

Research on Information Visualization Design based on Municipal Solid Waste Sorting

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Abstract. By expounding the concept of information visualization and municipal solid waste sorting, this paper illustrates the importance of information visualization design in municipal solid waste sorting. Then it conducts a systematic analysis on the current situation and existing problems of the visual language of municipal solid waste sorting at home and abroad from the perspective of information visualization design. Finally, it discusses the design countermeasures of information visualization for municipal solid waste sorting, thus providing a reference for the improvement of visual language of municipal solid waste sorting in China.

1 Introduction

At present, China is in a period of rapid development. With the rapid development of social economy and science & technology, municipal solid waste begins to draw people's attention, and the sorting of solid waste is an effective way to deal with the problem of the waste. With the increasing demand for information in the society, it is worth discussing how to convey the information of municipal solid waste sorting intuitively, concisely and efficiently. Information visualization design is a kind of visual language. Through the visual transformation and expression of information, people can quickly recognize and understand all kinds of flooded information. Through the research on the information visualization design of municipal solid waste sorting information, this paper studies the application of municipal solid waste sorting information design, providing reference for the problems of municipal solid waste, meeting people's information needs, changing people's cognition of municipal solid waste sorting information, so as to improve people's concern and attention to municipal solid waste sorting information.

2 The importance of information visualization design in the sorting of domestic municipal solid waste

2.1 Overview of information visualization

The essential meaning of information visualization is to show information of complex and huge data in visual language, with the advantage of transforming some boring numbers, symbols, knowledge and information

into a more acceptable visual form. Due to the limitations of the human brain on memory, the amount of information obtained through vision is often more than other senses. As a way of expression, information visualization uses human visual senses to obtain information, so as to help people quickly, accurately and effectively accept and understand the huge information produced in the era of big data.

Information visualization design refers to transforming information into a visual process that is easy for the audience to understand. The visual language conveys and expresses information through different technologies, media and other forms to provide people with a good interactive experience, so as to achieve the purpose of fast, accurate and effective transmission.

2.2 Overview of municipal solid waste

Municipal solid waste is a kind of solid waste produced by residents in daily activities. The sorting of municipal solid waste is to dispose, treat and transport the waste by sorting according to certain standard, so as to turn the waste into useful public resources [1]. Municipal solid waste has caused a variety of hazards to social development and ecological environment, and the classified disposal of municipal solid waste is considered as an effective countermeasure to deal with municipal solid waste and prevent the pollution of municipal solid waste, so as to achieve the goal of harmonious coexistence between human and nature.

2.3 The importance of information visualization design in the sorting of domestic municipal solid waste

Modern society has entered the era of "big data". People need to accept huge information flow. The main function

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of information visualization is to use visual senses to accept and understand the abstract data information expressed through visual language, so that it can enhance the identifiability and interactivity of information, and people can reduce the reading pressure in the fast-paced urban life. And people feel easier to recognize and remember, and can quickly understand and receive information. An outstanding visual design of information presents a perfect state in its recognizability, interest, beauty, creativity and interaction.

Waste sorting has always been the issue we discussed, but still there has been no substantive progress. Urban residents have limited knowledge of the complex sorting of municipal solid waste. At present, the visual language of waste sorting in China can't guide urban residents to subdivide a wide range of waste. Meanwhile, the visual language of municipal solid waste sorting has a direct impact on people's public behavior and the public's initiative in waste sorting.

Based on the positive influence of environmental protection knowledge on the change of public behavior and the current situation that the public's knowledge and awareness of waste sorting need to be improved, it is a good way to present the complex waste sorting information by means of information visualization design. By using the information visualization design in the sorting information of municipal solid waste, it can search, screen and integrate the complex and huge data information in the sorting of municipal solid waste, and convert it into visual graphics and multimedia information. And the interactive media is used to deepen people's understanding of it, to better carry out the sorting publicity of municipal solid waste.

3 The current situation and problems of visual language for municipal solid waste sorting at home and abroad

3.1 The current situation of visual language for the sorting of municipal solid waste in foreign countries

In the world, many countries have already started to implement the sorting of municipal solid waste and strictly abide by the waste sorting rules. Among them, the waste sorting systems of the United States, Germany, Sweden, Japan, South Korea and other countries are relatively complete and reasonable. The successful experience of these countries for the waste sorting system deserves our reference.

At present, Germany has a complete set of municipal solid waste sorting system and visual language graphics. The importance of Germany paying on municipal solid waste sorting is obvious to all. As early as 1904, waste sorting in Germany was divided into seven categories: paper waste, biological waste, packaging waste, old glass bottle waste, special toxic waste, other wastes and large-scale waste. Through the distinction between the bin color and the corresponding waste sorting mark, the visual language of waste sorting mark is unified and

recognizable, and the auxiliary graphics of waste sorting mark are widely used, so as to attract urban residents to take the initiative in waste sorting.

In the 1980s, Japan began to implement waste sorting. Waste types are mainly divided into five categories: combustible waste, non-combustible waste, large waste, resource-based waste and hazardous waste. Each waste type has a strict subdivision, forming a complete sorting system of municipal solid waste and visual language graphics. Japanese municipal solid waste sorting not only has excellent public sign design, but also a large number of excellent visual information language integrating with different media, which is used to express waste sorting information. It adds the interest of waste sorting information, so that the knowledge of municipal waste sorting can be popularized better, so that urban residents can have conscious waste sorting.

3.2 The current situation of visual language for municipal solid waste sorting in china

According to the data, China implemented waste sorting for the first time in the 1990s, but the results were not satisfactory. After more than 30 years of development, there are still many problems in the sorting of municipal solid waste in China. There are three standards for the sorting of municipal solid waste officially issued by the state. In 2003 and 2008 versions, the waste types are mainly divided into three categories: recyclable, hazardous and other waste. In 2019 version, the category of kitchen waste is added to the previous waste types.

The municipal solid waste sorting policy has drawn people's attention formally since the municipal solid waste sorting policy was implemented in Shanghai in 2019. The regulations on the management of municipal solid waste in Shanghai issued in 2019 mainly divides domestic waste into four categories: dry waste, wet waste, recyclable waste and non-recyclable waste. Most cities sort the waste according to national standards, while some cities just divide the waste into two categories: recyclable waste and non-recyclable waste. The disunity of waste sorting standards brings difficulty to the public, which makes it difficult for the public to sort the waste correctly.

The figures, colors and fonts of the three versions of the national waste sorting signs have been constantly adjusted. According to the author's on-site investigation, it is found that many cities have their corresponding waste sorting signs, and even signs in the same city have differences. There is no clear and unified standard for waste sorting signs in China, which makes it difficult for the public to correctly to sort waste.

3.3 The problems of visual language for municipal solid waste sorting in china

From the perspective of information visualization, there are three problems in the visual language of waste sorting in China.

3.3.1. *The visual images of waste sorting signs are not unified and lack of visual beauty.* There is no unified color and figure in the sign of municipal solid waste sorting in China, and the transmitting effect of information visualization is poor, which makes it difficult for the public to understand the sorting of

municipal solid waste quickly, accurately and effectively. Now the graphics and colors of the most of the existing waste sorting sign are lack of creativity and visual beauty, which can not attract the public to implement waste sorting.



Figure 1. The municipal solid waste sorting trash bins and signs in China

3.3.2. *Lack of auxiliary graphics for waste sorting signs.* Most of the visual images of waste sorting in our country are used in waste cans. People seldom see the propaganda and application of the auxiliary images under the waste sorting category in our life, which can not improve people's concern and attention to the information of municipal waste sorting.

3.3.3. *Single media channel.* At present, China's propaganda on the sorting of municipal solid waste is more confined to the traditional media, and the single and traditional media is not enough to support the complex and huge sorting information of municipal solid waste. As a result, people are lack of environmental awareness, and can not promote urban residents to actively sort waste.

4 The design countermeasures of information visualization for municipal solid waste sorting

Most of the perceptual information of human body is obtained through vision. Information visualization can make the audience see the information more intuitively and comprehensively. Therefore, in the process of design, the text, graphics and colors in the information are designed reasonably to ensure that the audience can

receive the information to the greatest extent.

By using the design method of information visualization, the visual graphic design of waste sorting in China is improved and innovated by summing up the font, graphic, color and other design elements of the audience's visual needs. And the visual communication media of different dimensions are adopted to solve the problems existing in the sorting information of municipal solid waste, such as incomplete, non-standard information system, poor information recognition and unattractiveness. so that it can enhance the integrity, recognizability, creativity and interest of the sorting information of municipal solid waste, and improve people's concern and attention to the sorting information of municipal solid waste.

4.1 To unify and improve the waste sorting signs

To unify and improve the existing waste sorting signs, enhance the innovation and interest of visual information such as text, graphics, color, etc. in the sign design on the basis of ensuring the recognizability of waste sorting signs, enhance the visual beauty of waste sorting signs, and consider people's visual needs for municipal solid waste sorting information considerably.

4.2 Increase the use of auxiliary graphics

Refining the waste sorting sign and carrying out the

auxiliary graphic design, so that it can be better applied in commodity packaging, waste sorting publicity atlas, waste sorting method brochures, etc., thus enhancing the integrity, cognition and interest of municipal solid waste sorting information, and improving people's concern and attention to municipal solid waste sorting information.

4.3 Enrich the media channel

With the development of the times, modern society has entered the "5g" era. New media can bring people rich sensory experience, and develop the waste sorting publicity information from two-dimensional plane to three-dimensional space and even new media. Combined with the current context, it can break through the traditional thinking, make full use of the media of different dimensions to bring better interaction for the audience. Municipal solid waste sorting information publicized by different media can bring fresh feeling to the audience while simultaneously interpreting information, which can make the information more accurate, interesting and intuitive, and improve the initiative of urban residents.

5 Conclusion

With the continuous development of society and the impact of the era of "big data", it is worth discussing how to convey the information of municipal solid waste sorting intuitively, concisely and efficiently. Based on the sorting information of municipal solid waste, combined with the information visualization design method, this paper provides a greater possibility for the design and application of the visualization system of municipal solid waste sorting information, so as to provide a reference for the improvement of the visual language of municipal solid waste in China.

References

1. He, W. Q. (2019) Definition and research trends of garbage classification related concepts. *Economic Research Guide.*, 35: 162–172.
2. Gu, W. (2015) Study on the sorting and treatment of urban waste in china. *Nanjing University of Science & Technology.*, 6-11.
3. Chen, X. (2018) Research on visual graphic design of urban waste sorting. *Guangxi Normal University.*, 1-6.
4. Huang, Y. (2018) Research on information visualization design method of drug packaging. *Southwest Jiaotong University.*, 15-18.
5. Li, M. (2019) Design and application of text arrangement in information visualization design. *Journal of Jilin University of Arts.*, 2: 96–99.
6. Liu, H.S. (2019) Graphic language construction in information visualization design. *Art And Design.*, 9: 34–35.
7. Cao, F. (2005) *The Principles of Visual Communication Design.* Jiangsu Fine Arts Publishing House, Nanjing.
8. Chai, Y. (2014) Research on graphic design based on information visualization. *Beijing Institute of Fashion Technology.*, 6–35.