





The Building Method of Information CAD Model for Interior Art Design

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Abstract. Standardization is an inevitable requirement of industrial design, and graphics are the main visual presentation form of interior decoration design. Standardized graphics are an inevitable prerequisite for the development of industrialized interior decoration design. The industrialization of residential buildings is the mainstream direction of the future development of residential buildings in my country. The industrialization of residential interior decoration, which is matched with the industrialization of housing, has already started and has been promoted. This paper points out that the standardization of interior art design of living environment is the necessary foundation for future interior decoration designers. At the same time, it is also an important means and basis for standardized teaching and assessment of teaching in developed countries. Standardization of design graphics is an important way to optimize design presentation, intuitively understand theory, and improve efficiency and quality. Graphical design is also a specific means of reuse, saving resources and labor. Graphical design has also become the embodiment of the concept of green environmental protection, low carbon and sustainable development.

Keywords: Interior art design; Information technology; CAD graphic design; Model building method

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1 INTRODUCTION

Interior design is a comprehensive system engineering. The application of elements such as colors, materials, graphic patterns, furniture, and soft furnishings is critical. These factors play a decisive role in the quality of the work [1]. However, the graphic thinking of artistic design is exactly the design thinking needed when these elements are applied to design. From the initial stage of design

to the stage of design completion and performance, it is inseparable from the graphical thinking method. Compared with interior design, design thinking refers to a way of thinking about the conditional setting of interior furnishings and environmental patterns. The reorganization of interior design thinking is critical. In addition, the correct application of design thinking in existing research can be achieved through accurate inspection and conditional modification of the initial object of the design. In order to control the overall completion of the final design goals. There have been studies on interior design methods in the overall design operation, so that Mazzoli et al. [2] mentioned that the relationship between the whole and the parts is compact and powerful. Parts are interconnected and mutually restricting each other. Ultimately, we were able to achieve the precise requirements of the design goals. Design thinking is based on the premise of design goals and the primary purpose of completing design works. Ultimately, the functionality, applicability, aesthetics and comfort of interior design are realized. Design thinking is to use the designer's thinking ability to combine the interior space pattern, decoration materials, color matching, etc. Malagnino et al. [3] mentioned that the main purpose of the design is to create an environment suitable for human activities. The importance of graphic thinking in design is very important.

The strength of graphic thinking ability can be directly reflected in the quality of design works. Graphical thinking ability is the practical process of designer theory, and it is an effective way to transform program information into entity information. A common way for designers to open up ideas in design is to use sketches to find design inspiration. However, it is very important that we verify the correctness of the design ideas. When the first draft of the drawing is designed, it is not only a verification of the design idea, but also may inspire new inspiration. Grasping the details for the next drawing will bring the design closer to the design goal. Shahi et al. [4] mentioned that this is repeated until a satisfactory result is achieved. For example, in the interior design industry, the initial floor plan always starts with simple geometric figures. Secondly, the complex internal space composition is also constructed from many simple graphics. Designers can express the functions and areas of the space by using simple graphics. Help the designer in the next stage of the design work. In many designer crowds, the designer's graphic thinking ability determines his ability. Yang et al. [5] said that the designers need to accurately translate design proposals into substance. Therefore, graphic thinking is a bridge between design theory and practice. Graphic design is also one of the most common modes of thinking in art design.

2 RELATED STUDIES

Graphical thinking is to compose pictures through the understanding of graphics and images. A way of thinking that expresses abstract concepts through the processing of designers. In general, abstract design methods can integrate knowledge and design. In turn, Dimitriou and Miller [6] said that the experience and cultural knowledge are transformed into intuitive visual products. Graphical thinking method is a necessary way for designers to complete design works. The method of graphic thinking still needs to follow the basic rules of design in design. Design requires the use of creative, beautiful, meaningful graphics. So as to ensure the perfect combination of design ideas and materials, craftsmanship and functions. Divergent thinking refers to starting from one aspect and radiating in all directions [7]. Divergent thinking is an explosive way of thinking. Divergent thinking requires designers to have pioneering thinking. Specifically, designers are required to be bold and innovative. This way of thinking outside the box can often find design inspiration. Make the work magical. Divergent thinking can often create unexpected surprises. Linear thinking is a regular way of thinking that people start from their daily experience. This way of thinking is along a certain aspect of a problem [8]. For example, from the waves to the sea, from the sea to the ship, from the ship to the sail and so on. The linear way of thinking is a way of thinking with personality. This is closely related to each person's personality and life experience. Reverse thinking is nothing but to break the routine and go in the opposite direction of thinking. This approach is the exact opposite of linear thinking. Using this way of thinking to design and create, the designed works often have unexpected effects.

Intuitive visual characteristics of graphs. Graphical thinking is the ultimate purpose of information transmission. Therefore, simple and intuitive graphics can make people understand at a glance. Help readers feel the charm of the design and the designer's design concept. Deepen the viewer's visual impression. The symbolic representation of graphics is also very important. Whenever we see a graphic pattern, we associate a lot of things [9]. It may be the external pictographic relationship of the figure, or it may be the internal symbolism of the figure. In short, when we see a graphic pattern, we will have an initial impression and feeling in our heart. This is the symbolic expression of graphics. For example, the ear of wheat symbolizes the harvest, the clock symbolizes time, and the ring symbolizes marriage. The aesthetic representation of graphics is also important. When looking at different images, simple or complex graphics give people different feelings. It will always give the viewer a pleasant inner feeling in terms of color, change, composition and other extroversion. People create subjective impressions of design works through intuitive visual perception. The aesthetics of an image directly affects how people feel about a design work [10]. Knowledge of the application of graphical thinking. Graphical thinking method refers to the use of image information to express abstract design schemes, as well as information such as brain thinking and cultural experience. Furthermore, the abstract information is transformed into intuitive visual information. Use sketches, analysis diagrams or directly completed graphic design works to express the designer's design ideas and concepts. The application of graphic thinking is a common way of thinking in modern society. At present, it has also become a direct bridge of communication between designers, manufacturers and users.

3 RESEARCH ON THE APPLICATION AND PERFORMANCE OF GRAPHIC THINKING IN INTERIOR DESIGN

3.1 The Specific Way of Thinking in Graphics

In general design behavior, the sketch is the initial form of the design proposal. Design ideas that take shape in the brain need to be expressed with the help of sketches. Then verify the practicability and advantages and disadvantages of the scheme. In order to facilitate the further implementation and improvement of the program. Three-dimensional sketches of interior design are generally done freehand. To better understand the space and plan the design space. Often it is necessary to draw a lot of design sketches. Present design ideas from different angles of the space. Sketches at this time, as a means of thinking for design thinking, are not necessarily accurate, but they can reflect the designer's ideas. Then preliminarily verify its rationality, grasp every design inspiration and record it. With these three-dimensional design sketches, designers can check for flaws in the design. Whether the scale is appropriate. When sketching, not only can you record the burst of inspiration, but it can also make people think more active. Inspire more design ideas. The amount of design sketches reaches a certain level, its content will become more and more abundant. Select reasonable and effective ideas in the sketch to continue to deepen the design scheme. In this way, a complete preliminary design scheme is constructed, as shown in Figure 1.

This way of thinking is generally limited to the early stages of design, mainly in the form of network diagrams and matrix diagrams. There is no rigorous pictorial thinking, and no specific graphic symbols. It is just an expression and record of a concept, and it belongs to the designer's own unique way of thinking. An abstract line that only the designer can interpret. However, the current interior design students basically have standardized drawing restrictions due to the teacher's teaching. This abstract way of thinking has the advantages of rapidity and strong ability to deepen. However, sometimes the inspiration is missed due to changes in the user's thinking. In the design, pay attention to the use of lines in the form of symbols. For example, the main objects designed at the time of conception can be represented by circles, and various divergent relationships can be represented by lines. In this abstract way of thinking, different areas can be represented by different geometric lines. For example, use a simple rectangle to represent one type of space and a circle to represent another. Spaces of the same shape can be grouped together. When abstract graphic language is used, it is easy to remember only when it is

represented by the simplest symbols. And, it's best to be concise and practical. In an analysis graph, it is generally best to keep the types of symbols below 5. Too many symbols are not easy to remember.

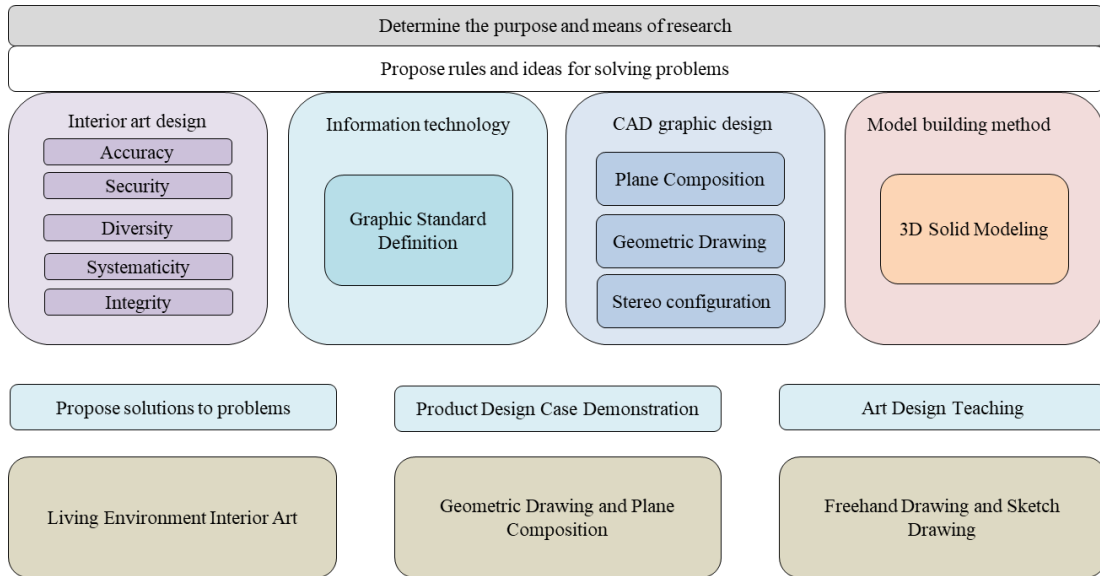


Figure 1: Computer-aided graphics design architecture.

3.2 Analysis of Graphical Thinking in Art Design

Representational geometry is a rigorous and precise way of expressing images. This part is also the most critical part of design performance. It is an intuitive and precise expression of the designer's conception. The precise presentation of visual information in front of the viewer is especially important for interior design. Drawing principles that conform to industry norms can provide ideas for design schemes. Accurate drawing of plane, inside and section can make later construction more convenient. And it can reduce the difference between the design plan and the actual output work. The image display of the interior design requires the systematic expression of the various joint surfaces of the interior space. Show a complete space on the plane. Generally speaking, apart from the hydropower diagram, the floor plan, and the horizontal and vertical section diagram of the structure, the most important thing is the effect diagram and the detailed indoor node diagram. Interior design renderings can truly reflect the designer's thoughts and the owner's requirements. In addition, details such as color, material, and space are included.

The graphic thinking methods used in each stage of interior design are different, and the performance characteristics of graphic thinking at each stage are also different. When using graphic thinking to design sketches, it is mainly to carry out initial design ideas. The key point is to quickly and accurately reflect the designer's inner feelings on the picture. Putting design ideas in the brain on paper is a perceptual thought process. Different people feel the same things differently. This is a way of sketching design with a personal uniqueness. Graphical analysis of interior spaces is a rational thought process. This is the basic behavioral process of design activities. The thinking activities carried out in the analysis process are perceptual thinking activities. The combination of rationality and sensibility enriches the design works. It can effectively express the use requirements and functional composition of indoor space. The use of graphic thinking first enables designers to grasp the inspiration that bursts out of the heart, and can express the original idea of the brain. Through the assumption and verification of the interior

space scale, space composition, material, color, light and dark contrast. Fully express the designer's design thinking and philosophy. Secondly, the use of graphic thinking allows designers to have a deeper understanding of the composition and functional relationship between indoor space and outdoor space when designing the overall system. It is helpful for designers to make reasonable design arrangements. Whether the function of the space is reasonable and whether the comfort meets the target requirements. Furthermore, the use of graphic thinking can intuitively realize the designer's design concept. Make it easier for designers and users to communicate. This kind of communication is a must in design and helps to draw on advice and experience. Further deepen the design and improve the design scheme.

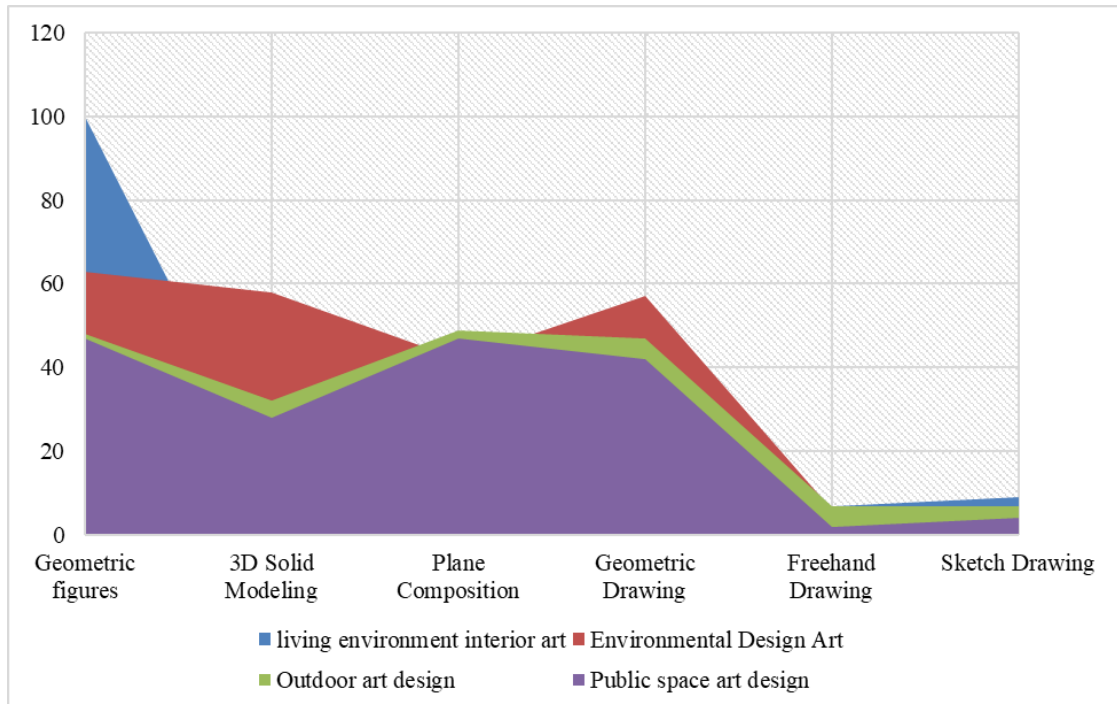


Figure 2: Research on existing CAD design method teaching.

"Standardization" has always been closely related to efficiency and quality in all walks of life. The earliest independent interior design industry, the United States established the "American Interior Design Education Council in 1980. The organization coordinates the content of interior design education in the United States and identifies the teaching quality. It advocates and implements the standardization, standardization and industrialization of education. The construction of the education system has experienced nearly 40 years of hardships before it is basically completed. With the development of housing industrialization, which is an important link in the process of urbanization in China, the industrialization of the interior engineering of the living space that is matched with it has become a lot of decoration in recent years, as shown in Figure 2.

The focus of enterprise planning. It will become the development direction of the future focus, and industrialization will inevitably require the standardization of design. The standardization of room interior design is presented through the standardization of graphics is shown in Figure 2. This is an inevitable choice for the development of residential industrialization in the future. This is the teaching of this field. New challenges have arisen. Whether it is for the consideration of this

premise or for the deepening reform of the currently prevailing project teaching. Important considerations at the world's advanced level are all concerned with this. The author intends to start from the standardization of living environment art design graphics Research is the starting point. Combined with project teaching, enterprises support and carry out some research work. It is hoped that through research, it can provide some theoretical basis for the improvement of teaching quality and efficiency in this field. It plays an important role in the establishment of teaching norms and standards for other projects.

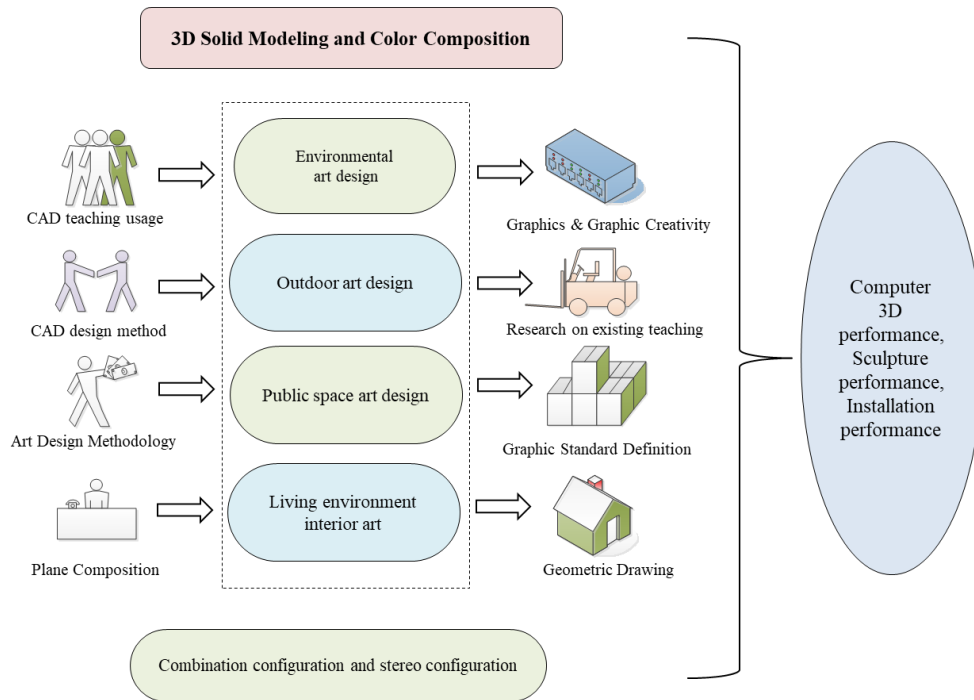


Figure 3: 3D Solid Modeling and Color Composition.

Standardization of teaching graphics for interior art design of living environment. It is to construct the creative prerequisites for the interior art design of a certain living environment. And, on a technical level, the design graphics are presented in a standardized way. Thus, the unification of graphics drawing regulations and means is realized, as shown in Figure 3. Solve the unity of design elements in size, style, material and construction technology and presentation. Further, standardized and standardized design documents and standardized design graphics are formed. To achieve unity in the application of teaching. Further, standardize the implementation details and goals of the project teaching graphics. Establish guiding documents and basis suitable for graphic teaching of projects in this field. Graph standardization research is carried out in terms of generality, systematisms and modularity of nodes and components. Gradually establish a reusable technical and theoretical system that assists intuitive understanding. Use standard graphics in project teaching to achieve innovation and improvement in graphics teaching efficiency and quality.

4 ANALYSIS OF RESULTS

4.1 The Application of Graphic Thinking in Interior Design

Standardized content of living environment interior art design graphics. Generally speaking, it is necessary to unify and standardize research on graphic drawing of project teaching. Documentation is critical to the interior design of living environments. Various related standards for graphic drafting are studied, including the unified national standard for housing construction drafting. As well as residential design specifications and architectural decoration interior design drawing unified standards and so on. This paper studies the graphic drawing drawings of the interior art design of the living environment from different sources. Including the design drawings of well-known enterprises in Hong Kong and Taiwan. By analyzing, integrating, screening, and combining teaching characteristics. Propose solutions to problems existing in teaching. Furthermore, the formulation is in line with the teaching rules and needs of interior design projects. Build a unified standard that meets the requirements of the country, industry, and enterprise. Especially in terms of computer graphics, standards are formulated in combination with the characteristics of computer graphics. Make up for the lack of this detail in the big standard. Innovatively solve the problem that students have been unable to combine document standards with computer software in teaching. The factors and elements of the cartography are also incorporated into the construction criteria. Including the use of computer software to develop uniform standards. For example, in the computer layer, frame, legend, drawing and other standard unification. Make it easier for students to apply textual standards to computer practice. So that the teaching of graphics drawing by different teachers and the graphics drawing of different projects can be based on evidence. In order to achieve the improvement of teaching efficiency and quality.

In-depth research and formulation of drawings of living environment art design. At the current stage, the research is conducted on various standards of living environment interior design and graphic drawing. Among them, including national architectural drawing depth requirements and enterprise drawing depth requirements. The study sorts out the drawings and data of Hong Kong and Taiwan masters and design companies. Conduct research on the drawings and materials of foreign masters and design firms. Combined with the characteristics of school students (inadequate mastery of engineering materials and processes, lack of practical experience, etc.). The problem leads to the inability to reach a certain depth in graphic drawing, and to formulate detailed unified standards. Research how to guide teaching to the details. To ensure the success of the implementation of teaching objectives, as shown in Figure 4.

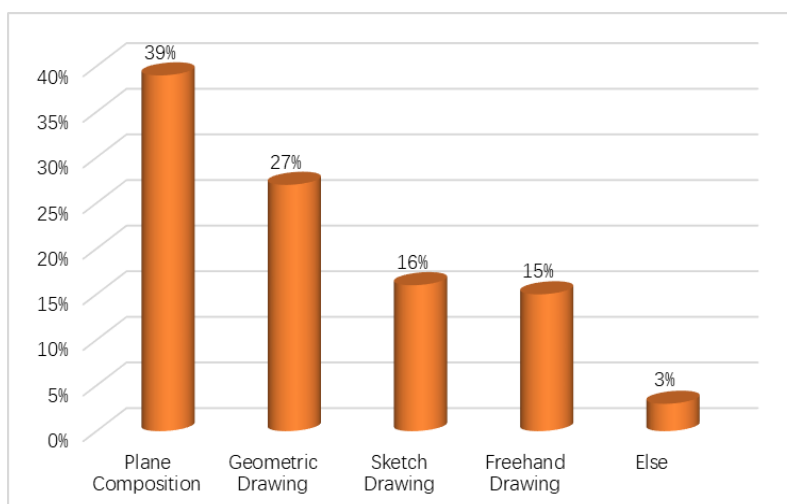


Figure 4: The main ways of art design in public space.

Research on standardization of process and material graphics. In view of the current situation of students' lack of understanding and experience of technology and materials in teaching practice. This paper collects information on the mainstream design works of the current living environment interior art design. Then analyze and integrate the data, and gradually develop some suitable for school use. Graphical standard diagrams suitable for project teaching in the field. Especially in the new technology, new materials have been reflected. It is applied to project teaching to improve the accuracy of graphic presentation of indoor art design in living environment, so as to achieve the goal of improving teaching efficiency and quality in this field, as shown in Figure 5.

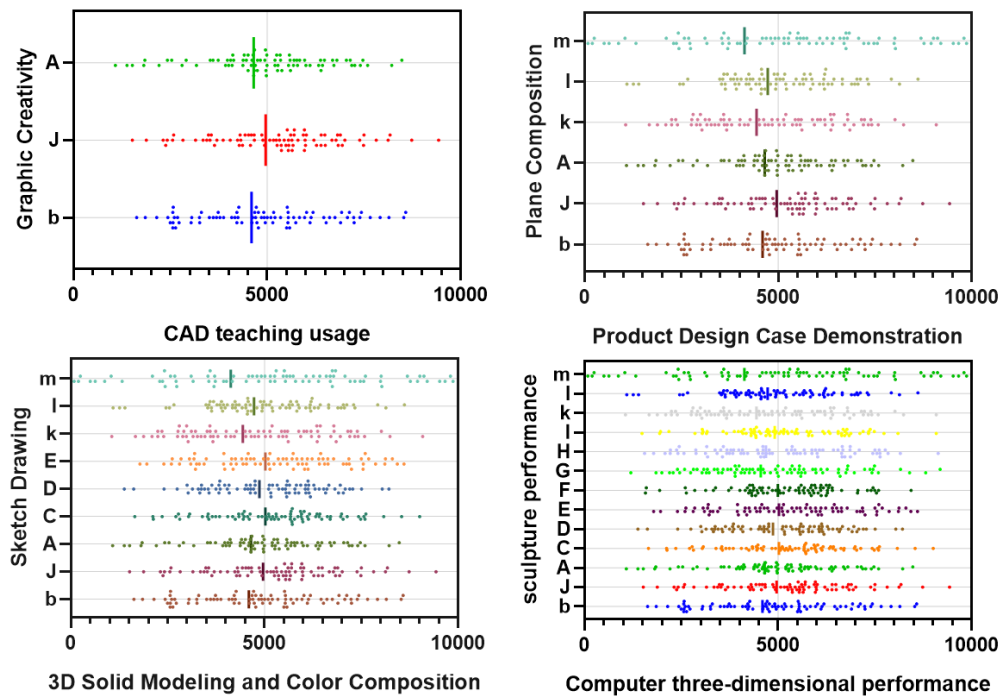


Figure 5: Combination configuration and stereo configuration.

Application of graphic standardization of interior art design of living environment. First, the application in the teaching of indoor art design graphics in the living environment. Conducive to the design and implementation of unified teaching. The goal is clearer and more intuitive. Conducive to course evaluation and identification and students' understanding of theoretical knowledge and practice. The innovation realizes the application of text standard to standard in computer software for drawing. Second, the application in project teaching. Conducive to the unity of teaching. Standard, reasonable and complete project design. It is also beneficial to control the progress of the project and control the quality of the project. It can effectively coordinate the connection between different team members, division of labor, categories, and different stages and the overall coordination and unity.

4.2 Analysis Results of the Abstract Linear Way of Thinking

Conducive to management, communication, and cultivate teamwork spirit. Reduce repetitive work and improve design efficiency. Third, the cultivation of students' professional quality. The standardization of interior design graphics of the living room environment is the premise of the standardization of residential interior decoration projects. Design standardization is presented

through standardized design graphics. Therefore, the standardization of design graphics is irreplaceable in the interior design of today's future living environments. It is an important means to unify size, realize modulus, save resources, realize environmental protection and save labor. It is also an international development trend and a policy that the country has focused on in recent years. The standardization of indoor graphic design of living environment is conducive to the batch technical processing of computer and mechanized production. This method is an inevitable requirement of industrial construction. Uniform standards can also save resources and labor. These are all good interpretations of modern design concepts of green, environmental protection and sustainable development, and are the basic professional qualities that interior decoration designers must master and possess in the future, as shown in Figure 6.

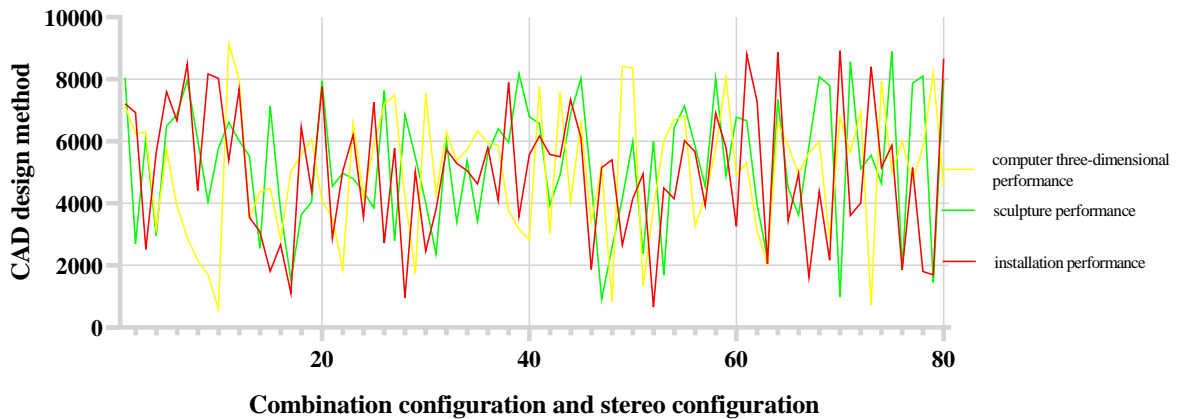


Figure 6: 3D Solid Modeling and Color Composition.

Difficulty analysis of graphic standardization of interior art design of living environment. First of all, the interior art design of the living environment faces different customer groups, and the individual requirements pose a challenge to the standardization of graphics. Secondly, the decoration styles of design projects are now rich and colorful, and the diversity of styles is also a problem for standardization. Thirdly, when carrying out standardized design, interior facades often change a lot, which is also one of the difficulties. In view of the above difficulties, the concept of modularization should be used as much as possible when designing graphics standardization. Design as many material and construction nodes as possible that can be used multiple times. The graphic design of components and furniture also tries to integrate spatial factors as much as possible. Reduce unnecessary changes. Classify factors to achieve multiple utilization of the same factor, component, and graphics, as shown in Figure 7.

The interior decoration design has been developing for nearly 30 years. Although interior decoration design education is gradually improving, it is still insufficient compared with developed countries and the rapidly developing industry. The interior decoration design education is benchmarked with developed countries, and there is a lack of unified standards for strategic education at the national level. As a proof of professional standards, the professional qualification certificate is not highly recognized at the social level. Vocational education has provided help for school-enterprise cooperation and project-based teaching in recent years. Some achievements have been made. From the measures taken by the state to transform a group of universities into practical universities, it can be seen that the state affirms pragmatic education. However, our reform and exploration are still on the way. Education is still loose. Although, a set of perfect and reasonable national-level unified standards has been established.

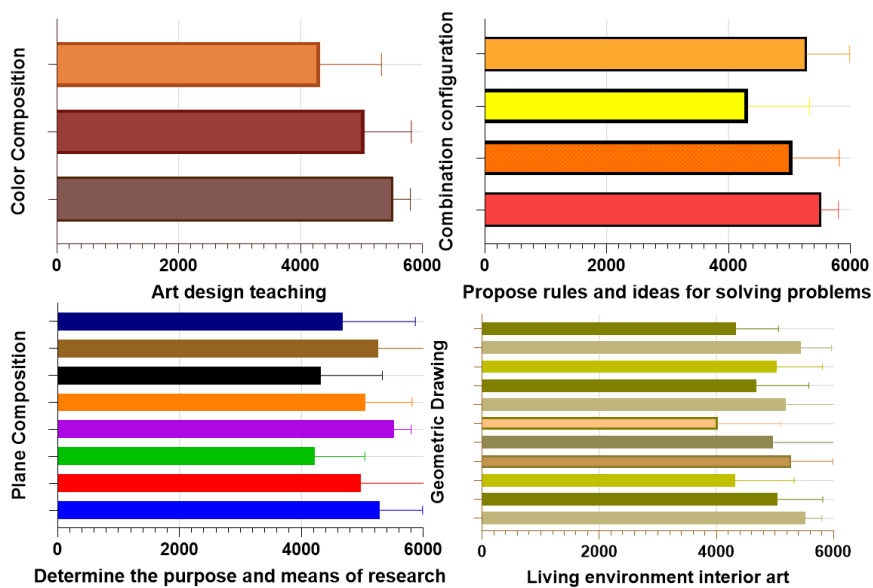


Figure 7: Geometric Drawing and Plane Composition.

However, starting from ourselves, we need to gradually establish some standards suitable for the local economy. These standards fit into the uniform standards of local school education. First, it can further deepen the process of project teaching reform; second, it can unify the current loose education. These requirements need to standardize teaching, provide evidence, and improve teaching quality and efficiency. Thirdly, these methods can "lead the way with points" and drive the construction of more similar topics. Furthermore, it lays a preliminary foundation for the formulation of unified standards and norms for higher-level education in the future. This is the significance of this topic and the prospect of future development.

5 CONCLUSION

The graphic way of thinking in artistic design plays an extremely important role in interior design creativity. Whether it is abstract or figurative graphics, it plays a great role in promoting the final formation and expression of creativity in design. It can be said that interior design without graphic thinking is like life without soul. Interior design is limited in function and demand. But spiritually the possibilities are endless. Thinking can be free. Graphical thinking runs through the entire design creative process in interior design activities. Only by using graphic thinking well can we create a space atmosphere with a sense of beauty and design. Gives the perfect artistic appeal. So as to build and form an excellent artistic design work.

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