Research on Innovative Design of Patchwork Art Based on the Concept of Sustainable Development——Take the Creation of "HUI Yu Men Ting" as an Example

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Abstract: While scientific and technological progress and economic development have improved the state of human life, they have also brought a series of hazards to human survival. Therefore, sustainable development has become an inevitable trend for development in various fields. Patchwork art is a typical traditional art form. No matter now or in the future, only by absorbing the essence of culture, deeply exploring the harmonious relationship between man and nature, and adhering to the road of sustainable development can we realize the vitality of modernization. This article focuses on the concept of sustainable development and provides theoretical knowledge and methodological guidance for modern patchwork art design. Taking the work "Hui Yu Men Ting" as an example, it discusses the sustainable design research of the use of waste denim clothing for the creation of patchwork art from the aspects of material selection, creative concept, and expression techniques.

1. Sustainable development concept

1.1. Background on the concept of sustainable development

Sustainable development, as the proposition of the times in all fields, is an inevitable requirement for human survival and an established direction for future social development. The concept of sustainable development is based on the comprehensive consideration of social factors such as ecological environmental protection, politics, economy and culture, and the integration of the concept of sustainable development into the production and life of modern society is the ideal and goal jointly pursued by human society.

1.1.1. Ecological environment. Although the development of science and technology in modern society has promoted the progress of human society, it has also accelerated the consumption of resources and energy. Incorrect development methods are the direct cause of environmental pollution and waste of resources. Overdesign and overproduction not only shorten the product life cycle, but also cause a large amount of domestic production waste.

From the perspective of the production process, in the early stages of production, over-exploitation of resources caused by a series of erroneous development cognitions such as the "pollution before treatment" and "zero growth" theories accelerated the consumption of non-renewable energy on the
planet. Incorrect production methods lead to serious waste of resources in the production process, but also bring a series of environmental problems such as water pollution, air pollution and land pollution. In the recycling process, imperfect recycling systems and mechanisms have led to a single form of waste recycling and low recycling rates, which has further aggravated the degree of environmental pollution. Taking the textile industry as an example, my country produces more than 20 million tons of waste textiles every year, with a comprehensive utilization of about 3 million tons and a comprehensive utilization rate of only about 15% [1] (see Figure 1, Figure 2).

![Figure 1. 2015-2018 my country's waste textile growth trend](image)

As far as the current situation is concerned, the ecological natural recovery capacity is far less than the speed of man-made destruction. Natural resources, as the material basis of social development, whose being damaged will restrict the further development of society. Development destroys the environment, and the environment limits development relatively, thereby forming a vicious circle in the ecological chain.

1.1.2. Production consumption. Since the industrialization era, the invention of machinery has promoted the acceleration of production. The "high consumption stage" brought about by the industrial revolution has had positive or negative effects on human development in many ways. On the one hand, productivity has increased significantly, enabling the economy to maintain long-term high-speed growth, continuously optimizing machine performance and production structure, resulting in faster product replacement; on the other hand, the rise of industrial civilization has accumulated a large amount of material wealth and the level of consumption has been raised with the increase of residents’ income, and changes in consumption concepts and consumption patterns have set off a climax of material consumption for modern people. In order to satisfy the pursuit of material life, mankind has made endless requests for nature, resulting in the consumption of a large amount of non-renewable resources in the production of commodities.

At the same time, the huge differences in consumption between developed and developing countries have exacerbated the unsustainability of consumption [2]. The industrialized developed countries pursue a high level of consumption, and excessive consumption causes a series of environments such as waste of resources problem. At the same time, in order to change the current
situation of insufficient consumer demand, many poor developing countries blindly expand production and increase the development of natural resources, causing environmental pollution and ecological damage. Therefore, changing the traditional production and consumption methods to achieve sustainable consumption has become the needs of the development of the times.

1.1.3. Ideological culture. Since mankind entered the civilized era, how to correctly handle the relationship between man and nature is an eternal topic in the process of human self-survival and development. From advocating nature to conquering nature, and then conforming to nature, with the continuous deepening of human self-cognition and natural exploration, the understanding of nature is also changing.

Although the theory of sustainable development in modern society originates from the West, the concept of sustainable development has been in existence in ancient China. Both Confucianism and Taoism in China have explained the concept of sustainable development to a certain extent. Laozi advocated that "the law of nature" and "little selfishness and few desires" should be followed. "Mengzi Liang Huwang" "Benevolence" thoughts such as "when not violating agriculture", "do not enter the pool", and "enter into the mountain forest", fully respect the objective laws of nature, and embodies the principle of sustainability in sustainable development. In addition, the concept of sustainable development has been mentioned in other traditional Chinese writings. Many philosophical ideas have explored the relationship between man and nature in the concept of sustainable development from different angles and levels, reflecting the essence of the ancient Chinese pursuit the simple nature view and values.

As the birthplace of modern sustainable development ideas in the West, European society has begun to pay attention to the relationship between humans and the environment since the Middle Ages. This concern has been throughout the modern development history of Europe. Many philosophers and humanists have put forward various views from different angles on the relationship between man and nature. Rousseau’s strong call for “going back to nature”, Nietzsche’s fierce criticism of modern civilization’s destruction of the sound human nature, Malthus’s “resources are absolutely scarce theories”, and Karl Little, one of the founders of German modern geography, deeply influenced the perfection of modern sustainable development theory in the second half of the 20th century.

1.2. Basic concepts of the concept of sustainable development

1.2.1 Modern sustainable development concept formation track and overview. The improvement of the modern sustainable development theory system is not a word of the family, but the strength of a hundred schools. At present, there are many research achievements on the theory of sustainable development in domestic and foreign academic circles, all of which are based on the theoretical basis and reality, and are summarized through practical experience. It is a long-term and complicated process from quantitative change to qualitative change.

Although the formation and establishment of modern sustainable development concepts have no clear trajectory to follow, they basically attributed the origin of the theory to the environmental protection movement in the 1960s. Carlson's "Silent Spring" as an enlightenment of sustainable development made people realize the seriousness of environmental problems for the first time. The awakening of ideas brought about by the scientific and technological revolution has made more and more scholars and experts turn their attention to the problems of environmental pollution and protection. The concept of sustainable development came into being and was systematically defined and elaborated. The concept of sustainable development in the 1970s appeared, and the slogan of "sustained growth" and "balanced development" was first proposed by the "Extreme Growth" of the Club of Rome in 1972; in 1978, the International Commission for Environmental Development officially used the concept of sustainable development in relevant documents for the first time. China's sustainable development is defined as: meeting the needs of our generation without sacrificing the needs of future generations \(^3\).
In the 1980s, the concept of sustainable development was clearly put forward. In 1980, the "Outline of World Natural Resources Protection" formulated by organizations such as the International Union for Conservation of Nature and many governments and experts put forward: “We must study natural, social, ecological, economic and basic relationships in the use of natural resources to ensure global sustainable development.”[4]; In 1987, the World Commission on Environment and Development submitted to the United Nations a report entitled “Our Common Future” and the mainstream definition of sustainable development was given. As a sign of the modern sustainable development concept officially established, it shows the future global development trend from the traditional industrial civilization development model to the modern ecological civilization development model.

Although the concept of modern domestic sustainable development started late, China has always been an important participant, supporter, practitioner and leader of global sustainable development from Agenda 21 to the 2030 Agenda for Sustainable Development. Since the United Nations Conference on Environment and Development adopted Agenda 21 in June 1992, the Chinese government has made a solemn commitment to fulfill the “Agenda 21-China's 21st Century White Paper on Population, Environment and Development”[5]. In recent years, with the continuous changes of China's national conditions, our understanding of sustainable development has also been deepened. The party and the government have also proposed green circular low-carbon development, "Two Mountains Theory", "Beautiful China", and the community of human destiny. We have the new concept of sustainable development with the development law of socialism with Chinese characteristics.

Forty years of reform and opening up is a testimony to the gradual maturity of China’s sustainable development. It has undergone a transformation from theory to practice and completed the localization of the concept of sustainable development in China. From “sustainable development” to “scientific development concept" is the sublimation of the development concept with Chinese characteristics. The establishment of a sustainable development strategy has set the direction for the construction of China's modern society. (see Figure 3)

| Time   | Author/Agency                                      | Books/Report                                      | Effect                                             |
|--------|----------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| 20C60S | Carlson                                            | "Silent Spring"                                  | Enlightenment of sustainable development          |
|        | Roman club                                         | "The Limit of Growth"                             |                                                    |
| 20C70S | International Development Commission               |                                                   | The concept of sustainable development            |
|        | International Union for Conservation of Nature and many government agencies World Environment and Development Commission | "Outline of World Natural Resources Protection" |                                                    |
| 20C80S |                                                    |                                                   | Clearly propose the concept of sustainable development |
|        | Agenda 21                                          | "Our Common Future"                               |                                                    |
|        | The 2030 Agenda for Sustainable Development        |                                                   |                                                    |

Figure 3. Modern sustainable development concept forming trajectory
1.2.2 Sustainable Development Concept and Sustainable Development Design. Based on their national conditions, each country considers specific issues and analyzes them in detail, and puts forward more targeted interpretations of sustainable development theory in various academic reports and special issues. But they are all based on the first clearly defined sustainable development theory in the 1987 "Our Common Future" report: development that can meet the needs of contemporary people without harming the ability of future generations to meet their needs [6].

As a brand-new value, sustainable development involves many disciplines and fields. It is a development based on various factors such as political economy, social population, resources and environment. It requires a sustainable economy, sustainable ecology and sustainable development. We need to continue to coordinate and unify the three aspects of society. From the perspective of development, sustainable development needs to establish a coordinated and harmonious dialectical development relationship between environment and development; from the perspective of ethics, it is a redefinition of the law of operation between man and nature and recognition of the relationship between future generations; from the perspective of fairness, it is expressed satisfying the fairness of this generation is the horizontal fairness between generations, and both developing and developed countries enjoy equal development rights. On the other hand, it refers to inter-generational fairness, that is, vertical fairness between generations. Contemporary people should take historical responsibility for the needs and consumption of future generations and treat each generation’s development rights fairly [7].

Introducing the concept of sustainable development into the design field is the embodiment of the concept of sustainable development. Sustainability design means that in the process of product development and design, every link must consider the function, performance, structure, form, color, material and other factors, while also fully considering the coordination between the product and people and the environment. In the design process, we should reduce pollution to the environment, improve resource use efficiency and recycling rate, which is emphasizing the protection of natural value and promoting social value, and promoting the harmonious coexistence between man and nature.

2. Sustainable Development Concept and Creative Design of Spreading Art

2.1. The sustainable connotation of the development process of patchwork art design
Patchwork first originated in northwestern China and ancient Egypt, but it was not called "patchwork" at the time, it was a practical method for humans to adapt to the cold natural environment, it was the product of human beings who gave full play to their subjective initiative and harmonize with nature.

As far as patchwork itself is concerned, the art of patchwork has been growing up to now because of its own sustainability. In an era of low productivity and lack of design concepts and artistic aesthetics, working people upheld the concept of recycling through diligence and frugality, and applied the simple concept of sustainable development to their daily production and life. Therefore, the traditional patchwork art not only has the characteristics of naturalness, richness and environmental protection, but also carries the cultural spirit of a nation, and is an effective way to spread and enhance the cultural self-confidence of the nation and region. With the changes of times and society, patchwork art constantly absorbs new blood and bursts out new vitality.

From a humanistic point of view, patchwork originates from poor people and begins in an era of scarce resources. As the best verification of the virtue of thrift and frugality of the Chinese nation, it not only embodies the wisdom and creativity of ancient people, but also shows the extremely poor living environment of ancient people and the perseverance to fight against nature and the infinite love for life under that circumstances. At the same time, it expresses the good auspicious meaning of people. Taking "Bajiayi" as an example, the reason why it is called "Bajiayi" is that the fabric it produces is piecemeal cloth from various companies. The blessings of children grow up healthily and safely. The patchwork form of this clothing not only has a strong symbolic meaning, but also contains
the harmonious relationship in life, and it holds the most sincere blessings and earnest expectations for future generations [8].

Although the popularity of modern patchwork is based on the sustainability characteristics of patchwork itself, it is also inseparable from the favorable conditions provided by the external environment. With the enhancement of the overall social awareness of environmental protection and the awareness of renewable resources, new consumer awareness has also occurred changes, and began to establish the concept of quality consumption, the pursuit of green, coordinated and shared consumption concepts. The patchwork concept and design concept of patchwork design coincide with the new consumption concept, rational use of resources, increase the utilization rate of fabrics, and reduce the ecological pollution caused by the waste of fabrics.

At the same time, with the improvement of material living standards, people's quality of life has improved significantly than before. The spiritual and cultural needs are growing rapidly, and it is particularly important to inherit and develop traditional culture. How to make patchwork art continue to inherit in modern society has become a new challenge for the development of modern patchwork art.

2.2 Research on Creative Design of Spreading Art Based on the Concept of Sustainable Development

At present, how to promote the sustainability of patchwork art design through material innovation and design innovation is an important direction for the development of patchwork art design. The patchwork design under the guidance of the concept of sustainable development must fully consider the characteristics of its design style, material selection, production process, production and sales, etc., consider the use of raw materials in the creative process and the waste recycling and disposal after the end of the use cycle. The recycling situation fundamentally reduces pollution and waste, extends the life cycle of products, improves the practical value and artistic value of products, and promotes the sustainable development of modern patchwork art.

2.2.1 Material selection and use.

The creation of modern patchwork art using waste denim clothing as a medium is determined by a combination of factors such as ecology, policy, culture, and the media's own attributes. It provides new ideas for the diversified development of modern patchwork art.

Economic development promotes the improvement of living standards and provides favorable conditions for people to pursue individual freedom and fashion expression. The speed of clothing replacement is accelerating, resulting in the continued increase in the amount of waste clothing and becoming an important part of solid waste. As a favorite clothing, denim clothing consumes a lot of water resources from production to disposal. The discharge of pulp dyeing, washing wastewater, and the use of sandblasting chemicals have caused serious pollution of soil and water. The release of toxic gases during the combustion process, heavy metal residues and degradation of the fibers in the landfill all cause environmental pollution and waste of resources to varying degrees. (see Figure 4)
In recent years, our country has repeatedly emphasized the importance and status of ecological civilization. During the “Thirteenth Five-Year” period, China's economic development has entered a new normal, and the development environment and situation of the textile industry are undergoing profound changes. New requirements for ecological civilization construction are proposed. From the new height of ecological civilization construction, we must promote the energy conservation and emission reduction of the textile industry and develop low carbon, green, circular textile economy to promote industry transformation and upgrading. And the construction of waste textile recycling and reuse system, standardize waste textile recycling, sorting, grading utilization mechanism and "zero discard of old clothes" activity process [9].

Choosing waste denim clothing as the main medium for patchwork art creation, also because of its unique fabric characteristics and strong plasticity characteristics determine the feasibility of using it for patchwork art creation. In the manufacturing process of denim fabrics, based on the needs of design and style, it will use washing, polishing, laser and other technical methods to form wear or wrinkles on the fabric. At the same time, due to the influence of personal wearing habits, environment and other factors, the wearer will leave the wearer on the clothing with unique texture. It is these special fabric textures that make it a unique raw material for patchwork art creation, which enriches the picture and brings a little humanistic temperature.

In the process of using waste denim clothing, the creative methods of deconstruction and reconstruction are mainly used. Deconstruct denim clothing and restore it from clothing to cloth pieces (see Figure 5) as the main material for patchwork. On the basis of creative needs, in order to meet the design requirements, physical or chemical methods are used for secondary art design, the texture or shape of the fabric is changed, and the artistic expression is enhanced to obtain the corresponding artistic effect. At the same time, the component structure on denim clothing is also the main element of the creation. Cut the available or needed parts (see Figure 6). According to the screen and design requirements, the waist, pockets, zippers, placket, buttons, leather cards, the representative elements such as the car line are re-created to obtain a new form of expression.

2.2.2 Diversified creation——The Art Collision between Traditional Production Technology and Modern Design Technique. The manufacturing process of traditional Chinese patchwork can be roughly divided into two types: "splicing" and "mending". The so-called "splicing" refers to the stitching of two or more pieces of regular or irregular fabrics according to the ordering or disordering stitching rules, and after splicing to form a brand-new unit.

"Mending" was developed by the poor people sewing and repairing worn clothes, and later used for decoration on clothing. It gradually evolved into patching, stacking, inlay, applique and other production processes. The fabric is overlaid on the existing fabric by quilting, rolling, setting, receiving, rolling and other processes. Coupled with the unique shape design and color matching, as well as the use of stitching, it has formed a variety of patchwork variations and unique decorative effect.

The work "Hui Yu Men Ting" also made full use of the traditional patchwork production process in the creation process. In the production of the wall (see Figure 7), the stitching method was used to cut the waist of jeans with rich color changes into rectangular blocks of different sizes, arranged and combined according to the principles of vision and painting, and then stitched to the base fabric.
Above, simulate the realistic blue brick form. The natural color and texture of the waist and a certain combination of patterns form a dappled ancient wall surface. At the same time, traditional embroidering techniques were used to depict the patterns at the gate (see Figure 8) to enhance the detail and three-dimensional sense of the picture.

In the creative process, a variety of modern design techniques were also used. By analogy, the tiling of the trousers was used to simulate the tiles on the wall of Huizhou (see Figure 9), and the special sharp shape of the back pocket of jeans was used to make the "drip" structure in the eaves and tiles of traditional buildings in Huizhou (see Figure 10). In contrast to the contrast method, focus on the first half of the picture during the production process.

The portrayal of some gatehouses weaken the production of the lower half of the doors and walls to form a strong visual contrast, highlight the visual center, and attract the viewer's attention (see Figure 11). Direct display method, in terms of the overall proportion of the picture, try to maintain the same scale with the real volume. We take the lantern production as an example (see Figure 12). While conforming to the overall proportion of the picture, try to resemble it to show the real feeling of the picture and give a view. The person is immersive.

In the production process, traditional production techniques and modern design techniques are combined to skillfully complete the conversion of waste and denim clothing into patchwork art works.

2.2.3 Communication of ideas and cultural heritage. The work "Hui Yu Men Ting" (see Figure 13 and Figure 14) is based on the Huizhou Gate Tower, using waste denim clothing, combined with patchwork art, and using deconstruction, reconstruction and other creative methods to restore the Huizhou Gate Court after thousands of years of rain. Vicissitudes and simplicity. Inspired by Huizhou's ancient proverb, "The four or two houses of Qianjinmenlou, the household is in the gatehouse", I hope to reproduce the charm of Huizhou architecture through patchwork creation, so as to convey the value concept and way of life of Huizhou people, and pay tribute to the spirit of Huizhou craftsmen. In addition, the art creation of patchwork of waste denim clothing and the creation of themes based on human life and natural landscape, etc., more widely conveyed the concerns of art creators on national, social and even global issues.

Through the new artistic expression form of old and worn denim patchwork decorative paintings, it delivers a far-reaching sustainable innovative design concept and green design concept to the society, giving viewers a more intuitive feeling and experience, so that the audience of the work can "Feeling", "Viewing gains".
3. The future of modern patchwork art guided by the concept of sustainable development

3.1 Protection of traditions

In the future, the development of patchwork art design should use innovative design concepts and ideas, but also develop traditional Chinese patchwork techniques. It combines ancient craftsmanship with modern creative ideas and aesthetic concepts to create an artistic expression form that is completely different from traditional patchwork art and interprets the beauty of modern patchwork art form, color, craftsmanship, texture and artistic conception.

Chinese traditional patchwork roots in the daily life of working people and is rich in profound historical and cultural backgrounds. It is heart-thinking and practical. It always focuses on caring for people and permeates simple ideas of sustainable development. Through the form of patchwork, China's outstanding traditional cultural ideas are displayed, and the road of patchwork art design rich in Chinese characteristics is constantly explored, so that the world can see the uniqueness of Chinese design, and the traditional Chinese patchwork art design is reborn.

3.2 Carry forward the heritage

Sustainable development should become a public cause, and sustainable development design must also be recognized, supported, and involved by the public.

For the government, first of all, it is necessary to embody the important awareness of sustainable development in legislation, establish a perfect legal system, and without compulsory laws and regulations, we cannot guarantee the true realization of sustainable design. Provide policy support to projects or designs with sustainable development, carry out various forms of publicity and education activities on sustainable development, and raise the awareness of sustainable development of the whole people. Establish a patchwork education system with Chinese traditional cultural characteristics, actively cultivate modern patchwork talents, integrate excellent traditional culture and modern design concepts, and promote the sustainable development of Chinese patchwork art.

For enterprises, modern patchwork art that is going to achieve industrial production should practice the theory of sustainable development. In the whole process from design to production, we must always adhere to the concept of sustainable development. Designers who carry out product development need to establish a sustainable design concept. In the production process, the use of raw materials and environmental pollution should also be strictly controlled.
For consumers, it is necessary to adjust the wrong concept and realize the change of concept. Understanding that sustainable development is not just about it is the responsibility of the government or enterprise, but the common responsibility of all the people. It is necessary to establish a strong environmental awareness and correct consumption concept, and actively integrate the concept of sustainable development into daily life, work, and study.

3.3 Innovative development

The development trend of patchwork art is becoming more and more diversified with the development of modern art. The changes in design methods and design concepts have transformed patchwork from simple traditional craftsmanship to meet the needs of life into a unique medium for countless art creators to exert their creativity and express personal emotions and thoughts. In order to meet the needs of the market and consumers and meet the direction of sustainable development, modern patchwork art needs to merge and intersect with other art design forms, break through the traditional thinking in the field of patchwork design, and lead the concept of sustainable development into the field of patchwork art design creation, which expand the creative field and enrich the creative form and content.

At the same time, environmentally friendly materials that can be recycled should be selected as much as possible to control the use of easily contaminated materials. How do we achieve real sustainability, we need to improve material utilization, reduce material consumption, and pay attention to the regeneration and recycling of materials.

4. Conclusion

This article starts from the background of the concept of sustainable development, and details the development track and basic concepts of the concept of sustainable development. Combined with certain design practice, it focuses on the innovative application of the sustainable development concept in modern patchwork art, and aims to convey a more profound sustainable development innovative design and cultural inheritance concept to the society through this art form. Proper application of the concept of sustainable development, protection of the environment, saving of materials, and coordination of human and natural design should become the direction of innovative development of modern patchwork art. The art design of patchwork using waste denim clothes as raw materials meets the requirements of sustainable development, and provides a new expression for the secondary design of waste denim clothes. However, it is still necessary to carry out in-depth exploration combining the characteristics of denim clothing and modern art concepts, combining modern craftsmanship with traditional handicrafts, and always running through the concept of sustainable development in the creative process, making positive efforts for the construction of sustainable development concepts and ecological environmental protection contribution.

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