Research on Urban Public Art Design Based on Digital Information Technology

Chang Liu1,*

1Hubei University of Technology, Hubei, China,430000

*Corresponding author e-mail: liuchang@hbut.edu.cn

Abstract. As the embodiment of human system, urban culture represents the historical development of human civilization. With the great improvement of people's living standard, people pay more and more attention to the colorful city life [1]. The intense impact of urban culture and life creates public art. Experts believe that public art is the core idea of a city. It is an important symbol of the maturity of the city. In recent years, people began to study various forms of public art. With the development of digital information technology, some artists try to apply digital technology to urban public art. On this basis, this paper briefly summarizes the public art and digital technology related knowledge and theory. Finally, the principles of urban design based on digital technology are put forward.

Keywords: Digital Technology, City, Public Art, Design

1. Introduction

The improvement of living standard promotes people to improve their cognitive range of knowledge. On this basis, people have higher and higher requirements for urban culture and urban life color. They use their own unique thinking to design many kinds of art forms. As an art form for public service, public art design inherits colorful urban culture [2]. In addition, public art not only shapes the beautiful environment of the city, but also improves the average aesthetic level of urban residents. With the increasing popularity of public art design topic, people are not willing to just be a spectator. Many residents use their unique aesthetic thinking and various technologies to design different kinds of public art.

With the update of digital information technology, it is widely used in various fields of our social life. On this basis, people are gradually not satisfied with the public art design for ordinary cities. Some folk artists put forward the theory of digital technology combined with public art design (see Figure 1). They believe that digital technology can improve the beauty of public art design. Using the technology of digital information setting, artists can set up different types of virtual public art models. At present, this design method has become the design trend of contemporary public art. Although it has a great impact on the design of traditional public art, it broadens the expression way of public art.
2. Theoretical research on urban public art

2.1. Research on the development history of public art
Ancient Greece is the root of the development of public art. The ancient Greek urban management mechanism was open. It is the breeding stage of public art theory. The medieval period is the preparatory stage of the development of public art. During this period, there were many murals and buildings which symbolized the urban culture. During the industrial revolution abroad, public works of art were owned by the royal nobles. In the period of modernism, public art began to develop formally.

2.2. The emergence of the concept of public art
The concept theory of public art first appeared in the United States in the 1970s. At that time, American scholars defined public art as a kind of art with public significance. American scholars believe that the variety of art is infinite. They believe that the design of public art needs the participation of all residents. With the popularization of social service knowledge, Chinese scholars define public art as an art type that can serve urban culture.

![Figure 1. Digital urban public art design.](image)

2.3. The historical development of public art design ideas today
After observing the murals in the middle ages, we can find that the contents of these works of art are all advocating slavery. In the period of foreign industrial revolution, the source of public art design idea is the technological revolution. At that time, a lot of artworks were designed to reflect the industrial revolution. After the reform and opening up, the design content of public art in China today is advocating freedom and happiness. Therefore, the author believes that the social background affects the design ideas of public art.

2.4. Innovation of public art in China
The design of traditional public art is completed by artificial means. Due to the continuous downturn of China's economy, the material cost of artworks at that time was very low, and the design of artworks was also crude. After the reform and opening up, China has used a lot of funds to support the development of public art. There are more kinds of materials for artworks. There are more and more kinds of art design. Until now, we can use digital technology to design public art.
3. Theoretical research on the main characteristics of digital art creation

3.1. Superb technical features
With the progress of information technology, people's ability to understand art has become more powerful. People have developed digital art [3]. The birth of digital art is based on high technology. It can use the superb computer technology to show the design features of the artwork completely. With this advanced technology, we can save a lot of costs. This technical feature shows the charm of digital technology.

3.2. Artistic features with strong aesthetic feeling
The design of traditional art based on artificial is very hard. People pay more attention to the finished art than the beauty it can show. Digital art can liberate designers’ hands. Designers only need to express their design ideas perfectly. It can help designers focus on artistic creation as much as possible. Therefore, the public art created by digital technology has visual aesthetic feeling.

3.3. Sensitive human-computer interaction characteristics
Digital art can create a virtual space by computer. Designers create public art in virtual space through electronic devices. The sensitivity of human-computer interaction technology can help designers quickly adapt to the digital design of art. In addition, the digital art system will also provide designers with different design schemes. In the process of product design, the digital system can also prompt the designer's errors.

3.4. Virtual features of objects are not required
In the process of traditional art design, designers need constant trial and error to design excellent works of art. However, the trial and error process costs a lot. It wastes a lot of material. The art model designed by designers through digital system is virtual. Designers can change any data of the virtual model. During the trial and error period, there is no material loss and cost output.

4. The application of digital information technology in urban public art design

4.1. Image technology to increase aesthetic feeling
We found that many urban buildings have large electronic screens on the surface. This is the carrier of dynamic imaging technology. It can make people feel the beauty of dynamic virtual city public art. In recent years, the emergence of three-dimensional dynamic image technology strengthens the aesthetic feeling of public art. It can even make people feel the charm of the virtual world. It can make people feel a real sense of participation (see Table 1).

| Application                      | Advantages              | Satisfaction |
|----------------------------------|-------------------------|--------------|
| Imaging technology               | Visual impact           | 89%          |
| Lighting technology              | Advanced aesthetic feeling | 86%         |
| Audio technology                 | Auditory enjoyment      | 70%          |
| Human computer interaction technology | Interest               | 95%          |

4.2. Colorful lighting technology
The night in the city is very beautiful. Many kinds of lamps and lanterns are attached to the surface of buildings in many cities. Through the debugging of digital system, designers can control the color of lamps and lanterns. Color regulation is not single. At present, lighting technology is very popular. These urban artworks with special color lights add rich artistic conception and gorgeous visual experience for the public.
4.3. Interesting human computer interaction technology
The design of man-machine interaction mirror of Japanese animation city building is excellent. This mirror is actually a huge interactive screen. When people look in the mirror, they will find that the image in the mirror is a two-dimensional character. This interactive technology makes public art more interesting. In fact, people are more eager for this kind of art. The equal exchange with art makes people get the edification of art culture.

4.4. Vivid audio technology
The music fountain is a symbol of art in many countries. It not only has the unrestrained beauty of flowing water. It can also play live music while the fountain is working. In some cities of our country, tonal fountain is also very popular. The height of the water jet is adjusted with the tone of the people. There is no doubt that the combination of digital audio technology and artistic creation can ease people's hearts.

5. The application principle of digital information technology in urban public art design

5.1. Innovative design principles
Unable to innovate is the main reason for the elimination of traditional art design. Digital art is the information technology of scientific and technological innovation [4]. The innovative application of public art design is very necessary. If the result of the combination of digital technology and public art design is similar to the traditional art design, the existence of digital technology is meaningless. Therefore, innovative design is the most important principle of the application of digital technology in art design (see Table 2).

5.2. In-line with the principle of public aesthetic
The audience of urban public design is the residents of the city. Therefore, the application of digital technology in art design should conform to the public aesthetic. Advanced art design is not suitable for the masses to appreciate. In the process of art design, designers' design thinking should be closer to life and humanity. Only such works of art can be accepted by the masses. It can also reflect the human culture of the city.

5.3. Low cost principle
The source of financial support for the construction of public art is the state. Although urban public art represents the city's culture, we still need to make art at a lower cost. Art design promotes the culture of low-cost art creation. It not only shows the city culture of thrifty art consumption, but also makes city residents feel the honest and upright government. It will promote people's thrifty art consumption.

Table 2. Analysis on the application principle of digital technology in urban public art design.

| Design principles       | Objective                        |
|-------------------------|----------------------------------|
| Innovate                | Replace traditional design       |
| Public aesthetics       | More popular                     |
| Green environmental protection | Protect the environment     |
| Low cost                | Cost reduction                   |

5.4. Green building principles
The construction of public art can not affect the natural environment and human normal life. In the process of public art construction, noise pollution and environmental pollution are very serious. Public art is the symbol of city culture. It should not become the source of environmental pollution in cities. The principle of green building is what designers should stick to when designing public artworks.
6. The practical significance of the application of digital information technology in urban public art design

6.1. Digital technology promotes the innovation of public art
The development of traditional public art is slow. The process of innovative design of traditional art is very difficult [5]. However, with the gradual improvement of people's living standards, the level of people's appreciation of art has been improved. This phenomenon forces the traditional public art to carry out innovative design. Fortunately, people find that the application of digital technology can effectively promote the innovative design of public art.

6.2. It has changed people's view of public art
The creation process of traditional public art is very complicated. People know that the creation of public art is very difficult. This phenomenon leads to the timidity of many folk designers who have creative thinking of art. They dare not try to design public art. However, the emergence of digital art simplifies the design steps of public art. Its appearance makes more folk artists boldly try to make public works of art.

6.3. It shortens the distance between urban space and people
The economy of many cities is very prosperous. Some foreigners are far away from their hometown and come to the city to work hard. However, more people do not feel the warmth of the city. The emergence of public art in the city has shortened the distance between the city and people. The interesting and interactive nature of digital art increases the connection between people and urban space. The application of digital technology in public art is conducive to the future development of the city.

7. Conclusion
The influence of digital information technology on urban public art is very extensive. It really takes the design of public art to a new level [6]. At the same time, it can give public art a lot of negative effects. We need to use the right mentality to treat the characteristics of digital technology. There is no doubt that the combination of digital technology and urban public art has accelerated the pace of innovation.

References
[1] Aiqing W, Xitong W, Fengwu H . Research on the Digital Multimedia Technology and Urban Landscape Design based on Multimedia Art Perspective[J]. International Journal of Multimedia & Ubiquitous Engineering, 2016, 11(10):371-380.
[2] Jiang T . Urban public art and interaction design strategy based on digital technology[J]. Cluster Computing, 2019, 22(4):1-8.
[3] Fang M, Wang R. Research on framework of integration platform for digital urban planning based-on service-oriented architecture[C]// The IEEE International Conference on Information Management and EngineeringICIME. 0.
[4] Yidong, Liu, Yiran, et al. Research on Digital Art Design Mode in China Based on 3D Animation Design Analysis[C]// 2018.
[5] Jiao J, Liu H, Zhang N. Research on the Urban Landscape Design based on Digital Multimedia Technology and Virtual Simulation[J]. International Journal of Smart Home, 2016, 10(9):133-144.
[6] Ping C, Mingdong K, Hongbin C. Research on incubator building function design of industrial park based on digital information technology[J]. Industrial Construction, 2017.