The Value and Application Analysis of Digital Technology in Environmental Art Design

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Abstract: The development and application of digital technology provide a new technological means for environmental art design. With the assistance of digital technology, more complex and diverse spatial forms can be created, and different styles of design results can be simulated with the fastest efficiency, ensuring a smoother design process and providing technical support for the innovative development of environmental art design. The article focuses on the specific components of digital technology, analyzes the important value of digital technology in environmental art design from the aspects of design schemes, design expressions, and design systems, and then proposes the practical application of digital technology in environmental art design for reference.

Keywords: digital technology; Environmental art design; Value; application

Introduction

Contemporary environmental art and design are undergoing unprecedented digital transformation, with various digital technologies such as big data, artificial intelligence, and virtual reality providing designers with more diverse means of expression. Environmental art design, as an art form that integrates multiple dimensions such as space, leverages the important functions of digital technology to construct a highly expressive creative ecosystem, greatly changing the way designers work. Promoting the diversified application of digital technology in environmental art design can significantly enhance the pertinence of environmental art design, transform it into relevant art media, and construct more infectious and personalized works.

1.The Important Value of Digital Technology in Environmental Art Design

1.1 Promote personalized design to meet diverse needs

The powerful analytical capabilities of digital technology can help designers deeply analyze users' behavioral habits, aesthetic preferences, and emotional appeals, and then develop personalized design solutions that highly meet users' needs. The use of big data technology enables designers to obtain design parameters and develop design plans based on real-time feedback from users. The design process has significant dynamic and diverse characteristics. Users can break free from the limitations of passive product reception in traditional design patterns, actively integrate into various processes of environmental art design, and accurately translate user needs into artistic design language. At the same time, the application of digital technology also provides technical support for the style creation of environmental art design, especially the use of generative artificial intelligence, digital modeling technology and other means, which can open up new design paths. Designers use programming languages to establish creative rules and harness the artistic power of numerical algorithms. If digital parametric design only requires designers to log in to the system and adjust key parameters, multiple design variants can be quickly generated, injecting creative vitality into the overall innovation and development of environmental art.

1.2 Enhance artistic expression and enrich aesthetic experience

The 3D rendering technology in digital technology can accurately simulate light, shadow, and material textures, and endow innovative visual effects to environmental art design through technological rendering, presenting imagined conceptual designs vividly to users. At present, the development of high-end rendering technology

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provides more diverse design choices for environmental art design, which can simulate real environments of different climates, seasons, and time periods, and create more diverse design innovations in the spatial and temporal dimensions. Virtual reality technology has powerful 3D display capabilities, breaking through the limitations of traditional 2D environmental art design and providing users with a multi sensory and all-round artistic experience space. Using virtual reality technology to construct virtual objects that users can see with their own eyes and come into contact with, combining environmental elements with the surrounding space to create interaction and enrich the aesthetic experience of the audience. The immersive spatial system created by virtual reality technology effectively broadens the boundaries of traditional environmental art expression, extending it to multiple sensory dimensions, creating a new spatial narrative mode, and bringing unique personal artistic memories to the audience.

1.3 Build a comprehensive system to ensure complete design

The use of digital technology provides strong technical support for innovation and cross-border integration in environmental art design. It can not only significantly enhance audience participation and enrich their emotional experience, but also achieve the integration and symbiosis of visual art in environmental art design. Designers can use 3D modeling software to preview the presentation effect of the design scheme in the pre production stage, accurately calculate the design deficiencies in different stages, adjust and optimize in a timely manner, avoid design changes, and ensure the integrity of the design. In addition, big data technology combined with artificial intelligence tools can create a comprehensive system that collects and analyzes important data such as user behavior and environmental factors to more accurately predict the final presentation effect of design solutions, ensuring that the design is reasonable and the product is complete. The decision support system integrated with intelligent algorithms also plays a key role in the design process, helping designers to horizontally compare the content and final presentation effects of multiple design schemes, evaluate them from the aspects of spatial function, environmental structure, and economic benefits, and highlight the comprehensiveness and integrity of the design.

2.Characteristics Analysis of Digital Technology

2.1 Interactivity

Digital technology has significant interactive characteristics, which are mainly reflected in the effective interaction between the environmental space and the audience in environmental art design. Customers only need to watch the design renderings to roughly understand the final presentation effect. Therefore, the application of digital technology in environmental art design needs to leverage its interactive function, emphasizing the full interaction between people, people and the environment, and environment to environment, reflecting the interactive value of applying digital technology in environmental art design. For example, in the process of interior space design, through the use of smart homes, indoor lighting and structural colors can be dynamically adjusted, and the interaction between users and the environment is more complete.

2.2 Multi perception

As a comprehensive technological means, digital technology can highlight the multi sensory effects of environmental art design, that is, organizing environmental art design through various forms such as images, audio, video, virtual models, etc. It not only enriches the forms of design expression, but also provides designers with more diverse design ideas. The development of modern digital technology has enhanced the directionality of modeling technology, transforming traditional two-dimensional drawing information into three-dimensional models, continuously improving and optimizing model content, and enhancing the attractiveness of design. During the design phase, multiple design elements can be rearranged and combined to create emerging spatial landscapes, effectively enhancing the overall quality of environmental art design.

2.3 Immersion

The application of digital technology provides a new perspective for environmental art design, whether it is the

construction of three-dimensional models or the creation of virtual spaces, further enhancing the innovative effect of environmental art design. In the process of architectural space design, digital modeling is used to visualize the architectural space, plan various spatial elements reasonably, and improve spatial functions to reflect design concepts. During the design phase, virtual reality tools are used to provide users with spatial renderings. Designers can directly observe the final appearance of the architectural design drawings, dynamically adjust the positioning of design deficiencies, and have significant immersive features.

3.The Application Strategy of Digital Technology in Environmental Art Design

3.1 Using real-time visualization to showcase design solutions

Real time visualization, as an important function of digital technology, mainly uses computer graphics technology to provide designers with real-time visualization of design effects, such as virtual reality technology, digital modeling technology, enhanced display technology, etc. Transforming two-dimensional design schemes into three-dimensional models helps designers visually and comprehensively evaluate the design space, improve communication efficiency and decision-making accuracy. 3DMAX and SketchUp are highly efficient digital visualization tools that can help designers efficiently construct 3D models. During the process of observing the model, designers can dynamically adjust local structures, design materials, etc., observe spatial effects under different design concepts, locate potential design issues, and ensure complete spatial functionality and distinct design features. The timely feedback function of digital technology provides designers with a more comprehensive means of risk control, such as virtual reality technology directly transforming two-dimensional drawings into virtual reality, allowing users to immerse themselves in the spatial environment and dynamically display design concepts and intentions. The real-time presentation of visualization technology also plays an important role in cross disciplinary collaboration[1]. Designers from different stages can observe and evaluate the design effect in a digital platform, communicate and interact in real-time on the design scheme, propose modification suggestions, and ensure that the final design scheme meets customer needs and expectations.

3.2 Utilize digital interactivity to enhance artistic experience

In the digital age, the aesthetic needs of the people are more diverse, no longer satisfied with a single static viewing, but also hoping to participate in environmental art design and interact efficiently with products and environmental spaces. The application and support of digital technology can incorporate the audience into the environmental art design system, leverage the interactive function of digital technology, and enhance the artistic experience of the audience. Environmental art design is a design form that is extremely close to the daily lives of the people, accurately grasping the personalized needs of the audience, breaking through the limitations of technical capabilities, enhancing the interactivity of design schemes, incorporating the audience into environmental art design, and stimulating positive user experiences. The interactive function of holographic projection technology can be utilized in the interior design process, allowing the audience to interact with the surrounding environment. For the indoor environment design of "anime theme", designers need to grasp the anime theme, position the anime characteristics, and present the main characters, plot, and actions in the form of holographic projection, so that the audience can interact with virtual characters while watching their favorite anime characters, greatly reducing the distance between the audience and the spatial environment and enriching the viewing experience. In addition, virtual reality technology has a stronger overall effect. In addition to traditional visual display, it has richer perceptual effects in terms of touch and motion, and the audience can also generate more diverse experiences in the process of experiencing environmental art. The interior design of the "Maritime Silk Road" Museum fully utilizes the functions of virtual reality technology to create a virtual "sailing on the sea" experience for the audience[2]. Virtual reality technology constructs a real ocean environment, and visitors wear VR devices to interact with the surrounding environment, more intuitively experiencing the magnificent waves of the Maritime Silk Road and further enhancing the effect of environmental art design.

3.3 Cross media artistic expression, precise presentation of results

After the design scheme is formulated, it is necessary to present the specific product results. High precision rendering technology is an important technical means for designers to showcase their creative achievements, which can surpass the limitations of real materials in visual expression and create visual wonders that go beyond real scenes. Real time ray tracing technology, based on the all-round matching of devices, can display and simulate the scattering and propagation effects of real light in space. Starting from surface scattering, ambient light shielding, soft shadows and other details, it continuously improves the design scheme and presents amazing detail realistic effects. The PBS material system simulates the microscopic surface characteristics of different materials. Designers can explore the combination effect of multiple materials by adjusting parameters in the system, and build a more hierarchical and personalized environment space. The application of digital technology can break through the limitations of traditional environmental art design with a single sensory design, and provide multimedia cross sensory experiences to audiences through cross media expression. The use of sound design software can convert spatial structure into data parameters, simulate the sound wave transmission effect in the space according to the data content, and allow designers to pre listen to the sound effects of the environmental space, design the hierarchy, directionality, and expression of various emotions of the sound, and give the audience a diversified sensory experience. In terms of olfactory design, the technological dimension has also been expanded. Digital molecular simulation software simulates exclusive fragrance environments and uses intelligent diffusion systems to adjust odor landscapes, providing technical conditions for olfactory design and building a fully sensory artistic experience. The meteorological data sensor directly enters the relevant data in the design scheme into the control system to feel the space effect of various conditions, and then adjusts the design elements such as light and sound to enrich the environmental space experience. The application of digital technology has broken through the inherent boundaries of environmental art design, allowing for the creation of richer and more infectious comprehensive artistic experiences.

3.4 Personalized scene interaction, creating art spaces

The modern development of environmental art design requires precise positioning of the personalized needs and psychological characteristics of the audience. On the basis of ensuring rich colors and diverse design elements, it is necessary to construct an environmental space that meets the real needs of the audience, highlighting the personalization of scene interaction. In terms of indoor environmental space design, it is possible to grasp the audience's desire for independent space and develop a cleanroom design structure with independent functions based on the overall structural design[3]. Based on traditional wall design methods, we use intelligent sound, lighting, and projection technologies to create independent spaces and provide audiences with semi open spatial structures, soothing and relaxing their minds. During this process, digital rendering technology can be used to provide users with multiple solutions and more spatial choices. If some audiences are more accustomed to silk and bamboo culture, designers can use digital lighting technology to create a quiet bamboo forest atmosphere in independent spaces, and match it with smart speakers to play the sound of Guqin flowing water; The spatial environment design of Quanzhou's outdoor enclosed pedestrian overpass comprehensively utilizes projection equipment, digital lighting, digital screens and other devices to create a multi subject spatial atmosphere. For example, the "Time and Space Train" theme imitates the seating arrangement of old-fashioned trains in indoor spaces for pedestrians to rest and enjoy the surrounding scenery. This personalized scene interaction design not only endows the audience with more diverse spatial interaction experiences, but also further enhances the artistic and diverse nature of environmental art design, enhancing the audience's artistic experience.

4.Closing remarks

In summary, digital technology, as an important technological means in today's era, provides unprecedented opportunities and challenges for environmental art and design, reshaping design methods and expanding the boundaries of art and design. The organic integration of environmental art design and digital technology requires

designers to rethink the essence of design and innovate their concepts. In this process, real-time visualization can be used to display design solutions, leverage digital interactivity, enhance artistic experience, cross media artistic expression, accurately present results, personalize scene interaction, create art spaces, break through the limitations of traditional environmental art design models, and create more infectious, interactive, and diverse art spaces, bringing people a deeper interactive experience.

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