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Discussion on Application of AI Image Generation in Undergraduate Landscape Architecture Courses

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Abstract With the rapid development of image-generative AI (artificial intelligence) technology, its application in undergraduate Landscape Architecture education has demonstrated significant potential. Based on this, the present study explores the implications of integrating image-generative AI into Landscape Architecture courses from three perspectives: stimulating students' creative design potential, expanding approaches to form and concept generation, and enhancing the visualization of spatial scenes. Furthermore, it discusses application strategies from three dimensions: AI-assisted conceptual generation, human-machine collaboration for design refinement, and optimization of scheme presentation and evaluation. This paper aims to provide relevant educators with insights and references.

Key words AI image generation, Landscape Architecture Courses, Application strategy

0 Introduction

Within the domain of Landscape Architecture education, cultivating students' design thinking and innovative ability should be regarded as the core objective. The traditional teaching model is constrained by time and space, making it difficult to fully unlock students' creative potential. In recent years, image-generative AI (artificial intelligence) technology, with its strong image generation capability and efficient design assistance, has gradually emerged as a new focus in design education. This technology can not only rapidly generate multiple design schemes but also, through visualization techniques, assist students in better presenting spatial scenes.

1 Application advantages of image-generative AI in Landscape Architecture Courses

1.1 Stimulating students' creative potential in design In the context of Landscape Architecture education, the use of image-generative AI is a key strategy for stimulating students' latent creativity. Conventional design teaching is typically limited by the scope of students' imagination and personal experience. The integration of AI breaks through these boundaries. By inputting brief keywords or concepts, students can prompt the AI to quickly produce a variety of images, which in turn supply rich visual inspiration and broaden their conceptual horizons.

In the context of urban park design, AI can generate images aligned with the "modern urban oasis" theme, incorporating diverse styles, vegetation types, and spatial arrangements. This capability enables students to investigate design alternatives from multiple perspectives. The instantaneous visual feedback stimulates creative thinking, liberating students from traditional design paradigms and empowering them to explore innovative design concepts and unconventional element integrations[1]. Furthermore, AI-generated images can function as creative stimuli, encouraging students to deepen and expand their explorations, thereby yielding more original designs and enhancing their capacity for innovative and independent thought.

1.2 Expanding forms and approaches of scheme conceptualization Image-generative AI has expanded new pathways for the forms and conceptualization of schemes in Landscape Architecture courses. During the design process, students often face the challenge of translating abstract ideas into concrete forms. The image-generation capability of AI can transform these abstract concepts into visible representations, helping students better grasp the interrelationships between design elements. For example, when designing a waterfront landscape, AI can generate various layout options for waterfront spaces, such as wetland gardens, public plazas extending to the water, and ecological walkways, based on the requirements of "ecological and hydrophilic characteristics." These images not only present diverse spatial configurations but also offer rich detailed information, including vegetation pairings, material selection approaches, and the effects of light and shadow. Through comparing and analyzing the images generated by AI, students can quickly select forms that align with their design objectives and further refine or improve them based on these selections. Additionally, AI can produce multiple design alternatives tailored to different site conditions and functional requirements, supporting students in considering issues from various perspectives and broadening their design thinking pathways. This diverse approach to conceptualizing solutions not only enhances design efficiency but also allows students to gain a deeper understanding of design principles and methods through comparing different alternatives, thereby strengthening their overall design capabilities.

1.3 Enhancing the visual expression effect of space scene In traditional teaching models, students typically present their design proposals through hand-drawn renderings or simple modeling software, methods that are often time-consuming and struggle to

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achieve highly realistic effects. In contrast, AI image generation technology can quickly create high-quality three-dimensional spatial scenes, including variations in lighting and shadow, the texture of materials, and detailed vegetation, making the presentation of design proposals both vivid and intuitive. For instance, when conducting a landscape renovation design for a historic district, AI can produce realistic scenes featuring traditional architecture, streets, and vegetation. This allows both students and reviewers to clearly perceive the spatial atmosphere and emotional experience created by the design proposal. Such an intuitive means of expression not only helps students gain a deeper understanding of their own designs but also facilitates communication and interaction with peers, teachers, and clients[2]. AI-generated images can also serve as a feedback tool during the design process, helping students promptly identify issues and make adjustments. Through such intuitive visual representation, students are able to delve deeper into the relationship between space and environment, enhance the feasibility and appeal of their design proposals, and lay a solid foundation for future practical projects.

2 Strategies of application of image-generative AI in Landscape Architecture Courses

2.1 Carrying out intelligent generation of auxiliary ideas combined with the design theme At the beginning of the course, teachers can assign specific design themes according to the syllabus, such as urban ecological park, historic district landscape renovation, or roof garden design. Students are then expected to conduct preliminary research and reflection on these topics. However, they often encounter challenges during the creative conceptualization phase. To assist them, teachers can guide students to input the design theme into an image-generating AI system, which will produce a series of relevant visual references. These images may depict varied site layouts, vegetation combinations, spatial configurations, and arrangements of landscape elements, offering students a rich source of visual inspiration. Taking the "urban ecological park" as an example, the AI can generate scenes such as wetland landscapes, leisure trails, and children's play areas, thereby helping students quickly expand their thinking and explore design possibilities from the overall scheme down to specific details.

Teachers can also assign students the task of categorizing and analyzing AI-generated images. By examining the design concepts, spatial planning approaches, and material selections reflected in these images, students can extract valuable insights and incorporate them into their own design proposals. This analytical process not only helps students understand different design styles and techniques but also guides them in developing critical thinking skills. For instance, students can compare waterfront landscape images of different styles, analyzing their variations in ecological performance, hydrophilic quality, and aesthetic effect, thereby selecting more appropriate strategies for their own design projects.

2.2 Integrating into the design process to achieve human-computer collaboration and deepen the creation In the survey stage at the beginning of the design, AI can act as a tool to collect and sort out information. Students can input the key content related to the design site, and then obtain a large number of related images and cases, which can help students quickly understand the historical background, cultural characteristics and natural environment of the site, and provide rich materials for subsequent design ideas. For example, in a landscape design project of a historic district, teachers can use artificial intelligence to help students produce images of architectural appearance, street planning and vegetation distribution at different stages of the area, so as to help students understand the context attributes of the site more comprehensively[3].

During the conceptual design phase, instructors can integrate AI image generation capabilities with students' creative thinking. Students can input their preliminary ideas into the AI system and, by adjusting parameters, generate visual representations of multiple design alternatives. These visuals not only provide immediate visual feedback but also help students quickly assess the feasibility and impact of different design approaches. For example, when designing an urban plaza, students can use AI to produce images of the plaza in various styles, such as modern, classical, or ecological, and with different functional layouts, such as leisure-focused, assembly-oriented, or commercial, enabling them to select the option that best aligns with their design goals.

2.3 Optimizing the scheme display and evaluation with the help of image generation technology In the first place, during the presentation stage of design proposals, image generation technology can swiftly produce high-quality 3D visualizations. These visuals not only achieve a highly realistic rendering effect but can also present the spatial distribution, functional zoning, vegetation arrangement, and the interplay of light and shadow in a design scheme from multiple perspectives. For instance, when students are working on an urban park design, instructors can leverage AI technology to generate landscape visualization images for different seasons and times of day. This approach intuitively demonstrates the park's evolving scenic characteristics and functional uses throughout the changing seasons. Such a highly visual presentation method not only helps students articulate their design ideas more clearly but also facilitates comprehensive and in depth analysis of the proposal by both instructors and peers.

In the second place, image generation technology can also produce comparative visualizations of multiple design alternatives, thereby helping students and project evaluators more intuitively assess the strengths and weaknesses of different schemes. In actual design workflows, students often develop several design proposals, yet traditional presentation formats struggle to promptly illustrate the distinctions between them. Artificial intelligence, however, can generate images of various design options based on different input parameters. By displaying these images side-by-side or toggling between them dynamically, both students and instructors can

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competency units, and assign corresponding credit values to each unit. Crucially, it is necessary to include outstanding achievements in the application of digital skills by village cadres and the effectiveness of rural digital governance within the scope of credit certification, such as e-commerce entrepreneurship results, award certificates, and exemplary cases of digital village construction, assigning them significant weightings. These can be recognized as credits after expert review and unified verification. Third, it is necessary to establish implementation rules for credit redemption and open up redemption channels, allowing village cadre learners to redeem their digital competency credits for academic course credits, professional qualification certificates, or as key evidence for awards and commendations. This effectively stimulates their endogenous motivation to enhance their own digital literacy.

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clearly discern differences in spatial effect, functional layout, and aesthetic expression across the proposals. For instance, in a waterfront landscape design project, instructors can use AI to generate contrasting images of a modern minimalist style and a naturalistic wildscape style, helping students and evaluators quickly determine which style better aligns with the site's practical requirements and design objectives.

3 Conclusions

Image-generative AI technology offers new opportunities for innovation in undergraduate Landscape Architecture courses. When applied appropriately, this technology can effectively stimulate students' creative potential, broaden their design thinking, and significantly enhance the visual presentation of spatial scenes. Looking ahead, as image-generating AI continues to advance and educational approaches evolve, its application in Landscape Architecture education is expected to become more widespread and deeply integrated. This progression will help lay a solid foundation for cultivating highly skilled professionals in the field.

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