Course Teaching Reform Practice of "Sculpture Creation" Based on Digital Technology

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ABSTRACT

With the development of digital technology, the design and presentation of sculpture continue to be innovated, the digital sculpture technology is gradually integrated into the teaching of sculpture professional courses, and a new teaching model has been formed. This teaching mode needs to design teaching content under the fusion system of traditional craft and digital craft, and the emphasis is on guiding the transformation and innovation of materials. Through teaching practice and questionnaire survey, this research draws a conclusion that the reasonable introduction of digital sculpture technology can effectively improve the teaching effectiveness of sculpture professional courses.

Keywords: Digital sculpture, Course reform, Material transformation.

1. INTRODUCTION

Traditional sculpture professional courses are generally based on the concepts, materials and techniques of sculpture. Through the demonstration and practice of the creative process and the appreciation or copying of excellent works, students can understand the knowledge and skills of sculpture. The practice process generally starts with the design, and through the construction of the skeleton, the clay draft, the turnover formwork production, and the effect, etc., finally a complete work is formed. With the continuous innovation of materials and technology in the sculpture industry, innovative forms of sculpture continue to appear, but many forms are not suitable for conventional sculpture courses. In recent years, the emergence of digital sculpture technology seems to allow the industry to see the feasibility of innovative sculpture teaching models. Although the debate between traditional techniques and modern technology has never stopped, it is very necessary for the professional teaching of colleges and universities to adapt to the development and let students understand the new technology and content.

2. RESEARCH BACKGROUND

Sculpture, as a kind of plastic arts, shows the artist's aesthetic taste and artistic feelings through materials and shapes. The emergence of digital technology has caused a certain impact on traditional forms of expression. It is true that digital sculpture only innovates the content of the industry in terms of materials and modeling methods, but because of its very different modeling methods, it does expand the concept of traditional sculpture modeling; on the other hand, the vigorous development of physical scanning technology and 3D printing technology has also put forward new requirements and ideas for the molding, turnover formwork production, and material expression of sculptures. Whether this change has an impact on the nature of sculpture is open to question, but the industrial chain of digital sculpture has already taken shape, and the market's demand for relevant talents continues to increase. The introduction of digital sculpture techniques and content in the teaching of sculpture courses for art majors in colleges and universities will help broaden students' horizons, increase industry understanding, and provide methods for innovative creation.

3. THE PROCESS AND PATTERN OF MANIFESTATION OF DIGITAL SCULPTURE IN MODERN SCULPTURE PRACTICE

There are two main forms of integration of digital technology and modern sculpture technology. One is a semi-digital creation process, that is, a process where clay sculptures participate in the creation. The sculptor first makes a prototype of the clay hand sample, scans it into a digital model with a high-precision holographic scanning device, then creates or refines the digital sculpture model in 3D software, and then creates the finished product through 3D printing. The other is a purely digital creation process, that is, after creating directly in the software, the created model is directly cut, cast or 3-dimensionally printed through the equipment.

According to practical experience, it can be known that the main characteristics of digital technology in modern sculpture practice are: 1) Non-linear process. 2) Digitalization and virtualization 3) Diversification of materials and tools. These characteristics have a direct impact on the future outlook of sculpture creation, collection and education.

4. APPLICATION OF DIGITAL SCULPTURE IN SCULPTURE COURSES

As an auxiliary sculpture method, digital sculpture is different from the traditional teaching of pure handicraft. What digital sculpture improves is students' software production ability, but its requirements for form, proportion and aesthetics remain unchanged. In essence, no matter what kind of sculpture method it is, it will not affect the essence of the teaching purpose of sculpture courses. In teaching, the most economical way is to use related software to create sculptures, as a sketch of sculpture creation, to exercise students' mastery of shape and proportion. If the relevant professional students have strong ability to operate software, then it is also possible to use it as a complete digital sculpture creation case. Capable schools can also introduce 3D scanning and printing into the classroom, so the teaching methods will be richer. Since the speed and accuracy of 3D printing are affected by equipment and consumables, this type of teaching may be more suitable for use in various competitions and entrepreneurship and innovation projects for college students.

5. COURSE CASE ANALYSIS OF "SCULPTURE CREATION"

It's necessary to master the creation methods of digital sculptures. According to the course requirements, the main teaching content can be divided into three parts: digital modeling, process combination and material transformation and innovation. It is worth noting that the sculpture creation course is an advanced professional course. Before this course, students should have basic sculpture techniques and certain theoretical knowledge. There should also be a pilot course in software learning, such as software technology courses "Digital Sculpture Fundamental" or "Three-dimensional Modeling Fundamental". The basic technical problems that may be encountered in the creation of digital sculptures should be solved before the start of the professional course, which helps students quickly enter the creative situation and avoid being affected by basic software operations or basic theoretical knowledge. In view of the difficulties in teaching, the experimental course has designed three projects, namely digital modeling practice, integration of process and practice and material transformation practice.

5.1 Digital Modeling Experiment (16 Class Hours)

Digital modeling is a modeling method, and its essence is not very different from manual sculpture. In the past, subject to software thresholds and teacher restrictions, the industry generally believed that digital modeling was learning content for software majors or design majors. Some teachers were very shy away from letting students learn such content, believing that it will slow down the teaching progress, increase the difficulty of teaching, and make it difficult to control the teaching effect. However, with industry changes and market demand, the introduction of this kind of teaching content has become inevitable. While in fact, students who have received basic software training in art majors have a good acceptance of this type of digital sculpture software. In 2020, many colleges and universities have chosen online teaching or blended learning mode under the influence of the COVID-19 pandemic. In the process of teaching practice, they found that the software digital sculpture course is very suitable for online teaching, and in this process, due to the natural coordination of digital technology and network information, the course context is richer and more flexible. According to a questionnaire

survey of 40 students of the course before, during and after the course, it can be seen that students can well accept software learning, and the acceptance level is much higher than expected. This has a lot to do with the basic learning of software in the early stage of the professional training program, and also has a lot to do with the acceptance level of modern students. ("Figure 1")
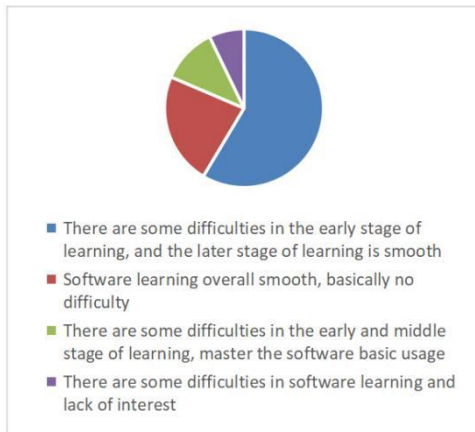

Figure 1 Students' feelings in learning digital sculpture software.

In the process of selecting teaching cases, it is necessary to follow the concept of combining science and art organically with creativity and aesthetics as the premise, and from easy to difficult, with results as the goal, to guide students to create. For example, relief creativity can be used in the imported case, because in digital modeling technology, two-dimensional text, patterns, photos, etc. can be processed, combined, and reconstructed to form a normal map, and the relief can be directly generated in the software. In the creative process of this case, it's needed to avoid too simple combination of elements, but to follow the construction principle of relief, pay attention to the relationship, combine decorative sculptures, pattern sculptures, abstract sculptures and other content by the fund and apply them in relief works. Because this case involves relatively simple software operations, the general completion time is 8-12 class hours. Through this case, students are initially familiar with the application of digital sculpture software and the principles of creation of reliefs, and can create complete works in the software in a short time, which has a good role in stimulating students' creative enthusiasm. After this case is over, 1 or 2 class hours can be used for work appreciation and process evaluation to consolidate the teaching effect. At this point, the guiding part of the teaching has been successfully completed. The

choice of the second case has certain variability. Whether it is further enhanced on the basis of the basic case or conducts theme creation should be designed according to the specific situation of the students.

5.2 Combination Experiment of Digital Sculpture and Traditional Sculpture Technology (32 Class Hours)

Sculpture teaching in the traditional academy of fine arts generally involves the creation of human-themed art, as well as paint from life and other links. How to not only allow students to complete the corresponding skill training within the limited teaching time, but also to enrich students' learning content through digital technology and expand the creative theme of sculpture is of great significance to the quality of modern sculpture courses.

In this link, in order to allow students to have more in-depth contact with the industry process, students should first follow the routine to create clay hand samples of sketchy human body, use sculpture "sketch" to shape the human body in a relatively short period of time, and carry out practical operations on the structure, proportion, and aesthetics of the form. The time is about 4 to 8 class hours. Then through scanning the student's work with a three-dimensional scanner, on the one hand, it can permanently save the student's work, and on the other hand, it can prepare the data foundation for the following teaching content. Students use digital sculpture software to refine their own clay hand samples and improve their software operation ability in practice.

In traditional sculpture teaching, sketchy human body is based on realism, and there is a time limit, and due to the constraints of the environment and facilities, students have to complete the magnification, refinement, and preparation of turnover formwork production materials for the clay draft in a short time. In addition, the sculptures must be reproduced, polished and colored. If the class hours are short and the time is limited, the quality of the finished product is often difficult to control. In actual teaching, it is common for beginner to damage the clay draft after turnover formwork production. Therefore, generally, teachers pay more attention to the production of clay drafts before turnover formwork production, and have a relatively tolerant attitude towards the final product. This teaching method is of course a choice based on the actual situation of students and teaching, but the introduction of digital sculpture

technology can solve this problem in some areas. After obtaining the scanned data, students can make detailed modifications, and can also create human body themes. Digital sculpture is suitable for creating special-shaped or abstract shapes, and it also has quite good performance on texture drawing. In the process of re-creation, the requirements for students are no longer limited to the mastery of the basic techniques of human body structure and circular engravure, but have risen to the content of re-creation of artistic elements. And when creating, students only need a computer and software to be able to master the process and evaluate the process anytime and anywhere. Even if the creation effect is not satisfactory, it is very convenient to modify and rework in the software. When everything is completed, it can be handed over to a professional 3D printing company to print the finished product, and the size can be customized according to budget or needs. The data that can't be printed temporarily can also be saved for future use. Compared with the requirements for venue, equipment and time in traditional sculpture teaching, the introduction of digital technology does have its advantages.

5.3 Practice of Material Transformation (12 Class Hours)

Material transformation has always been an important subject in sculpture creation, and it is also a relatively complex and specialized part of industry application. In traditional sculpture teaching, students will also be exposed to different sculpture materials as much as possible, such as metal, stone, wood, acrylic, pvc, etc. Many materials require certain production conditions to achieve. Due to the limitations of teaching conditions, it is difficult to master them within a few dozen class hours. Generally, appreciation, field visits, and other methods are used for teaching and understanding. After the students have completed the clay drafts, the more economical and faster way is to reproduce the glass fiber reinforced plastic materials or directly display the clay drafts. The finished product has a single form or short storage time, and is easily damaged. In terms of the efficiency and success rate of the finished product, manual reproducing also has its pain points.

Three-dimensional printing technology can now print with various materials. In addition to common consumables such as PAL, ABS, PVC, and resin, more materials such as metal and imitation stone mortar are also gradually being used. In the production of relief products, digital engraving machines have always been the preferred production method in the industry. High efficiency and low loss are the advantages of digital technology. In the past, this was an unattainable technology for college students. However, with the reform of course content, the continuous reduction of the cost of digital sculpture and the popularization of software technology, in the creative practice, students can also use digital sculpture technology to quickly turn their creativity into finished products. They are less restricted by their technological capabilities and can freely exert their creativity.

5.4 Evaluation of Works (4 Class Hours)

Positive, immediate and adequate evaluation of work is an important part of any practical course. After the introduction of digital content in sculpture courses, the direction and dimension of evaluation have expanded. Teachers should look at the pros and cons of works from a more comprehensive perspective. In addition to the evaluation of concepts, shapes, and aesthetics in traditional sculpture teaching, innovation and technical application should also become important evaluation content. In addition, if it is a team work, the ability to solve problems cooperatively or the ability to organize and manage should also become an important evaluation indicator.

6. CONCLUSION

Studying the application of digital sculpture in modern sculpture specialized courses is to comply with the development of the market and art, and is an effective supplement to traditional sculpture teaching. It doesn't affect the sculpture's demand for modeling and aesthetics. Its essence is a change in the result-oriented teaching concept given to modern sculpture by the times. With the continuous expansion of the application of digital technology in the sculpture industry, the digital integration and application reforms in sculpture teaching in colleges and universities also have good prospects. It is hoped that through teaching practice and bold introduction, the teaching of sculpture art will develop towards a more diversified future.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Weian Luo.

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