Research on Computer Aided Environmental Art Design Based on 3D Studio Max

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Abstract
Computer graphics technology provides a new form of artistic expression for the designer, which shortens the distance between the designers’ creativity and design work. It greatly enhances the feasibility of the design method. In this paper, the authors research on computer aided environmental art design based on 3ds max software. The so-called computer aided environmental art design refers to the designer using the computer technology to design intent and to the manner in which the image is to inform the customer, enabling customers to clearly understand the designer's intent and creativity. It is a more direct and effective way of performance.

Keywords: Environment art Design, Computer Aided, 3D Studio Max

1. INTRODUCTION

As an important technical tool in the information age, the computer has been widely used in the field of environmental art design. The so-called computer aided environmental art design is refers to the designer through the computer technology design intent and eventually to the manner in which the image is to inform the customer, enabling customers to clearly understand the designer's intent and creative, it is a more direct and effective way of performance. It can be divided into building interior renderings, building outdoor renderings and landscape effect (Yongdong, 2005; González, 2015). Nature of environmental art design is macro, overall, system, so the concept of environmental art has not only: painting, sculpture, architecture, and other ornamental art combine to create a viewer’s outside of the art. But the connotation of it has done a broad extension, it includes the environmental behavior of the space environment to change the pure artistic environment works, its pure artistic behavior. It is based on people's subjective consciousness as the starting point, which is established in the beauty of the natural environment, which is guided by the spiritual pursuit of beauty. It also includes the combination of the spirit and the practical, the organization of various design elements, and the creation of the beauty of the human living environment (HOULDING, 1994; RAGHOTHAMA, 1998). The beauty of creation, is not necessarily to painting, sculpture and other ornamental art combined, it can free from outside of the context of natural beauty, and not from the body of the natural environment, it must rooted in a certain environment, become involved with organic symbiosis of environmental art. This fully reflects the macro, the overall grasp of the environmental art design, so as to establish the system of environmental art design research methods. In an increasingly humane, scientific and technological economy, the rapid development of political culture today, the growing demands for mankind (Daiyong, 2000; Qiang, 2004). Environment as the space of human existence, the art design of it must be in the premise of not destroying the sustainable development of the ecological system, the overall grasp of the macro, is more and more closely related to human and environment, human existence and way of behavior in space on the broad extension, content also greatly enriched and deepened, environment problem is not only to meet the requirements of the people the most basic survival; but to solve the human survival and the overall requirements and improve the life quality; fully satisfy people outside environment in the physiological and psychological needs. Therefore, people's understanding of their own environment and the quality of life, as well as the environment of beautification, scientific, rational and perfect degree put forward higher requirements.
Understood from the perspective of subject and environment art design has been from the indoor space design and arts and crafts extends to cross disciplinary integrated system, it is a strong comprehensive and multidisciplinary, which includes natural science, humanities, and so on, is put into architecture, design, technology, art and technology combined with the overall artistic disciplines. From the ecological point of view, with the increasing of China's population and living space density, with the depletion of environmental resources, environmental pollution, land subsidence, sulfuric acid rain, heat island effect and other phenomena. The severe ecological crisis has caused people to reflect on the original living space, the life style and the value idea, which has aroused the awakening of the human ecological consciousness (Denghua, 2005; Liangfeng, 2006). In 1980s put forward the concept of sustainable development, the core of sustainable development is the correct specification of the two basic relations: first, the relationship between man and nature, the relationship between the two is the relationship between people. From the designer's point of view of social responsibility, on the one hand, landscape architects, planners, architects of environmental art and design knowledge is not enough, on the other hand, due to the lack of a comprehensive knowledge of the environment art designer, resulting in us in the design process, the design of each link is independent, the monomer's. Resulting resources waste, unreasonable design, consider the overall week, integrity is not strong, design taste and cultural heritage of the low etc., especially ignoring the regional culture characteristics, focus only on the form, resulting in the design of great regret. Therefore, the use of systematic approach to design and study of environmental art is the historical responsibility of the builders of our generation. With the rapid development of science and technology in twentieth Century, the creation of environmental art is in an unprecedented new situation.

2. COMPUTER AIDED ENVIRONMENTAL ART DESIGN

2.1. Computer graphics technology

Computer aided design to develop a new field of design, computer graphics technology for the designer provides a new form of artistic expression, to shorten the distance between the designers’ creative and design work, it makes the design behavior of controllability and design method of the feasibility and design works can greatly enhance the production of. Computer graphics technology since the 60s of the 20th century so far, for the designer provides a machine hand, with the emergence of various graphics software and constantly updated,
design creative designer can manifest itself through the computer. Not only can perform a variety of hand drawn effects, but also very difficult to achieve the visual effect of hand drawn, through the computer is not only convenient and quick to complete, but also more close to the reality of the scene. By computer 3D graphics software in order for model building, light setting, material editing. Finally, in perspective chart can be obtained a by computer calculation accurate perspective view, can also according to the customer request arbitrarily change the viewing angle, material, never with the angle of view to observe, examine, modify the work, greatly improves the authenticity of the design and predictability. According to statistics, a design work from the design concept to the completion of the work, the proportion of modification is about 70% or more. The computer’s convenience may simplify the tedious revision process. Due to the computer with the efficiency and accuracy of feature, the designer provides a kind of new art forms and manifestations in the space, so as to exploit the potential of creative designers, designers design force and the working efficiency is improved.

In the design of aesthetic and design thinking, the impact of the application of computer graphics technology is profound. The use of computer graphics design will gradually affect people's re cognition of design, and then form a new design aesthetic consciousness and new design thinking mode. Such as computer aided environmental art design in the computer construction roaming animation, can more truly simulate the real scene, visitors can watch the space effect of the different angles, give a person a kind of be personally on the scene feeling. This kind of virtual space, which is so close to the real space, is difficult to be realized by other means of expression. Through the application of three-dimensional computer software technology, it creates a virtual world that does not exist, so that the creative imagination of designers can be realized. In his works, but also can make use of light and sound effects such as contrast the scene atmosphere, improve the vividness and authenticity of works. The application of computer graphics software technology makes the environment art expression space more extensive, the method is more abundant. This “real” virtual space of expression, as well as its aesthetic feeling, will have a subtle influence on people's aesthetic orientation.

2.2. Practical application of 3ds MAX

Design course is an indispensable part of the teaching of environmental art design, and for the students who study the environment art design, 3ds MAX software is a very important tool for visual simulation design. 3ds MAX course is a very practical course, which involves rich content, clear hierarchy, wide range of applications. The course will be applied and environmental art 3ds MAX combined, will play a role. In
rendering performance, whether it is indoor direction of environmental art design, environmental art design of the outdoor direction, 3ds MAX, powerful function and flexibility is the best choice to achieve creativity; in adjuvant application program design, the use of 3D Max software to create the needed space, more intuitive to multi angle observation perspective effect, flexible change materials and lighting effect. Compared with the traditional hand-painted save a lot of repeated work, relatively flexible, comprehensive, detailed and realistic expression of “idea”, makes it easy for the designers to continuous improvement and perfection.

In the process of design in practical engineering, virtual simulation design engineering case based on 3ds MAX, with the help of the virtual simulation design visualization, designers can greatly improve the work efficiency, reduce and avoid the design defects; in the process of communication with customer, 3D MAX renderings allows customers to browse to the project after the completion of the effect in advance so, to communicate with customers, in order to make the corresponding adjustment plan according to customer requirements, to reduce unnecessary economic loss due to design changes in the process of construction and construction; in exchange, 3D MAX can affect the auxiliary construction, and overcome the lack of construction drawings directly, can make construction personnel more visually see the structure, reduce the risk of construction error rework.

Figure 5. 3D MAX

3. VALUE OF ART IN ENVIRONMENTAL ART DESIGN

3.1. Cultural value of environmental art design

Environmental art design is the history and culture, natural, economic and social comprehensive art, in order to fully reflect the value of environmental art, to elements of the mining, refining and finally the use of combination of thinking, system will be refined after the symbolic elements of accurate reflection and summary refined spiritual values. Only in the creation of cultural activities in order to become a true sense of the people; culture is nothing more than the human, the object of, is nothing more than the reality of symbolic activities and specific. This fully shows that the symbols in the environment through the mining, extraction, can be achieved through spatial language to convey the meaning and value of the purpose. Color can help us to recognize and identify the function of visual image, at the same time, the elements of different colors to match can also express different feelings, reflect the different spirit, culture, this is color of their own value. Such as the roof of the palace in ancient China, most is dominated by yellow, followed by green and yellow in the Forbidden City is the most distinguished color, reflecting the ancient Chinese palace architecture culture, but also reflects the society of politics, economy, religion, culture and geographical characteristics (Figure 6). In ancient Egypt, the use of different colors have different symbolic meanings, such as yellow and gold symbol of the sun, with the green symbol of nature, with purple symbol of the earth, blue is the sacred color, etc.. Color culture of ancient Rome basically followed the ancient Greek building, dominated by white marble and brown granite, only in the decoration part of the frescoes and sculptures to blue, yellow, green, black and other colors.
3.2. Historical value and cultural inheritance

History is the development process of human thought and consciousness, is to grasp the progress of technology, and the morphology of human dwelling evolution process. The traditional historical value is that it can often wake up the memory of history and society deeply buried. Although this part of the memory may have been bleak, but it is a record of the same people have been living in the life of the world. We should protect the spiritual and cultural legacy of history, the protection of historical buildings, streets and places of different times, so that people in different times, events and places in the city left a mark. "Legacy" refers to the traditional spiritual and material elements retained, as part of the modern development, and to be recombination, so that the history can be extended. There are a large number of cultural heritages in the vast treasure house of human civilization, which is the historical and cultural heritage of the national classic. The intangible cultural heritage is a proposal for the protection of folk traditional culture, the oral and intangible heritage of mankind outstanding works. It represents a unique artistic achievement, a creative genius.

3.3. Principles of environmental art design

Environmental art design is to build the environment organized and structured approach for the purpose, through the environmental laws of form and form factors have an impact on the environment, then environmental design of the basic elements of the integration as a whole.

- **Proportion and scale:** The different proportion of the environment art performance is closely related to its functional content, technical condition and aesthetic point of view. The harmonious proportion relation can establish a kind of continuous visual perception between the whole and the part, it is an effective tool to improve the unity and coordination. The scale of the master reflects the number of designers in harmony on the scheduling capabilities.

- **Balance and stability:** in the visual arts, the equilibrium is the characteristic of any viewing object. For any element of the organization, whether it is the arrangement of the plane or space layout, must be in the visual to achieve a balance. Balance is involved in the construction of the various elements of the composition of the left and right, and the relative weight of the relationship between the processing, stability is involved in the overall structure of the relationship between the two.

- **Rhythm and rhythm:** whether it is in the plane art or space art, there is a regular repetition is the rhythm; the rhythm can make the elements of a simple relationship between them. The rhythm of the foundation is the rhythm, is the rhythm of the form of the deepening of the sentiment in the use of rhythm, the visual arts, rhythm, rhythm is the elements of any object into a system to repeat the attribute, and between these elements, with relationship could be recognized.

- **Unity and variety:** environmental art design is not simple designs, or the simple functions of the list, but the pursuit of a similar expression connotation and artistic image, also requires the designer to combine
various elements and functions, to reach the overall harmony and unity. In various elements of the environment, there is a tension between order and disorder, unity and change, how to grasp the delicate and artistic tension, is the key to environmental art design.

4. THE SURFACE DESIGN BASED ON THE NURBS TECHNIQUE

Non uniform rational B-spline and NURBS is the common numerical method of free-form surface is established. The basic idea is expressed in the form of rational fraction by introducing a weighting factor, and will describe the free curve or surface of B-spline strip method. Compared with the B spline method, this method can describe the free curve or surface, but also can be used to express the conventional analytic surface or curve, which can be used more widely.

![Figure 8. The simulation process based on NURBS](image)

5. CONCLUSIONS

Whether it is the balance theory of social environment or development theory, it is not to emphasize quantity on the growth, but the quality of the overall improvement, from the aim of both material civilization and spiritual civilization, to carry out a comprehensive planning, so that the development of social space environment can not only meet the needs of economic growth, but also help to promote social stability and progress. It's a concrete embodiment of environmental sustainable development that the economic factor is classified into the category of environmental design, which is completely adapted to the demand of the times. At present, the idea of sustainable development has become a social consensus and widely accepted, and environmental protection has become the top priority of urban construction. Therefore, we must correct understanding of conflicting and unified relationship between economic benefits and environmental benefits, environmental protection and economic development and with the increase in the level of economic development, with a corresponding increase in investment in environmental protection, to ensure the environmental protection work to adapt to the needs of the regional economic and social development.

In the context of rapid economic and social development, the evolution of social and economic structure should create conditions for the development of regional culture. Changes in the economic and social development and social mode of production, will inevitably lead to the change of people's ideology and powerful foreign culture based on the economic development and widely spread, so that the concept of traditional culture can be expanded, updated, the flourishing of new cultural awareness, accelerate the regional culture with the traditional upheaval. The economic environment for the sustainable development of environment design, especially in the field of architecture, often related to distribution and allocation of function space, reasonable arrangement of the functional space to achieve the highest efficiency in the use of, "mixed development" is a high efficient design. At a huge cost investment in exchange for environmental design is a successful design, on the contrary, good design should rely on Design of pre-positioning and construction investment and bring the subsequent stable economic and social benefits for the owners and the community. In
the continuous development of the level of development and promote the combination of science and technology and art design, the designer must designers in engaged in art and design work should be more through the product technology, function and form beauty of organic fusion as a whole.

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REFERENCES