Research on Sculpture Creation under the Background of Digital Technology

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Abstract: Digital technology and digitization has gradually become an important symbol of the digital age. Digital technology has a direct impact on art-related fields. Whether artists or artistic work, whether the way of artistic expression or the form and content of materials in the artistic work, these will be carried forward in the process of inheritance. The continuous development of economy and science and technology, as well as the liberal environment of artistic creation, are the reasons for these influences. This paper systematically expounds the inevitability of the application of three-dimensional digital technology in sculpture creation, studies the impact of three-dimensional digital technology on traditional sculpture creation, and finally studies the application of three-dimensional digital technology in sculpture creation.

With the continuous development of digital technology, digital technology is bound to become the flower of wisdom in the history of human civilization. The continuous improvement of its digital technology and hardware capability will also play a key role in the creation of sculpture. The use of digital technology in sculpture creation takes advantages of the Internet to open up two or more parallel spaces in a world. The virtual digital space and the objective world space approximately belong to the isomorphic relations. The use of digital technology in sculpture creation enables the realization of objective material symbols and virtualization.

1. The concept of digital technology

The application of digital technology to sculpture is based on a variety of digital forms and sculpture software, such as Zbrush, Auto Desk? Mud Box, 3d -- coat, Modo, Silo, 3DMax and Maya. Digital technology has been widely used in the creation and teaching of art and design, and digital sculpture is one of the application directions, combining 3D modeling technology, imaging results and processing methods with traditional sculpture art. Teachers use the characteristics of digital software to create a variety of real background effects, create different spatial forms of sculpture works, and bring students a brand-new visual experience and space shock. Digital sculpture has gradually become a new science and technology and traditional art design disciplines.

2. The application of 3D software in digital technology in sculpture creation

2.1. Creation of digital model

Relying on digital technology, the first step of sculpture creation is model creation. Generally speaking, the creator will first conceive the creation object's outline, then displays each part in the form of two-dimensional sketch, synthesizes the stereoscopic image as the creation support. As the support of creation, some artists will also do on-site creation. Whichever way has the disadvantage of not having enough value of reference. Under the digital technology, the creator can collect the data of the object he is trying to create, put it into the virtual software one generation by one generation, and generate a virtual model step by step. The model is generally scaled down (a few are replaced by the same scale), but it can be scaled by digital decoding technology to understand the key information of each part of the sculpture object. In his autobiography, the American sculptor, James Blatt, recalls learning to sculpt when, in his early years, Blatt was unable to grasp the character's facial features and his work had a poor sense of dimension. With the help of digital model creation, Blatt knew how to deal with the changes of light and dark in the face. In the process of creating the sculpture, he intentionally combined the features of the character to deal with the eyebrow and cheekbone, so the third dimensional of the figure sculpture was also increased. In essence, sculpture creation under digital technology is still a means of artistic creation, but it strengthens the creator's ability to control the details, thus improving the level of sculpture.

2.2. Stereoscopic analysis

Three-dimensional sense is the main feature of sculpture different from the plane art. Even relief, will let the viewer obtain three-dimensional sense in a flash. The application of digital technology in sculpture creation is helpful to enhance the three-dimensional analysis ability of the creator. For example, ZBrushcore simplified Chinese sculpture software, which has the function of color multiple decoding, can produce a three-dimensional impression with strong visual impact through Chiaroscuro. When the creator has finished the preliminary sculpture, he can show the work from different angles through the software, and also can enlarge part of the work and change the background, so that he can analyze the shortcomings of the work under the three-dimensional environment. For example, if the creator creates an abstract sculpture, he can choose a square as the background and analyze it. He can find that the lines of the work are too rigid and do not match with the cultural atmosphere of the square. With the aid of stereoscopic analysis, he can directly change and correct the lines until he get a promising result and a good design. Stereoscopic analysis is one of the main advantages of applying digital technology to sculpture creation.

2.3. Virtual adjustment

Virtual adjustments are also implemented by using various types of software. Because there may be many unsatisfactory links in the process of sculpture creation, if sculpture creation is carried out with every adjustment, it will lead to unnecessary consumption of energy. However, the problem has been solved by digital technology. For example, a creator designs a sculpture for a residential area. After finishing, he communicates with the property right unit. The property right unit believes that the sculpture proportion is too large, the creator can use digital technology to directly scale down at the same proportion, until the property right unit is satisfied. Because the adjustment process is carried out virtually by means of computer and other equipment, it has high efficiency and flexibility. In addition, in the process of creating sculpture, the creator can also use digital technology to optimize some of the details, such as small stone pattern changes, proportional fine

adjustment of the different structure, etc. As long as we can get enough available resources, these adjustments can be achieved by software parameter changes, convenient and efficient.

3. The application of three-dimensional scanning technology in sculpture creation

The process of moving an electron beam or radio wave from left to right to display a picture or figure on a screen is called scanning. Initially, scanning was used in medicine, but later it was widely used in copying, memorizing words and patterns and saving the scanned text and pictures of the screen, this instrument is called a scanner. With the development of computer technology, scanners, as a very popular machine equipment, enters into people's lives. People have more and more high functional requirements of scanners, a variety of new technologies are applied in scanners, which makes the scanner technology continue to develop. In order to meet the needs of people, the three-dimensional scanner, which not only can scan two-dimensional text pictures, but also can scan three-dimensional objects, appeared.

The use of three-dimensional scanning technology makes three-dimensional space entities turn into data to store in the virtual space of three-dimensional software. Three-dimensional scanning technology makes sculpture art be Datamation, and it makes sculpture art store not simply rely on three-dimensional space any more, it can be stored in three-dimensional software virtual space data, which is conducive to sculpture storage and protection.

The three-dimensional scanning technology has changed the creation technique of the traditional sculpture art. Many modern sculptures begin to use the three-dimensional modeling software to create works. Young sculptors have strong ability to learn digital software, and it is easy for them to operate and use the three-dimensional modeling software. The old sculptors are too old to learn digital modeling software, and some 3D modeling software is not suitable for them. They have a certain high level of skill in hand modeling and high accuracy in hand operation. When creating sculpture works, they mostly use traditional hand operation to shape clay manuscripts. After modifying the final version, they copy it into a sculpture. The process is cumbersome and a certain unpredictable, and the old sculptors also want easy-to-use technology to help them. Now the appearance of three-dimensional scanning technology can solve this modeling problem. The sculptors just need to scan the finished clay manuscript, and convert it into a digital model into software, saving the software modeling process. In 3D modeling software, ZBrush operation mode, which is simple and has high compatibility, can achieve data docking with 3D scanning technology. Moreover, the brush function in ZBrush is simple and easy to operate, it can also complete the graphic modification work, more suitable for old sculptors to use. Old sculptors can modify a sample in ZBrush software and then directly print the data model with a 3D printer, or scale it up or down in the software. After the final version, they just need to transmit and create data. It helps the old sculptors to simplify the production process to the greatest extent, and it has fine accuracy, so it was accepted by sculptors.

4. The application of 3D printing technology in sculpture art

The solid models are digitized by 3D digital software and the 3D virtual images designed on the computer are printed directly by 3D printing technology or digital engraving, thus integrating design and manufacturing. Fast imaging technology can turn design ideas into a real product model directly, fast and accurately.

Rapid imaging technology has been widely used in machinery, industry, aerospace, medicine and art and other areas to simplify the process of sculpture creation. This technology has also been used by sculptors in sculpture art, from design modification to model making, and then sculpting and shaping. In this process, the production time cost is greatly reduced, and it is easy to mass-produce.

The 3D printing device can make the virtual model created by 3D software output things, materialize the virtual data and realize that the virtual data output entity. The precision of virtual modeling data ensures the precision of solid sculpture and the integrity of works.

The 3D printing technology and the scanning technology unifies and applies in the sculpture, the cultural relic restoration and so on. In the process of sculpture or cultural relic restoration, if the traditional method wanted to obtain high-precision patch blocks, the production process should be complicated. If the manual operation in the production process is slightly biased, the patch blocks produced will not reach the standard. Furthermore, improper operation will cause secondary damage to the original sculpture. However, the 3D laser scanning technology is used to scan the damaged cultural relics, build the digital model for the cultural relics, calculate the 3D geometric model of the sculpture or the missing part of the cultural relics by 3D software, calculate the mirror model according to the symmetry, get 3D model of the matching area by the Algorithm, and then print the missing part to restore the sculpture or the cultural relics by 3D technology. 3D technology can scientifically simplify the working procedure, realize the virtual restoration, protect the sculpture or the cultural relics, simplify the procedure of making the patch block and the whole patch work, and improve the working efficiency. 3D printing technology can be used to print sculptures or artifacts in the software as an alternative of artifacts, using printed copies to protect the original from environmental or accidental damage.

5. Conclusions

The application of 3D modeling software in digital technology is more and more extensive in sculpture art. The use of 3D modeling software has changed the creation method of sculpture art. Now sculpture art creation using three-dimensional modeling software simplifies the creative realization process, adds creative complexity, so that art modeling has diversified development. Deformation and abstract processing in the three-dimensional modeling software stimulates the artist's artistic sense, so that sculpture art forms are diversified. Three-dimensional modeling software changes the imaging mode of sculpture art and virtual imaging mode, so that sculpture art has predictability. The revocation, backward, and forward functions in the three-dimensional modeling software make the creation of sculpture reductive and avoid mistakes. Three-dimensional modeling software allows the sculptor and works have an interactive, so that the sculptor and his work can complete the dialogue in the virtual space.

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