Analysis of the Differences in the Presentation Forms of Artistic Design Based on Computer and Hand Drawing

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Abstract. With the high popularity and extensive application of computers, computer renderings can meet the market demand and conform to the development trend of the times. Hence, they are so widely used in the design market for communication that designers may ignore the existence of hand-drawn renderings to some extent. However, after several years of vigorous development, when we began to review the renderings in the design calmly, we found they have their respective strengths and weaknesses. Neither should be ignored, but they should be combined instead. Computer drawing has accounted for an increasing proportion of the design field. However, hand-drawing still has its irreplaceable features. Based on their respective features and design process, the differences in the forms of presentation between hand drawing and computer drawing can be reasonably analyzed to fully exert their respective roles.

Keywords: Design, Computer Drawing, Hand Drawing, Presentation Form, Analysis of Differences

1. Introduction
With the rapid progress of information technology, more and more computer technology has been integrated into the design industry. Its development speed has become more remarkable in China[1-3]. Up to now, it has almost reached the point where customers only recognize computer renderings, and the territory of hand drawing is becoming smaller and smaller. But in the recent period, hand-drawn has the trend of rising again, and various hand-drawn training camps are emerging[4-6]. Then there is the dispute between hand drawing and computer drawing. However, according to the viewpoint of dialectics, they should complement each other. Let's analyze their relationship from the design perspective.

2. Expression means of design
From the effect perspective, both of them also have their own features. Because of the use of the actual indoor space data, the walls, roofs, floors, and furnishings are attached to their corresponding materials, and the simulation of light and sunshine makes them render the drawings according to the way of heat transfer, and the computer graphics can be more intuitively displayed in front of the client. It can change the camera angle, range, size to make the view have multiple perspectives, and even to let the
client feel the change of space and time in the way of animation. As Li Xianjue said, “in the mid-1990s, we began to develop the” virtual reality “system, input human data into the computer model, so that people can feel the effect they want to see freely in space to further shorten the gap between the imagination and the real scene.” However, the hand-drawn effect picture is not good in this respect, once it is painted on paper, it is not easy to change. Let alone change its space to cater to people’s experience. So the computer can reflect the actual space situation objectively, but it is too rigid because of its rationality and lack of artistic value. Hand-drawn renderings not only express the space design but also show the designer’s aesthetic ideal, personal quality, and inspiration in the process of hand drawing. It makes the performance more artistic, such as the contrast between the virtual and the real, the change of strokes, and the vivid form. At this time, it is not only a drawing to elaborate the designer’s idea, but also a flexible and diverse art work with charm, which can be appreciated, tasted, and collected by people.

Before the concept of design appeared, the hand-drawn design has appeared, and it has been continued until now, still adopted by many designers. Until nearly half a century, computer-aided design has replaced hand-drawn. Whether hand drawing or computer drawing, in essence, they are a way of expression. The real design art is the final product. From the perspective of expression, there are only appropriate, inappropiate, or more appropriate problems, rather than distinguishing the advantages and disadvantages. Their purposes are the same, i.e., means of visual communication. The difference lies in that they are just different means. We should adopt an open attitude, accepting new things and inheriting traditions. What we should do is to analyze the differences in the forms of expression, so that the traditional and modern means can play the largest role and better serve the design.

Given the sample data set, \( D = \{x_1, x_2, ..., x_n\} \), \( x_i \in R^d \), \( i = 1, ..., n \). Before assumption1 samples are labeled as \( \varepsilon = (x_1, x_2, ..., x_n) \), the corresponding label \( \eta = \{y_1, y_2, ..., y_n\} \).

The significance of each feature dimension in the classification problem is different. The environmental art design data can overcome the shortcoming that the environmental art design data treat each feature dimension equally to some extent. Its definition is as follows:

Sample \( x_i \) and \( x_j \) the environmental art design data between is defined as

\[
d_i(x_i, x_j) = \sqrt{(x_i - x_j)^T A (x_i - x_j)},
\]

(1)

\( x_i \in R^d \), \( A \in R^{d \times d} \) indicates a symmetric semi positive definite matrix.

Based on the properties of positive semidefinite matrix, \( A \) can be broken down into \( A = L^T L \), the above formula is:

\[
d_i(x_i, x_j) = \sqrt{(x_i - x_j)^T A (x_i - x_j)}
= \sqrt{(x_i - x_j)^T L^T L (x_i - x_j)}
= \sqrt{(Lx_i - Lx_j)^T (Lx_i - Lx_j)}.
\]

(2)

It is equivalent to the matrix as a mapping, mapping the data of the original space to the new space, and transforming the environmental art design data of the original space into the environmental art design data of the new space.

3. Features of hand drawing and computer drawing

3.1. Hand drawing

Next, I will analyze the features of hand-drawn drawings and computer drawings. Only by clarifying
their advantages and disadvantages can we complete the analysis of differences in forms of expression and give full play to their respective strengths. Hand painting is born from art painting. A few sketches and masterpieces of oil painting can express the artist's emotion, but the time they take is very different. In the process of design, using the sketch to express the idea of design can quickly record the inspiration passing by. With the development of design, it takes more time to render the details. An experienced designer will choose which hand-drawn expression method to use according to the actual situation to adapt to the design task schedule.

Although hand-drawn design drawings have been separated from the category of art and painting, and formed a certain fixed technology, but after all, it is a direct reflection of the designer's ideas, in any case, it will bear the mark of the designer's painting habits. At the same time, due to the limitations of hand-drawn performance tools, it is impossible to achieve real and objective performance. Therefore, the hand-drawn design drawing focuses on conveying the verve of the design, showing the designer's design idea, vivid but not realistic. Just like the painting works have different schools, the painting materials have different textures, and the same hand-drawn design drawings show different styles and effects by using different media such as tools. Even if the same materials and techniques are used, different painting effects will be displayed. For example, the mark pen is clear and simple, while the transparent water color has a bright and harmonious picture. Therefore, the use of hand-drawn expression, can show the style and personality of the designer.

Another major feature of hand-drawn design drawings is that the requirements for drawing conditions are not high, and they are not limited by the external environment. Basically, they can be completed as long as there is pen and paper. Many of the original concepts of designers are formed on a piece of paper that is readily available. Even if it is a strict engineering drawing, it is only required to add a drawing board and t-ruler. The final rendering of color renderings is just to add another item of pigment. In order to have flexible hand drawing skills, we must have certain painting skills. First of all, the ability of modeling, not only to have a full understanding of the expression object, but also to be able to accurately express it through the way of painting. Secondly, the performance and control of structure, perspective, light and shade, and color require a certain amount of accumulation. After a long time of training, even a certain talent. Therefore, for designers, in order to be able to skillfully use the expression of hand painting, it is necessary to work hard next time.

3.2. Computer drawing
Since the first day of computer technology, it is based on its operation speed. The application of computer is through the conversion of processing objects into numbers for operation, and finally get the results. Combined with the design process, the use of computer-aided design, the size accuracy of the design object is its biggest advantage. Basically, the computer can meet the accuracy requirements of the existing design specifications, and can intuitively reflect the real space scale of the design object. Another great advantage of computer technology is virtual reality. Through applying the real material mapping, scale-space modeling, establishing a mathematical model of light propagation, combined with supercomputing power, to generate a design effect drawing that can match the real photos, the real modeling, structure, perspective relationship, material, color, light and other aspects of information can be simulated so that the third party can understand the design idea that the designer wants to express more intuitively.

Aided by computer, the designer can hand over the grasp of the picture, such as perspective relationship, picture layout, space and color relationship, which can be adjusted through repeated observation. It is not necessary to have a solid mind like hand drawing, which greatly reduces the threshold of drawing design drawings. For the design with low requirements, as a designer, as long as he has a certain understanding of the parameters of the computer design software, as long as he has a clear concept of the scale of the design object, he can make decent design drawings without too long basic training. In general, it is easier to draw by hand, and CAD drawings belong to electronic resources Once generated, the source can be copied indefinitely, preserved for a long time, and can be split and combined indefinitely, which significantly reduces the repeated work of designers when
drawing, and also reduces the time and difficulty for making design drawings. At the same time, due to the continuous progress of information technology and the continuous enrichment and improvement of various related resources, the production of CAD drawings is becoming more and more simple and exquisite.

Computer-aided design must depend on electronic information equipment and power supply. At the same time, with the development of technology, there are still problems of equipment updating. This dependence on the hardware environment is its biggest disadvantage. This limitation is very obvious in the construction site of the project, for example, when explaining the design drawings to the construction personnel temporarily, it is quite troublesome to use the computer.

4. Analysis of the differences between hand and computer drawing

Through the above analysis, we have made clear the features of hand drawing and computer drawing. According to these features, in accordance with the general design process, combined with the content and nature of the design tasks in different stages, a comprehensive analysis is made on how to give full play to their respective advantages and realize the difference analysis of organic forms of expression.

1. Data collection: understand the situations of customers, products, and industry, and identify the problems to be solved. In this stage, the drawings are basically the records of the designer's data collection and design ideas. Therefore, a quick sketch will be more suitable.

2. Preliminary design: analyze and synthesize the information collected in the previous stage, propose solutions and ideas, communicate with customers and reach an agreement. The core of this stage is creativity, which pays less attention to details, and needs to communicate with customers repeatedly and modify the design for many times, so the hand drawing which can express the designer's ideas quickly is the main part. After the basic design scheme is finalized, it can enter the design of computer graphics to facilitate the description and modification of details.

3. Detailed design: demonstrate the feasibility of the creative idea, coordinate various relations of the design, improve the creativity, make it operable, and pass the practical test. In this stage, the detailed design, especially for the design of technology implementation, so the computer-aided design with accurate features is dominant. As shown in Figure 1 and Figure 2.

![Figure 1. Computer detailed rendering](image)
Figure 2. Hand drawing details

Complete the design: Determine the design scheme, discuss and develop the complete production plan. This stage should enter into the design stage of engineering drawings. What is needed is standard technical drawings, and hand drawing should completely give way to the computer.

Put into production: Carry out production, publicity, marketing, and other related work. In the design implementation stage, it is necessary to select technical means according to the specific situation, such as industrial production, digital design drawings are needed to connect industrial automation equipment, while paper drawings are needed for building decoration construction to facilitate construction, and hand drawings are used to facilitate communication between designers and construction workers.

5. Conclusion
The above analysis suggests that hand drawing and computer drawing have their respective strengths and weaknesses. In different design stages, they should be flexibly used and organically combined to achieve the purpose of communicating the designer's concepts properly and facilitate the expansion and enrichment of the designer's ideas.

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