

Research on the Application of Geometric Form Composition in Contemporary Design

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Abstract: In this paper, the geometric form used in indoor space is taken as the object of study, and the related concepts of geometric form are defined. By analyzing the semantic characteristics of three basic geometric forms: square form, circular form and triangle form, and their application and expression in indoor space, it is concluded that the simplicity and generosity of square form can increase the sense of volume and hierarchy for space. Circular state has its own characteristics of integrity and harmony, which can be used in indoor space to soften the space. The lively and jumping characteristics of triangle form play an active role in interior space as decorative elements. For the research and application of geometric shape in 3D animation modelling, it greatly increases the level of 3D animation modelling design, expands the jumping thinking in 3D animation modelling design, and makes the research of 3D animation modelling design more in-depth and more artistic appeal.

1. Introduction

We often think that the word "form" is more about the appearance and attitude of the object given shape. Nowadays, the conceptual study of "form" in design tends to understand the functions and States expressed by the relationship between visual elements or structures of objects. The popular understanding of the word "shape" refers to the shape of an object and the way people look at it [1]. Shape refers to the recognition of the shape of the object, and manner refers to the psychological feeling of the person to the shape of the object. Morphology is a natural feature in natural space and a comprehensive state of nature in which objects change time, place and surrounding environment in nature [2-3].

Generalized understanding of form formation is the conception of changing shape. The narrow sense of understanding is to extract pure point, line, surface and body elements from the body elements to create and study [4]. Composition is an internal form based on objective natural objects, not the extraction without basis, but the correlation between them. There are many shadows in traditional art design. For example, the geometric texture on Chinese pottery, the texture on Chinese official clothes and cheongsam, furniture, paper-cut and other modelling elements are all elements [5-6]. According to the current definition of knowledge, the formation of form is a kind of composition of processing and recombination of raw materials in accordance with psychology, design and visual aesthetics [7]. The elements of form constitute the thinking process of creative

combination according to certain principles. It is a complex subject. It is necessary to design the display works of art in the whole interior design, embody the connotation and atmosphere of the space, and enhance the beauty of the space. Strengthening the visual effect of space to meet people's aesthetic requirements and show the unique temperament and connotation of space is the purpose of studying the composition of interior design form.

2. Interior Design and Plane Composition

In the process of modelling design, the plane composition is to combine the basic elements points, lines and planes on the two-dimensional plane organically and reasonably through the artistic language according to certain modelling graphics and their principles. To grasp the law of beauty and deal with the relationship between them and then deal with the characteristics of things, the key is to deal with the relationship between their elements, to create new things according to the law of formal beauty and the law of composition, and to cultivate and improve people's artistic creativity and thinking ability [8]. These elements can be widely used in all areas of the art field. For example, the early decoration of porcelain, the facade decoration of architecture and the wall decoration of interior space, etc., are the wide application of plane composition, which enriches the life of modern society and makes it more colorful [9].

People's analysis of beauty can be divided into two categories: one is the beauty of order, the other is the beauty of breaking the conventional order. From the point of view of composition, the beauty of order is mainly expressed by strong sense of rhythm and rhythm, such as repetition, grouping, gradual change, approximation and launching [10]. To shape the beauty of breaking the conventional order, we can use a lot of special, intensive and comparative balanced forms. In the study of plane composition, there are principles of symmetry and balance, repetition in group, rhythm and rhythm, contrast and harmony, variation and unity.

2.1 Symmetry and Equilibrium

Symmetry consists of the same number and size of the same shape, is two or more objects in two-dimensional space parallel and balanced arrangement, in fact, is the simplest symmetry. Symmetry has many forms. The symmetry includes the symmetry of the upper, lower and left sides with the center as the datum, and the symmetry of the circle with the symmetry point as the center, as shown in Figure 1(a).

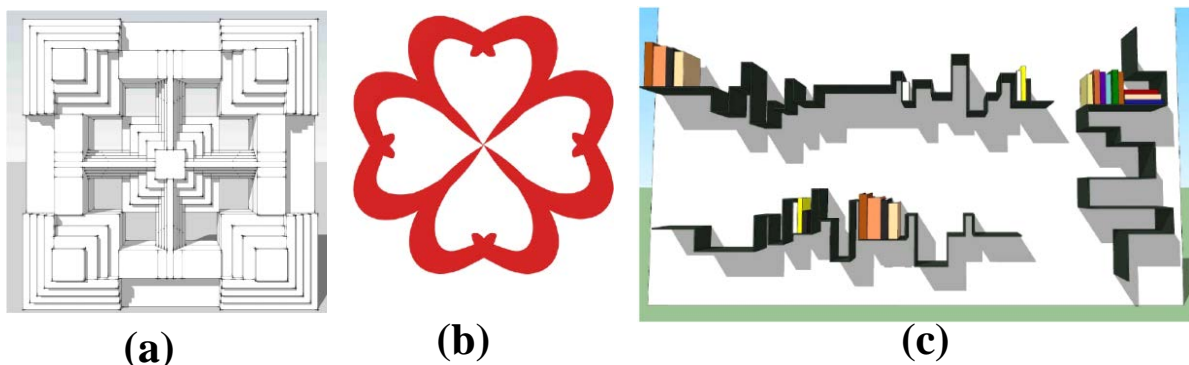


Figure 1 Geometric effect

2.2 Repetition and group

In the natural environment, it is not difficult to find that any growth and development of similar

things have a regular aesthetic feeling. In the designer's eyes, this aesthetic sense of order is a kind of image with continuous links, which is formed by the repeated arrangement of graphic symbols with similar shapes. Grouping is a special form of repetition of basic shapes, as shown in Figure 1(b).

2.3 Rhymes and rhythms

Rhythm is the arrangement and combination according to a certain order, forming a sense of momentum, which has the same spacing continuous change: larger, smaller, longer, shorter, brighter and darker arrangement formed. The rhythm is a kind of mood that makes the rhythm of music more vigorous, strong and weak sense of fluctuation, the change of cadence and setback, and endows the rhythm. The form of rhythm has repetition, gradual increase and inhibit. It can also transfer people's sight from one place to another uncontrollably. The principle of rhythm is to produce unity, as shown in Figure 1(c).

3. Design Embodiment of Geometric Form in Interior Space

With the rapid development of social economy, people are pursuing a higher level of life and pleasant and comfortable home environment, and a variety of home styles have emerged as the times require. This paper briefly analyses the application of the three representative geometric forms of square, circle and triangle in indoor space from the traditional Chinese style, modern style and idyllic style.

The interior space of Chinese style pays attention to the sense of hierarchy. In Chinese style, square is used to divide the space, and the combination of square form and circular form can be used to show the sense of hierarchy and order of Chinese interior space [11]. In modern style, straight lines and squares are used to express the functional beauty of residential space, abandoning redundant interior decoration, following the characteristics of materials themselves, the whole residential space looks simple but not monotonous; the decorative elements of pastoral style residential space are circular and arc. Arbitrary iron art lines, wooden frames and geometric forms are combined to create a simple and elegant space atmosphere.

3.1 Design and Application of Square Form

The four sides of a square are perpendicular and parallel to each other. Rectangles and squares are collectively called squares. From the shape, we can see that the square is calm, solemn and atmospheric. Compared with other geometric forms, square forms are more used in residential space. In interior space design, square shape is mainly reflected in the interface and display of interior space.

Space interface design includes roof part, wall part and ground part. This paper mainly explains the top interface design. The application of square shape in roof modeling can optimize the roof space and increase the level of ceiling. The size, length and width, thickness and fineness of square shape also affect the top space to a certain extent. For example, the use of simple and clear square lines in the roof will make the whole space rich in layers and modern concise fashion sense; the use of complex and dense square lines in the roof will change the style presented in the space. In interior space design, square shape is simple and generous. Successful use of this geometric shape element can help shape and improve the interior space.

In the space interface design, the ceiling is decorated with simple and clear square lines. The top space is rich in shape, which enhances the sense of spatial hierarchy and makes the space simple but not monotonous. The whole space presents a sense of modernity, as shown in Figure 2 (a).

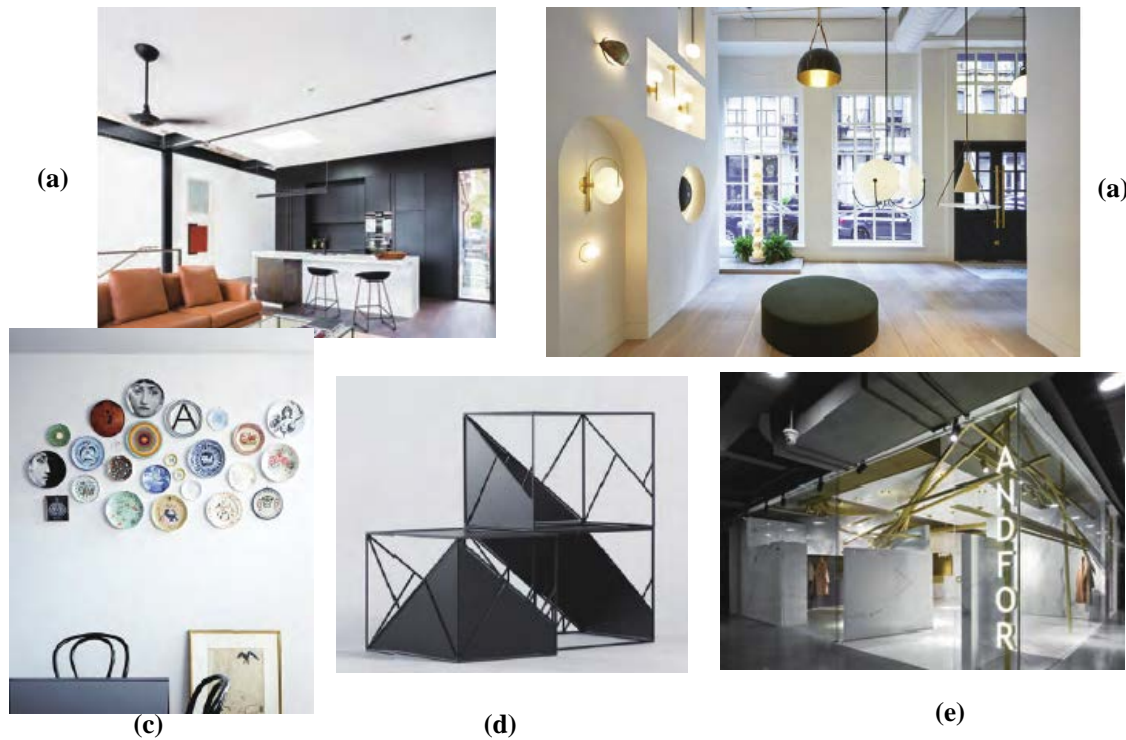


Figure 2 Art design effect integrating geometric form

Square shape also plays an important role in the interface design of interior wall. The wall interface uses the shape to add the sense of order and interest of the wall, and also activates the interior wall interface space. The interior wall is decorated in square form, and the whole wall becomes more interesting and rich, and is no longer a monotonous ceramic tile wall.

3.2 Design and Application of Circular Form

There are two kinds of circles in a circle: a regular circle and an arc circle. Orthodox circle is widely used in indoor space. In the interior interface design, the horizontal round ceiling is soft and elegant, which alleviates the hard and cold feeling brought by the straight line of the original indoor building. In the wall interface design, circular shape can enrich the wall interface and add a little fun to the interior space. In the interior space interface design, designers often use overlapping method and mosaic method to use circular geometry shape in modern residential space design.

The use of circular geometry can weaken the contrast of indoor space. Make bedroom space both personality and relaxation, create a complete feeling space as a whole. Curved surface is actually some curved surface, which is irregular, asymmetric and random, as shown in Figure 2 (b).

These regular curves and circles can embellish the space in the indoor space. The application of the active atmosphere circular form in the children's room can bring a light and pleasant atmosphere, which conforms to the characteristics of children's lively and active personality and helps children grow up happier and healthier in childhood, , as shown in Figure 2 (c).

3.3 Design and Application of Triangle Form

Geometric forms in indoor space have different characteristics and differences. For example, the square shape is steady and square; the round shape is perfect and friendly; and the triangle shape is full of randomness. Therefore, in interior space design, triangle shape is used in more novel and bold design.

In indoor space, the geometric shape of triangle is changeable in indoor top surface modeling. By changing the angle size and the length of edge, triangle can be changed into a variety of triangular geometric shapes, such as isosceles triangle, right triangle and so on. In the top design, these triangles can often be combined to form a sense of opposition between the top and the wall, so that the whole space is full of a sense of expansion and strength to break through the limitations. The monotonous and rigid space is becoming much brighter.

The triangle shape is successfully used in the ceiling design of clothing stores. The triangle ceiling design of clothing stores makes the whole space active and dynamic. The triangular strips are arranged in the original blank space, which is drab and tedious and full of warmth, as shown in Figure 2 (d) and (e).

4. Research on 3D Animation Modeling Design Based on Geometric Form

4.1 Geometric Shape Elements of 3D Animation Modeling

Geometric shape elements in 3D animation modeling design mainly include points, lines, surfaces, bodies and spaces. These geometric shapes are also the basic elements of 3D animation modeling. They all have different modeling characteristics and application methods. The change of 3D animation modeling is also the result of the collocation and location change of geometric shape elements.

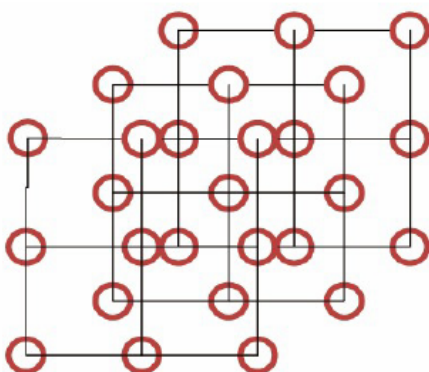


Figure 3 Point-to-Point diagram of geometric shape elements in 3D animation modeling

In 3D animation modelling design, point is the visual unit that can best express the spatial position of objects. Point characterization has the expressive characteristics of expressing spatial position and cohesive realization in 3D animation modelling design. It is also the smallest experiential visual unit. It is called "element" in 3D animation modelling design. Therefore, in 3D animation modelling design, the concept of point element is very relative. Like other body elements, it must have some background foil or related clues, so as to reflect the basic nature of "point" elements. In 3D animation modelling design, point elements are usually used to express emphasis and tension rhythm, as shown in Figure 3.

The trajectory of point elements forms line elements. In general concepts, line only has length and orientation. However, in 3D animation modeling design, line elements are in fact "bodies" with different proportions of length, width and thickness. It has been endowed with the characteristics of "bodies" in 3D animation modeling design. Line element is the outline of the state, which can express and modify the basic characteristics of deformation. Line is also the decomposition of shape and shape. In 3D animation modeling design, there are many hidden and technically processed lines, which can not directly express the characteristics of line elements, but show the shape of other elements, but are the characteristics of line.

Surface element is one of the basic elements of geometric shape in 3D animation modeling design, as is line element. In 3D animation modeling design, different combination forms of surface elements can form a ever-changing three-dimensional space form. At the same time, surface elements are easy to be affected by point elements and line elements. Point elements can embellish the space position of the opposite elements, line elements can divide the position and time of the opposite elements, and surface elements can also reflect their own advantages by point elements and line elements, which usually have more visual impact than point elements and line elements.

The function of point, line and surface in 3D animation modeling design is determined by the relationship between them and the degree of agglomeration. Elements and elements can produce new 3D animation modeling form through arrangement, agglomeration, parallel, interchange and connection. Surface elements can be divided into conventional surface and unconventional surface from their own morphology. Conventional surface elements have three basic types: conventional circle, conventional square and conventional triangle. From basic types, many derived shapes such as rectangle, polygon and ellipse have the basic characteristics of conventional surface elements, as shown in Figure 4.

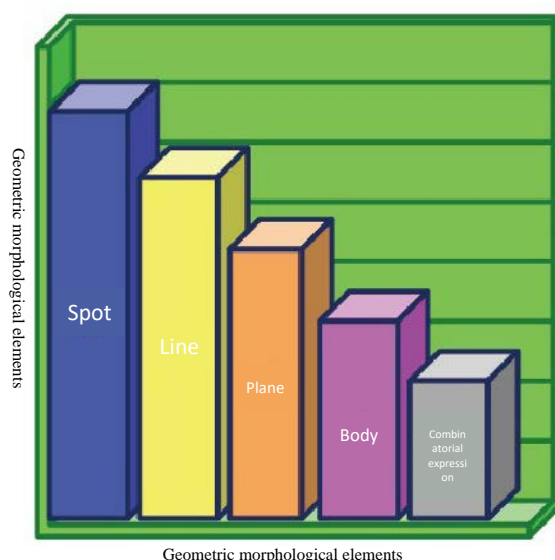


Figure 4 Geometric shape relations of 3D animation modeling

4.2 3D Animation Modeling and Geometric Shape Function

3D animation modelling is to consider the rationality of the design and application of 3D animation modelling, at the same time to create perfect modelling and refined application, put other elements in a relatively minor consideration position, find a balance point in aesthetic modelling and application form, and integrate aesthetic form and application function. One of the basic characteristics of 3D animation modelling is based on the form expression. Therefore, the design of 3D animation modelling should take full account of the presentation effect of the form expression. The basic elements of geometry form supplement the dynamic singularity of 3D animation modelling with unique dynamic changes, which greatly meets the design requirements and concepts of 3D animation designers. In summary, the overall use of geometric modeling elements in 3D animation modeling can better present aesthetic concepts, modify contours, highlight characteristics and applications.

Different geometric shapes in 3D animation modeling can bring different emotional impact. For example, symmetrical patterns or regular rectangles show space rigor, which is conducive to

highlighting the quiet, elegant and solemn atmosphere in 3D animation modeling design. Routine circle and ellipse embody the sense of tolerance, and create a happy and happy atmosphere in 3D animation modeling design. The use of free curve dynamic modelling in 3D animation modelling design can reflect a warm, festive and mild atmosphere. The most eye-catching thing in 3D animation modelling design is free curve. The perfect degree of free curve is more emphatic and more active. The created space has rhythm and rhythm beauty, as shown in Figure 5.

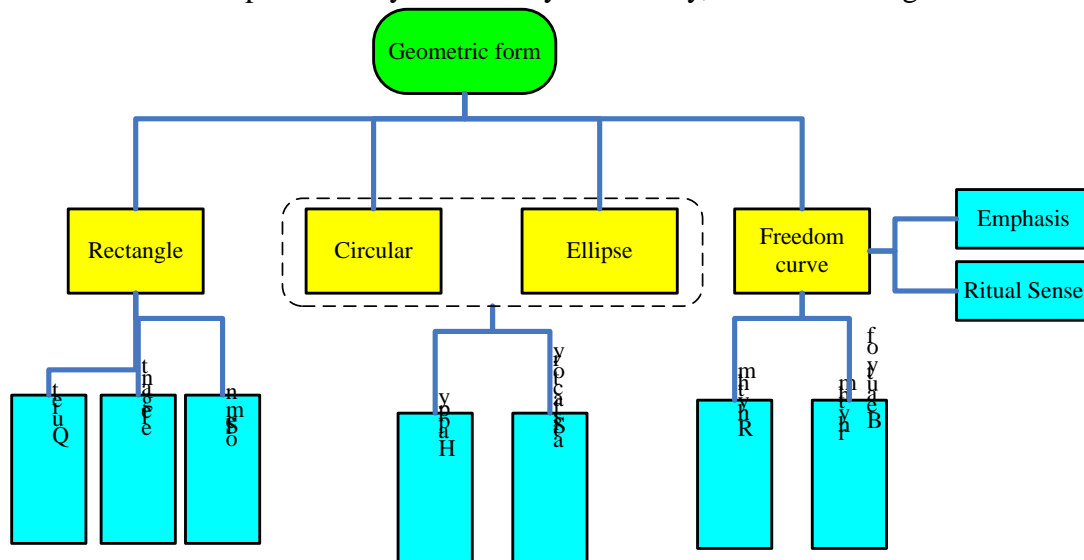


Figure 5 Strong emotional characteristics of geometric form

5. Conclusions

Interior design shows the overall artistry through partial design, strengthens the integrity of interior design, and optimizes the interior environment style. In the interior space design, we should consider the shape design according to the actual factors such as space, synthesize humanistic emotion, strengthen the application of form construction and interior design, and improve the level and artistic sense of interior design as a whole. Morphological structure plays an important role in interior design, especially now people pay more attention to the aesthetic and comfortable feeling of design. With the rapid development of social economy and culture, it is necessary for designers now and in the future to continue to develop the principle of form composition, and use this principle to create new and better designs.

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