Application Research of Computer Software Design Analysis in Sculpture Design

Dazhi Liu 1,*
1Fuzhou University, Xiamen, Fujian, China, 361024
*Corresponding author e-mail: liudazhi@fzu.edu.cn

Abstract. With the iterative progress of social economy, all kinds of sculpture art are constantly emerging. The utilization of computer software in sculpture design can effectively improve the efficiency of the design process, intuitively show the effect of design, and can significantly reduce the cost of the project. On account of this, this paper first analyses the status and problems of sculpture design, then studies the value and role of computer software in sculpture design, and finally gives the specific utilization of computer software in sculpture design.

Keywords: Computer, Software, Sculpture, Design

1. Introduction
With the iterative progress and maturity of software tech represented by computer, it has been widely popularized and studied in many fields, especially in the field of sculpture design, which greatly promotes the level of sculpture design [1-3]. In the process of sculpture design, it should to comprehensively consider and integrate several elements as shown in Figure 1, so that the design of sculpture can effectively reflect the conception and integrity of sculpture modeling. The utilization of computer software in sculpture design can effectively improve the efficiency of the design process, intuitively show the effect of design, and can significantly reduce the cost of the project.

![Figure 1. Integrated elements of sculpture design.](image-url)
Before making sculptures, using calculation software to design and display the 3D effect is helpful to have an intuitive understanding of the final physical structure, especially the details of the sculpture, so as to greatly enhance the intuition of sculpture design and the experience and interaction of the design process [4-6]. On the other hand, as a direct representation of the spiritual outlook and cultural connotation of a city or region, sculpture design is the direct carrier and platform of residents' aesthetic taste and cultural taste. Public art on account of the birth of sculpture design is an important part of regional culture, and is an important window and symbol of regional external display.

In addition, with the deepening of the utilization of computer software in sculpture design, the level and efficiency of sculpture design are greatly promoted. However, the utilization of information software also puts forward higher requirements for the information literacy of sculpture designers. It needs to carry out digital information revolution to make sculpture design better match and serve the development of regional culture and the display of spiritual outlook. The speed and accuracy of computer software can perfectly interpret the space construction process of sculpture design. Some software can not only accurately draw sculpture drawings, but also intuitively display the complex design forms of sculpture. Computer software for sculpture modeling design, in addition to intuitive display the effect of sculpture design, but also can simulate the space environment of sculpture works, as well as the matching and display effect with the space environment. Sculpture art design on account of computer software makes its creation process break through the limitation of time, space and material.

In short, the utilization of computer software in sculpture design, on the one hand, can improve the intuition and interaction of sculpture design; on the other hand, it also helps to provide effective data support for the budget, production evaluation and calculation of sculpture design. With the development of software tech, the rich expressive force, artistic forms and creative means of sculpture art are also being enriched and optimized iteratively, which makes the connotation of sculpture art increase the content of digital art and become a new art form. Therefore, it is of great practical value to study the utilization of computer software development in sculpture design.

2. The present situation and problems of sculpture design

2.1. The present situation of sculpture design

With the iterative growth of social economy, sculpture design, as an important representation of art and culture, has received more and more attention and utilization. In this context, the types and contents of sculpture are not only more abundant, but also its design style, theme and conception are more diversified. Sculpture design, as a key link to ensure the display effect of sculpture works, plays a vital role and position in the production and display of sculpture. The broad development potential and space faced by sculpture design provide a broad platform for sculpture design, but also bring new challenges and problems. In particular, the rapid progress of computer information tech has brought great changes to sculpture design.

2.2. Problems in sculpture design

Sculpture design, as a work form carrying cultural conception and designer's thoughts and aesthetics, its finished products need to match and coordinate with the surrounding environment and atmosphere, so as to better express the conception of the work and the views of the creator. This requires planning from the overall perspective in the process of sculpture design, so as to better serve the creativity that the works want to express. However, most of the current sculpture design are lack of systematic planning, resulting in the modeling of sculpture works at will, the theme of vulgar, not only difficult to express its aesthetic and artistic sense, but also lead to works and the surrounding environment and atmosphere out of tune, it is very abrupt. Moreover, due to the lack of creativity and innovation, the homogenization of many sculpture works is more prominent, which further leads to people's aesthetic fatigue. All these are caused by the lack of systematic and holistic planning in sculpture design.
Secondly, sculpture design is difficult to reflect the rich connotation, which leads to the loss of cultural and artistic sense of sculpture works. Some sculpture works lack of conception and innovation in the process of design, which makes it difficult to reflect its uniqueness and personalized characteristics. Many sculpture works have vague conception, confused theme, and lack of refinement and innovation of spiritual culture, which seriously limits the improvement of sculpture design level. In addition, the lack of cultural creativity in some sculpture designs not only leads to the waste of cultural connotation resources, but also greatly reduces the effect of sculpture. In this context, the creators of sculpture design need to integrate the era background, historical evolution and cultural essence of sculpture comprehensively and systematically, so as to better show their theme and creativity.

3. The value and function of computer software in sculpture design

3.1. The value of computer software tech in sculpture design
First of all, the utilization of computer software can enrich the creative means of sculpture design, which is not only reflected in the technical level of sculpture design, but also in the freedom, convenience and creative richness of sculpture creation. The utilization of computer software can greatly enhance the creator's freedom of sculpture design, making the artistic and cultural value of sculpture significantly improved. Traditional sculpture design is easy to be limited by the space of the site, and the virtual space of computer software greatly reduces the limiting factors of sculpture design, which makes the creation process of sculpture designers more coherent. Secondly, the traditional sculpture design has a great demand for production materials, and its production process is complicated. Through the virtual material tech, computer software can simulate the whole process of sculpture design and production, which greatly reduces the demand for production materials, improves the production efficiency and reduces the production cost.

In addition, the utilization of computer software in sculpture design further enriched the artistic language of sculpture. As a unique form of artistic expression and the carrier of cultural emotion, sculpture art has its own historical evolution, and eventually formed a certain style of artistic language form. With the change and progress of tech, the artistic language of sculpture design has been constantly enriched, and gradually developed several aspects of forms and characteristics as shown in Figure 2, which makes the sculpture art form have a unique sense of digital order.

![Figure 2. The expression form of artistic language in sculpture design.](image)

3.2. The function of computer software tech in sculpture design
The utilization of computer software tech in sculpture design can significantly expand the creator's thinking, enrich the sculpture artist's creative language, but also greatly expand the concept and way of sculpture innovation. Secondly, the computer software stimulates the sculptor's creative inspiration, and provides a more powerful technical support for his sculpture art creation process, thus further enhancing the expressiveness of sculpture art. In addition, with the help of computer software, sculpture creators can conceive and create, so that their working place and creation process can break
through the limitations of time and space and materials, and can carry out sculpture art design more flexibly. Finally, the utilization of computer software in sculpture design promotes the social influence of sculpture artistry. On the one hand, 3D sculpture created by computer software is more convenient to spread, thus expanding the scope of social influence of sculpture; on the other hand, its convenience and accessibility also indirectly broaden the utilization depth of sculpture works of art.

4. Utilization of computer software in sculpture design

4.1. Utilization of computer software in sculpture creation
First of all, computer software can make creative sketches of sculpture creation, which makes the sculpture works have rich design concepts and element characteristics. Secondly, the software can effectively simulate the spatial scale of sculpture works, especially the spatial scale of sculpture display, so as to intuitively display the effect of sculpture display, so that the creator can edit and modify the content and elements of the works more conveniently.

4.2. Utilization of computer software in sculpture modeling
Sculpture modeling on account of computer software mainly includes polygon modeling, NURBS modeling and subdivision surface tech modeling. The characteristics and applicability of these different modeling methods are shown in Table 1. With the help of computer software, the simulation of sculpture material and light effect can show the material of sculpture itself to the greatest extent, so as to effectively simulate the realistic scene of sculpture works. In addition, the rich design scenes in computer software also make the utilization of sculpture design more abundant.

| Sculpture modeling     | Applicability                        | Features                                      |
|-----------------------|--------------------------------------|-----------------------------------------------|
| Polygon modeling      | Architecture and complex scenes       | The fitting of point, line and surface forms the block |
| NURBS Modeling        | Industrial design and high precision requirements | Curve modeling has a large amount of data |
| Subdivision surface tech | Meet the degree of freedom and flexibility in design | Combines the advantages of the above two modeling methods |

4.3. Utilization of computer software in sculpture construction stage
The utilization of computer software in sculpture construction stage can effectively improve the accuracy of sculpture design drawings; make sculpture construction drawings more convenient for construction, especially for team division of labor. Secondly, computer software is helpful to batch output of sculpture construction results, thus greatly improving the efficiency of design and construction stage. Using computer software to carry out the design of sculpture shape and structure, such as the design of sculpture size and angle, can greatly reduce the material consumption of construction and improve the production efficiency. In addition, the use of software database can directly reflect the position relationship of the sculpture base point, which is convenient to find the support point of sculpture construction, making the construction process more reliable and accurate.

The utilization advantages of computer software in sculpture design are mainly reflected in the aspects of easy storage, easy editing and easy adjustment, and it has strong convenience. The utilization of this tech makes the sculpture design scheme can be easily modified and improved, and can be adjusted according to the type of sculpture material. The sculpture design on account of computer software is easier to achieve the perfect angle of sculpture, and can achieve 360 degree observation and creation, so as to significantly enhance the artistry and connotation of sculpture design.

5. Conclusion
In summary, the speed and accuracy of computer software can perfectly interpret the space construction process of sculpture design, and can intuitively display the complex design form of
sculpture. In addition to the intuitive display of the effect of sculpture design, it can also simulate the space environment of sculpture works, as well as the matching and display effect with the space environment. Through the analysis of the current situation and problems of sculpture design, this paper studies the development of sculpture design and the necessity of computer software utilization. Through the research on the value and function of computer software in sculpture design, this paper analyzes the value and specific utilization value of computer software tech in sculpture design. Through the analysis of the utilization of computer software in sculpture design, this paper studies the specific utilization of computer software in sculpture creation, sculpture modeling and sculpture construction.

References

[1] Chen Lixin. The embodiment of regional culture and humanistic spirit in public sculpture [J]. Art education, 2017 (z2): 247-248.
[2] Li Chuanwen. Current situation, problems and solutions of domestic public sculpture creation and display [J]. Qilu art garden, 2015 (06): 34-40.
[3] Liu Houcai, Mo Jianhua, Liu Haitao. 3D printing rapid prototyping tech and its utilization [J], mechanical science and tech, 2018, (9) : 12-13.
[4] Pan chizi. The influence of computer on design and art design in the information society. Art education, 2017 (3): 45-46.
[5] Zhou Lizheng. The return and Transcendence of contemporary urban sculpture development [J]. Science public (Science Education), 2018 (09): 184.
[6] Zhu Xiaowen. The present situation and Prospect of contemporary Chinese urban public sculpture [J]. Beauty and the times (City Edition),2017 (08):6-7.