

Three-Dimensional Application of Information Visualization Graphic Design

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Abstract: In order to study the graphics design of information visualization and explore the application of information visualization graphics design in Museum exhibitions, a new perspective of combining information visualization graphics design with museum exhibitions is opened. The results show that information visualization graphic design plays an important role in the efficient dissemination of information, saving the time of human understanding and absorption of information, and improving the efficiency of people's use of information. The three-dimensional application of information visualization graphic design plays an immeasurable role in improving the cultural information dissemination of the National Museum exhibition, displaying the Chinese history and civilization, and analyzing the contents of exhibits and value of the whole exhibition. It is seen that the three-dimensional application rules and methods of information visualization graphic design under different exhibition categories can provide reference and guidance for the exhibition application of other museums, and give full play to the demonstration effect of National Museum exhibitions. It plays a positive role in improving people's cultural consciousness, enhancing cultural self-confidence, and promoting the exchange of civilizations between China and foreign countries.

1. Introduction

In today's era of Internet upgrading, information emerges in our daily life and work learning like a flood of beasts. With the invention of information processing technology, information visualization has already been applied in various disciplines and fields to help dealing with increasingly complex information [1]. The information visualization is combined with graphic design, and design thinking and pattern law of information visualization are used to guide graphic design works. The application rules of information visualization graphics in National Museum exhibitions are discussed, with a view to summarizing the application law and ways of information visualization graphics design under different exhibition categories. It is expected to provide reference and guidance for the exhibition application of other museums, and give full play to the demonstration effect of National Museum exhibitions.

Three-dimensional application on information visualization graphic design of exhibition space in national museums is studied. Through many field investigations and analysis, it has been found that different Museum spaces (except exhibition space in each exhibition hall) have different design styles, and the design styles and methods depend on the categories, attributes, and status of museums. The whole form of museum space design will not be changed in a short time after it is applied, which confirms that the visual graphic design of information in museum space will not change quickly [2]. The exhibition space in the museum will be constantly updated according to the schedule of the exhibition period. Then, it is of great practical value to study the present situation and summarize the rules of information visualization graphic design in exhibition.

This paper takes the exhibition space in the National Museum as the research object. Through case analysis, literature analysis, and field investigation, the three-dimensional application of information visualization graphics in six exhibition types of National Museum is systematically combed and explored. The three-dimensional application scope, method, effect, and influence of information visualization graphics in the exhibition of National Museum are also explored. The

application of information visualization graphics plays a positive role in improving people's cultural consciousness, enhancing cultural self-confidence, and promoting the exchange of civilizations between China and foreign countries.

2. Three-dimensional Application of Information Visualization Graphics in National Museum Exhibition

As the largest public museum in China, the biggest attribute of the National Museum lies in its "public universality", that is, its openness to Chinese citizens. The way of Museum exhibition dissemination is generally to sort out exhibition information by the exhibition organizer. According to the needs of the audience or the dissemination intention of the organizer, the information needed will be placed in a suitable place for the audience to visit in various forms, such as physical exhibits, text information, graphic information, illustration information, etc. [3]. The audience plays a leading role in the process of visiting. The recognition and acceptance of exhibits and their information determines its success. Generally speaking, the audiences visiting the National Museum exhibition come from all over the country or even all over the world. These audiences have different educational level, wide age distribution, social cognition and experience, language and skin color, and different beliefs, which will lead to different understanding and cognition of exhibits and views in the same exhibition.

As one of the basic exhibitions of the National Museum, "ancient China" is a long-term exhibition. The exhibition is divided into eight parts, with precious cultural relics as the main witness, systematically demonstrating the long historical process of China from ancient times to the end of the Qing Dynasty, and comprehensively demonstrating the continuous development of Chinese civilization and the historical process of the people of all nationalities jointly building a multi-ethnic country. Among them, each part of the three-dimensional application of information visualization graphics is more common. In the whole exhibition, graphic information visualization graphics are widely used to explain the characteristics, application methods, and details of exhibits to enhance the viewing effect of the exhibition and deepen the understanding and memory of the exhibits [4]. As shown in Fig. 1, in ancient times, the three-dimensional application of information visualization graphics was used to display the skulls of cave dwellers and Peking dwellers. The skulls of modern apes, Peking dwellers, and modern people are compared. In the same picture, the viewers could clearly compare the skulls of modern apes, Peking dwellers and modern people. The shape information of human skull can be obtained intuitively by the shape difference of human skull. This information visualization graphics form is relatively concise, but the information conveyed is very clear, which is a good case of the application of information visualization graphics.



Figure 1. 3D visualized skull of ancient times

Among them, there are many three-dimensional applications of spatial information visualization graphics, including city site schematic maps, site maps, road maps and so on. In order to know the overall style and the names of various parts of the car and horse decoration in detail, a sketch of the

car structure in the late Shang Dynasty of Yinxu in Anyang, Henan Province, is added to the rear of the exhibition, which can show the structure of each part of the whole car. And mark the name of each part in the structure. The whole picture is concise and clear, and the time of reading information is fast. The structure of each part of the car is clear at a glance [5]. The application of information visualization illustration greatly improves the dissemination of exhibit information, so that more useful information can be obtained in a shorter period of time.

Figures 2 and 3 show the fish-pattern pottery basin of Yangshao culture in Banpo of Neolithic Age, which has more realistic fish-pattern than the external murals of the basin. Fish pattern is a motif pattern, which evolves into a series of sub-motif patterns. The evolution process is from complete to local and from realistic to abstract. In the exhibition, the process of pattern evolution is clearly demonstrated through the use of visual illustrations of process information. Additional cultural information about exhibits is added while exhibits are displayed [6]. The three-dimensional application of information visualization graphics has certain significance in enriching exhibit information.

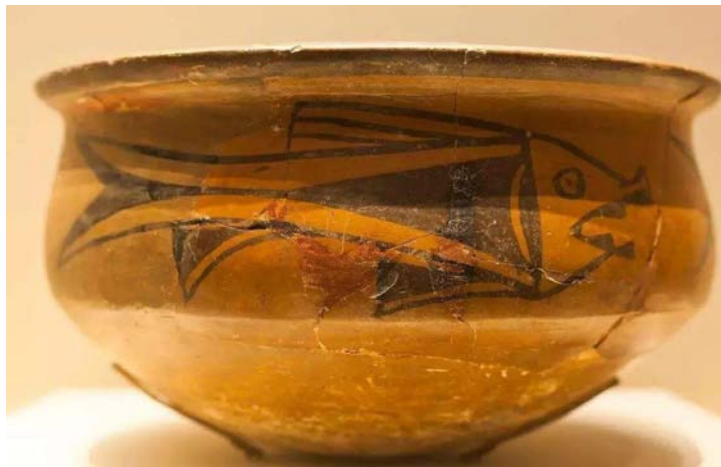


Figure 2. Fish-pattern painted pottery basin

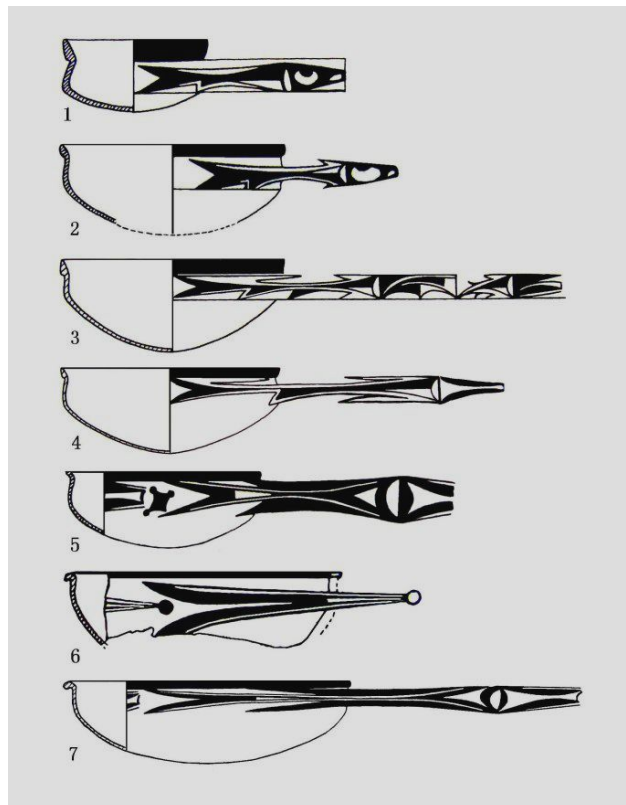


Figure 3. The evolution processes

In a word, in “ancient China”, there are many three-dimensional applications of some information visualization graphics design, and the results are very remarkable. From the perspective of exhibition display, the three-dimensional application of information visualization graphics to a large extent clarifies the details of the exhibits. The exhibits in the exhibition hall are relatively fixed, and cannot view the exhibits from multiple perspectives. When some important information is inside the exhibits, the audience cannot clearly see the information of the exhibits, so they need information visualization graphics to assist the display, and the parts that the audience cannot see are presented [7]. Some exhibits are not well-known to modern people. In order to further understand the characteristics of exhibits and facilitate the understanding of the viewers, the design is used to transform the information that is difficult to understand into the form of visible graphics of tangible information, so as to make the transmission of information more concise and intuitive, so as to make different levels and different categories of audience groups better accept and understand the content of the exhibits to be transmitted.

3. Three-dimensional Application Rule of Information Visualization Graphics in Museum Exhibitions

3.1 Summary of the Application Rules in Exhibitions

In the long-term exhibition, because of the long-term exhibition time, the information visualization graphics have been used since the beginning of the exhibition. Generally, the information visualization graphics used in the exhibition will not be modified in the process of the exhibition. Therefore, in the design of information visualization graphics, more attention should be paid to the timeliness of the graphics content, and some short-term design factors and components will be replaced, which will be consistent with the long-term nature of the exhibition. On the other hand, the value of cultural information disseminated by long-term exhibition is greater, which has a far-reaching impact on society and audiences. This is determined by the exhibition attributes of long-term exhibition itself. Therefore, the design of information visualization graphics should be consistent with the cultural value of the exhibition itself, as shown in Table 1.

In temporary exhibitions, the application frequency of information visualization graphic design is high. Compared with the long-term display and basic display, it can be found that the three-dimensional application of information visualization graphics is more extensive with the development of exhibition, and the frequency of use is increasing. Therefore, in the constantly updated temporary exhibition, the three-dimensional application frequency of information visualization graphics is higher [8]. In addition, the exhibition cycle of temporary exhibition is shorter, the exhibition renewal speed is faster, and the exhibition method is closely combined with the present exhibition means and technical application. Then, the application of information visualization graphic design is often combined with science and technology, which opens a new application mode of information visualization graphic design.

Table 1. Exhibitions of the National Museum in the past four years

Projects Year	Thematic exhibition	Exchange exhibition	Temporary exhibition	Basic display	Long-term display	Total
2015	13	3	27	3	12	58
2016	12	4	30	3	12	61
2017	11	3	35	3	12	64
2018	14	4	19	3	12	62

In thematic exhibitions, the use of information visualization graphics is unbalanced, and the content of thematic exhibitions is consistent. The application of information visualization graphics design in different exhibition types depends on the exhibits themselves. When an exhibition needs information visualization graphics as a means of display, the utilization rate of information visualization graphics in the whole exhibition will be greatly increased. On the contrary, the

utilization rate of information visualization graphics may be zero when the exhibition does not need the help of information visualization graphics as a means of display. In addition, in thematic exhibitions, because of the consistency of exhibition contents, the design patterns of information visualization graphics are similar, which is determined by the nature of thematic exhibitions.

In addition to the reasons mentioned above, the reason why information visualization graphics can gain a place in exhibitions of National Museums (including other museums and other fields) lies in that it can achieve different acquisition modes in different media to express the different characteristics of exhibits and make the audience have an intuitive memory [9]. In the era of the wide application of multimedia technology and the rapid development of the Internet, the traditional static and single mode of communication based on paper media has gradually been replaced by the dynamic and multi-dimensional mode of communication supported by digital technology. This is not only the general trend of the development of the times, but also reflects the impact of information technology on the process of human civilization. Therefore, the three-dimensional application of information visualization graphics technology in museum exhibitions inevitably needs to adapt to the development of the times and innovate, so that the audience can get the information and content conveyed by exhibits faster and more efficiently.

3.2 Requirements for Information Visualization Graphic Design in Future "Participatory" Museums

In the future, "participatory" or "interactive" exhibition will become one of the trends of Museum exhibition, which correspondingly improves the standards of conduct of Museum exhibition planners and outline designers in planning and designing exhibitions, and takes the participation and interaction of audience or people into account in the whole exhibition. Especially as an important role of information visualization graphics design, it is essential how to use the current developed media and network to allow people at all levels to participate in the design and put forward their feelings and opinions.

"Museum allow people to participate in the exhibition design, provide people with the opportunity to express their wishes, and increase the sense of mission of the museum exhibition". The information visualization graphics design involved in the exhibition design should also fully mobilize the strength of the people, sort out and design the audience favorite information visualization graphic design type. The information illustrations designed respecting the wishes of the audience represent the voice of the people, and will certainly support information visualization graphic design for a longer time.

4. Conclusion

The three-dimensional application of information visualization graphics in the exhibition is studied, which plays an immeasurable role in explaining the characteristics of exhibits, application methods, regional topography, age history, etc. Combining various display means and technologies in the exhibition, it fully shows the information connotation to be conveyed by each exhibition. Information visualization graphic design has far-reaching significance in the time value, cultural value, and dissemination value of exhibitions in National Museums. Although great achievements have been made in the application of information visualization graphics in exhibitions of National Museums, there are still some problems. In order to distinguish different exhibitions, highlight different exhibition themes, and deepen the memory and impression of the audience on each exhibition, appropriate information visualization graphic design should be adopted according to the exhibition design style to avoid similarities in design patterns.

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