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Exploring an Applied Talent Development Model for the Integration of Scienceand Art—Taking the Environmental Design Major as an Example

Xu Xiaolin, Xiang Bin

Chengdu College of Arts and Sciences, Chengdu, China

Abstract: *Against the backdrop of the artificial intelligence and digital age, how to transform traditional teaching models, leverage the strengths and distinctive features of environmental design programs, and cultivate innovative, application-oriented talent is a question worthy of in-depth consideration. This paper explores models for cultivating application-oriented innovative talent in environmental design programs. Through the observation and comparison of various teaching philosophies, models, distinctive features, and course content, this paper seeks to analyze the current state and existing issues in talent cultivation within environmental design programs at application-oriented undergraduate institutions. Guided by the concept of integrating science and art, this paper proposes a model for cultivating application-oriented innovative talent that is grounded in national. Guided by the concept of integrating science and art, this paper proposes a model for cultivating application-oriented innovative talent that is grounded in national strategic needs, guided by cultural heritage, and driven by technology. By integrating social demands, competitions, and research projects into the talent development system, this model aims to foster students' intelligent creative thinking, diverse practical skills, and comprehensive qualities.*

Keywords: *Integration of Science and Art, Integration of Industry and Education, Applied Talent*

1. Introduction

The environmental design program has been in existence for over sixty years since its establishment in 1957. With the advent of the digital age and the rise of artificial intelligence, educators in the field of environmental design are facing unprecedented challenges. It was proposed at the National People's Congress and the Chinese People's Political Consultative Conference that innovation in higher education should meet the development needs of the digital economy era. The concepts of inheritance and innovation, interdisciplinary integration, and collaboration and sharing in the "New Liberal Arts" provide an opportunity for the development of the "New Arts." Technological advancements and applications—including artificial intelligence, AIGC-assisted design, digital twin design, and virtual space design—have already been integrated into the field of art and design education, charting a clear path forward. The development of talent cultivation models for environmental design programs must break away from traditional teaching methods. Starting from the practical developments of the current era and market demands, we must deepen innovative applications in the fields of artificial intelligence and big data, strengthen the integration of industry and education, broaden our understanding of humanistic values, and align with the needs for applied talent. By focusing on the unique teaching characteristics and current status of the discipline, we should seek a talent cultivation model that embodies institutional distinctiveness, possesses market competitiveness, and ensures sustainable development — ultimately cultivating innovative, multidisciplinary professionals who align with national strategies and meet societal needs.

2. Overview of the Current Status of Environmental Design Programs

The Environmental Design program is currently facing the dual challenges of industry digital transformation and educational reform. On the one hand, the traditional curriculum system lacks sufficient integration with rapidly developing technologies such as artificial intelligence, digital twins, BIM, VR/AR, and parametric design, resulting in a gap between students' digital design capabilities and industry demands. On the other hand, some teaching content is not closely aligned with industry frontiers, and the authenticity, comprehensiveness, and innovation of practical teaching projects need to be

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enhanced. At the same time, against the backdrop of national strategies such as rural revitalization, urban renewal, green and low-carbon development, and cultural heritage preservation, society has placed new demands on environmental design professionals, requiring interdisciplinary collaboration, sustainable design, digital innovation, and comprehensive practical skills. To address these challenges, the program seeks to leverage technology to drive educational reform, actively promoting the "AI + Design Education" initiative. This involves integrating technologies such as AIGC, digital modeling, virtual simulation, and intelligent design into the curriculum and practical training components. The goal is to establish an educational mechanism that integrates industry and education and fosters university-enterprise collaboration, thereby propelling design education from a traditional experience-driven model toward a data-driven and intelligence-driven approach. This will cultivate high-quality, application-oriented environmental design professionals equipped with innovative thinking, digital literacy, and practical skills.

2.1 The curriculum system tends to be traditional, lacks distinctive features, lacks sustainable optimization, and lacks interdisciplinary top- level design

The curriculum framework for the Environmental Design program is designed to cultivate high-quality, application-oriented professionals who possess a solid foundation in the discipline, master methods of architectural and spatial design, are familiar with environmental design presentation techniques and computer-aided design skills, and demonstrate strong humanities and scientific literacy, a solid professional foundation, and robust practical abilities.The curriculum for the Environmental Design program is primarily divided into four major components: foundational courses, technical skills courses, practical courses, and hands-on instruction. However, in the current environment driven by technological innovation, artificial intelligence, and big data, the current planning and teaching models for the Environmental Design program can no longer meet the rapidly evolving demands of the market and society.The constant emergence of new materials and technologies has led to a lag in specialized knowledge, causing design education to become detached from the market and resulting in a weak connection between teaching and society. This is particularly evident in professional skills courses. The development of artificial intelligence technology has replaced the process of creating three-dimensional spatial models, leading to a lack of market relevance, functionality, and contemporary relevance in the design of spatial environments. Interdisciplinary knowledge remains fragmented, and the absence of a curriculum system that integrates interdisciplinary elements prevents teaching from achieving sustainable optimization that adapts to market demands.

2.2 Monotonous Teaching Models, Insufficient Industry-Education Integration, and Lack of Interdisciplinary Integration

The core courses in the Environmental Design program are inherently highly practical, employing project-based learning with a primary focus on hands-on instruction. While the program engages in industry-academia collaboration, the bridge between schools and enterprises is not sufficiently well-established in actual teaching practices. and the need to meet a series of policy requirements, the curriculum design, syllabi, and teaching schedules are constrained by numerous factors. Consequently, course offerings remain traditional, adhering to the "core courses + major courses + electives + practical courses" model. This results in collaborations that are largely superficial and difficult to deepen, making it challenging to implement industry-education integration teaching plans and hindering the realization of a collaborative school-enterprise talent development model. With the advancement of technology, the pace of innovation in artificial intelligence and the rate of knowledge updates are accelerating. Interdisciplinary knowledge is an essential competency for students majoring in environmental design. While current teaching incorporates interdisciplinary elements, it primarily involves the simple combination of knowledge from different disciplines. While this partially meets the need for interdisciplinary integration, it remains superficial. Students lack specialized knowledge across different disciplines and the practical application of such knowledge.

2.3 Lack of Comprehensive Cultural Literacy

An analysis of graduation design projects in the environmental design program reveals that outstanding student works must not only meet design requirements but also possess cultural depth. The lack of critical thinking training in professional coursework, coupled with a neglect of artistic concepts and the significance of cultural literacy in guiding practical work, has led students to lose sight of the intellectual and creative dimensions of their designs . As designers mediating between people and the

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environment, environmental design students must not only understand the objective conditions of the physical environment but also delve deeper into regional culture and folk traditions.

3. Establishing an Applied Talent Development Model Integrating Science and Art

With the cultivation of innovative, application-oriented talent as its core mission, the Environmental Design program has established a model guided by the integration of science and art and the convergence of industry and education, utilizing scientific and technological innovation and application as educational tools, as shown in Figure 1. In response to societal talent demands, the Environmental Design program actively adapts to trends in artificial intelligence and digital technology. By integrating knowledge and skills from aesthetics, technology, marketing, and the humanities, the program aims to cultivate students' artistic design capabilities, cultural heritage preservation skills, and technological application abilities. Through industry-education and science-education integration, the program develops students' practical training skills and professional ethics. Aligning with the program's characteristics and developmental direction, it serves local economic development and has reorganized the entire talent cultivation system.

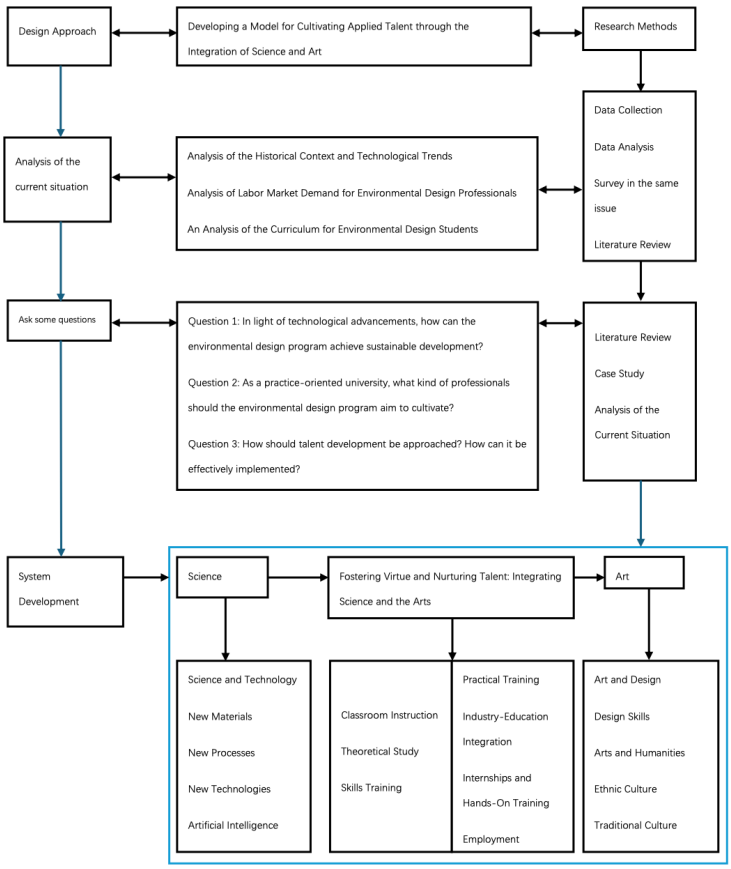

Figure 1: Conceptual Framework for the "Science-Art Integration" Applied Talent Development Model

3.1 Reconstruction of the Curriculum System Guided by the Integration of Science, Education, and Research

The construction of a curriculum system for applied talent cultivation through the integration of science and education organically unifies science and technology, teaching activities, and research projects, thereby promoting the collaborative development of both students and faculty. While students master foundational professional knowledge, they further expand their professional creative tools, delving into areas such as AIGC-assisted design, virtual spaces, and smart spaces. By incorporating faculty research projects and real-world projects from industry-university collaborations into teaching, students' practical abilities are cultivated. Through exploratory learning, design technologies are updated, fostering students' self-directed learning capabilities as well as their ability to analyze and solve

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problems.In the teaching process, faculty members utilize intelligent tools to further transform and apply teaching outcomes, thereby enhancing teaching quality while fostering the incubation of research achievements.While fostering the collaborative development of faculty and students, the curriculum reform system—rooted in the philosophy of integrating science, education, and industry—strengthens industry-education integration to form new teaching models. Content related to intelligence and visualization can serve as key modules within core professional courses or as integral components of specialized or elective course systems. This approach systematically enhances students' understanding and application of new technologies, materials, and processes, while reinforcing their digital design and innovative practical skills.Leveraging the construction of the Digital Intelligent Space Laboratory, we will further expand the virtual simulation experimental teaching platform for the Environmental Design program and explore innovative teaching models supported by intelligent technologies. Within the core curriculum, we should build upon the reinforcement of traditional design skills training to strengthen the cultivation of artificial intelligence and digital technology application capabilities, while simultaneously emphasizing the integrated development of humanistic literacy and design thinking. This will establish a high-quality curriculum system that unifies technological empowerment with humanistic guidance, thereby comprehensively enhancing the quality of talent cultivation.

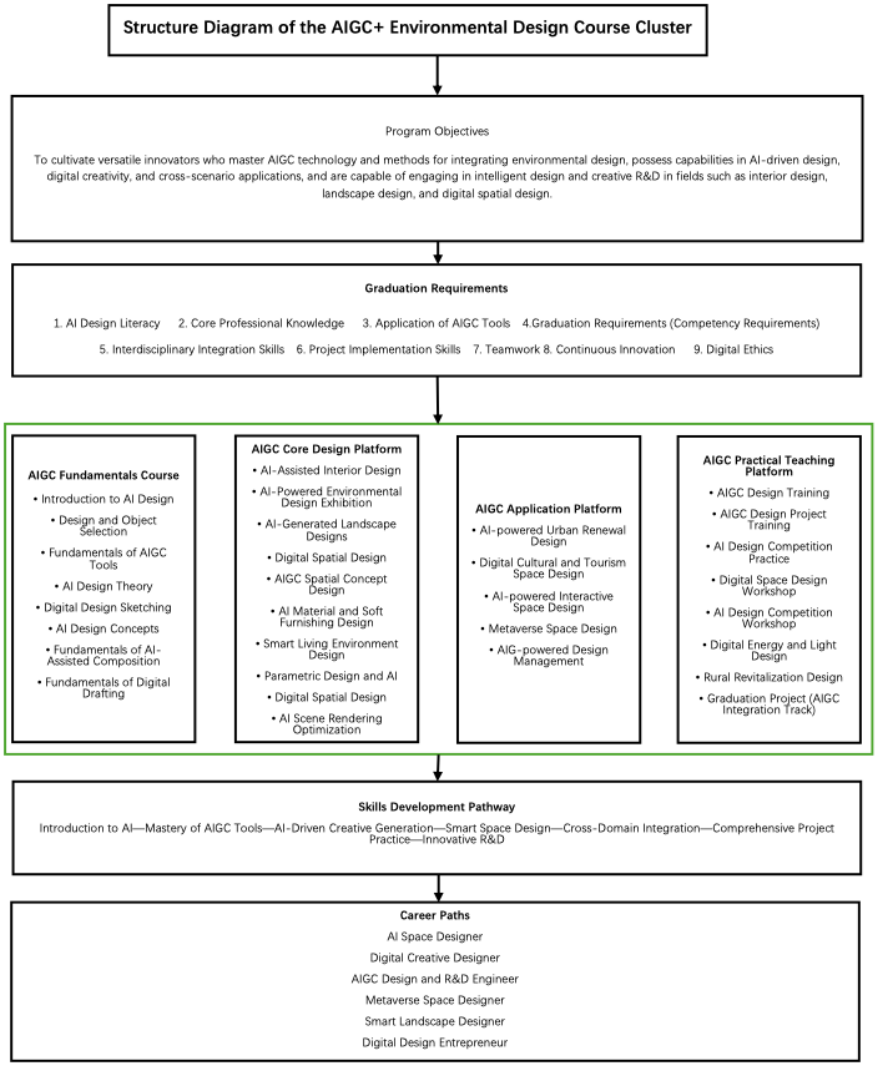

Figure 2: Environmental Design Curriculum Framework

3.2 Interdisciplinary Teaching Model

The Environmental Design major is inherently interdisciplinary. During their studies, students must not only master foundational design knowledge but also acquire related knowledge in areas such as ethnic culture, social customs, ecological conservation, and science and technology. Currently, most students

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in the Environmental Design program are arts and humanities majors, with knowledge backgrounds primarily in the humanities and social sciences. Therefore, a student-centered approach should be adopted to design curricula tailored to their characteristics, breaking down the barriers of the existing course structure. By adopting an interdisciplinary teaching model, we can break down the boundaries of students' existing knowledge. For students with strong visual thinking skills, this approach cultivates logical thinking abilities and expands the dimensions of their professional knowledge.

3.3 Deepening Teaching Practice Through Industry-Education Integration

Through industry-education integration guided by employment outcomes, we will further deepen cooperation models between the school and enterprises. Guided by the OBE (Outcomes-Based Education) philosophy in curriculum design, we will collaborate with enterprises to scientifically and continuously improve teaching syllabi, course standards, learning objectives, and teaching plans. The design of industry-education integration practice courses will be based on the business characteristics and job requirements of partner enterprises. For example, the interior design curriculum system includes: "Smart Living Space Design," "Digital Twin Space Design," "Digital Office Space Design," "Smart Exhibition Space Design," "Interior Design Practice 1," and "Interior Design Practice 2." By increasing the practical component of the entire curriculum, students can apply their learning to real-world business scenarios. This approach not only cultivates students' practical skills but also develops their professional ethics, thereby achieving the goal of professional talent development.

4. Conclusion

Against the backdrop of rapid advancements in artificial intelligence, traditional educational models are no longer sufficient to meet the demand for applied talent; the integration of science and art addresses this shortfall.Based on the current state of environmental design and the challenges it faces, this paper takes moral education and talent development as its foundation, aims to cultivate innovative, application-oriented talent, and uses the development of students' strong practical skills and comprehensive market adaptability as its benchmark. Adopting a "science-art integration" perspective, it explores the cultivation of students' practical abilities, interdisciplinary knowledge, innovative design thinking, and humanistic literacy, while also addressing the specific characteristics of students in the environmental design major. The implementation of this application-oriented talent development program enhances students' overall competitiveness.

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