

Research on the Application of Digital Design in Landscape Architecture

Hao Lei

College of Forestry and Horticulture, Hubei University for Nationalities, Enshi, China

Abstract: *The progress of digital planning and design of landscape gardens is investigated. Today design is inseparable from the assistance of a computer. However, the progress of digital planning and design of the landscape is behind the rapid development of technology. Therefore, the purpose of this study is to find out how the common application software is used in landscape architecture design as the main design application method. In each stage of landscape architecture planning and design, designers can use today's information technology and various software to carry out a topographic survey, environmental analysis, planning, and design. Computer-aided drawing provides convenience for designers. The result shows a reference value to maximize the application role and value of digital design in landscape design.*

Keywords: *garden design, parameterized design, digital design, calculation and auxiliary drawing*

1. Introduction

Landscape architecture is related to the world economy, social development, and the relationship between ecological environment protection. The goal is to achieve reasonable use of the natural environment with limited resources and establish an ecological environment system. Landscape design has changed its artistic conception, reflecting the culture and the sustainable development of human living environment. Landscape architecture integrates various discipline theories, which reconcile the affinity between human beings and nature in the information age. It is irreplaceable compared with other disciplines to create environmental, social, and economic benefits [1]. The landscape design includes a planning strategy in a certain regional scope to beautify the urban environment and provide convenience for people's recreational life and ecological role. The most important thing is to find a scientific analysis of the terrain, traffic, architecture, hydrology, and various related elements. The subjective emotion needs to be considered to cope with the present era of landscape [2]. Since the 1990s, the development of the information age has brought the great product of computer, and garden design should naturally progress together with its development as a more convenient and efficient way. Integration and use of big data information provide the entire landscape industry with a more accurate development direction. Designers use today's technology for terrain surveys and environmental analysis with GPS and GIS: GPS for landscape planning terrain environment reasonable forecast fusion and GIS for satellite remote sensing information of intuitive analysis and effective sorting. Thus, landscape planning becomes more convenient [3]. In drawing assistance software, PS (photoshop), CAD (autocad), 3dsmax andSU (sketchup) are used commonly because of its comprehensive functions and convenience. In other words, the software has brought innovation to garden planning and design. We can even predict future development through the existing software. From the original traditional paper design, we can draw a more real, vivid, and beautiful rendering with the help of the software.

2. Application of Digital Design in Landscape of Gardens

At present, there is still a big gap in the digital process of national landscape architecture planning and design compared with foreign countries [4]. According to references, most landscape garden planning and design education in colleges and universities are still at a low-end level of computer-aided drawing. The design of gardens needs human inspiration to create as a discipline [5]. Landscape architecture lacks a series of scientific theoretical systems to support its connotation. In the current information age, the changes that man has brought to nature are enormous, and ecosystems have changed dramatically [6]. When this new ecological change comes, we have to use one of the best tools, computers. All scientific connotation of landscape design has been expanded to many fields, including urban areas

and ecology. China's landscape design is relatively undeveloped due to a lack of demand. China's urbanization promotion speed is fast, and the construction quantity is large. The problem is that the investment scale and construction standards are limited, and construction time is short. In landscape garden planning and design, the promotion of digital planning has not been successful.

3. Digital Landscape Garden Planning and Design

3.1. Concept of digital landscape garden planning and design

Landscape architecture integrates art and science and then has a closer affinity between mankind and nature [7]. It needs a constant improvement of the strategy of digital garden planning and design to strengthen the space design ability. For simulating the complex terrain by computer, efficient and convenient auxiliary tools are needed to integrate scientific and reasonable concepts. To improve the early traditional development mode, the way, and technology of landscape garden design, integrating digitalization into landscape architecture design is necessary to promote scientific development [8].

The digital concept of landscape garden planning and design is the landscape design process with an advanced computer digital platform and computer graphics processing ability. The whole landscape structure and space environment design is enabled to make the designer have better observation and creation of space. Solving the difficulties, the final result comes out as a combination of technology and the art of garden design. The digitization of landscape gardens must also have systematization. The whole process of landscape garden planning and design includes the collection of information, the analysis of environmental terrain, and scheme design to evaluate the design. Digital information plays a role in the whole design process. Through the exchange of information and data obtained by each software, a complete result is finally obtained. The software helps designers to complete the design work efficiently, conveniently, and relatively objectively.

In localization, we should establish a garden design roadmap and strategy that meets the local needs according to the actual situation and use appropriate design routes and software information for urban and rural planning and architectural design [9]. We also need to strengthen the data information and analysis in the plant landscape area.

In the rapid development of the digital age, designers have powerful art creation and space analysis abilities. In other words, with the help of computer graphics power, designers accurately draw complex space structures for better control and ideas [10].

3.2. Digital pedigree concept of Landscape Architecture

The rapid development of the information age has led to faster software updates, which comprehensively promote garden digital design. Through literature review, we list the current methods of digital planning and related concepts.

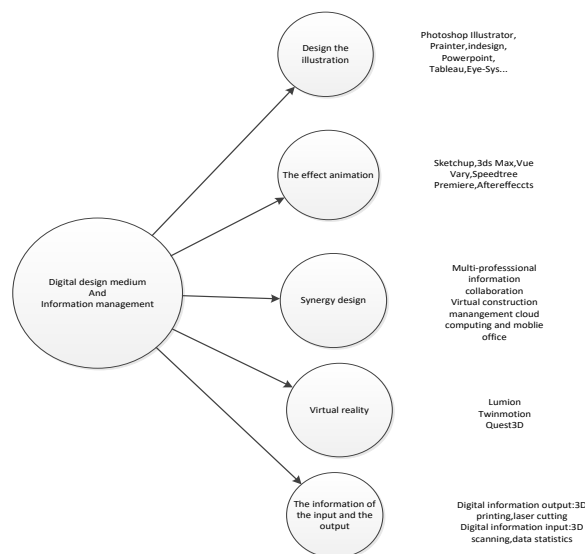


Figure 1: Digital design media.

4. Digital Planning and Design Process of Landscape Gardens

Digital planning and design of landscape gardens generally require many concepts, software, and complexity. New ideas are always flowing into the industry, but at the same time, the old ideas cannot be completely excluded. There are difficulties in learning new techniques. Based on the conceptual pedigree, we refer to the previous experience in using software, Sorout, in the digital planning of landscape. The digital planning and design of gardens have the following steps: real-time information input, digital design analysis, parametric design, computer generation design, digital design evaluation, digital design media, and computer-aided drawing (Fig. 3).

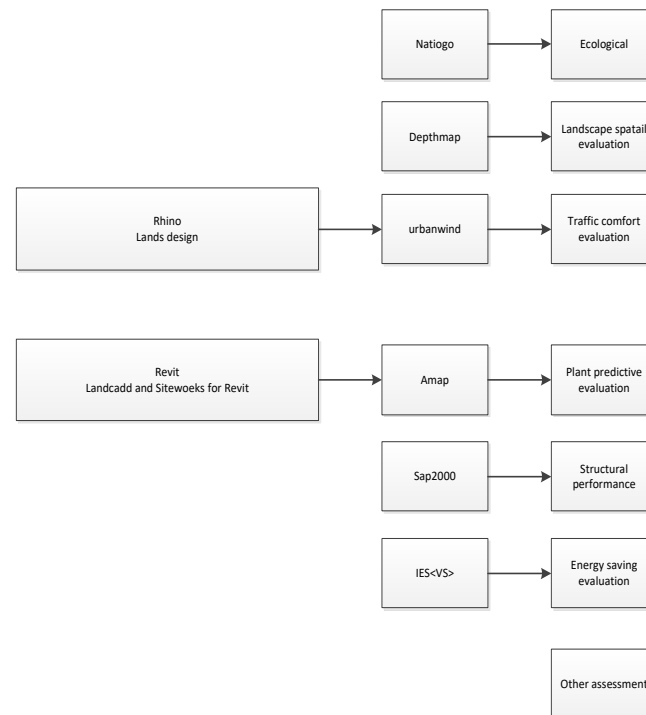


Figure 3: Software process design

5. Conclusion

New technologies and theories in landscape architecture bring about reflection and opportunities, especially in the current information age. Using computer design and parameterization field have the premise that the design objects can be converted to 0 or 1. This means that the design object must be digitized, During the whole planning and design of the landscape garden, many elements cannot be replaced by 0 and 1. The elements are created by talent. The computing power is advanced in this era but computers cannot replace humans. Only talented people play a decisive role in the planning and design of the landscape. The advancement of the computer is reflected in its objectivity, and the computer provides reasonable analysis and design through the existing data.

In literature, there is a common misunderstanding about the digital planning and design of computers. Most people feel that parameters and algorithms produce the so-called "digital rational" to produce the final design results. However, digital design builds a more reasonable, scientific, and objective design rather than creative design. We need to understand digital design technology in the right way, the essence of design subject initiative by mastering the digital design technology. Technology is always in continuous development and innovation, and with the development, the link becomes closer to improving the beauty of the landscape and enriching the landscape. Then, people become to have a hierarchical sense and realize the concept of the landscape.

References

[1] Wu Chengzhao. From landscape gardens to recreation planning and design [J]. Chinese Garden, 1998, 14 (5): 4.

- [2] Li Jiale, Liu Jiaqi, Wang Bingluo. *The Review and Prospect of Chinese Landscape Architecture Discipline [J]. Chinese Garden*, 1999, 15 (1): 4.
- [3] Liu Xiaozhao. *The Application of Modern Information Technology in Landscape Architecture [J]. Jiangsu Forestry Science and Technology*, 2000 (S1): 7.
- [4] Li Jiale, Liu Jiaqi, Wang Bingluo. *Review and Prospect of the Chinese Landscape Architecture Discipline [C] // Collection of the History and Development of the Discipline of Landscape Architecture*. 2006.
- [5] Jin Zhipeng. *Research on urban planning and landscape design [J] Engineering Management*, 2021, 2 (1): 78-79.
- [6] Mei Yaojiong, Liu Dinghua. *On interactive garden: An expected development direction of interesting communication and spontaneous participation in — Urban garden [J]. Chinese Garden*, 2006, 22 (11): 6.
- [7] Cai Linghao. *Concept pedigree and flow diagram of digital planning and design of landscape gardens [J]. Landscape Architecture*, 2013 (1): 10.
- [8] Cao Youxin. *Application of Digital Technology in Landscape Design [J]. Fujian Architecture*, 2001 (4): 3.
- [9] Zhu Saihong, Wan Xiaohua. *Application and Inquiry of Digital Auxiliary Design Strategy in Landscape Architecture [J]. Modern horticulture*, 2016 (20): 2.
- [10] Fang Haojun, Ling Huping, Ye Lu. *Application of Digital Technology in Landscape Design [J]. Urban Architecture*, 2015 (14): 2.
- [11] Cao Xiaoyan, Li Yan. *Application of Digital Technology in Landscape Design [J]. Construction Engineering Technology and Design*, 2016, (11): 2897.