MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

Faculty of Design

Development of a visual complex for “Toy Rebirth”

BACHELOR'S THESIS

on the topic:

Development of a visual complex for “Toy Rebirth”

Performed by: a student of the BED-20 group

First Name Huang Ruxuan

Supervisor degree, academic rank, First name

_____

Kyiv 2020

INTRODUCTION

In the era of consumption, there are social pain points in households where it is difficult to dispose and recycle a large number of idle toys. People's actions towards the recycling and reuse of idle toys are insufficient, and the phenomenon of difficult disposal and recycling of a large number of idle toys inevitably leads to problems such as resource waste and environmental pollution. This project is based on the concept of sustainable development and aims to promote and promote the concept of recycling and reusing idle toys through practical exploration. Firstly, collect relevant information on the recycling and reuse of idle toys through the internet, and sort, classify, and analyze the information; And in response to the current situation of difficulty in handling and recycling idle toys, it is proposed to conduct practical exploration through the "Revitalization Plan" activity to enhance people's awareness of the utilization of idle toy resources; Finally, a series of visual communication designs, including logo design, IP design, poster design, and information visualization design, were completed in the visual design of the "Revitalization Plan" activity through color matching, graphic composition, and layout design. Conveying the concept of sustainable development, guiding people to participate in the small matter of toy recycling and reuse through forms such as charitable donations and environmental recycling, and contributing their modest efforts to sustainable development.

Chapter I

TOPIC JUSTIFICATION

1.1 Background

The United Nations officially adopted the 2030 Agenda for Sustainable Development at the United Nations Summit in September 2015, which announced the Sustainable Development Goals (SDGs). The agenda includes 17 Sustainable Development Goals, including SDG11 (Sustainable Cities and Communities), aimed at building inclusive, safe, resilient, and sustainable cities and human settlements; SDG12 (Responsible Consumption and Production) aims to achieve "more, better, and more efficient production", while improving the quality of life and increasing the net welfare benefits of economic activities by reducing resource consumption, degradation, and pollution throughout the entire lifecycle[1].

In the era of consumption, with the continuous improvement of people's living standards and the increasing richness of material life, the types and quantities of toys are also constantly increasing. However, this also brings about an undeniable problem - the proliferation of idle toys. Firstly, with the emergence of trendy play culture, toys are no longer just exclusive to children, but have also become a hobby for many young people; Secondly, people's sense of freshness towards toys lasts for a short period of time, and toy products are easily replaced. For example, according to research, 95.3% of children have a sense of freshness for a toy for no more than 6 days[2]; Thirdly, idle toys at home are often piled up in large quantities or disposed of in the simplest way possible, resulting in waste of resources and environmental pressure. At the same time, unlike common garbage sorting and clothing recycling in daily life, there are few places to recycle toys. Idle toys are often equated with waste disposal in traditional recycling, just like plastic bottles and cardboard boxes. Therefore, it is difficult to recycle and reuse idle toys.

Our country has a traditional virtue of "making the most of everything". This project is based on the concept of sustainable development to explore practical ways of recycling and reusing idle toys. It aims to design a more suitable way of recycling idle toys that is more in line with current life. Through interesting and vibrant visual communication, it promotes and promotes the concept of recycling and reusing idle toys, enhances people's awareness of the utilization of idle toy resources, and encourages them to actively participate in the action of recycling and reusing idle toys.

1.2 Significance of the topic selection

1.2.1 Theoretical significance

In theoretical terms, this study is deeply rooted in the core concept of sustainable development, aiming to promote the effective recycling and reuse of idle toys through adherence to environmental responsibility, social justice, and economic feasibility. The 3R principles of sustainable design, namely Reduce, Reuse, and Recycle, form the foundation of this research methodology, aiming to propose innovative solutions for the practical challenges of recycling and reusing idle toys and find practical and feasible breakthrough paths.

Firstly, through systematic literature collection, this study extensively explores the cutting-edge theories, practical cases, and the latest developments in recycling and reuse technologies in the field of sustainable design. This process not only covers academic journals and professional books, but also includes policy documents, industry reports, and international conference papers, striving to comprehensively grasp the latest trends and research results in this field. Through a detailed literature review, we have conducted in-depth induction and analysis of the core concepts, development history, design principles, and their applications in different fields of sustainable design, laying a solid knowledge foundation for the theoretical research on the recycling and reuse of idle toys.

On this basis, this study further provides a detailed review and analysis of the current situation, existing obstacles, and successful cases of toy recycling and reuse

both domestically and internationally. We not only focus on the physical properties and material classification of toys, but also delve into the impact of multidimensional factors such as social psychology, economic incentive mechanisms, and policies and regulations on toy recycling and reuse behavior. Through an interdisciplinary perspective, this study attempts to reveal the inherent laws of toy recycling and reuse, providing theoretical support for design innovation.

Of particular importance, based on theoretical analysis, this study attempts to propose a series of strategies and design ideas for the recycling and reuse of idle toys based on sustainable design principles. This includes but is not limited to: designing toys that are easy to disassemble and upgrade to promote recycling; Develop diversified toy recycling channels and platforms to improve recycling efficiency; Promote creative redesign and personalized customization of toys to increase their appeal for reuse; And through education and public promotion, enhance public awareness of the importance of toy recycling and reuse.

This study not only contributes to the theoretical research on the recycling and reuse of idle toys, but also provides guidance and inspiration for practical operations. The aim is to promote the sustainable development of the toy industry, reduce resource waste, protect the environment, and enhance social welfare, promoting the construction of a more green and harmonious society through the power of design.

1.2.2 Practical significance

In design practice, from the perspective of sustainable design, explore the pain points and needs of people regarding the difficulty of handling and recycling idle toys. Through the "Revitalization Plan" activity design, we aim to cater to the current target group's preferred recycling methods, with vibrant and adorable visuals, as well as derivatives of environmentally friendly recycled materials. We aim to deepen the sustainable concept of recycling and reusing idle toys into our daily lives, providing support and reference for the practical operation and innovative development of recycling and reusing idle toys. Through the "Renewal

Plan", we aim to provide people with a deeper understanding of the recycling and reuse of idle toys, , as well as more convenient ways to dispose of them. Through practical actions, we are committed to solving the practical problem of difficult disposal and recycling of idle toys.

1.3 Study Methods

1.3.1 Literature research method

Focusing on the issue of recycling and reusing idle toys, this study extensively collects and analyzes relevant concepts, practical cases, technological innovations, and policy directions in this field from multiple perspectives, both domestically and internationally. The aim is to provide comprehensive theoretical and practical guidance for the effective recycling of idle toys. Specifically, the study covered the following key dimensions:

1. Building a conceptual and theoretical framework

Sustainable Design and Circular Economy Theory: Exploring how sustainable design principles (3R principles) guide the recycling and reuse design of idle toys, and how circular economy models promote the closed-loop flow of toy resources.

Sharing Economy and Rental Models: Research how to extend the lifespan of toys and reduce one-time purchases and disposal through emerging business models such as shared toy platforms and toy rental services.

2. Analyze practical cases both domestically and internationally

Recycling and Classification System: Analyze the toy recycling systems in European and American countries and some parts of Asia, such as Germany's "Green Dot" system, Japan's fine waste classification and recycling, and toy recycling pilot projects implemented in some parts of China.

Redesign and Creative Transformation: Collect and analyze examples of creative projects that transform idle toys into artworks, home decorations, teaching aids, etc., such as park benches made from waste plastic toys, personalized handbags made from puppets, etc.

Digitization and Virtual Toys: Exploring how digital technology can reduce

the demand for physical toys, such as AR (augmented reality) toys, online educational games, and how to digitize physical toys to extend their entertainment and educational value.

Through a series of multi angle and multi-channel research, this project aims to provide a comprehensive strategic framework for the recycling and reuse of idle toys, promote efficient resource utilization, reduce environmental pollution, and promote the development of the toy industry towards a more sustainable and responsible direction.

1.3.2 Questionnaire survey

By designing a questionnaire survey, we aim to understand the national intention to dispose of and recycle idle toys, and explore the pain points that people find difficult to dispose of and recycle. We aim to understand people's demand for the recycling and reuse of idle toys, which can be transformed into opportunities for the design of this project, and optimize the design of recycling and reuse of idle toys.

Firstly, collect basic information about the respondents, such as age, gender, occupation, and location, to analyze the differences in attitudes and behaviors towards toy recycling among different groups of people. Ask the respondents how they currently handle idle toys at home (such as direct disposal, donation, second-hand sales, storage, etc.) to understand common handling habits. Explore the willingness of respondents to participate in toy recycling activities, as well as the main obstacles encountered during the participation process (such as inconvenient recycling channels, lack of information, and concerns about health and safety). Inquire about the respondents' expectations for the reuse of idle toys, such as whether they hope the toys can be transformed into new toys, daily necessities, artworks, or other educational materials, as well as their requirements for the quality, design, and safety of recycled products. Understanding which incentive measures (such as recycling rewards, point redemption, environmental certification, participation in public welfare activities, etc.) can effectively enhance their enthusiasm for participating in toy recycling. Finally, evaluate the public's

awareness of the importance of toy recycling, as well as which promotional channels and educational activities can most attract their attention and response.

By collecting and analyzing questionnaire survey data, this study will be able to clearly identify the common problems and individual needs of the public when dealing with and recycling idle toys, and can optimize design strategies for the recycling and reuse of idle toys in a targeted manner.

1.3.3 Case analysis

The research on the recycling and reuse methods of idle toys cannot be separated from reality and previous practice. Through the analysis of typical cases, the advantages, disadvantages, and causes of existing methods of recycling and reuse of idle toys are dialectically analyzed, laying a foundation for the design of recycling and reuse of idle toys.

Some successful cases demonstrate the enormous potential of community power in promoting toy recycling and reuse. Through regular toy exchange activities and environmental themed workshops, not only has the secondary life of idle toys been effectively activated, but also the environmental awareness and practical ability of residents, especially children, in resource recycling have been significantly improved, forming a good community cultural atmosphere. With the rapid development of Internet technology, some projects have realized the digital management of toy recycling by using online platforms, including reservation recycling, status tracking, bonus points, etc., which has greatly improved the recycling efficiency and public participation. These innovative mechanisms simplify the recycling process, enhance transparency, and incentivize more people to participate in this environmental action through reward mechanisms. Some projects showcase the infinite possibilities of toy reuse, such as transforming toys into devices with artistic value, practical home decorations, or innovative teaching aids integrated into educational curricula. These practices not only give toys new life, but also open up new fields of circular economy, achieving a win-win situation in terms of economic, social, and environmental benefits. Transforming idle toys into high-quality, market competitive new products faces technological barriers and

cost pressures. Toys have diverse materials and complex structures, requiring high levels of technological innovation and refined processing processes. However, the high cost of modification often limits the scale and efficiency of reuse. Therefore, it is crucial to develop cost-effective reuse technologies and explore reasonable cost sharing mechanisms. The lack of public awareness of the environmental significance of toy recycling and reuse is a deep-seated reason that affects recycling efficiency. This requires strengthening environmental education in the education system, promoting knowledge of toy recycling through multiple channels such as media and social media, and cultivating public awareness and willingness to participate in environmental protection.

Through such a comprehensive and in-depth analysis, we can clearly understand that the promotion of the recycling and reuse of idle toys is a systematic project involving multiple factors such as technological innovation, social mobilization, policy support, and public education. The future strategy design needs to be based on these lessons learned, continuously optimize the recycling system, innovate reuse methods, enhance public participation, in order to achieve efficient recycling of toy resources and sustainable development of the environment.

Chapter II
DESIGN RESEARCH

2.1 Overview of Sustainable Development and Sustainable Design

With the rapid development of the Industrial Revolution and the continuous improvement of human technological level, material life has become increasingly abundant, and the excessive use of Earth's resources has led to the deterioration of the Earth's ecological environment, resulting in development constraints becoming a global problem. Countries are contemplating how to balance the relationship between the limited resources of the Earth and the infinite needs of humanity, seeking ways to achieve harmonious unity between social development and ecological environment, thus generating the concept of sustainable development.

In the early 18th century, the term "sustainability" (English: sustainability; German: nachhaltigkeit) emerged in the concept of "sustainable forest yield" proposed by Hans Carl von Carlowitz in Germany[3]. In 1987, the United Nations World Commission on Environment and Development released "Our Common Future", which defined sustainable development as "development that meets the needs of contemporary people without posing a threat to the ability of future generations to meet their needs."[4]. This gave rise to the concept of "sustainable development".

Nowadays, the United Nations seeks opinions and suggestions from countries and stakeholders around the world, and has formulated more participatory and representative Sustainable Development Goals (SDGs) aimed at promoting sustainable development in society, economy, and environment[5].

Sustainable development refers to a development model that satisfies the needs of contemporary people without compromising the ability of future generations to meet their own needs. This concept emphasizes a balance between economic development, social inclusion, and environmental protection, aiming to achieve long-term global prosperity. The core concept of sustainable development can be summarized as the "triple bottom line": economic prosperity, social

inclusion (or social justice), and environmental protection.

It requires the pursuit of economic growth, but emphasizes quality rather than simply quantity, focuses on improving production efficiency, and encourages innovation and technological progress. Create decent job opportunities, improve people's living standards, and ensure that the fruits of economic growth benefit everyone.Optimize resource allocation, promote circular economy, reduce resource consumption and waste generation, and improve resource utilization efficiency. Eliminate poverty, reduce inequality, ensure that everyone has fair opportunities to participate in social development, enjoy basic rights and public services. Ensure universal health coverage, provide high-quality education, enhance population quality, and promote comprehensive human development. Establish a sound social security system, provide protection for vulnerable groups, and enhance social resilience. Protecting natural ecosystems, maintaining biodiversity, preventing pollution, and addressing climate change. Reasonably utilize natural resources, promote renewable energy, and reduce dependence on fossil fuels. Develop low-carbon technologies, promote environmentally friendly materials and clean production methods, and reduce negative impacts on the environment.

To achieve sustainable development, the government is required to formulate and implement policies and regulations that are conducive to sustainable development, including environmental standards, tax incentives, green procurement policies, etc. Faced with global challenges such as climate change and biodiversity loss, the international community needs to work together and strengthen cooperation. It is also necessary to enhance public environmental awareness, encourage consumers to choose green products, participate in environmental activities, and form a green lifestyle. Utilize technological progress to solve environmental problems, develop clean energy, intelligent transportation systems, sustainable agriculture, etc.

Sustainable development is not only a goal, but also an action framework that requires the joint efforts of all stakeholders such as government, enterprises, civil society, and individuals to achieve a future of harmonious coexistence between humans and nature.

Sustainable development is not only a goal, but also an action framework that

requires the joint efforts of all stakeholders such as government, enterprises, civil society, and individuals to achieve a future of harmonious coexistence between humans and nature. Sustainable design is a concept that goes far beyond simple artistic creation or technological application. It is a profound humanistic concern and a profound understanding and respect for the symbiotic relationship between natural ecology and human civilization. The viewpoint proposed by Victor Barbarak in his book "Design for the Real World" reflects on the planned abolishment system that swept across the world in the United States after World War II. He believes that design should fully consider the limited resource utilization of the Earth, and design should serve to protect the limited resources of the Earth where we live, which has led to the rise of sustainable design. In Victor Barbanac's landmark work, he not only deeply reflected on the "planned abolition of the system" under the prevalence of consumerism in the United States in the mid-20th century, but also forward-looking proposed that the design community should take responsibility for the future of the Earth. This system, by intentionally shortening the service life of products and stimulating consumption cycles, although it has driven economic growth in the short term, has led to excessive consumption of resources and serious environmental damage, accompanied by an increasingly severe ecological crisis. Babanak believes that the original intention of design should shift towards serving the long-term well-being of the Earth, rather than short-term commercial profits. His philosophy advocates that design should follow natural laws, respect the limited resources of the Earth, and design products and services that can meet human needs while minimizing environmental burden throughout the entire lifecycle through innovative thinking and methods. This idea laid the theoretical foundation for the subsequent sustainable design movement, emphasizing the ecological, social, and economic aspects of design, and promoting the shift of design from a single product oriented approach to a systematic, comprehensive solution that considers the entire lifecycle.

"Sustainable design" is the thinking and practice process of the design community on the relationship between human development and environmental issues, originating from the theory of sustainable development. Sustainable design is a strategic design activity that involves building and developing sustainable

solutions. All design activities, research, and practices in various fields that adhere to the concept of sustainable development belong to the category of "sustainable design". The concept of sustainable design has a broad scope, with a focus on the design strategy and direction. Scholars, designers, and other groups continuously explore sustainable design related theories and conduct practical research in their research activities, which has further developed them.

Sustainable design is formed on the basis of the concept of sustainable development, which is a design method that emphasizes environmental friendliness and social responsibility. It aims to balance the three aspects of economy, environment, and society, ensuring that the designed products and services not only meet people's needs but also meet the requirements of environmental protection and social justice.The core concept of sustainable design includes the following parts: firstly, efficient utilization of resources. In the design and production process, reliance on natural resources should be minimized as much as possible, and resource utilization efficiency should be improved to reduce negative impacts on the environment. Secondly, reduce waste. The design should consider reducing waste generation and adopting appropriate treatment and recycling methods to achieve resource recycling. Thirdly, build an ecologically friendly environment. The lifecycle of a product should consider its impact on the environment, including the acquisition, production, use, recycling, and treatment of raw materials. Fourthly, create an atmosphere of social justice. Design should respect human rights and labor regulations, ensure fair and ethical treatment in the production process, and also consider fair distribution of products and social responsibility in the value chain.

Sustainable design requires designers to comprehensively consider the impact of environmental, social, and economic factors in their design, in order to achieve sustainable development of the environment, society, and economy. The 3R principle is a very important principle in sustainable design. The principle of reduction requires designers to minimize unnecessary resource consumption in product design, pursue a simple and plain design style, and serve functionality in form; The Reuse principle requires designers to design products that have a longer lifecycle and can be reused, thereby reducing waste; The principle of recycling

requires designers to consider the reusability of the product during product design, so that the product can become a usable resource again after completing its service life. Reusing idle or discarded products to extend their lifecycle is also a method of sustainable design[6].

Figure 2-1 Sustainable design 3R principle (source: self-drawing)

Sustainable design is not only a design concept, but also a social responsibility. Designers should actively respond to this concept and promote sustainable social development through design. At the same time, consumers should also raise their awareness of environmental protection, choose products that comply with sustainable design principles, and jointly contribute to the future of the earth.

2.2 Analysis of the current situation of recycling and reusing idle toys

The early disposal methods for idle toys were relatively simple, and unused toys were often discarded in trash cans like plastic bottles and waste paper boxes. According to the analysis of the questionnaire survey, it is concluded that for users with a high number of idle toys, they choose to put them on the shelf, followed by selling them at a low price like scrap. Except for this, most choose to donate their love to those in need, and a very small number will choose to throw them away directly.

Depending on the material of the toy, there are very few ways to achieve secondary recycling. Common idle toys are divided into plastic materials, paper materials, metal materials, etc. Plastic is the most widely used material in children's

toys, and its low cost and fast forming method are highly favored by producers. The affordable price of plastic toys gives them a huge consumer market[7]; The most common type of paper toy in the market is jigsaw puzzle toys. As a puzzle toy, jigsaw puzzle toys are loved by friends of all sizes and can also be used as decorations after mounting. However, paper toys are more susceptible to damage compared to other materials due to their material characteristics; Metal toys have the characteristic of being less prone to damage, so the service life of metal is often longer than other materials. Metal toys can be recycled not only by the toy itself, but also by separately classifying and recycling its components, with a higher recycling value. Wooden toys commonly include building blocks, ornaments, etc. Although they are expensive, they are loved by people due to their gentle touch. Velvet toys generally refer to plush toys, whose cute shapes and soft texture make them a relatively large type of toy. In the era of consumption, the prosperity of the toy market hides huge resource waste and environmental pollution problems.

In the field of recycling and reusing idle toys, although a group of enthusiastic non-governmental organizations (NGOs) and volunteer teams are actively taking action to improve resource recycling and reduce waste, the overall progress still faces many challenges and the progress speed is not satisfactory. The root causes of these problems can be explored in depth from the following aspects:

1. Limitations of public awareness

Firstly, the general public's awareness of the recycling and reuse of idle toys is not high, which is a key factor hindering the development of this field. Many families often discard toys directly after they lose their appeal, rarely thinking that these toys can actually be reused as resources. Lack of awareness of the importance of environmental protection and resource recycling has resulted in the recycling of idle toys not becoming a widely accepted habit among the public. Therefore, raising public awareness of environmental protection and popularizing knowledge on the recycling and utilization of idle items is one of the urgent problems to be solved.

2. The imperfect recycling system

Secondly, the existing recycling system appears particularly weak in toy recycling. Unlike traditional recycling methods such as waste paper and plastic

bottles, which have more mature recycling channels, toy recycling faces difficulties in collection and classification. The lack of convenient channels and clear classification standards specifically for toy recycling makes it difficult to efficiently carry out the recycling work. In addition, due to the diverse materials of toys, including plastic, fabric, electronic components, etc., it brings additional complexity to classification processing and increases the cost of recycling.

3. The single path of reuse

Furthermore, currently, most recycled toys only enter the second-hand market for circulation. Although this method extends the lifespan of toys, it has not fully explored their potential innovative and added value. The lack of creative projects in the market to convert idle toys into new products or artworks limits the depth and breadth of toy recycling. For example, although some cases have shown the possibility of transforming old toys into home decor, teaching tools, or handicrafts, these practices have not yet formed economies of scale and are not sufficient to significantly enhance the vitality of the entire industry.

4. Solution strategy

To overcome these bottlenecks, a series of comprehensive measures need to be taken. Firstly, increase investment in environmental education, raise public awareness through various means such as media promotion, school education, and social activities, and let more families understand the importance and specific practices of recycling and reusing idle toys. Secondly, the government and relevant institutions should start to establish and improve a toy recycling system, including setting up specialized recycling stations, optimizing classification standards and processes, and providing economic incentives to encourage recycling. Finally, encourage innovation and cross-border cooperation, explore diversified ways of toy recycling and reuse, such as supporting design innovation, artistic creation, and technological transformation projects, and promote toy recycling and reuse to a wider range of application fields, truly achieving the maximization of resource utilization and sustainable development of the environment.

Taking Danish toy brand LEGO as an example, they promote the "LEGO Recycling Program", as shown in Figure 2-2. They encourage consumers to donate LEGO blocks that are no longer in use to the program. The donated blocks are

recycled, cleaned, sorted, and recycled to make other items, such as storage boxes. Tim Brooks, Vice President of Environmental Sustainability, stated that "piloting the LEGO Replay program in the UK is an important step towards a more circular development. Allowing them to be used for a longer period of time." According to online data, since the launch of the recycling service, 230 million blocks of building blocks have been recycled from households in North America. From this, it can be seen that the effective utilization of idle toys has provided a more reasonable destination for idle building blocks at the public level, solving the problem of processing and recycling idle building blocks; From a social perspective, it has promoted the development and progress of social circulation; And LEGO's recycling of recycled building blocks not only extends the product lifecycle, but also stimulates consumer awareness of environmental protection. However, such successful cases are not common, and the road to recycling and reusing idle toys still has a long way to go.

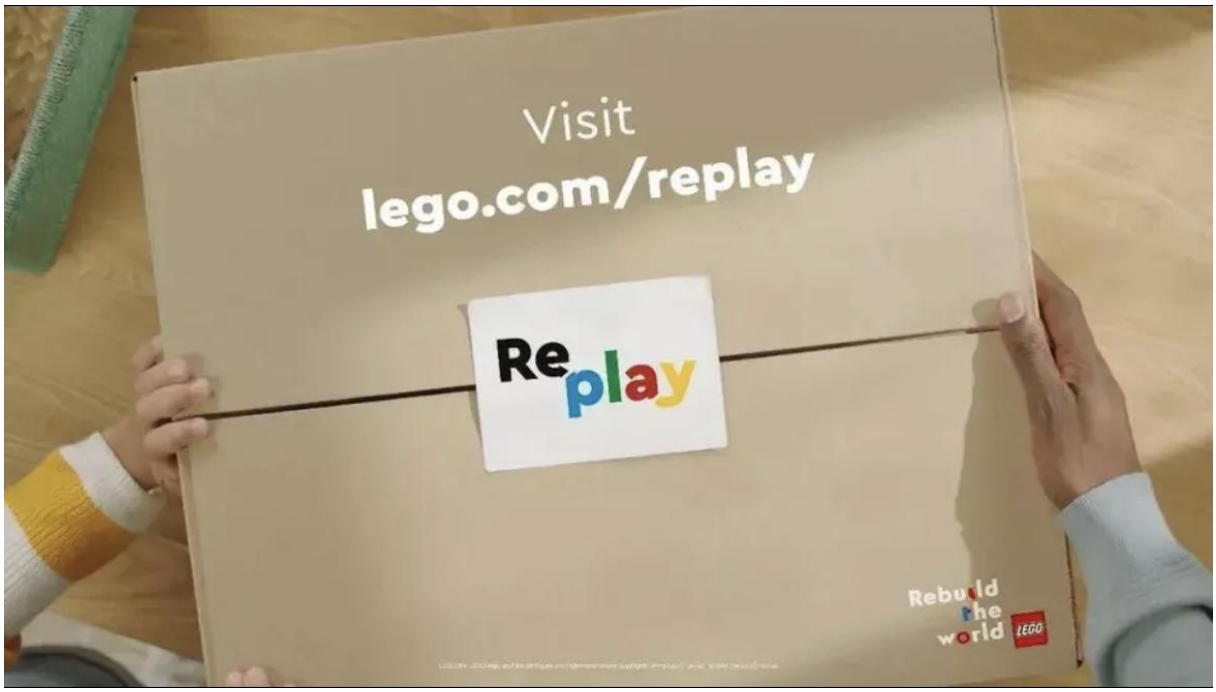

Figure 2-2 Danish Toy LEGO Recycling Program (Source: China Chemical Information Weekly)

In response to this situation, we need to make improvements from multiple levels. Firstly, strengthen popular science education and raise people's awareness of the recycling and reuse of idle toys; Secondly, improve the recycling system for idle toys and establish a more convenient and efficient collection and classification mechanism; Finally, explore more innovative and feasible ways to recycle and

reuse idle toys, such as street flash mobs and creative workshops, to bring new vitality to idle toys. As Achim Steiner, former Executive Director of the United Nations Environment Programme, once said, "Sustainable development requires everyone's participation and action." Let us work together to promote the development of the recycling and reuse of idle toys and contribute to building a better future.

2.3 Handling methods and problems faced by idle toys

In the process of recycling and reusing idle toys, we face many challenges and problems. Firstly, the public's awareness of the recycling and reuse of idle toys is generally insufficient. According to online data, less than 30% of parents are willing to recycle their children's idle toys, while the majority of parents choose to discard or store their toys. This lack of environmental awareness and resource utilization awareness not only wastes valuable resources, but also exacerbates environmental pressure.Secondly, the system for recycling and reusing idle toys is not yet perfect. At present, there is a lack of professional channels and platforms for recycling idle toys in the market, resulting in a cumbersome and inefficient recycling process. Meanwhile, dealing with recycled toys is also a challenge, requiring manual screening of idle toys that cannot be reused due to damage, obsolescence, and other reasons, resulting in wastage of human resources.

2.3.1 Research on the Current Situation of Disposal Methods for Idle Toys in China

In the early days, the disposal form of idle toys in China was relatively single, and as idle toys, they were generally labeled as "garbage", with most of them entering the trash can. Table 1 draws a conclusion based on the survey and analysis of the questionnaire that more users choose to sell idle goods on the Internet, followed by donating them to people in need, a small number choose DIY parent-child transformation, and a small number also choose to discard them directly. Depending on the material of the toy, there are very few ways to achieve

secondary recycling. Idle toys can be classified into plastic materials, paper materials, metal materials, etc. Plastic toys, due to their low price and simple craftsmanship, are easily abandoned by consumers in a short period of time. As a toy with recognition function. The replacement speed of recognition toys is relatively fast. This type of product has a much higher probability of being idle due to its single function and lower price compared to other toys. The environmental problems caused by idle plastic toys are also countless.

The most common type of paper toy is jigsaw puzzle toys, because during children's growth, jigsaw puzzle toys can not only promote their thinking development, but also increase their attention. The continuous innovation of jigsaw puzzles and the increasing difficulty level unleash children's greater challenge. The four piece puzzle is a lower difficulty entry-level puzzle that poses a challenge to children who have just started learning. With each complete puzzle experience, children will gradually acquire puzzles with higher difficulty coefficients. Therefore, the replacement speed of paper puzzle toys is no less than that of plastic toys, so the idleness of paper puzzle toys is also higher.

Common metal toys include decorative models and puzzle metal toys similar to Luban locks. In addition to metal toys themselves, they also serve as components for many toys. Toys that cannot be used properly due to the lack of a certain component have become a huge part of idle toys. Therefore, in idle toys, many metal parts themselves are not damaged, so they have a high utilization rate.

2.3.2 Analysis of Disposal Methods for Waste Children's Toys in China

1.Street to Lane Recycling

Street to street recycling is a relatively traditional way of recycling. The commonly seen scene is an old man riding three wheels, shouting in the alley. Some cars have a horn hanging in front of them, repeatedly playing pre recorded cheers. Whether the waste is returned in full or scattered, the time and energy consumed are consistent. Most of the people encountered during recycling are retail investors, and the method of weighing and selling is not cost-effective for lighter toys. There are also relatively few types of recyclable toys, which gradually

disappear due to their relatively low efficiency.

2.Material classification recycling

With the advancement of urbanization, people's lives have become more diverse and diverse, and the types of idle items have become more complex. What is recyclable, what is non recyclable, and what is harmful. These terms have entered people's lives. Idle items have become an inevitable part of society, requiring people to have the ability to judge the attributes of idle items. Recycling cabinets can be seen everywhere standing in rows in various communities. Regionalizing the management of waste recycling can be better implemented in every household, but the knowledge of waste classification varies among individuals. Even more lazy people tend to dispose of waste into any trash bin without sorting, which increases the difficulty of subsequent recycling work. Garbage sorting recycling is a good method to instill awareness of garbage sorting in everyone who produces garbage. People's self-awareness and supervision need to be strengthened in order to create a harmonious and beautiful home.

3."Internet+" recycling

"Internet+" recycling is a popular recycling method at present. Compared with "street crossing recycling", the "Internet+" recycling method is equivalent to setting up a platform using the Internet, which can enable the whole people to participate, become more popular and more convenient. You can use your fingers at home to deal with idle goods. But regardless of the recycling method, people's subjective initiative is very important.

According to a survey, people not only choose more convenient recycling methods when recycling waste, but also attach great importance to efficiency. Toys and clothes purchased in large quantities can only be weighed by the pound when sold as scrap. Some people believe that the value of recycling is relatively low and making appointments is troublesome, so they still choose to leave it at home to occupy space. From people's perspective, if we build a reasonable bridge between idle toys and new toys, perhaps more people will participate.

2.3.3 Analysis of recycling methods for children's toys in China

1.Flea market

The flea market is also known as the second-hand street vendor market. The flea market is a way of reusing idle items that has emerged in Western countries such as Europe and America. A wave has also emerged in our country, with many schools offering small flea markets that encourage children to engage in barter, allowing them to meet new friends and engage in good social activities. According to an interview, a mother of a 6-year-old child said, "Allowing the child to participate in flea market sales activities results in varying quality of items exchanged or purchased."

Not all, the children will soon lose interest in him again. However, for flea markets, we pay more attention to children's spiritual gains. As for items that may be fresh for a few days, they may become idle again

2.Charity donation in impoverished mountainous areas

There is a significant wealth gap in our country, and many parents have strong empathy. Children's idle toys and items will choose to be donated to children in impoverished mountainous areas. Let children in impoverished mountainous areas also have a happy childhood. The idle toys donated by compassionate individuals not only satisfy children in impoverished mountainous areas, but also enrich the hearts of donors. It conveys care between people and increases the product's lifespan. For children in impoverished mountainous areas, they have obtained novel toys. But for children who donate toys, they still need new toys to meet their inner needs.

3.Parent-child DIY transformation

In the era of relatively developed Internet, information interaction is not difficult. We can acquire a wealth of knowledge through the internet. Parent-child DIY transformation, where parents lead their children to complete the transformation of idle items together. In family activities, it is a way to communicate with children and convey environmental awareness. Idle items gain a

second life of the product through cutting, pasting, painting, and other methods. But the probability of DIY items being able to be DIY again is extremely low. The life of new products is difficult to cycle again and will eventually enter the recycling industry. Like flea markets, parent-child DIY places more emphasis on providing children and families with a spiritual experience during this process, but it is difficult to recycle idle items. The limitations of family materials make DIY works singular.

2.3.4 Facing challenges and problems

The recycling and utilization of idle toys face a series of challenges and problems, which limit their effectiveness and popularity. Here are some main difficulties:

1. Poor recycling channels: Although there are recycling mechanisms in some places, overall, convenient and extensive recycling channels are still insufficient. Many families do not know how or where to recycle their old toys, resulting in a large number of toys eventually being discarded.

2. Disinfection and safety issues: Toys are directly related to children's health, so disinfection treatment after recycling is crucial. However, the corresponding disinfection standards and facilities are often not sound, and parents have doubts about the hygiene status of recycled toys, which affects the acceptance of recycled toys.

3. Classification and processing costs: There are a wide variety of toys with different materials, which increases the difficulty and cost of classification and processing. Especially toys containing electronic components, improper handling may cause environmental pollution.

4. Reuse value evaluation: Not all toys are suitable or easy to reuse, and it is difficult to find suitable ways to reuse toys that are severely damaged or outdated.

5. Low economic benefits: Compared to other recyclable materials, toys have lower recycling value, especially plastic and fabric toys, which reduces the enthusiasm of recycling enterprises.

6. Lack of public awareness: Many people are not aware of the importance of

toy recycling, or lack sufficient environmental awareness, resulting in idle toys often being treated as garbage.

7. Policy and regulatory lag: Lack of clear policy guidance and incentive measures to promote the development of the toy recycling industry, and related laws and regulations are not perfect enough.

8. Innovation and technological limitations: Although creative reuse methods continue to emerge, large-scale applications are limited by technology and funding, making it difficult to form effective business models.

9. Market supply and demand mismatch: Even toys that have been recycled and processed may not be able to find suitable markets for re circulation, especially for specific types of toys or in economically underdeveloped areas.

Addressing these issues requires joint efforts from the government, businesses, and the public, including establishing a sound recycling system, setting strict hygiene standards, promoting environmental education, providing economic incentives, and developing more efficient treatment technologies.

2.4 Analysis of Visual Design for Activities

2.4.1 Briefly describe the visual design of the event

Visual language is a visual style composed of images and colors that can convey information, emotions, and ideas in the field of plastic arts. As a visual representation, graphics are also one of the fastest ways to transmit information. The generation of graphics requires designers to refine and reconstruct their understanding and creation of conceptualized things through natural objects, and design according to the principle of unity of content and form, creating an effect that can resonate with the viewer and achieve synesthesia. The current graphic expression methods are based on the form of objective things, which are refined and summarized to form concrete forms with recognition; Using a certain object image as the basic image, adding decoration and abstract symbols to express an image form with higher artistic proficiency; A more abstract and symbolic form that is easy to remember, represented by abstract geometric shapes. The techniques

of imagery form have more symbolic meanings, and the visual effects presented through the artistic processing of the creator are used to mobilize the viewer's memory synesthesia while watching.

Event visual design refers to the creative planning and design process of various visual elements of an event in order to attract the attention of the target audience, convey specific information, and enhance the image of the event. This includes but is not limited to the theme logo, promotional posters, invitation letters, on-site arrangements, signage, stage background, video animations, web interface, and any visual presentation related to the event. A good visual design for an event can effectively enhance its recognition, stimulate the interest of participants, create an atmosphere, and ensure clear communication of event information. The following are several key elements in event visual design:

1.Clear theme: Visual design should closely revolve around the theme of the event, whether it is color selection, font style, or image elements, they should be consistent with the core concept of the event, enhancing brand recognition.

2.Color application: Color is crucial for creating emotions and atmosphere. Choose color combinations that match the nature of the event, such as using warm tones to create a lively and cheerful atmosphere, or using cool tones to create a professional and calm image.

3.Font and layout: The choice of font should not only be beautiful and easy to read, but also reflect the style of the activity. The layout should be clear and orderly, ensuring clear levels of information and making it easy for the audience to quickly access key information.

4.Creative elements: Unique graphics, icons, or illustrations can increase the attractiveness of the design, making the visual experience stand out among numerous pieces of information.

5.Consistency: All visual materials from online to offline should maintain consistency in style and brand elements to establish a unified brand image and strengthen memory points.

6.Interactivity: When possible, interactive elements such as AR (augmented reality) and VR (virtual reality) experiences can be incorporated into the design to enhance the interactivity and immersion of participants.

7.Adaptability: Considering the needs of different platforms and media, the design should ensure that visual elements can maintain good display effects in various sizes and resolutions, such as image formats and sizes suitable for social media sharing.

In short, event visual design is a creative work that comprehensively considers aesthetics, communication strategies, and user experience, aiming to effectively convey the value proposition of the event through visual language, and stimulate the interest and enthusiasm of the target group to participate.

2.4.2 The dissemination of convenient user experience concepts

Research on interaction and design psychology includes cognitive psychologist Don Norman, who defines "instinct, behavior, and reflection" as the three levels of design in his "Design Psychology" series of books on interaction and design psychology. This user psychology based research approach has universal guiding significance for design. Psychology is a discipline that studies human psychology and behavior. Therefore, in the process of interaction design, psychology can help us analyze human behavior from the perspective of human psychological characteristics using scientific methods, making interactions more in line with user psychological expectations and achieving a better user experience.

In terms of visual design for garbage classification, innovative cases from abroad include the 2019 European Provdiv designer ME, YOU, PLOVDIV, which created a visual feature through bright colors, minimalist graphics, and dynamic expression. Through the integration of online and offline technologies, people are made aware of the possibility of recycling and another way of reducing waste. By reflecting on the situation of waste production in Russia, utilizing waste photography and a collection of works by contemporary artists and photographers, a set of environmentally friendly books with a special visual experience is formed.

In this regard, when designing visual activities, it is necessary to fully consider the actual experience of users and promote the concept of environmental protection and sustainability through their hands-on experience.

2.4.3 Research on Activity Visual Design Process

The design process is to control various aspects of design execution, ensure project progress, and coordinate various aspects of work. The British Standards Institute launched the BS7000 Design Management System in 1989, which established a series of professional process systems including design standard processes, management standard processes, and manufacturing standard processes. This system provides designers with a standardized design process system, which includes:

1. In the preliminary research stage, based on the investigation and summary concept, a diversified thinking approach is adopted to collect key design points and form a preliminary conceptual plan.

2. In the mid-term design stage, a detailed design plan is carried out based on the design direction and creative points determined in the early planning stage, and the entire design scheme is ultimately completed.

3. In the later stage of production implementation, after the conceptual plan is determined, the plan is evaluated and produced, and finally the display space effect is presented. The standardization procedure developed by the British Bureau of Standards provides authoritative reference value for the development of science popularization display design processes. On this basis, the process of science popularization display design is divided into four stages. In the preliminary research stage, designers need to analyze and study the background of different exhibition themes, identify target groups, screen exhibition content, and summarize useful information to prepare for the next step of project implementation. Concept planning stage: The planning stage mainly involves researching and summarizing the collected data, analyzing and integrating the theme and content of the entire display design. By analyzing the overall characteristics of the exhibition space, with a focus on spatial characteristics, display content, and other aspects, a design plan is proposed to achieve common goals and ultimately form a conceptual framework. Design phase: Reasonably arrange the spatial flow, comprehensively consider the overall structure of the display space, such as the plane structure and pedestrian flow direction, and design the overall display space structure and

functional areas of the space. Output design diagrams and spatial structure diagrams, complete spatial renderings, and vividly display design concepts. After the overall plan of the display space is determined, the visual style will be unified, including the design of text, images, and display board content, as well as the display method. By studying and practicing the design process, we ensure that the presentation plan can meet project requirements and continuously optimize it in practice.

4.Information feedback stage: In the design of the display space, the design team needs to pay attention to every detail and ensure the presentation of its display effect. Simultaneously receiving feedback from exhibitors on their feelings. The quality of display design directly affects the audience experience and ultimately whether success can be achieved.

5.Integration is the focus of service. In exhibition design, the "Service Blueprint" was used to organize the entire exhibition process, and the atmosphere can be divided into pre exhibition, mid exhibition, and post exhibition. Before the exhibition, a certain promotional strategy should be adopted to give the audience a preliminary understanding of the exhibition's content, theme, style, and methods, and to generate interest and a certain desire to explore the exhibition content. The exhibition process is the core part of the exhibition, which requires systematic design and organization of the exhibition's theme, form, and content to enhance the overall effect of the exhibition. After the exhibition, determine the direction for improvement, optimize the design, and enhance the service experience based on feedback from visitors.

Chapter III
DESIGN PROCESS AND RESULTS

3.1 Design positioning

Based on the above research, the target user is designed to be the group of people in households who have the problem of idle toys; Choose activity venues in communities, parks, and neighborhoods[8]; As an important way for humans to perceive the world, vision can capture attention and transmit complex information in an instant. Therefore, in promoting the recycling and reuse of idle toys, visual communication design plays an important role that cannot be underestimated. This design project is based on this understanding, aiming to use the powerful power of visual communication design to comprehensively stimulate the public's interest and enthusiasm for the recycling and reuse of idle toys from three dimensions: science popularization education, social promotion, and event promotion, and thereby enhance the overall understanding and support of society for this resource recycling behavior; Through vivid and interesting visual storyboards, information charts, and interactive exhibitions, we present the complex recycling process and the environmental significance of toy reuse to the public, especially children and families, in an intuitive and understandable form. Cartoon characters and gamified elements will be incorporated into the design to make the learning process fun, deepen children's understanding and memory of environmental behavior, and cultivate them to become environmental guardians from an early age; With the help of social media, outdoor advertising, and collaborative platforms, we design a series of creative and infectious posters, videos, and animations that emphasize the revaluation and social contribution of idle toys, showcasing how recycled toys can be transformed into new toys, art pieces, or educational tools, evoking emotional resonance and a sense of responsibility among the public. In addition, by comparing pictures or videos before and after recycling, visually display the changes before and after recycling, and strengthen the actual effectiveness of recycling and reuse;

Design a unified and recognizable brand visual image that can be applied to

various recycling activities such as signage, brochures, websites, and event site layouts to build a distinct brand identity. Plan regular offline recycling day activities and online interactive challenges, such as "Idle Toy Transformation Competition" and "Toy Exchange Market", and attract the attention and interest of participants through visual design. At the same time, develop social media materials that are easy to share, encourage participants to spread information through their social networks, and form a viral transmission effect.

As a more direct part of human perception experience, visual communication design plays an important role in the practical exploration of recycling and reusing idle toys. This design aims to explore the practical application of recycling and reusing idle toys from the perspectives of science popularization, publicity, and promotion through visual communication design. It aims to enhance people's awareness of the utilization of idle toy resources and actively participate in the action of recycling and reusing idle toys.

The original meaning of "flash" is a brief form of performance art. Its concept has evolved into a creative new marketing model formed by brands to cater to the consumption preferences of young people with the development of the times. The pop-up store has a scene based experience, a novel display form, personalized, topicality, and an interactive experience that provides a super experience. Flash stores are limited by time, which brings a sense of urgency and deadline to the public, allowing them to actively experience and share. At the same time, the location of the "pop-up exhibition" is not limited by space and has the characteristics of arbitrariness and temporality. "Flash", as a new display mode, downplays the concept of marketing, uses experience and interaction to impress the audience, and conveys information to the audience in a form that the public is willing to participate in. Therefore, this "flash" form is very suitable for promoting popular science information and is suitable for the "Renewal Project" idle toy recycling and reuse activity.

3.2 Logo design

The core of logo design is to convey the core concept[9]. Logo design is an

important component of visual communication design, which refers to the process of creating unique and representative visual symbols or graphic symbols for individuals, companies, organizations, activities, or products. A good logo design can convey brand information concisely and clearly, establish brand recognition, and stimulate emotional resonance among the target audience. Logo design is not only an artistic creation, but also a part of brand strategy. It requires designers to have good creative ability, visual communication skills, and keen insight into market trends. Excellent logo design often follows the principle of "less is more", and can remain clear and distinguishable even at the smallest application size. A concise design not only helps to quickly convey information, but also facilitates flexible application in different media and environments. Whether it is printed materials, billboards, websites, social media, or product packaging, consistency and high recognition can be maintained. Logo designers not only need profound artistic skills and creative thinking, but also need knowledge in various aspects such as market analysis, psychology, and brand management[10]. They need to constantly learn the latest design trends and technologies, while maintaining sensitivity to social and cultural dynamics, integrating these comprehensive qualities into design, and making the logo a beautiful and powerful brand communication tool. In short, logo design is a comprehensive art and science discipline. It is not only a visual endorsement of brand image, but also a condensed expression of brand story, carrying the important task of connecting brand and consumer emotions. In design practice, constantly pursuing innovation and precise communication is the key to enhancing the value of logo design.

With the rapid development of digital technology, the rise of new media platforms has changed the way people obtain information and communicate, and has also brought new challenges and opportunities to logo design. The basic function of a symbol system is for the subject to construct a cognitive and recognition link through symbols and the things they refer to. It creates a communication channel for all living beings, including humans, and plays a crucial role in their survival, reproduction, and development[11]. Taking humans as an example, long before the emergence of language and writing, humans marked places with scratches to avoid losing direction, and tracked prey by observing

footprints and recording things through rock paintings. In addition to establishing communication channels, symbols also have an important function of greatly reducing communication costs, that is, abstracting information into concrete and simplifying complexity. There are many intangible and difficult to describe things in life that require lengthy descriptions to express clearly, such as the wind blowing by us, the air we breathe, the ups and downs of emotions and experiences. However, we have created many corresponding symbols to describe them, such as what love is and how people should express love. We can convey it through writing poetry, sending messages, and other means, that is, abstract it into concrete form - using a hug, a kiss, or a bouquet of roses or a diamond to convey it, that is, simplifying complexity. From this, it can be seen that symbols are indispensable in the operation of social systems, and symbols, as a type of thing mainly appearing in the form of images or text, are essentially a series of symbols with symbolic significance.There are a large number of similar products in the market, and due to the possible similarity in packaging and posters of similar products, it is difficult to express specific brand content. In this situation, how to distinguish different brands requires the use of brand logos. For example, there are always many mobile stalls on the streets outside the university campus, with a wide variety and high repetition rate, making it particularly crowded with more students. In such an environment, it can be extremely difficult to find a stall that has been tasted well before. If that stall has a brand logo and is placed in an appropriate position, students can quickly target it and make a purchase. At this point, the brand logo plays a crucial role in distinguishing different brands, helping consumers find their expected goals faster and more conveniently.

Logo design is an important component of visual communication design, which refers to the process of creating unique and representative visual symbols or graphic symbols for individuals, companies, organizations, activities, or products. A good logo design can convey brand information concisely and clearly, establish brand recognition, and stimulate emotional resonance among the target audience. Logo design is not only an artistic creation, but also a part of brand strategy. It requires designers to have good creative ability, visual communication skills, and keen insight into market trends.When designing the "Renewal Project" logo,

because the design theme is based on the concept of sustainable development, the recycling and reuse of idle toys is first associated with the logo of recycling. Arrange the appearance of the "Revitalization Plan" in the same shape as the circular logo, and use graphic materials to convey the sustainable concept of recycling and reusing idle toys, and recycle limited resources to meet the infinite needs of humanity. Choose activity themed colors for color matching, blue represents idle toys, and yellow represents vitality and rebirth. The overall design of the logo is concise but not lacking in connotation, with bright colors, directly and clearly conveying the design theme of the "renewal plan".

Figure 3-1: Design sketch of the "Renewal Project" logo

Figure 3-1: Design sketch of the "Renewal Project" logo

3.3 IP design

IP design, also known as intellectual property design, typically refers to the process of creating and developing original characters, stories, worldviews, and other content with unique recognition and commercial value. This is not limited to cartoon characters or fictional characters, but also includes the design of various cultural and creative products such as literary works, film and television scripts, game plots, music works, etc[12].The importance of IP design, as one of the core driving forces of the cultural and creative industry, is self-evident. It goes far beyond simple character creation, but rather a comprehensive creative and development process aimed at building a rich, diverse, and profound cultural universe. In this process, creative talents such as designers, writers, screenwriters, musicians, etc. work together to integrate unique ideas, emotions, and aesthetic concepts into every detail, creating IP content that not only touches people's hearts but also resonates in the market. With the development of technology and the diversification of media, successful IP designs often adopt cross media narrative strategies, which involve presenting the story content in various forms such as books, movies, TV shows, web dramas, animations, comics, games, etc., forming an interrelated and complementary ecosystem. IP design is a complex process that highly integrates creativity, technology, and business intelligence. It is not only related to artistic creation, but also about how to construct and disseminate cultural symbols with lasting vitality in modern society, achieving a win-win situation between cultural value and commercial value.

IP plays an important role in brand activities, and digital IP image, as a new form of brand communication, has gradually attracted the attention of enterprises and brands. By leveraging the advantages of digital IP image, brand awareness and recognition can be enhanced, thereby creating greater economic benefits. By analyzing the impact of digital IP image on brand value, this paper explores the application of digital IP image in brand design and communication, providing various methods and practical references for the design of IP image. The main elements that make up the appearance of an IP image are shape, color, and pattern, which play a crucial role in shaping the brand image and conveying brand

information. Firstly, shape is one of the core elements of IP image design. The use of different shapes can showcase the characteristics and personality of IP images. If the brand is positioned as cute and lively, then you can choose to design the head, body, and limbs of the IP image in circular, curved, and other shapes; If the brand positioning is serious and formal, then you can choose shapes such as rectangles and straight lines to design the head, body, and limbs of the IP image. Secondly, color is an important element in IP image design. Different colors can convey different emotions and atmospheres, such as red representing enthusiasm and liveliness; Blue represents calmness, stability, etc. When choosing colors, one should consider the brand positioning and the characteristics of the target audience, and choose the color that best represents the brand image. At the same time, attention should also be paid to the combination and combination of colors to create a unique visual effect. Finally, patterns are also an indispensable element in IP image design. Using different patterns to enhance the details and visual effects of the IP image. For example, selecting representative patterns to decorate clothing, hair, accessories, and other parts of the IP image, presenting the brand's characteristics and image. In the design process of digital IP image, it is necessary to organically combine shape, color, and pattern to create a unique appearance. At the same time, attention should be paid to the alignment with brand positioning to ensure that the appearance of the IP image accurately conveys the brand's value and characteristics, thereby creating an attractive and recognizable digital IP image, laying a solid foundation for the long-term development of the brand. The updating and upgrading of digital IP image needs to be synchronized with brand strategy, better conveying the core values and characteristics of the brand. For example, Huawei's "Xiaoyi" IP image was designed by Huawei to promote its smart home products. In the early image, "Xiaoyi" was designed as a cute and lively image to attract young consumers. However, with the changes in Huawei's brand strategy, its IP image has also undergone corresponding adjustments. The current image of "Xiaoyi" places more emphasis on intelligence and practicality, emphasizing its position and function as a center for smart homes. At the same time, the storyline of "Xiaoyi" has also been adjusted to pay more attention to the combination with smart home products and the display of application scenarios. In addition, keeping

up with the times in image updates also requires attention to emotional connection and feedback with consumers. The updating and upgrading of digital IP image should pay attention to the needs and feedback of consumers. Through interaction and communication with consumers, we can understand their views and suggestions on digital IP image, and then optimize and upgrade it.The dissemination attribute of a scene is the reshaping of participant identities and the integration of communication channels. The scene is reinforced by representative symbolic images, that is, the brand image IP is contextualized. Using information media as a carrier, creating special situations through story interpretation to enhance user service experience, so as to resonate with the user group and the brand, thereby improving the dissemination efficiency of the brand, and creating emotional dependence and loyalty among users towards the brand.

The purpose of this IP design is to create a warm and friendly image, as shown in Figure 3-3. It represents people who actively participate in the "Renewal Plan" and the power of stars to showcase sustainable development activities, shining brightly and illuminating the night sky for future development. Therefore, stars are chosen as the main element of the IP "Huanxing'er", with yellow as the main color tone to express infinite vitality.

Figure 3-3 "Huanxinger" IP Design

3.4 Poster Design

Poster design is the use of various visual elements, such as images, colors, text, etc., to convey information. Activity posters are an important communication tool that highlights the theme of the event and calls on people to participate.Poster design is a form of visual communication art that aims to efficiently convey specific information or promotional purposes to the public by creatively combining elements such as images, text, color, layout, and graphics. It is an important component of advertising and promotional activities, not limited to traditional paper media, but also widely used on digital platforms. Posters should fully consider the audience's cognitive characteristics, and "images" often use things that exist in real life. Color selection theme, applying emotional and rational colors to poster design.

Semiotics is a discipline that studies symbols and their role in human communication and social life, exploring how to construct and convey meaning through symbols. The origin of semiotics can be traced back to ancient Greek philosophy, but as a systematic discipline, its development is closely related to the work of linguists Ferdinand de Saussure and philosopher Charles Sanders Peirce from the late 19th to early 20th century. Semiotics not only occupies an important position in humanities, such as literary criticism, art theory, sociology, and anthropology, but also has important applications in fields such as design, advertising, information technology, and artificial intelligence. By understanding how symbols construct and convey meaning, semiotics provides a theoretical basis for interpreting cultural and social phenomena, designing effective communication strategies, and constructing human-computer interaction interfaces.As a pioneer in semiotics, Pierce proposed the principles for creating semiotics from a logical perspective, also known as general semiotics, which is applicable to various semiotic phenomena[13]. Semiotics theory is often applied in poster design. Pierce understood symbols as those that can be understood or interpreted by people and have a certain significance, so he innovatively proposed the "triadic relationship" of symbols, which is the triadic relationship of symbol representation, object, and interpretation[14]. Representation refers to the expression form of a symbol or an

object or concept, which can be a word or an image, and it is used as a medium to convey information; Object refers to or represents an object; Interpretation refers to the process by which the audience or recipients of information understand or interpret its meaning. It is the process by which people understand, infer, and interpret the conveyed information through personal experience and cognition. As shown in Figures 3-4.

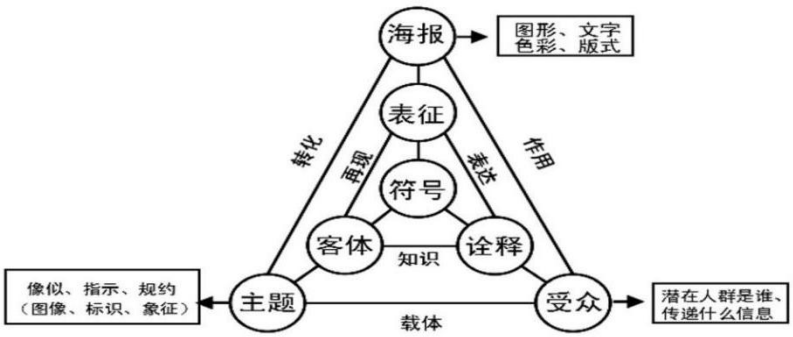

Figure 3-4 Based on Pierce's ternary relationship model

In terms of poster graphic design, the author adopts an abstract and flat style for creation. Although the concrete form expresses and expresses objects clearly enough, it lacks a certain level of interest and interactivity with the viewer. The specific manifestation in flat design is the simplification of perspective, texture, and gradient, which can make "information" itself reappear as the visual core. Compared to the realistic style, flattening focuses more on the portrayal of object images and is more general, with a flat, two-dimensional style. In terms of portrayal of form, whether it is scenery, characters, or still life, it is a graphical language refined and transformed by the creator.

The works of Japanese designer Ryo Takemasa are well reflected in his food illustrations for Annie Bell's Howto Cook. The simple and precise appearance contrasts sharply with the simple and rich texture, reflecting the freshness of the food. American illustrator Christopher Dina's depiction of plants and fruits also embodies the charm of flat graphic design. His graphic design is deeply inspired by nature, showcasing the vibrant state of food through its flat graphic design and vibrant color contrast. The author analyzes the appearance characteristics and color style of natural food, presenting the graphics in a monochromatic flat form, subtracting excess colors from the graphics, adding design form, and using accurate food contours and monochromatic gradient design techniques to express

the taste of food, making the artistic value of the graphics stronger.

The poster design of the "Renewal Project" is aimed at users who need to deal with idle toys in their homes. The layout center selects toy shapes with distinctive features, such as tambourines and game consoles, and uses a central composition combined with deconstruction style, which is simple but not simple; The color scheme adopts high saturation colors, which are eye-catching and full of appeal, reminding people to think about the structure of idle toys and the functions of those idle toys that have not been noticed, thus calling on people to actively participate in the "Renewal Plan" activity and reduce the idle situation of toy resources.

Figure 3-5 Poster design for the "Renewal Project"

3.5 Information Visualization Design

Information visualization transforms data and information into visual forms, using graphics, charts, and other visual tools to help people better understand data and information[15].Information Visualization Design is a process of transforming complex data and information into visual elements and graphics that are intuitive and easy to understand. Its purpose is to enhance people's cognitive and understanding abilities of data through visual means, so that the stories, patterns, trends, and relationships behind the data can be quickly and accurately conveyed. Information visualization design combines knowledge from fields such as graphic design, data science, human-computer interaction, and cognitive psychology, and is an interdisciplinary practice. Information visualization is the process of extracting, transforming, mapping, abstracting, and integrating the feature values of information, and representing the content features and semantics of information through graphics, images, animations, and other means[16]. Information visualization involves multiple fields such as information science, cognitive science, graphics, data mining, multimedia technology, computer-aided design, and human-computer interaction technology. Information visualization is an important achievement in the development process of computer graphics. Information graphics are the form of information dissemination, while information visualization is the design method of information. Information graphics use information visualization to organize and graphically design complex relationships of information, helping people quickly understand complex information content. In information visualization, there are more possibilities for the future development of information graphics, such as the transition from traditional information graphics to modern information graphics, and the change in the development ideas and presentation methods of information graphics in the short video era from static reading information graphics to dynamic interactive information graphics, making it easier and faster for people to understand information content and avoid complex information content being converted into simple and easy to understand information graphics[17].However, it is important to note that information graphics should not overly emphasize visual aspects and ignore effective information

transmission. Therefore, in information visualization, the design of information illustrations should start from primary and secondary information, grasp the methods of information organization, content expression, and visual process. In information organization, valuable information should be collected and analyzed to determine the primary and secondary relationships of the information; In terms of content expression, the readability and readability of information should be considered, and visual elements should be used to layout the primary and secondary relationships of information; In terms of visual flow, the visual flow of learning diagrams should be arranged based on the primary and secondary relationship of information. Starting from improving the efficiency of information graphic dissemination, we should grasp the methods of text design, color design, and graphic design. In terms of text design, it is necessary to choose appropriate forms of information expression to achieve comfortable reading effects and improve the efficiency of information dissemination; In color design, it is necessary to reflect the visual effect of information, quickly find information, and strengthen the reading memory of viewers; In graphic design, complex information should be transformed into vivid graphics that are easy to understand and read.

Information visualization design is a discipline that transforms complex data and information into intuitive and easily understandable visual representations. It combines knowledge from fields such as graphic design, data processing, human-computer interaction, and cognitive science, with the aim of helping users analyze, understand, and remember information more effectively. The core of information visualization design lies in revealing the relationships, trends, patterns, and important details between data through various visual means such as charts, images, and interactive interfaces, enabling non professional audiences to quickly grasp the key points of information[18].

In summary, people have limited understanding of the recycling and reuse of idle toys, as well as the resource and environmental pollution caused by discarded toys. Therefore, the information visualization design for the recycling and reuse of idle toys is based on this. Firstly, collect relevant information on the recycling and reuse of idle toys through the internet, and sort, classify, and analyze the information; Secondly, based on the overall design style and layout, visual design

will be carried out for toy classification, pollution index, recycling value, recycling and reuse suggestions, etc.

Sort out and analyze the information related to the "Revitalization Plan" idle toy recycling and reuse activity, dividing it into three parts: the first level information is based on the classification of five common materials of toys, explaining their recycling value and environmental pollution index, and placing them in the visual center to convey the theme of science popularization; Secondary information is the presentation of recycling and reuse methods, theoretically providing solutions to the problem of difficult recycling and reuse of idle toys; Third level information refers to the relevant data on the recycling and reuse of idle toys, which can also deepen people's understanding of the recycling and reuse of idle toys. However, compared to first level and second level information, it lacks directness, so it is placed in third level information.

To enhance the eye-catching nature of information visualization design, highlight the clear relationship between information levels, use complementary color contrast, emphasize the theme and harmonious unity; Secondly, color area comparison is used, with blue as the larger color area representing larger information content, and orange and pink as the smaller color area representing smaller information content; Cute toy shaped silhouettes echo the theme, creating a relaxed and energetic atmosphere for the "Revitalization Plan" event.

Figure 3-6 Information Visualization Design for "Renewal Project"

Figure 3-7 Information Visualization Design Level 1 Information for the "Renewal Project"

Figure 3-8 Secondary Information for Information Visualization Design of "Renewal Project"

Figure 3-9 Information Visualization Design Level 3 Information for the "Renewal Project"

Figure 3-10 Visualization Design of Activity Process Information for "Revitalization Plan"

3.6 Derivative Design

With the diversified development and exchange of global culture, the cultural and creative industry has become an important force in promoting economic development and cultural inheritance[19].

In the era of advanced information technology, products with unique designs have the characteristics of wide influence, innovative forms, efficient promotion, and good interactivity when promoting[20]. For completed IP and information visualization designs, a series of derivative designs need to be carried out. The categories of derivatives I have chosen mainly include handbags, medals, commemorative vouchers, stickers, etc. These derivatives are items that friends of all sizes love and can attract people to participate in the "Renewal Project" idle toy recycling and reuse activities.

The design concept of a handbag is based on the "Revitalization Plan" activity format. People can participate in the activity to collect handbags, and when they return home, they can put idle toys in the handbags and bring them to the event site for recycling and reuse. The raw materials for the handbag include recyclable canvas and PP woven materials. Printed with activity logo, eye-catching color scheme, toy deconstruction design.

Figure 3-11 "Renewal Project" handbag

The medal design of the "Renewal Project" draws inspiration from the recycling of unused plastic toys, breaking recyclable plastic into pieces and using recycled materials as the medal owner. As the periphery of the activity, we encourage people to strive to be "new champions" and actively participate in the recycling of idle toys.

Figure 3-12 "Renewal Project" Medal

The design of commemorative vouchers is inspired by the traditional Chinese proverb "giving roses to others, leaving a lingering fragrance in one's hand". The material of the vouchers is seed paper, adhering to the principle of green and sustainable development. On the one hand, based on questionnaire surveys, people are motivated to participate in activities by receiving gifts, thereby increasing their participation in activities; In addition, the behavior of participants dedicating their idle toys at home is worth encouraging. Those who participate in the event can receive this commemorative voucher, plant it in a flowerpot, and take good care of it. Once beloved toys will turn into seeds and grow new flowers, corresponding to the theme of "rejuvenation" in the event.

Figure 3-13 "Renewal Plan" Commemorative Coupon

The "Revitalization Project" plush pendant is made of idle plush toys with external fluff, and is handmade DIY. Handmade DIY of idle plush toys is a feasible way for daily reuse.

Figure 3-14 "Revitalization Plan" Plush Pendant

The "Revitalization Project" event features a design of adhesive objects, with the theme of "Revitalization Dream". Idle toy parts are collected, cleaned, polished, and cut and pasted, and the activity theme color is used as the color scheme. Drip glue is injected to form this set of adhesive object design. The main idea is to allow people to stop and gaze at the components of these idle toys and think about the recycling value of idle toys.

Figure 3-15 "Renewal Project" adhesive objects

The main audience for stickers is activity participants, who will apply the anthropomorphic and vivid image of IP "Huanxinger" to stickers, creating a happy atmosphere for the "Huanxin Project", encouraging people to actively participate in the recycling and reuse of idle toys in the "Huanxin Project", and promoting sustainable development.

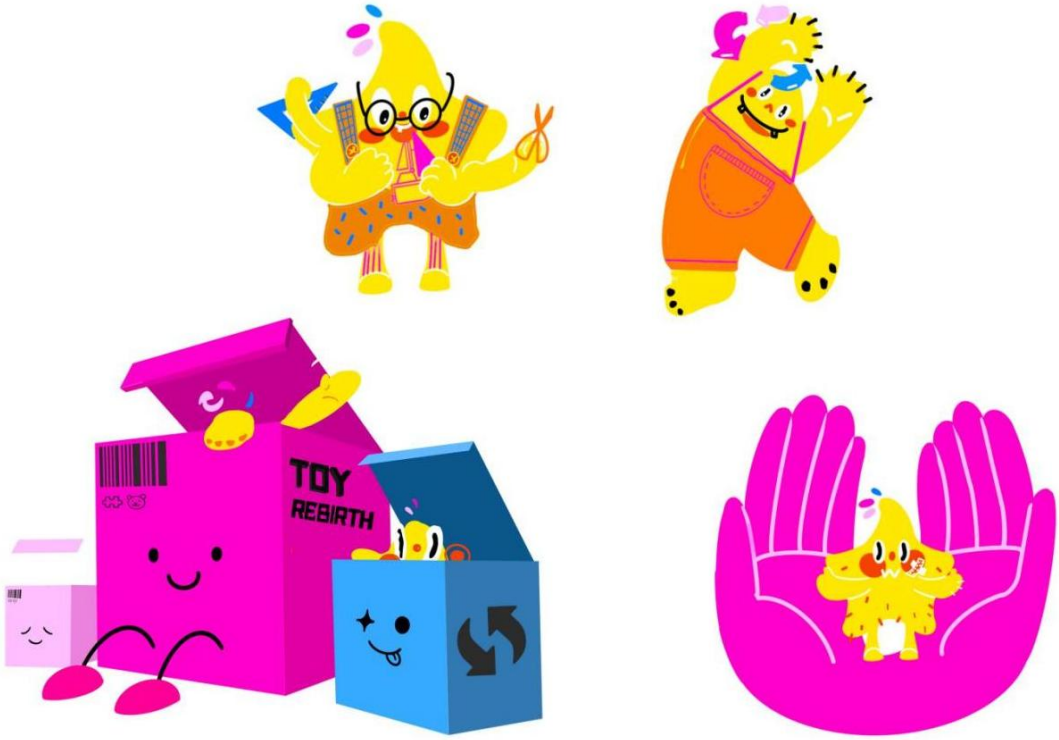

Figure 3-16 "Revitalization Plan" sticker

GENERAL CONCLUSION

In the era of consumption, with the continuous improvement of people's living standards and the increasing richness of material life, the types and quantities of toys are also constantly increasing. Behind the booming development of the toy industry is an issue that cannot be ignored - a large number of toys are idle. Firstly, the age range of toy audiences has expanded. With the rise of trendy play culture, toys are no longer just exclusive to children, but have also become a hobby for many young people; Secondly, people's sense of freshness towards toys lasts for a short period of time, and toy products are easily replaced; Thirdly, idle toys at home are often piled up in large quantities or disposed of in the simplest way possible, resulting in waste of resources and environmental pressure. At the same time, unlike common garbage sorting and clothing recycling in daily life, there are few places to recycle toys. Idle toys are often equated with waste disposal in traditional recycling, just like plastic bottles and cardboard boxes. Therefore, it is difficult to recycle and reuse idle toys.

Sustainable development is a feasible method to address the constraints of global development, and it is also the key to balancing the limited resources of the

Earth and the infinite needs of humanity. The United Nations and countries around the world are making unremitting efforts to promote sustainable development, starting from small things in all aspects and valuing sustainable development. Starting from the issue of idle toys, this project explores practical and feasible methods for recycling and reusing idle toys, and provides a reference for visual communication design through the activity design of the "Revitalization Plan".This article mainly conducts theoretical research on sustainable development and sustainable design, fully analyzes the current situation and difficulties of recycling and reusing idle toys, and combines practical successful cases of idle toy recycling to visually convey the design of an idle toy recycling and reuse activity. Using the recycling and reuse of idle toys as a visual design carrier for sustainable design, the concept of "rebirth" of idle toys is based on handmade DIY and charitable donations. Integrating recycling and reuse, triggering emotional resonance among users towards sustainable design. Optimizing the recycling and reuse methods in the market, combined with sustainable design, and tearing off the label of toys as "disposable" consumption, proves the effectiveness and feasibility of the research project.

This article mainly conducts theoretical research on sustainable development and sustainable design, fully analyzes the current situation and difficulties of recycling and reusing idle toys, and combines practical successful cases of idle toy recycling to visually convey the design of an idle toy recycling and reuse activity. Due to the author's lack of sufficient social practice ability, insufficient cross disciplinary knowledge reserve, objective conditions, and limitations in resources and personal abilities, there are still shortcomings in the research process. Due to objective constraints and limitations, this article has not yet conducted quantitative research and verification. It is hoped that in future research, interdisciplinary integration can be achieved to improve the design and planning of the entire process of recycling and reusing complex idle toys. More accurate and accurate data analysis can be conducted on the idle situation of toys and the level of public demand, avoiding subjective judgment in design and obtaining a clear design direction.

REFERRENCE DOCUMENTATION

Journal article:

[1] Huixian Zhong. Design study of the sharing of children's toys in the community from a sustainable design perspective [D]. Guangdong University of Technology, 2021.
https://kns.cnki.net/kcms2/article/abstract?v=wQLHse-Rxfe4msZwsKTJO3m20qBWXYxhxwNUtO_YeB5yqaV1EXavgfdw4M9vbsQAXV-p02a0d05MXIXwavNBFqKrFNJ2G1lX4g1WVpgxdG8_ycrVT3I228c6GZsAXvcotbG-3nDbbAOGV7fU0whzsw==&uniplatform=NZKPT&language=CHS

[2]Zhang Shuang. Toy rental is more shared thinking [N]. Economic Daily, 2015-July-16 (011).
http://views.ce.cn/view/ent/201507/16/t20150716_5948155.shtml

[3]Mo Yiwei, Luo Chao. Analysis of the influence of his ideas on sustainable design [J]. Green packaging, 2024(01): 174-178.
https://kns.cnki.net/kcms2/article/abstract?v=vRpkk4QO0ojl-MbZJakO9EEksXR-TmveG9xwC42A1aJ_ps68jDFs_yVtXJZFPj5s9ciBBr8rHyYRX0IIsLbwxS7svZPBblDGRWAa6cwdwkNfuhFgxxMHtc-CqvG88BMHxTrZymMoY_w2lVtzFAdFaA==&uniplatform=NZKPT&language=CHS

[4] World Commission on Environment and Development Our Common Future Changchun: Jilin People's Publishing House, 1997

[5] Sun Bo, Jin Yan, Ma Ning. Visual Analysis of Sustainable Design Research Trends [J]. Packaging Engineering, 2024,45 (02): 14-24
http://views.ce.cn/view/ent/201507/16/t20150716_5948155.shtml

[6] Burns A . Up cycling Classics—Sustainable Design Development through Fabric Manipulation Techniques in Fashion Design Education[J]. International Journal of Art Design Education, 2024, 43(2): 272-288.
https://kns.cnki.net/kcms2/article/abstract?v=vRpkk4QO0ojy2QmQ3ArrOEsVO4pTSk7EkkDltajeD0XJoywOyiozRuFNmtEX31HPw55HXKXUCvDHGy6z2ssDnakfV6tqWX3uoEKEEFz2t936yAEae7q24uBpyfkEgHWjWCYzd2nLoNA=&uniplatform=NZKPT&language=CHS

[7]Chen Xu Xin. Material recycling and reuse design of children's idle toys under

sustainable design [D]. Jingdezhen Ceramic University, 2023. https://kns.cnki.net/kcms2/article/abstract?v=vRpkk4QO0oiK47Ruh6PxgDgCwQbeAm3NSv2gjq5bZ9fMCAzjpZSFqJlsXD9O2doMWW8eobpZ6OuZkpRGP1p2Hdx1oMntUv__L6Ic8KlI3W4tM8ousDQq9xDk8JwuXPaWIk9ibiycUEkTtX1rHQ2_Lw==&uniplatform=NZKPT&language=CHS

[8] Yin Jing. The experiential construction of embodied cognitive context in spatial design from the perspective of metaverse media [J] Hunan Packaging, 2022, 37 (05): 21-24. https://kns.cnki.net/kcms2/article/abstract?v=wQLHse-Rxfdvl6N0w7_elRzRb-0_ojbkAC3V5nh_W3xROw0sL0GUcslvWgzG75Q3G2uqEPlU3H8ibnvi_L2zGPuZcOU4TprrqUIJW5g6vO1H_ViDGIh4pAJmzPdF8vyfskEDG7_FnU1xbKqSip3E8Q==&uniplatform=NZKPT&language=CHS

[9]Wang Yuanlei, Ruan Chao Research on the Application of Minimalism in Logo Design [J] Design, 2023, 36 (12): 109-111 https://kns.cnki.net/kcms2/article/abstract?v=wQLHse-RxffZED-syK5iheUa_jqjd-6hXp5kkW6YzPZFAha9tQzXcwW8VilMGGEguExsitEE-lcFmBssC5oWitojI7vvEJt6zyvbHLRJd_dOdeHgdZIlFL75SXOpDZQHshVHqUabMNoRUYTnLqRd5w==&uniplatform=NZKPT&language=CHS

[10] Pan Yitian. Analysis of the underlying logic of brand logo design [J]. Art Market, 2024 (02): 108-109 https://kns.cnki.net/kcms2/article/abstract?v=K_cp52o2S7-TlyMlq511ngj4BuBaOzuGvWL4wC0HLJVQGy-fHhWZO2J8Tb3DtJtkdKWr1jcoJPW6JxIy_LKkM13XofH2s6ys5bwi-yxuVUP2jAmxA95JaE9RD903uhDU4edO-52592a0V5U-JTRXuw==&uniplatform=NZKPT&language=CHS

[11] Zhou Hongtao. Effective Application of Digital IP Image in Brand Design and Communication [J]. Shanghai Packaging, 2024 (04): 111-113 https://kns.cnki.net/kcms/detail/detail.aspx?filename=LVBZ202401037&dbname=cjfdtotal&dbcode=cjfd&v=

[12] Xu Hengchun Design Semiotics [M] Beijing: Tsinghua University Press, 2008 https://kns.cnki.net/kcms2/article/abstract?v=wQLHse-Rxfdvl6N0w7_elRzRb-0_ojbkAC3V5nh_W3xROw0sL0GUcslvWgzG75Q3G2uqEPlU3H8ibnvi_L2zGPuZcO

U4TprrqUIJW5g6vO1H_ViDGIh4pAJmzPdF8vyfskEDG7_FnU1xbKqSip3E8Q==&uniplatform=NZKPT&language=CHS

[13] Li Bohao. Analysis of Public Welfare Poster Design from the Perspective of Pierce Semiotics [J] Journal of Changchun University, 2024, 34 (03): 88-93 https://kns.cnki.net/kcms2/article/abstract?v=wQLHse-RxffAE7VcKjLS9LI2lg0cMphxh_4tRc_YOOem5atycMXqX0PZNw1uj-sBMDsFcf1dkId6SVMvaQE73itlSRmSaI3AWm0kv-0hdzxO2e8-mmTjFY9VLQMoG4pxPo56VORi8-VEyoSnbzH9og==&uniplatform=NZKPT&language=CHS

[14] Bai Jieran, Yang Yong, Zhang Xinmeng. The application of information visualization design in "dual carbon" science popularization education [J] Shanghai Packaging, 2023 (12): 177-179 https://kns.cnki.net/kcms2/article/abstract?v=wQLHse-RxfcQp_QEwLn0wuX9j0xKRs3lnjGZ8Bb2C_LCSjB4BAnzPbU0WP2QhydkihBBlQ5NsRXFIsoX77TO123SmjOoaUIMxiYuH8W1mUddO2Z4cAlasmMDVcwn1kHOtKD_u4pm4ANgMswlnQK3Lw==&uniplatform=NZKPT&language=CHS

[15] Wu Qinghua. Information Visualization and Information Graphic Design [J]. Encyclopedia Knowledge, 2024 (09): 84-85 https://kns.cnki.net/kcms/detail/detail.aspx?filename=LVBZ202401037&dbname=cjfdtotal&dbcode=cjfd&v=

[16] Tan Lu. Exploration of Information Construction and Transformation Methods in Visual Design [J]. China Information Technology, 2024, (04): 46-47 https://kns.cnki.net/kcms2/article/abstract?v=K_cp52o2S79HIE8J_A8xU8BujGjWZMRR1BwqSYWDG84LPo7PXWzPR-MNci-XHXDoLH1E0dHR1FxXyBykvxFf2EjNrTnvW7mDUo6PgJyes8qbns_5Fp8bY-wA0yJTPHBkKnO-UrV8NiWd8aReWIl0AA==&uniplatform=NZKPT&language=CHS

[17] Zhou Hongwei, Yuan Ruifan. Analysis of Design Ethics in Public Health Information Visualization [J]. Art and Design (Theory), 2024,2 (04): 33-36. https://kns.cnki.net/kcms2/article/abstract?v=K_cp52o2S7_W8L-3z7U_hlgYy9C9ndMz3H-p5JxCYbCeCHAcuOMdjEwmQq2Hv6QEgQmG-jtC7cD8gtGMQ478QhjSVmz6eMPDcE5XD2lbm0RRim4OxHwraczf0rIiYf49Pl_dG_-0HBE=&uniplatform=NZKPT&language=CHS

[18] Wang Wenzhuo. The Application of Information Visualization in Brand Design [J]. Tomorrow Fashion, 2024 (04): 91-93
https://kns.cnki.net/kcms2/article/abstract?v=K_cp52o2S789rbHeleAOalyninmiVm-ciWlQqFeBL6K-f5j45xSTvHdRVGjpxr2nX5vsCNal7XZSlBCBLUN4m8FohL9wpRDol1vyyBlNmoY5yNpQPdA2IC-flP_SeLerh2qrG2RCi14K6IyebornoA==&uniplatform=NZKPT&language=CHS
[19] Xu Meng. The Application of Traditional Cultural Elements in the Design of Cultural and Creative Derivatives [J]. Footwear Craft and Design, 2023,3 (23): 64-66
https://kns.cnki.net/KXReader/Detail?invoice=EEejdv65zc%2FKcsQN0Vpi8Vi5FfvB62iHVsWRP%2F3C9BL1%2FVr69kBli7pguetFpEzGH5imXExuOOENZWxrNuiDoErYrg4k7SQlz3zQKQYfLHcqg3rAm33OM%2BPuFiem4rovB2TJMdcIam72rqAlYud1zaSnbZWcIaTMPrtAuHVTxhk%3D&DBCODE=CJFQ&FileName=ZWXE202323022&TABLEName=cjfdlast2024&nonce=15B88F55FAF64F72B895E3882996CF75&TIMESTAMP=1717647742553&uid=
[20] Chen Jiaxin. Creative Design Description of Childhood Culture IP Derivatives Clay Sculpture World [J]. Screen Printing, 2023, (07): 117-119. DOI: 10.20084/j.cnki.1002-4867.2023.07.07.032
https://kns.cnki.net/kcms2/article/abstract?v=K_cp52o2S78zLRgWxPW-U_5sCIRrULPauOc0Uob4uqCnpOMfymdikZT7pRnFRFf9hxj31lBVx8nZycOqMrTTlwOi1YNCRJkRQN0S5-lDlWyHqF9bVfaRgR1-GYsORdWgZqThDkhs_LK_405GjunAoA==&uniplatform=NZKPT&language=CHS

ANNEX