The Application of Computer Aided Design in the Planning and Design of Landscape Architecture

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Abstract: With the continuous development of science and technology, computer technology has also been further developed. Computers are used as an aid to many work tasks, and computer aids are also applied to landscape garden planning and design. Landscape architecture planning and design cannot show the design effect three-dimensionally based on drawings alone. There is a gap between the plane display of design drawings and the three-dimensional construction in reality, and computer assistance can achieve the specific effects of three-dimensional display of landscape architecture planning and design. This article mainly introduces the application of computer-aided design in the planning and design of landscape architecture.

1. Introduction

Due to the influence of traditional garden design technology, most gardeners still use traditional landscape design methods, and digital planning has not been paid attention to. This has led to a stagnant landscape design and no complete garden design informatization has been formed. The system. However, many countries have invested a lot of capital costs in the digital technology of landscape architecture at a very early stage, innovating digital technology, and organically integrating landscape architecture, and involving the production of related industries, and also injecting core costs. In my country, it has only begun to be implemented in recent years, and corresponding progress has been made. Compared with other countries, my country's digital planning and garden design has a long way to go. my country should vigorously promote digital technology in landscape architecture, make rational use of it, strengthen the awareness and skill training of garden workers, and advocate this technology in practice [1].

2. The Status Quo of Modern Landscape Garden Planning and Design

2.1 Outdated Concept of Planning and Design

At this stage, many designers are still unable to jump out of the template of traditional garden design. Most designers lack bold and innovative thinking, or directly copy the model of Western urban gardens and apply them to Chinese urban construction, resulting in obvious failures [2]. A sense of obedience. These old-fashioned design concepts have hindered the development of Chinese urban gardens to a large extent and prevented the quality of planning and design from being improved. Mainly manifested in [2]: (1) In the planning and design, many excellent western garden creation models are used for reference, but they reflect fewer Chinese cultural elements. Western gardens do not fully conform to the concept of modern Chinese urban planning and development. Therefore, it is inevitable that there will be a detachment from the surrounding area, and the uniqueness of the style cannot be created. (2) There are also many designers who have cited traditional garden design patterns when designing, and the design of a very simple garden is incompatible with the surrounding reinforced concrete building environment, which is very abrupt. (3) In the process of designing many gardens, the emphasis is on the choice of hardware landscapes, such as stones, rockery, paths, etc. [1]. However, the important role of soft landscape has been neglected, such as underestimating the planning issues of flower planting, the design of water landscape, the location of trees, etc., which makes artificial landscape dominate and obscures the main role of natural landscape, the relationship

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tends to be unbalanced.

2.2 Ignore the Ecological Environment and Quality of Life

For the planning and design of a small number of modern landscape gardens, some designers lack mature skills and experience, which causes the functionality of landscape garden planning to occupy a secondary position in the urban landscape, ignoring their role in protecting the ecological environment and improving the quality of life. In the actual landscape planning and design process, many designers overemphasize visual conflict and symmetrical beauty, and overemphasize formal effects [3]. Although they create a higher sense of art and beauty, they neglect the landscape garden planning and design to satisfy people's needs. It is impossible to plan and design landscape gardens that can highlight the local urban characteristics according to the local climate and environmental characteristics according to the needs of the use of functions and the protection of the ecological environment.

2.3 Serious Imitation, Lack of Innovation

At present, serious problems such as imitation and plagiarism have appeared in the planning and design of modern Chinese gardens, resulting in a few gardens with local characteristics being simply and rudely copied to other places. On the one hand, the formation and development of innovative ideas are inhibited [3]. On the other hand, it is difficult to highlight the local customs and cultural characteristics of various places. In fact, many designers just use the previous landscape design methods indiscriminately, and have not carried out self-innovation and self-development under this premise, which has led to many landscape gardens with the same characteristics and unified styles appearing in various cities in China [4]. To a certain extent, it hinders the innovation of modern urban landscape planning and design on the long road of sustainable development.

3. Application Strategies of Computer-Aided Landscape Planning and Design

When building a landscape garden model, do the basic necessary work. The next job is to simulate the plan of landscape garden planning and design online. The computer can roughly construct the outline of the garden based on the design value, and the design will be displayed through the form of model construction [4]. In this way, the designer can intuitively see whether the design effect is consistent with the design concept, and it is also convenient to modify the design in time. The construction of the model is equivalent to showing the finished product in front of the eyes, and the design concept also jumps from the drawing to the sand table simulation.

3.1 Computer Gis Assistance and Landscape Planning and Design

GIS plays an important role in analyzing topography and geology in the planning and design of landscape architecture. When selecting a site for landscape architecture planning and design, it is necessary to ensure that the location of the garden construction site is stable and the topography is suitable [5]. Through GIS positioning and system analysis, it provides design basis for landscape garden planning and design, and formulates a focused design plan according to its topography and geology and other topographic characteristics, as shown in Figure 1.

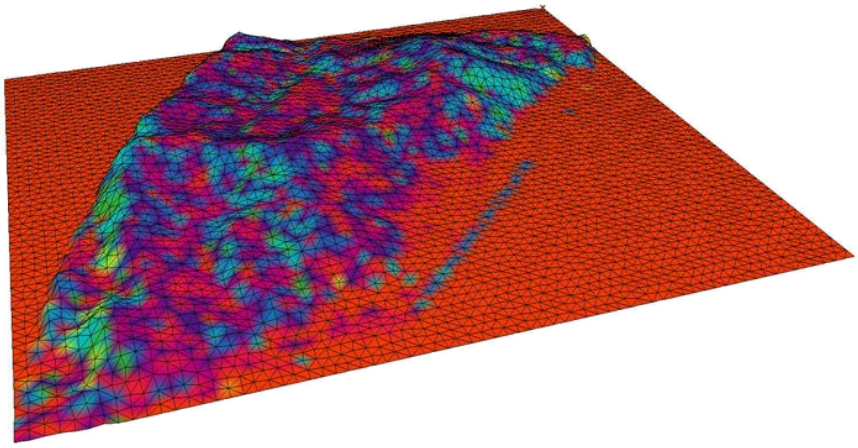

Fig.1 Gis-Assisted Landscape Geographic Planning

3.2 Analysis of Computer-Aided Garden Weather Data

Computer assistance can receive meteorological information with the help of the network, and by analyzing the meteorological data of a certain area, you can understand the elements and matters that need to be paid attention to in the planning and design of the landscape [5]. For example, in the southern region, the climate is relatively hot and humid. In the planning and design of landscape gardens, the construction materials selected need to be moisture-proof and insect-proof. Such landscape gardens can last longer. When constructing gardens, we should also pay attention to the local meteorological characteristics, and need to be integrated with the local ecology to avoid conflicts with the ecological environment.

3.3 Computer-Aided Garden Thermal Environment Analysis

When designing landscape gardens, attention should be paid to the design of the temperature in the garden, especially in the hot summer, tourists need a comfortable environment, and it is necessary to install air conditioning [6]. However, air-conditioning is not conducive to the ecological environment. Therefore, it is necessary to use computer technology to activate ecological auxiliary functions to regulate the thermal environment for the purpose of minimizing energy consumption and environmental pollution.

3.4 Computer-Aided Garden Acoustic Environment Design

In architectural and environmental design, the indoor and outdoor acoustic environment will directly affect the functionality and comfort of the building. In this regard, in the design phase of the building, it is necessary to be able to consider the acoustic environment to avoid the impact of noise on the operation of the building and the environment [6]. Noise avoidance is also a key consideration in the design of high-quality buildings. If the problem is not demonstrated in advance, it is very likely that there are defects in the acoustic environment and cannot be remedied in future work. Through the application of computer simulation approach, the acoustic characteristics can be simulated in the design stage of the building, and the acoustic environment can be actively optimized [6]. At present, the main application method is to combine the mirror source method with the path tracing method to simulate the sound source and sound environment in multiple directions in three-dimensional space, and process the complex reflected sound on different surfaces. In terms of urban landscape design, computer simulation alone cannot meet the needs of landscape design research. For this, the visibility of natural landscapes can be marked, the quality of urban landscapes can be assessed through the application of geographic information systems, and scientific vision The application of protection measures provides a basis for the design activities to achieve the city's sustainable development goals, as shown in Figure 2.

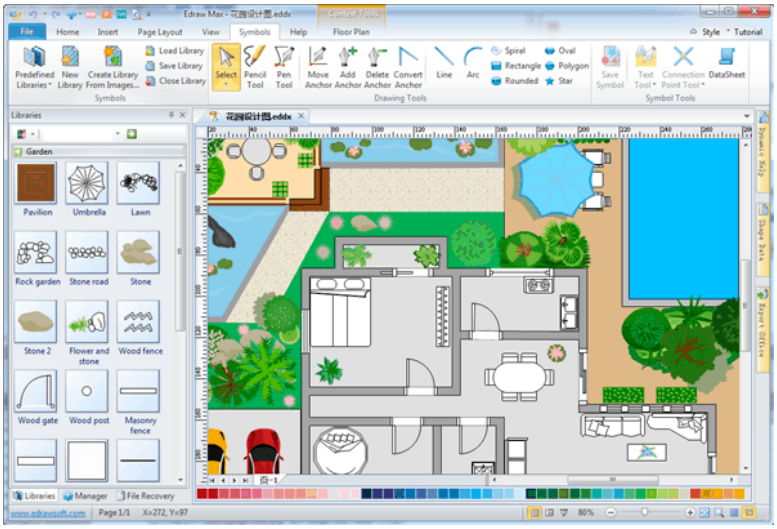

Fig.2 Computer-Aided Layout Design

3.5 Computer-Aided Garden Light Environment Design

In specific architectural and environmental design, the existence of good natural lighting not only has better energy-saving effects, but also has better performance in terms of color rendering, which can reduce people's visual fatigue in the spiritual level. For a pleasant feeling, and then get the improvement of work efficiency. At present, it has the auxiliary software in this respect. In practical applications, the software can simulate and calculate the distribution of lighting light and daylighting in the space [7]. After inputting the three-dimensional model into it, it can calculate the illuminance of a spectrum. The color image is generated to calculate the accurate value of the illuminance on the surface of the object. In practical applications, the software has a complete database, including different types of building materials, etc., that is, you can attach the information to the building in accordance with the actual situation, and adjust the surface texture, color and reflectivity of the material according to actual needs. At the same time, it can also simulate natural lighting and artificial lighting, simulate geometric shapes and sky conditions at different times during the day, control the simulation process in accordance with actual needs, and finally generate different types of image formats for the application of other software the call created good conditions [5]. At the same time, it can also calculate the surface precision illuminance through the false color and illuminance curve, reflect the light quality from multiple directions and the angle of human eye sensitivity, and guide the design on the basis of comprehensive inspection of physiological factors, lighting art and psychological feelings , It can effectively avoid reactions such as overheating, glare and visual fatigue caused by sunlight, and realize the balance and coordination goals of different aspects.

3.6 Computer-Aided Garden Environment Design

In the specific operation, the wind environment is also the content that needs to be considered in the design work. Generally speaking, construction personnel usually analyze the ventilation performance based on subjective experience. The existence of this kind of situation cannot accurately determine the consistency of the ventilation effect in the plan with the actual ventilation, nor can it be explained and analyzed in a quantitative manner [7]. With the continuous development of cities and the increasing height of buildings, the existence of wind environment around buildings will also have a negative impact on people's normal life. In this case, it is difficult to design the wind environment around the building that meets the requirements based solely on experience. At this time, the computer simulation method can be applied to calculate and simulate the wind load, wind environment and internal ventilation of the building and surrounding areas. With the support of visual image technology, it can be used to calculate the indoor and outdoor wind environment. Master Fengya plane, airflow velocity, profile distribution, vortex and other parameters to help designers understand the wind environment more intuitively and clearly [8]. On this basis, they can analyze and compare related plans, and adjust unreasonable conditions in the plans to ensure that they can Meet

the design requirements. In addition, the greening situation near the building is also the key content in the environmental design, that is, it can be compared by fluid dynamics, specifically, the wind direction, radiation temperature, wind speed, and relative humidity of the environment can be determined through the application of computer technology. Numerical simulation can be used to design the environment more specifically to better meet the design requirements, as shown in Figure 3.

Fig.3 Computer Aided Garden Wind Environment Design

3.7 Water Environment Simulation Landscape Garden

The internal water scenery is an indispensable factor. To perfectly match the water environment with the local ecology, it is necessary to play the role of computer ecological auxiliary technology. The water environment inside the landscape garden cannot hinder the normal water cycle. When simulating the water environment [8]: (1) Pay attention to the needs of the simulated water environment, monitor and regulate its flow rate and flow in real time; (2) Pay close attention to the water environment The biological condition ensures the clean water quality and the smooth air in the water. 3.5 The light environment simulates the interior lighting design of the landscape garden, which not only needs to meet the lighting requirements, but also to be in harmony with the local ecology. The natural light environment can give visitors a more comfortable visual effect. The landscape garden design itself is a kind of artistic conception [8]. The warm and suitable light visual effect improves the style of the landscape garden. Computer assistance needs to adjust the light environment inside the landscape garden in real time to achieve the effect of warm and fusion of light.

4. Summary

Computer-assisted planning and design of landscape architecture provides a design assistance tool, while landscape planning and design plays a role of computer assistance. The two are related to each other, and the cooperation of the two also promotes the development of the two fields. Although landscape architecture planning and design cannot fully replace the design itself, it can provide design services. The computer covers a wide range, and different solutions can be given for different projects of landscape architecture planning and design. Relying on its own accuracy, the computer can reduce the error of landscape garden planning and design, and with the aid of the computer, it can more perfect the landscape garden planning and design plan.

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