

New Space, New Thinking, and New Guidance Discussion on the New Thinking of Guidance Design of Space in the Future

Zhiqiang Cai^{1,*}

¹ Department of Visual Communication Xiamen Academy of Arts and Crafts, Fuzhou University, Xiamen, Fujian, China

*Corresponding author. Email: 263989989@qq.com

ABSTRACT

The outbreak of the COVID-19 has changed people's lives to some extent. The original ordinary travel now seems to be a luxury. Coupled with the constant emergence of new spatial environments in the city and the absence of a guidance system that keeps pace with the times, this is not only a barrier to cognitive transmission, but also a barrier to living behavior, and even psychological and spiritual barriers, which will certainly have a negative impact on future social development. The changes in the post-epidemic era may be more dramatic and turbulent than we thought, and in response, we must make changes as soon as possible. There will be a must to first change and reshape our thinking to deal with the new, more intricate and intertwined spaces in the future. Based on the characteristics of the new space of the future, the author used divergent thinking and proposed as followings: the first is the thinking based on new materials and technologies; the second is the thinking based on the concept of environmental protection; the third is the thinking based on environmental factors; the fourth is the thinking based on the perception of five senses, and the fifth is the thinking based on multidimensional space. It is hoped to explore solutions to cope with the new spatial guidance of the future.

Keywords: *New space, New thinking, Divergent thinking, New guidance.*

1. INTRODUCTION

The outbreak of the COVID-19 has changed people's lives to some extent. The original ordinary travel now seems to be a luxury. Coupled with the constant emergence of new spatial environments in the city and the absence of a guidance system that keeps pace with the times, this is not only a barrier to cognitive transmission, but also a barrier to living behavior, and even psychological and spiritual barriers, which will certainly have a negative impact on future social development.

The rapid growth of the world population and accelerated urbanization have led to an increasingly dense population and more and more congested traffic. The disorderly expansion of the commercial space environment, coupled with the increasing demand for limited living space, has forced people to pursue how to effectively use limited urban space, resulting in that the urban space environment is becoming increasingly three-dimensional and

intricate. On the one hand, new urban spaces such as three-dimensional transportation hubs, underground commercial strips, urban complexes, and conjoined high-rise buildings are emerging. On the other hand, the constant changes and updates in urban space often make people living and traveling here feel nervous and at a loss. In addition, the original guidance cannot meet the needs of the new space function, resulting in that the modern spatial environment is increasingly chaotic and disorderly, all of which urgently need to be improved and perfected by the construction of the environmental guidance function of the new urban space.

Guidance design is a new design methodology, which is the process of managing spatial or environmental information to help users guide their way. It is characterized by a design that seeks to establish or improve the function of a specific spatial environment, and the construction of a guidance system is to establish a new way of providing information. Its purpose is to solve the

problems of efficiency, safety and human health between "human, artifacts and spatial environment", so it is very important to expand the thinking and explore more design solutions.

Thinking influences the process of human development and plays a major role as the main means of solving problems in social development, and is an orderly act of consciousness in which human beings recognize the objective world, conceive the ideal world of the future, and cope with the real spatial environment in the process of the creation of spirits. With the development of the city, the formation of a new spatial environment, the original relatively single mode of thinking is unable to cope with the current situation of guidance design of modern complex space and the multi-layered and multi-formed challenges of new space, so it is an inevitable trend to develop ideas, explore multiple perspectives and find more design solutions[1].

Divergent thinking is an important way of thinking to form innovation, a multidimensional and divergent way of thinking, which refers to the way of thinking and process of thinking through different directions to think and explore multiple answers from a certain problem. The key to divergent thinking is to go beyond the conventions, break the inherent way of thinking, give full play to the imagination, develop ideas, and think at multiple levels and in multiple angles for the same problem, so as to obtain more solutions. By applying divergent thinking to guidance design of space, we can promote the advantages of thinking and find as many design solutions as possible to meet the multi-layered and multi-formed challenges of new space.

2. THINKING BASED ON NEW MATERIALS AND TECHNOLOGIES

Technology is developing, and new materials are emerging, which have excellent performance and special functions that traditional materials do not have, directly affecting human thinking and lifestyle, providing unlimited possibilities for the development of various industries. There is no exception to the guidance design. The use of reflective film on the highway is a successful case of the combination of new materials and guidance design, and according to the author's research, the following new materials and technologies will definitely affect the future guidance design.

2.1 The Application of Light and Shadow

The guidance system of the French National Film Museum designed by Swiss graphic designer Professor Ruedi Baur is based on the characteristics of film, using light and projection to create a rich virtual space change, and exercise the function of guidance in the process of art and interpret the theme of film, which is a classic case of the combination of light and shadow and guidance design ("Figure 1").

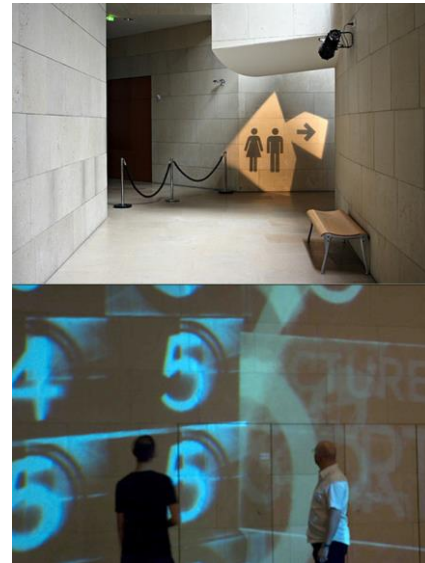


Figure 1 The guidance system of the French National Film Museum designed by Ruedi Baur.

For the use of light and shadow, the new traffic light guidance designed in Ukraine uses new means of optical technology to achieve an augmented sense of reality in a real sense. It is able to present a traffic light curtain wall at the intersection, which is like a red wall with a time display when the traffic lights are red, so that people will involuntarily stop when driving in front of it [2]. When the traffic light is in the case of green, this red wall will disappear, and then appear on the other two sides. For people traveling in it, it's like walking in a special channel inside, very safe. Such a creative design is really admirable. Of course, it must rely on the rapid development of modern optical technology.

2.2 The Application of OLED Light-emitting Display Materials

OLED is organic light-emitting diodes. OLED ("Figure 2") display technology has the characteristics of self-illumination, with a large visual angle, ultra-thin and energy-saving. It can

be bent and folded and has other advantages. Its combination with guidance design can provide more options for complex space guidance, such as emergency measures (earthquake, fire, etc.), and will be more flexible in installation form due to the thinness and bendability of the material.

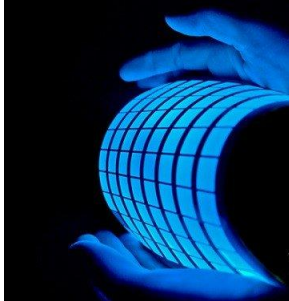


Figure 2 OLED light-emitting display materials.

2.3 The Application of Magnetic Levitation Technology and Materials

Magnetic levitation technology is space electromagnetic levitation technology. Levitation technology mainly includes electromagnetic levitation, optical levitation, acoustic levitation, air levitation, electrostatic levitation, and particle beam levitation, etc., of which electromagnetic levitation technology is more mature. EML is short for electromagnetic levitation technology. The combination of magnetic levitation technology and guide design can provide unlimited feasibility and convenience for the production and installation of guides, especially for some complex and variable spaces.

2.4 The Use of Wireless Power Technology

Israel Powermat developed a wireless power, called "power pad". It can achieve power transmission through electromagnetic waves, thus eliminating the need to connect power cords and power outlets. The combination of this technology and guidance design provides power for the design and installation of guidance in a vast wilderness. And it is especially a disruptive and innovative change for the production of self-luminous guidance installation.

2.5 The Application of Computer Information Technology and Intelligent Technology — "Smart City"

In recent years, the rapid development of computer information, big data applications and intelligent technology have directly changed our way of life, which must affect guidance design in the future, such as guidance design with VR and IA technology. It can realize the interactive experience of virtual space, which greatly improves the accuracy of guidance information.

In November 2008, at the Council on Foreign Relations in New York, IBM proposed the concept of "smart earth", which led to the boom of the construction of smart cities. Smart City refers to the use of various information technology or innovative concepts to connect and integrate city systems and services to improve the efficiency of resource utilization, optimize city management and services, and improve the life quality of citizens. ("Figure 3")

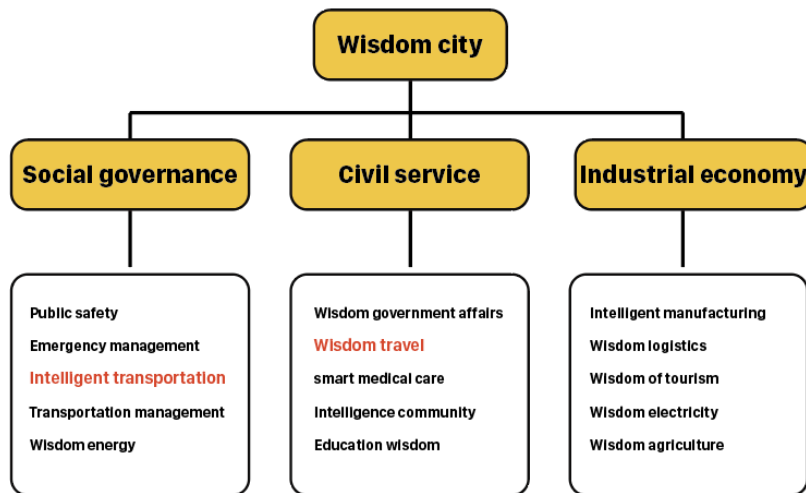


Figure 3 Smart City architecture system, (drawn by the author).

In order to build a smart city, the city of Southampton, UK, is implementing the "Southampton Legible City" plan ("Figure 4"), which aims at the design of guidance and urban mapping system, and tries to solve the problems of modern urban development, convenient mobility and smart travel with interrelated and multimodal guidance and transportation systems. Its pragmatic design provides experience and reference for the combination of computer information technology and intelligent technology to solve future guidance design[3].



Figure 4 The design of Southampton Legible City, Southampton, UK.

3. MATH AND EQUATIONS DESIGN THINKING BASED ON THE PERCEPTION OF FIVE SENSES

Humans mainly perceive the outside world through vision, hearing, smell, sense of touch and sense of taste. Psychologists have proved that 83% of human perception is through vision, 11% through hearing, 3.5% through smell, 1.5% through the sense of touch, and 1% through the sense of taste. It can be seen that human memory of external things mainly relies on vision and hearing, but they are not the total means of remembering external things[4]. As the new modern space is becoming more and more complex, a single design thinking that relies solely on vision and hearing can no longer cope with the complex guidance design of modern space and the needs of various people, so the design relying on other perceptions may be able to find a breakthrough design approach for future guidance design.

As the saying goes that "fragrance spreads for miles" and "good wine needs no bush", which is the specific elaboration of taste. So is it feasible to use the unique taste to design the guidance? The botanical garden in Denmark uses herbal scents for guidance, trying to provide spatial guidance through the sense of taste, which is just an attempt. Compared with the "sensory parks" built in

developed countries such as Britain, the United States and Japan, it adopts the "all-round sensory interaction" viewpoint for design, especially the use of technology to visualize and digitize the five human senses and other mutual conversion experience. This may provide a way and technical support for other sensory integration into the design of guidance.

4. THINKING BASED ON ENVIRONMENTAL FACTORS

Environmental space determines the quality of the survival of human beings. As an important element of modern environmental composition, a good space guidance can not only exist alone, but also can be integrated into the space of the surrounding environment. So the guidance design must be integrated into the thinking of environmental space, such as the characteristics of environmental space, natural alternation of day and night, seasonal changes and weather changes, etc. Therefore, how to integrate and coordinate with the environment is a problem that must be faced in the future.

4.1 Design and Integration

The design combines the characteristics of the environment and various factors of the space, so that the guidance is integrated into the environment and changes with the environment. This kind of design thinking is simple and effective. For example, the theme park in Rabin, Croatia ("Figure 5"), which is called "Waiting for the wind", is ingeniously integrated with the environment. The guidance has the function of guidance, and at the same time, it shows various images based on the environment of four seasons, day and night, sunny and rainy days[5].

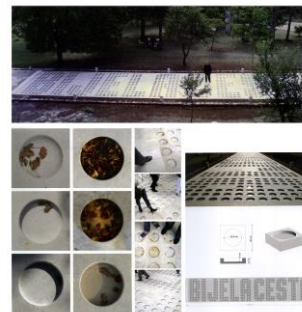


Figure 5 Guidance design of theme parks such as "Waiting for the wind" in Rabin, Croatia.

4.2 The Application of Environmental Stacking Techniques

The design of the guidance uses the technique of stacking and hollowing, using the environment as a background, combining environmental materials, texture, color, shape and other elements of the stacking and integration. It is a relatively intelligent thinking, such as the guidance in the zoo ("Figure 6"), which exercises the function of guidance, but also has a strong eye-catching effect, and complements the environment.



Figure 6 The guidance system of the zoo.

4.3 The Use of Materials

The design starts from materials, such as glass, specular metal and other reflective and transparent materials, using the refraction, reflection and projection of light to produce a special effect of merging with the environment. For example, the work of Japanese graphic design master Takenobu Lgarashi ("Figure 7"), it uses the symmetrical reflection of specular metal materials to form a special effect of uniting things and scenes, which is a perfect pair.



Figure 7 Guidance system designed by Takenobu Lgarashi using bright stainless steel material.

4.4 The Imitation of the Environment

Then the imitation of the specific shape or specific elements of the environment is also good

thinking, which is favorable for the guidance to be naturally hidden into the environmental space and mixed into one. For example, the guidance system of the Paris Museum of Natural History imitates the shape of the ancient trees in the environment ("Figure 8"), which complements the environment, and meets the requirements of function, connotation and environment.



Figure 8 Guidance system of the Paris Museum of Natural History.

5. THINKING BASED ON THE CONCEPT OF ENVIRONMENTAL PROTECTION

In recent years, the rapid development of the industrial economy has led to the rapid deterioration of the living environment, so "green" design was born at the right moment. This is no exception for guidance design. Under the premise of protecting the environment, how will the spatial guidance design of the future respond?[6]

5.1 Modular Combination

It is an important embodiment of low carbonization of guidance facilities that modular facilities can be repeatedly combined and used. Modular design is to decompose the guidance signs according to the unit module, make its function independent, and then mass-produce the independent unit module. According to the function of the use of space requirements, it can be combined and configured according to the different order of various combinations, so as to create the guidance facilities applicable to different functional environments, and to meet the guidance needs of various spaces. The advantage is that it can be reassembled and used, the shape can be infinitely changed (like Lego building blocks), and if a unit is damaged, it can be replaced individually, saving material consumption and maximizing the life of

the guidance. For example, the guidance of the 11th Venice International Architecture Biennale is designed by modular concept, which adopts the 3D graphic module of a sphere, providing endless configuration possibilities and uniform presentation for the guidance of Venice International Architecture Biennale, which is a very successful case of modular guidance design. ("Figure 9")



Figure 9 Guidance system of the 11th Venice International Architecture Biennale.

5.2 The Design and Use of Natural Materials

Natural materials come from nature, meaning that nature originally has unprocessed or basically unprocessed materials that can be used directly. Such as sand, stone, wood, and bamboo, etc. Natural materials themselves have the value of use. The reasonable combination or direct use of natural materials given by nature as guidance design materials is also a choice of green design. For example, Japan's "Friendly Park" uses the park's fallen and dried trees to make a guidance system through simple technical processing ("Figure 10"). The overall guidance looks natural and harmonious.



Figure 10 Guidance system of "Friendly Park" in Japan.

5.3 The Design and Use of Natural Materials

General design, also known as universal design, and all-round design, was proposed by Ronald Mayes, director of the Center for Universal Design at California State University, in 1990. He defined universal design as the design of products, buildings and spaces that can be used to the maximum extent by all people at the least cost.

The essence of the universal design proposition is to save materials and reduce waste as much as possible, which is the basis of green design. Therefore, the universal design concept is introduced into the space guidance design, which is conducive to the promotion of simplicity and reduction of consumables in the guidance design, which is also the easiest goal to achieve through design techniques. In the future of ecological development, it is inevitable to introduce the concept of universal design into the design of spatial guidance system.

6. THINKING BASED ON MULTIDIMENSIONAL SPACE

"Dimensionality" refers to the pathway connecting space. Generally zero-dimensional is the point, one-dimensional is the line, two-dimensional is the surface, three-dimensional is the static space, and four-dimensional is the dynamic space (plus time). In the past, guidance design is mainly dominated by two-dimensional, while now due to three-dimensional, interlaced, and complex new space, two-dimensional space guidance has been unable to meet the needs of the new space, so the thinking of multi-dimensional space is the direction of the guidance design in the future.

6.1 Multi-faceted Utilization of Inherent Space

At present, the majority of space guidance is basically in the form of two-dimensional existence, which can meet the relatively single function of space needs, but can not cope with the multifunctional and complex needs of the future urban space.



Figure 11 Multi-faceted utilization of inherent space.

6.2 Multi-space Perspective, and Overlapping Use

Space is characterized by three-dimensionality, that is, with length, width, and height. But what we face in the design of guidance is often not a single space. The reality of space is complex, mixed, interlaced, overlapping, and perspective etc. It is a trend to promote the development of multi-functionality and complexity of space in the future. Therefore, designers must re-examine the possibility of designing and using the inherent space, change the original two-dimensional space design and application thinking, focus on the multi-faceted use of three-dimensional space design ("Figure 11"), and constantly develop the design horizon to find solutions to multifunctionality and intricate guidance needs in the future.



Figure 12 Multi-space perspective, and overlapping use.

For the guidance design of Eureka Tower parking lot in Melbourne, Australia ("Figure 13"), these letters are not easy to read when walking. But only when sitting in the car, we can use the principle of areal perspective and other principles to combine the letters on the ground and the wall to read them, and to form clear and huge directional information. This design thinking of multi-space perspective and overlapping use ("Figure 12") provides us with experience and ideas for the use and solution of complex spaces.



Figure 13 Guidance design of the parking lot--EUREKA TOWER.

7. CONCLUSION

The future space is bound to be more intricate and intertwined, so the design must go beyond the convention, break the inherent way of thinking, and give full play to imagination by thinking at multiple levels and in multiple angles, so as to obtain more design solutions to meet the challenges of the future. Design changes the future, and thinking determines the way out. Only by expanding our design thinking, with the development of future materials and science and technology, can we create a multi-form, multi-functional and diversified guidance to meet the needs of new spaces in the future.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Zhiqiang Cai.

REFERENCES

- [1] (Japanese) Tanaka Naoto, Iwata Mikiko. Universal Design for Signage Environments:

- 108 Points of View for Planning and Design, translated by Wang Baogang et al. [M] Beijing: China Buliding Industry Press, 2004.
- [2] Zhang Lili. Guidance Design [M]. Shanghai People's Fine Arts Publishing House, 2014.
- [3] (Japanese) Katsura Miyazaki. The Design of Somatosensory Signs, translated by Zhang Yanfang. [M] Beijing: China Buliding Industry Press, 2019.
- [4] (Korean) Korea Architecture World. Sign Design, translated by Guo Dongmei. [M] Liaoning: Liaoning Science and Technology Press, 2004.
- [5] (USA) ARTPOWER. Guidance System 5. [M] Liaoning: ARTPOWER Publishing, 2015.
- [6] Chen Hansheng. A Preliminary Discussion of the Design of Chinese Character Fonts [J], Journal of Art College of Inner Mongolia University. 2008. (in Chinese)