

Experimental research on conceptual clothing design under low-poly style

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ABSTRACT

Aiming at the current clothing designers under the diversified art style design is not perfect and innovative enough, the new fashion trend is not clear and some of the difference from the traditional clothing shown in the art style is not novel and so on, according to the theory of conceptual clothing design, this paper through the literature research method, observation method, case study method, inductive summarization method and other methods, to analyze the current clothing design exists in the style of the very different and other problems, and finally, the Separately try to apply the style in the clothing style, clothing structure and the modeling design of apparel items, so as to carry out the innovative experimental thinking of conceptual clothing under the cross-border thinking mode, which promotes the important development of the current clothing design.

KEYWORDS; low-poly style; Experiment; Conceptual clothing; Modern design

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I. INTRODUCTION

With the rapid development of science and technology and economy in today's society, people's living standards and aesthetic demands are getting higher and higher, and consumers not only pay attention to the functionality embodied in the apparel, but also focus on the pursuit of individuality and the search for their own styles when choosing apparel. Nowadays, there are problems such as the lack of perfection and innovation in the design of clothing designers under the diversified artistic styles, the uncertainty of new fashion trends, and the lack of novelty in the artistic styles differentiated from those of traditional clothing. Therefore, it is necessary to improve the use of style in the design of clothing styles, clothing structures and the styling of clothing products.

Through the collection and collation of domestic literature, the relevant foreign literature mainly analyzes how to use software techniques to realize the drawing techniques of low-poly style works. The famous foreign low-poly animation short film "Poly World" uses low-poly style to vividly draw the image of animals and natural landscapes. In addition, there are relatively more design tutorials on low-poly style, which mainly take animals, plants, buildings and vehicles as prototypes, grasp the basic features of low-poly style, and make use of computer software to make block modeling, so as to generate low-poly style images. In addition to the sharing of some model illustrations and the publication of tutorials, low-poly style modeling is also widely used in various fields. By searching for the keyword "low-poly", the author found 27 papers related to low-poly in the domestic academic journals, including 13 master's and doctoral dissertations and 14 journal papers. Among them, 37% of the total are in the field of computer software and computer applications in the field of "information science and technology", 7% in the field of "engineering science and technology", and 56% in the field of "philosophy and humanities".

The thesis takes low-poly style as the main research object, explores the origin, characteristics and application of the style in various fields, and summarizes and analyzes the design language expressed by the style. Through understanding the characteristics of conceptual clothing design and analyzing its current situation, we explore the possibility of collision and fusion between low-poly style and conceptual clothing design, so that the clothing can be presented in more novel forms. In the design practice, we try to use this style in the design of clothing styles, clothing structures and apparel, so as to carry out experimental thinking on the innovation of conceptual clothing under the cross-border thinking mode.

II. low-poly style and conceptual clothing design overview

Formation and development of low-poly style

"Low-poly" (low polygon) is originally a term in 3D software modeling, which is a low-precision model with a relatively small number of polygons. Low polygon and polygon modeling is a way of computer three-dimensional modeling, which is mainly composed of three elements: point, line and surface, through three or more

line segments to form a closed figure, so as to form a surface. The entire low-polygon model is composed of relatively few closed triangles or quadrangles, resulting in a simple, abstract shape. The images that do not form a closed state or have curves in the process of connection cannot be called polygonal surfaces in low-poly modeling. Low-poly was originally produced along with real-time rendering in 3D games. When designers model 3D objects in games, the more polygonal images are used, the more realistic the final rendering effect will be. That is to say, in polygon modeling, the more polygons formed, the clearer the object rendered, and the less polygons formed, the blurrier the object rendered and the lower the accuracy. The number of faces determines the sharpness of a three-dimensional object.

The formation of low-poly modeling is also related to the graphics processing ability of the computer, the lower the graphics processing ability of the computer, the number of model surfaces rendered is relatively small. In the 1990s, because the technology at that time was relatively backward, the computer's graphics processing ability was relatively weak. In order to ensure the fluency of the game, game developers could only reduce the clarity of the picture and use low-poly modeling. For example, the classic game "Super Mario World" known to the public in the 1990s, in order to ensure the fluency of the game, the Mario character modeling is obviously low-poly modeling.

With the development of the era of science and technology, the increasing perfection of computer accessories and the increasing maturity of technology, the way of modeling has also been more improved. The term "low-poly" was first proposed in the game industry in the 1980s and 1990s. Due to the limited computer technology, designers had to reduce the resolution of the game screen in order to ensure the fluency of the game process when designing games, that is, to reduce the number of polygon blocks during polygon modeling. With the development of The Times, the progress of science and technology, computer technology has been improved, and the clarity of the game scene has been higher guaranteed.

Conceptual clothing design

Conceptual fashion design is the designer's unique view of the design theme to form a personalized creative concept, with the help of clothing to conceptualize and sublimate the design theme. The basic feature of conceptual fashion design is that designers have a high grasp of the originality of their works and fully integrate their own design ideas into the clothing, thus expressing different ideas. In addition, designers constantly get new ideas and new inspirations during the experiment process, and finally break through the thinking set to realize the translation of concepts and ideas. Professor Lu Min's "Conceptual Clothing Design" mentioned: "From a broad point of view, conceptual clothing has no specific design target group, it is different from other types of clothing, it is not necessary to consider when and where the clothing will be worn by whom; From a narrow point of view, the purpose of conceptual clothing is to convey the free concept of designers, to break traditional design concepts without breaking away from the basic form of clothing, so as to highlight the unique design ideas of designers." Conceptual fashion design means that designers break through the limitations of traditional fashion design thinking and use novel and avant-garde design thinking to create more possibilities for clothing styles, shapes, materials and other aspects. It shows creativity in a new way, launches free design creation, integrates perceptual thoughts into the design, breaks through the thinking pattern, and makes the fashion design show more spirituality. Unlike the general ready-to-wear design, it does not need to consider the commercial value, production costs, process standards, the practicality of the clothing itself and consumer preferences, the designer fully releases himself, puts aside all restrictive factors, perhaps a sudden flash of inspiration, quickly made clothing, fully expresses the artistic appreciation, reflects the designer's emotions and stories.

The main purpose of conceptual fashion design is to use innovative ideas and methods to break through traditional thinking patterns, and use clothing as a medium to express the designer's personal concepts and emotions, and to reflect a series of thoughts and concepts of today's society and ideas and exploration of the future. Its positioning and form of expression are different from ordinary clothing, ordinary clothing mainly reflects its functionality and practicality, and is designed for different ages, different seasons, different professions and other factors. The conceptual fashion design mainly reflects the designer's reflection of the creation theme, the experiment and application of clothing materials, the uniqueness of the production method and the originality of personal thought. Conceptual fashion design can be expressed in various forms, and its conceptuality can be expressed in thematic design and creation. Designers can express the inspiration source of the theme, such as the pattern related to the theme or personal understanding and emotion of the theme, in the design of clothing style and silhouette when carrying out conceptual fashion design. It can also be reflected in the structural design of clothing, clothing structure design is mainly based on the human curve and the sense of space between the clothing to create, can be fit with each other, can also be left a lot of space, but the main theme is the interaction between the human body and clothing. The conceptual design of clothing is reflected in the structural design, which breaks the traditional structural design of clothing and creates several figurative shapes or abstract irregular shapes, so as to show the conceptual design of clothing in the structural design. In addition, [1] the concept of clothing can also be expressed in clothing materials, and experiments on various materials can be combined with each other to

create more possibilities for collision. It can also be the incorporation of conventional non-wearable materials into clothing to innovate, so as to express the concept of clothing. There are many forms of conceptual clothing design, in a word, whether it is from the shape, structure, material performance, is the embodiment of innovative design principles.

the development status of conceptual fashion design

Since the primitive society, people will use a variety of materials to cover the body, from the use of plant branches and leaves to animal fur, and then to the weaving of textile fabrics, etc., people make clothing to ensure its functionality at the same time, style, color, materials are constantly evolving and updating. According to the development of society, different times have their own typical clothing, and people living in different social classes have different clothes. With the liberation of people's bodies and minds, the forms of clothing display are diversified. All kinds of clothing with unique shapes and novel styles have appeared in major shows one after another, and people's designs have become relatively bold and free. Conceptual clothing gradually enters people's lives on this basis, and with its bold, novel and unique creativity, people have more interpretation of fashion. It also enables consumers to understand that clothing is not only used to show its functionality, but also reflects the designer's design thoughts and emotions.

In the 19th century, European women wrapped their corsets for beauty. With the popularity of various social activities in Europe, foreign women strongly demanded the reform of clothing. Paul Boillette, the world's first fashion designer, overthrew the shackles of corsets on women and abandoned traditional clothing design principles such as excessive emphasis on the buttocks and breasts, so that women's bodies can be liberated to show their natural beauty. Then a lot of fashion designers emerged, and everyone was able to express themselves.

With China's reform and opening up, the famous French designer Pierre Cardin introduced foreign popular clothing to China, and then he integrated the cornices of classical Chinese architecture into the design of the shoulder, making the clothing not only realize its functionality, but also show Chinese characteristics, so that gradually opened the eyes of the Chinese people. Later, with the continuous development of China's economy, politics and culture, as well as the appreciation and learning of excellent foreign clothing works, conceptual clothing design gradually appeared in Chinese shows, and a large number of excellent designers emerged. Some designers conceptualized clothing shapes, materials and structures, thereby creating a series of avant-garde and fashionable conceptual clothing.

III. low-poly style of artistic expression and aesthetic characteristics

low-poly style has its unique artistic expression and aesthetic characteristics. From the perspective of modeling, its most typical feature is the construction of natural geometry. low-poly style images or products are composed of triangles or quadrilateral surfaces to form a three-dimensional geometric picture. It is a design art style that can show both retro feelings and future trends. It forms a block-oriented visual effect through points, lines and surfaces, which is abstract and vivid. It uses the arrangement of order to abstractly reflect the image of objective things, forms a certain sense of space through the construction of geometric blocks and surfaces, and combines various objects to form small scenes to reflect its unity. Nowadays, with the rapid development of science and technology, designers pursue lifelike visual effects without limit, and some even achieve the state of "fake and fake". low-poly style is exactly the opposite. Along with the popularity of flat art style, it presents the public with another new artistic style that is different from the skeuomorphic design style.

The typical features of low-poly style use triangular, quadrilateral and other geometric blocks to construct the shape of objects. The aesthetic feature of its expression lies in the orderly arrangement of each individual geometric block, so that the whole body of the work is clean and neat. In low-poly style, each geometric block formed by a straight line is used as a unit, with different colors, different areas and different textures, so as to carry out repeated, regular and directional arrangement. This arrangement seems to have no rules to follow, but in fact, it must be consistent with the objective facts of the existence of objects. The characteristics of the image of the object, the color and the light source in the environment should be studied. low-poly style has the characteristics of rational layout effect and order arrangement, which fully reflects the rational thinking of designers for objective things under the background of rapid development of science and technology. In the painting of natural things in the low-poly style, the shapes of trees and stones are presented in the images. The designer constructs the trees and stones in geometric blocks, and arranges each object in an orderly manner by using geometric blocks. Although the characteristics of objects are different from those of natural objects, the image of objects in the low-poly style still has a high recognition. In this image, the designer also depicted the same objects in different forms, presented the perspective principle of near large and far small, and cleverly expressed the occlusion relationship between objects by using geometric blocks. The whole picture showed a harmonious natural world, although it was not a true portrayal of nature. However, by presenting the natural landscape in this way, the visual experience is flexible and fresh.

Purely abstract images of objects

From the perspective of image content and elements, low-poly style abstracts and conceptualizes objects in a comprehensive way. In the early stage, most low-poly style image works choose to depict animals, plants, landscapes and other themes in nature, and then expand the materials, involving characters and materials of their own associations. low-poly style is good at abstracting concrete objects and simply summarizing complex objects. The geometric blocks with different area, color and distribution are used to generalize the concrete complex objects, thus forming a simple, pure and abstract object image. [2]low-poly style is between skeuomorphism and flat style. Skeuomorphism pursues infinite imitation of objects to express the real world, while flat style is symbolic expression of objects to express abstract elements. In low-poly style, the image of objects is depicted in a simple and abstract form by the designer. In the design process, objective analysis and rational opinions of things are incorporated, so that the works not only contain interest and appreciation, but also possess rational thinking and objective reality. low-poly style gets rid of the style characteristics of skeuomorphism and flatness, and skeuomorphism design mainly conveys realistic visual effects through the designer's exquisite depiction of objective things, so as to try to restore things. Flat design, on the other hand, abandons complex design forms and excessive decorative effects. It respects the design concept of "less is more", and most of the works formed use minimalist features to shape things. The form of objects in low-poly style is constructed in an orderly manner through geometric blocks. It is not a realistic skeuomorphic design method, and it is different from the intention expressed in minimalist flat design. Instead, it generalizes purely abstract objective images of things with its own unique features.

The expression of objects in low-poly style is in line with the objective fact that things exist in nature, and the basic form of objects is abstracted. Although it is different from quasi-real things, objects in low-poly style are still easy to identify. In the low-poly style, the local depiction of the natural landscape, the block processing of the natural landscape, such as terraces, houses, trees, sun, clouds and other objects, and the three-dimensional modeling sense, these objects are in line with the characteristics of their objective reality. [3] The low-poly style in the digital art style is purely abstract in shaping the image of objective objects, which not only gets rid of the public's aesthetic fatigue of the image of the simulated object, but also gives the viewer rich imagination space.

Clear and bright colors and shadows

From the perspective of image color and light and shadow, low-poly style uses geometry as an element to convey visual information. Each polygon surface is a cell, and each cell is endowed with color. In the color matching of the object, the main color is matched with the auxiliary color, and the overall color is mainly used in the neighboring color, and the brightness of each color block attached to the object is adjusted to create a sense of volume. The shadows generated by the objects are expressed using polygonal surfaces and given color to express the sense of space. low-poly style works generally use softer light and shadow, and clearly express the color and material of objects through the arrangement and combination of color blocks with different brightness and purity.

Objects in low-poly style are abstract and personalized works formed by the designer after summarizing and summarizing the characteristics of the objects to be depicted and combining the design language of this style. Visually, the combination of different colors on the geometric block surface conveys a lively sense of rhythm, making people feel a relaxed and soothing design method under the background of today's era of a large number of data information. Works in low-poly style need to segment a certain object in blocks and then use different colors to distinguish. A color represents a part of the work. In low-poly style, the colors are mostly the same color system to distinguish different brightness and purity, so as to achieve gradual, progressive and transitional color effects. The initial low-poly style picture uses some bright colors to emphasize the characteristics of its block sense. As the style continues to evolve and update, many designers try to use color blocks with similar colors and different transparency to present the shape of objects.

low-poly style objects are mostly constructed with polygon blocks of neighboring colors or similar colors, showing geometric blocks and rich color effects. The shadow formed by the object under the irradiation of the light source, using the same color or gradient color characterization, the image as a whole full color, rich changes. As a low-poly style illustration, the image depicts a landscape in nature, including buildings, water, mountains, clouds and other elements. The overall color collocation is harmonious and has a sense of rhythm. The light and dark relationship of the object is expressed through the neighboring colors and similar colors, and the transparent texture of the water surface is expressed through the polygon of different colors. The whole picture integrates color with light and shadow, and uses polygon surface to express the texture of objects, but it can present low-poly style abstraction. Through the continuous continuation of the style, designers fill the polygon surface with texture, so as to form a different effect of the ground with texture materials collage, and the visual effect of the tree contrast, making the picture more rich.

IV. The application status of low-poly style and its design language analysis

The term "low-poly" appeared in the early game design. Due to the pressure of computer technology, designers had to reduce the clarity of the picture in order to make the game run smoothly, so as to use "low-poly" modeling. These days, people are accustomed to modern high-definition, high-flow games. Under the influence of retro fashion trends, designers evolved the early modeling method into a retro style, using polygon surfaces to form new game scenes and characters. At present, low-poly style has gradually penetrated into people's life. There are relatively mature works in animation design, product design, graphic design and other major design fields. Such works are mainly characterized by simplicity and abstraction, and they are also popular products for consumers.

low-poly style has been fully used in the animation design industry. Its main purpose is to create the atmosphere of the whole animation. Simple, abstract and block-oriented visual effects are more interesting than traditional animation forms. low-poly style originates from the most original way of game modeling, animation design is an essential part of the game. Low-poly style animation design has a strong recognition on the whole, the picture is simple and beautiful, and the production process of low-poly style animation is relatively simple, and the production cost is relatively low. At present, low-poly style animation design is mainly based on commercial propaganda animation and experimental animation short films. The innovation of low-poly style in animation design is mainly reflected in the construction of the overall effect. The whole interface uses geometric blocks to form a picture with simple shape, bright colors and clear light source, which has a certain unity.

low-poly style design language analysis

This paper analyzes the application status of low-poly style in various fields, finds out the commonalities and thought points between the application of low-poly style in various design fields, and summarizes the design language of Low-poly style. It is mainly the aesthetic transformation from figurative to abstract, the conceptual visual experience, the embodiment of digital "virtual reality", the integration of multiple artistic styles, and the aesthetic transformation from figurative to abstract. When people interpret works of art, they usually use words such as "concrete" and "abstract" to describe their visual morphological characteristics. As an adjective in the field of art, "concrete" means concrete, clear, can be seen or felt the real, existing form. Most of the content of figurative art works is objective, which can be a true portrayal of nature, or an objective modeling of their own imaginary things. They can clearly express the shape, color and characteristics of objects, and are the beginning of the display of art forms

"Abstract" has the opposite meaning to "concrete". "Abstract" literally refers to the observation and solution of problems in isolation from reality, while in philosophical category it refers to the process and method in which the provisions, attributes and relations of things are extracted from the complex whole. The "abstract" meaning in works of art refers to the negation of concrete forms of creation and images of things. The expression form of abstract art is to break the conventional mature things in nature, liberate from the inherent form of objects, and pay attention to the subjective thoughts of people. For example, in Salvador Dali's work "The Eternity of Memory", the author abstracts concrete objects and paints the original clock shape into a soft and flowing state, so as to show the crazy passage of time and express the author's personal emotions. The second is to completely abandon the characteristics of things in nature and use color or form to show beauty. For example, Kandinsky completely uses the picture composed of points, lines and surfaces to form abstract works. Such works have different understanding and are relatively interesting for different people.

V. Analysis of the possibility of low-poly style in fashion design

low-poly style is good at abstract expression of concrete things. At present, the creative industry has gradually penetrated into People's Daily life, subtly affecting people's aesthetic taste and making people's desire to express themselves more intense. Therefore, simple and direct expression of visual effects is particularly important. In this context, thematic design stands out, low-poly style can become a new fashion design language, with a certain object or event as the inspiration theme, the use of its pattern pure geometric features and soft light and color effects to interpret figurative things, from the pattern to express the theme and concept of a series of clothing. Its form of expression can be the expression of things in the plane like an illustration, or it can get rid of the bondage of plane patterns, transform them into three-dimensional space, use geometric blocks to create spatial devices, and integrate them into clothing design, so as to present three-dimensional spatial concept clothing. low-poly style originally mimics the geometric block planar graphics formed in the immature state of early computer modeling in game design. The patterns of this style have abstract, simple and pure visual effects and can trigger people's inner nostalgic and retro emotions. At present, digital art is developing rapidly, and people have experienced generation after generation of technological innovation, forming a certain visual fatigue for "absolutely realistic" images, and thus began to pursue simple and abstract visual effects.

Implementation method: clothing form generation

The way of clothing generation is a particularly important step in the process of clothing design to production, which is a key step to reflect the designer's inspiration source, design scheme and expression of ideas. Designers need to grasp the generation of clothing form, in order to make clothes better display. When thinking about the transformation of low-poly style into clothing, it is particularly important to find suitable means to express the style in clothing. The three-dimensional shape presented by the paper folding art has some similarities with the characteristics of this style; The basic feature of low-poly style is mainly block surface, and the use of non-wearable materials can express the sense of bulk better than traditional fabrics; In addition, in the processing of details, you can use lines to build polygonal surfaces. Explore the way of presentation in line with this style, as a theoretical basis for later practice.

Emotional expression: Conveying nostalgia and retro

Under the social background of modern industrialization and information technology, human nature has become more and more indifferent, products have become more and more mechanized, and there is a lack of emotional revelation. In the era of the popularization of science and technology and intelligence, people's thinking is too rational, and the lack of emotion, such as the closed working and learning environment and the convenience brought by the diversification of communication media, can not express the accumulated squeezed emotions. At this time, emotional expression and emotional appeal in design and creation became more and more important, which became the focus of more artists to express in their works.

Works under the influence of low-poly style, because they come from the low-precision pictures formed by the immature computer technology in the past, can make people feel nostalgic when watching, and can evoke a series of associations, so as to generate communication and form emotional resonance to a certain extent. The features of low-poly style geometric blocks remind people of the tangram pieces they played when they were young, but the tangram pieces at that time could only be stacked to form flat graphics, while the current low-poly style works can be processed by computers to stack geometric blocks to form three-dimensional images. The nostalgic and retro emotions are well combined with the current science and technology, so that people can feel the emotion of the work while feeling the welfare brought by science and technology. Nowadays, in the era of technology and information technology, people's way of thinking is gradually becoming more and more rational. Many digital artists pay more attention to the expression of high-precision images and fluency in their creation. However, more and more such works cause people to have certain visual fatigue. So that the public does not leave an impression on such works. The use of low-poly style elements in clothing design enables people to feel the use of retro elements and the embodiment of retro feelings more intuitively. Clothing works under the influence of low-poly style, combined with nostalgic and retro emotional expression and modern abstract aesthetic way, can make the public have associations or form stories in their minds when viewing, so as to leave an impression on the works and form memories to a certain extent.

VI. CONCLUSION

With the rapid development of economy, culture and Internet technology, the public's access to various information is becoming more and more convenient, which makes the fashion trend of various industries constantly updated and iterated, and the clothing industry is no exception. Fashion designers are constantly trying and exploring new fashion styles, and getting rid of traditional fashion design methods, and conducting cross-boundary experimental research with other design industries. By exploring low-poly style, this paper makes an in-depth exploration and analysis of this style.

The following conclusions are drawn:

(1) The style and clothing in this kind of digital media industry cross over, stepping out of the basic characteristics of the original "virtual reality" of the style, and presenting it in three-dimensional and pattern ways with the help of materials.

(2) Practical innovation should be carried out on the basis of theoretical research, so as to provide more cases for cross-border experiments between the garment industry and other industries, enrich the public's aesthetic vision, and make more novel fashion design methods recognized by the public.

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