resource deficiencies through the adoption of information technologies such as virtual simulation, notable disparities in resources among universities persist.

(3) Achieving a balance between theoretical frameworks and practical application constitutes a fundamental challenge in instructional design. An overemphasis on ecological theory can result in course designs that are excessively scientific, thereby diminishing their artistic and creative aspects. Conversely, prioritizing formal innovation excessively may lead to departures from ecological principles, resulting in what can be described as “ecological formalism”. Attaining an equilibrium between ecological constraints and creative autonomy requires educators to demonstrate deep pedagogical insight and advanced course design expertise.

### 4.2 Future development direction and optimization strategies

In response to the challenges previously

identified, future reforms in postgraduate landscape design education should further advance in the following areas (Table 2).

(1) The formation of interdisciplinary faculty teams is essential for advancing educational reform. Comprehensive courses should be collaboratively developed by integrating faculty expertise from disciplines such as ecology, geography, and design through the establishment of interdisciplinary teaching teams. The practice at Chongqing Jiaotong University of regularly inviting industry experts to contribute to course instruction serves as a commendable model worthy of wider adoption. Additionally, mechanisms for cross-departmental faculty collaboration and systems for incentive distribution should be implemented to provide institutional support for interdisciplinary teaching.

(2) Developing digital teaching resources represents an effective strategy for addressing limitations in educational materials. Based on the experience of Liaocheng University in establishing its Virtual Simulation Teaching Innovation Laboratory, institutions can create virtual simulation projects for ecological design that are customized to reflect diverse regional characteristics. The sharing of resources can broaden the accessibility of high-quality instructional materials. Furthermore, promoting collaboration and resource sharing among institutions is essential to improve the efficiency of resource utilization.

(3) Graded curriculum design represents an effective approach to harmonizing theoretical knowledge and practical application. By employing a tiered curriculum structure that encompasses “fundamental theory, skill development, and integrated practice”, students progressively improve their capacity to tackle complex environmental challenges while mastering essential ecological principles. The three-stage progressive curriculum system at Chongqing Jiaotong University, comprising Reading Nature, Translating Nature, and Cultivating Nature, provides valuable insights.

(4) The establishment of a long-term evaluation mechanism is crucial for facilitating continuous improvement. In addition to assessing student learning outcomes, a sustained tracking system should be implemented to evaluate the effectiveness of curriculum reforms. This system should encompass comprehensive assessments of the actual impact on students’ professional competencies and industry development, utilizing methods such as alumni interviews, employer feedback, and case studies. These evaluations serve as the foundation for the ongoing refinement

**Table 2 Optimization strategies for integrating environmental protection concepts into landscape design education**

Challenge category	Specific issue	Optimization strategy	Expected outcome
Disciplinary barriers and faculty structure	Insufficient interdisciplinary capabilities of teachers and lack of cooperation mechanisms	Forming interdisciplinary teaching teams and establishing a school-enterprise collaboration mechanism	Breaking down disciplinary boundaries and promoting knowledge integration
Limited teaching resources	Insufficient experimental equipment and limited practical conditions	Developing virtual simulation resources and establishing an inter-school sharing platform	Expanding resource coverage and enhancing teaching efficiency
Imbalance between theory and practice	Disconnection between ecological theory and design practice	Developing a tiered curriculum system and strengthening project-driven education	Promoting the transformation of theory into practice
Inadequate evaluation mechanism	Emphasis on outcome evaluation and lack of long-term tracking	Establishing a diversified evaluation system and conducting postgraduate development tracking	Comprehensively evaluating the effectiveness of reforms and pursuing continuous improvement

of reforms.

## 5 Conclusions

The integration of environmental protection concepts into postgraduate landscape design education is not only an enhancement of teaching content but also a comprehensive reconfiguration of pedagogical philosophy, methodology, and assessment frameworks. This study examines prevailing challenges within current teaching practices and proposes a reform strategy focused on conceptual integration, curriculum redesign, methodological innovation, and evaluation reform. Utilizing practical case studies from domestic universities, it investigates specific implementation strategies and their effects.

Research suggests that the comprehensive integration of environmental protection concepts into postgraduate landscape design education necessitates the development of an interdisciplinary curriculum that surpasses conventional disciplinary limits. This integration requires the implementation of innovative pedagogical strategies, including project-based learning, case study analyses, and technology-enhanced methods, to foster students' intrinsic motivation for actively engaging in ecological problem-solving. Additionally, it calls for the reform of evaluation mechanisms to enable holistic assessments that balance both the learning process and outcomes involving multiple stakeholders.

Zhongyuan University of Technology has exemplified the potential and efficacy of incorporating environmental protection concepts

into landscape design education through a low-carbon perspective within its postgraduate curriculum reform. This method provides valuable insights for reform efforts at other academic institutions.

In the contemporary era of ecological civilization development, postgraduate education in landscape design assumes the critical responsibility of cultivating highly skilled professionals endowed with environmental responsibility, ecological wisdom, and innovative design competencies. Through the comprehensive integration of environmental protection concepts and systematic reform of the teaching system, landscape design education can more effectively contribute to the realization of the Beautiful China Initiative and sustainable development targets, thereby offering both talent and professional expertise essential for constructing a modern society characterized by harmonious coexistence between humanity and nature.

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