

The Practical Path to Cultivating Innovative Talents: Implementing Cross-Disciplinary Learning Communities in Environmental Design Education

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Abstract: In response to the national strategy of “vigorously cultivating interdisciplinary talents and actively promoting interdisciplinary integration,” this article focuses on the nationally recognized Environmental Design program at Hezhou University’s College of Design, leveraging local industry advantages to engage in interdisciplinary integration through educational practices. Using the “Construction of the Panoramic Virtual Nature Museum of the Guizhou Crocodile Lizard at Mount Dagui” as a case study, we aim to establish a professional and interdisciplinary learning community, incorporate student-centered interactive teaching methods, boost student motivation, enhance teaching quality, nurture forward-thinking versatile innovative talents, and provide a guideline for interdisciplinary educational reform.

Keywords: Interdisciplinary integration; Environmental design; Pedagogical practices; Cross-disciplinary learning communities; Interactive teaching

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1. Introduction

As the “Double First-Class Initiative” gains momentum in Chinese universities, there is an increasing emphasis on interdisciplinary research at the national policy level. Hezhou University’s College of Design, home to the nationally recognized Environmental Design major, has developed a relatively mature and stable educational framework with distinctive characteristics over the years. However, within the context of interdisciplinary integration, it becomes pertinent to examine how Environmental Design can traverse disciplinary boundaries, which disciplines it should encompass, how to effectively integrate them, and how to create significant value. Thus, this article, commencing with practical projects, leverages Hezhou City’s local industry advantages to construct a cross-disciplinary learning community, responding to the evolving trends of our times, renewing

the teaching models, and nurturing innovative talents that align with China's national interests and societal development.

2. Constructing the cross-disciplinary learning community

The importance of effectively utilizing the “catalyst” for interdisciplinary integration was emphasized. It is necessary to strengthen the capacity to cultivate fundamental disciplines, break down disciplinary and professional barriers, adjust and upgrade existing disciplinary and professional systems, and focus on the forefront of science and technology in key fields. This crucial directive outlines the path for nurturing composite innovative talents, which are in high demand in our society. Within this process, there is an inherent need to overcome disciplinary barriers and blend different disciplines and majors. Thus, it is essential to consider whether the current “teaching” approach, where educators often excel in a specific profession, can adequately address students’ knowledge needs in various majors. Traditional teaching methods, while effective within specific disciplines, may not suffice when dealing with a heavy mix of majors. Consequently, the establishment of cross-disciplinary learning communities emerges as an inevitable trend. A cross-disciplinary learning community represents a collaborative and mutually supportive educational environment established among educators, students, and other stakeholders. Its core essence lies in “a group of individuals who share a common vision, problem, or passion for a particular topic, deepening their knowledge and expertise through continuous interaction” ^[1]. The defining characteristics of a cross-disciplinary learning community include breaking through professional boundaries, working together towards a shared goal, as well as collective responsibility, reflective exploration, and cooperation. The construction of a cross-disciplinary learning community not only addresses students’ diverse knowledge needs when tackling complex social issues, but also enhances educators’ absorption of various professional knowledge during interactions among community members, thus subtly impacting their own growth and development.

3. Internal construction of the cross-disciplinary learning community

3.1. Responsibility sharing and promotion

The cross-disciplinary learning community involves negotiations and collaboration among students, teachers from diverse disciplines, and other stakeholders who share a common purpose and vision. While this self-organizing system requires minimal management, its development necessitates guidance. Scholars such as Cecil A. Gibb (1958), Peter Gronn (2000), and James P. Spillane (2006), among others, advocate for Distributed Leadership within this organization. Distributed Leadership entails that every member contributes to the community’s development within their capabilities, and they all bear the responsibility for promoting its growth. Moreover, the learning community should encompass supporters and mentors dedicated to students’ development, including professional teachers and project mentors, who play a vital role in its advancement.

3.2. Fostering a positive learning and emotional environment

Within the cross-disciplinary learning community, students, teachers, and other supporters and helpers hailing from diverse disciplines bring a range of expertise and attributes to the table. To foster mutual assistance and interaction, the environment should embrace a democratic and egalitarian perspective on knowledge. It is in this environment of safety and trust that members find encouragement to engage in communication, learning, questioning, and mutual correction, all while gaining experiences and lessons in the process. The anticipated outcomes include mutual encouragement, collaborative reflection, and personal growth. Within

such an environment, students and teachers, each with their distinct specializations, can liberate themselves from isolation, transcending disciplinary boundaries to facilitate equitable and constructive dialogues among individuals of varying natures and affiliations.

4. Fusing student-centered interactive thinking

Marxism posits that an individual's essence is intricately linked to the amalgamation of various social relationships. This perspective underscores the crucial role of linguistic information in achieving mutual comprehension and effective consensus^[2]. This insight highlights the information-processing role of interaction, which has the potential to enhance the real-time and dynamic exchange of information between learners and the educational system^[3]. This process occurs either synchronously or asynchronously, mediated by feedback^[4]. Interactivity occurs in computer-mediated college and university education^[5]. Consequently, the application of interactive thinking within a cross-disciplinary learning community fosters multidimensional communication, interaction, and feedback among its members.

4.1. Conceptual interaction

In the era of 5G and information technology, a cross-disciplinary learning community must go beyond traditional teaching methodologies. By integrating interactive teaching philosophies, it should facilitate cross-disciplinary cognitive deconstruction through interaction. Using the "Construction of the Panoramic Virtual Nature Museum of the Guizhou Crocodile Lizard at Mount Dagui" project as a case study, the community should guide both students and teachers to leverage information technology for elucidating the significance of the Guizhou crocodile lizard. This includes its listing in the "IUCN Red List of Threatened Species," "CITES Appendices I, II, and III," and the "National Key Protected Wild Animal List," along with the corresponding timelines for these classifications. Community leaders must further direct students to deduce the ecological habitat of the Guizhou crocodile lizard, its geographical range, behavioral patterns, threats to its existence, physiological characteristics, morphological features, subspecies differentiation, and other pertinent natural and cultural data specific to Hezhou. This comprehensive approach allows them to discern both the scientific research value of the Guizhou crocodile lizard and the humanistic significance of Hezhou's natural resources.

By embarking on the mission of safeguarding endangered species like the Guizhou crocodile lizard, the amalgamation of biological, cultural, sociological, semiotic, architectural, and artificial intelligence-related knowledge is imperative. Consequently, the students must comprehend the interrelationships between design and these disciplines. In alignment with national strategies and government policies, this undertaking promotes ecological conservation and aims to harness the success of the project to stimulate Hezhou's tourism industry and related sectors. It signifies a shift from "material-driven" to "innovation-driven," disseminating the natural and cultural attributes of Lingnan, instilling cultural self-confidence, and bolstering cultural development.

4.2. Problem interaction

The essence of design lies in the conceptualization and resolution of problems, constituting the core of all valuable creative endeavors. With this in mind, design educators should not merely seek methods from abstract theoretical frameworks; instead, they must focus on cultivating students' problem-solving capabilities when confronted with the intricacies of practical issues. In this spirit, the cross-disciplinary learning community should propel its members to tackle real-world problems with authentic dilemmas, tasking students with understanding the complex interactions between species, culture, history, and technology, as demonstrated by the Guizhou crocodile lizard project. In each facet of project development, students should comprehend that

problems hold varying levels of complexity and interconnectivity, invariably involving multiple disciplines.

In the design of an environment for the Guizhou crocodile lizard, students should acknowledge the ecological, social, and technical components. The students are to embrace the concept of biological continuum, ecological connectivity, and the utilization of “artificial intelligence + environment design” to reinforce the connectivity between diverse biological species. They must harness the biodiversity of Mount Dagui to spur tourism, simultaneously bestowing educational significance. Through the evolution of environmental design solutions, students learn to solve problems, equipping themselves with the capacity to assess the needs of diverse stakeholders and charting sustainable developmental pathways. They cultivate skills to formulate innovative ideas, design novel products and spaces, and assess the effectiveness of their designs, understanding the essentiality of interdisciplinary integration in problem-solving.

To carry out problem interaction in a cross-disciplinary learning community, first of all, in the ontology of the design discipline, the main consideration lies in the perspective of environmental design, focusing on the process and construction method of building the Mount Dagui Crocodile Lizard Ecological Museum, and guiding students to review their learned professional knowledge. Secondly, in interdisciplinary questions, the questioning of students involves biological knowledge of the biological characteristics and habits of the Mount Dagui crocodile lizard, semiotic knowledge to understand the biological status and representative meanings of the Mount Dagui crocodile lizard, cultural and sociological knowledge to discover the humanistic characteristics of Hezhou City, as well as architectural knowledge and artificial intelligence knowledge for panoramic virtual construction, such as the construction technology of the ecological museum. Lastly, returning the question to society, why do we study crocodile lizards and why do we mix our existing professional knowledge with other professional knowledge to promote science for crocodile lizards? This has further enabled students to understand the national policy guidelines and the important value of characteristic organisms in scientific research. It also enables students to break through disciplinary boundaries in the process of interspersed and interactive problems, seek knowledge through thinking, and practise through seeking knowledge, breaking through disciplinary barriers, and applying various knowledge to solve complex social problems.

5. Achievements of cross-disciplinary learning community teaching practices

At the helm of the cross-disciplinary learning community, the practice of nurturing innovative talents amid pedagogical innovation achieved marked successes, leaving an indelible imprint. The “Construction of the Panoramic Virtual Nature Museum of the Guizhou Crocodile Lizard at Mount Dagui” project, with students from diverse disciplines as its core, engendered creativity, innovation, and comprehensive growth. The project not only resulted in the establishment of the museum, but also orchestrated substantial progress in the students’ academic performances and their research and design abilities. Through participating in the project, students underwent tangible transformations in terms of their design abilities, environmental awareness, and their comprehensive quality.

6. Conclusion

In conclusion, this study unveils the proactive role played by Hezhou College’s Environmental Design program in ushering forth a new paradigm of interdisciplinary fusion and the construction of cross-disciplinary learning communities. Aligning with national policy directives and societal needs, the project’s achievements and innovative teaching practices provide an illuminating illustration of pedagogical innovation and cross-disciplinary integration. As China surges towards becoming a world-renowned hub of innovative talents, such

pedagogical models, which nurture versatile, future-oriented design professionals, are poised to have far-reaching impacts. This research is offered as a foundational guideline, inspiring further exploration in the realm of interdisciplinary education. The nexus between pedagogical innovation, ecological conservation, and socioeconomic development is symbolically exemplified, underscoring the comprehensive nature of the revolution underway within contemporary higher education.

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