




Intelligent Teaching Method of Interdisciplinary Art Design and CAD

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Abstract. Due to the popularization of computer design software and the development of computer technology in the design industry, the interdisciplinary subject combining art design and computer has been widely popularized. The establishment of computer-aided design courses is of great significance for the intelligent teaching of art design majors in colleges and universities. Faced with this development situation, how to adjust the appropriate teaching mode and comprehensively improve the artistic literacy and computer skills of professional students is the primary problem for colleges and universities to solve. How to let students master and use a variety of design software in a short period of time in teaching plays a crucial role in students' completion of graduation design and work in the early stage of the workplace. This paper focuses on the following key technologies: how to divide and design the material library to improve the working efficiency of the system; how to simplify the user's operation and improve the usability of the system; how to design the typical environment of the system to make the use of the system more efficient Extensive; in addition, it focuses on the design of the interface part from the aspects of use and technology. In the end, the paper summarizes the application prospects and application fields of the computer-aided design system for art design, emphasizes the important role of the system in the field of education, and analyzes the current deficiencies and future research directions of the program.

Keywords: art design; computer-aided technology; interdisciplinary; intelligent teaching

DOI: <https://doi.org/10.14733/cadaps.2022.S8.96-104>

1 INTRODUCTION

The digital technology revolution represented by computer network technology constantly promotes the extension of the boundaries of art and design. It is in this general trend that the digital media art design major was born and developed. It breaks the traditional disciplinary boundaries and realizes interdisciplinary integration. Using the background of computer digital technology to express design creativity is a typical emerging discipline integrating technology and art. Computer-aided design is the basic course of art design major, and it is also an important means of art design thinking expression. Erdei et al. [1] think it can intuitively and vividly show the whole process of design, and assist designers to complete the design work better and faster. Therefore, computer-aided design is also a compulsory course for art design majors. Therefore, how to better combine art design with computer and improve teaching quality is an urgent problem to be solved in colleges and universities.

Alazzam et al. [2] consider one of the goals of classroom teaching is to cultivate high-quality practical technical talents on the front line of production, service and management. The value orientation of talent training is employment, and its ultimate goal is to focus on professional ability, emphasizing its distinctive career. Li et al. [3] considers that the school's art design major emphasizes cultivating students' design thinking and design ability. Whether they have this ability is judged by the works designed by students, and the design itself focuses on computer-aided design. Therefore, the art and design majors teach computer-aided design courses (Figure 1). Higher requirements. Paterson et al. [4] thinks the computer-aided design course is a link between the previous and the next, and is directly related to the screen execution ability of the subsequent professional courses. In addition, as a software operation technology course, computer-aided design focuses on mastering software operation technology and using it for professional design. In the art design course, the establishment of the computer-aided design course is of great significance to the art design major.

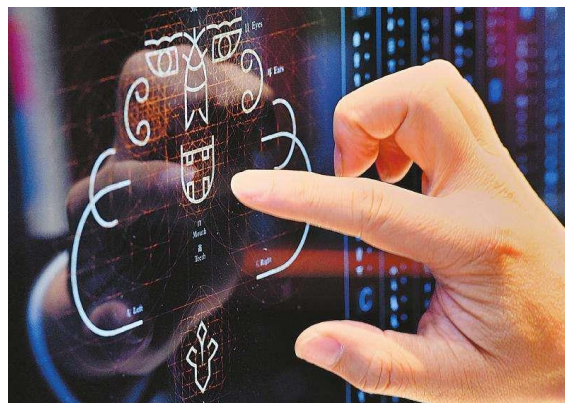


Figure 1: Computer-aided design.

Elyashberg and Argyropoulos [5] think art design major is a comprehensive interdisciplinary subject that combines technology and art. It not only requires students to have good aesthetic ability and certain artistic accomplishment in the field of art, but also requires a certain degree of computer-related knowledge and can be used well. In this way, artistic creativity can be well expressed in the form of computer. How to set up a curriculum system to cultivate comprehensive talents combining art and technology is the primary problem for universities to solve.

The cultivation of comprehensive interdisciplinary talents should first be set according to the characteristics of the discipline itself. Traditional art and design majors only focus on cultivating students' aesthetic and design abilities, ignoring hands-on operation ability, which leads to the situation that some students cannot express their design ideas through technology, resulting in the situation that "the eyes are high and the hands are low". The pure computer science is only pure science teaching, and the results of the pages made by students around codes and programs are not satisfactory. Computer-aided art design is a subject that combines computer technology and art design. On the basis of their professional theory, students focus on strengthening the cultivation of practical application ability, and promote practical ability. Only in practice can innovation and progress be achieved. Through this mode of teaching, students can better master art theory and skills experience, maintain a balance between the two, and avoid one-sided and extreme phenomena [6,7].

In the teaching of art design professional courses, the application of computer-aided design is extremely in-depth, and the diversified elements such as graphics and colors in professional basic courses are applied to professional curriculum design teaching. In the teaching of computer-aided design, teachers, students, and computers are repositioned to give full play to the effectiveness of teaching.

Students majoring in art and design must have a comprehensive understanding and mastery of the software used in art and design, and perfectly integrate their own ideas with advanced computer technology. Based on this point, the establishment of the computer-aided design teaching mode objectively requires teachers to master a certain knowledge of computer graphics software while teaching design courses, and organically combine the two to effectively guide students to use computers rationally, and in During the teaching process, students are advised and encouraged to maintain their traditional drawing skills, such as the use of brushes, colors and other tools, to make adequate preparations for conception and composition before going on the computer, and to flexibly combine some natural and traditional materials. Through the scanner input to the screen, the two design languages communicate and complement each other. The attraction of computers is only as an advanced tool to help students activate their thinking, develop their brains, increase their interest in learning, and inspire students to apply computer graphics language to open up new visual fields [8].

In recent years, in the computer-aided teaching of art design majors, the teaching content is generally incomplete and unscientific in various art colleges. This misunderstanding of teaching is caused by the one-sidedness and subjectivity of each teacher's understanding of the course, and the deviation of the professional direction of the course teaching content. In addition, computer-aided design courses are insufficiently linked with professional courses. For example, TianZheng cad and VRAY software, which integrates software functions such as AutoCAD, 3ds max, and Photoshop, can be shared, and are rarely used in the teaching of domestic environmental art majors. The integration of art teaching is imperative, teachers must constantly absorb experience in practical teaching, keep pace with the times, and innovate the teaching of computer-aided courses, which is of great significance to the curriculum setting of art teaching reform [9,10].

2 INTELLIGENT TEACHING METHOD OF INTERDISCIPLINARY ART DESIGN AND CAD

Computer-aided design tools are mainly developed by software companies, such as Photoshop and Illustrator produced by Adobe; 3ds max and AutoCAD developed by Autodesk; CorelDRAW and Painter developed by Corel. The functional arrangement and use steps of these designed tools are often strictly logical. Developers integrate many functions in one software. The realization of these functions is based on the professional knowledge of computer graphics. Therefore, only by understanding the internal logic of these software constructions and briefly by understanding the basic principles of computer graphics, users can infer the software functions and use them to realize their own unique design ideas. At the same time, practical application is the ultimate purpose of software tools. As far as the purpose of use is concerned, there is no essential

difference between them and manual drawing. However, unlike manual drawing, tools such as paper and brushes have become button menus on the screen and software interface. and mouse and keyboard. This makes beginners often troubled by logical computer operations, but forget the creativity, ideas, ideas and ideas of design work. Due to the weak scientific foundation and logical thinking habits of most Chinese art students, it is difficult to understand the internal logic of these software tools, which seriously affects their ability and interest in using computer tools effectively in professional courses. Moreover, facing the same application field, different companies have developed software for designers to choose. During the development process, different understandings of user needs and habits have resulted in the interface, function and menu window settings of similar software often having obvious differences. Different, these factors bring trouble to software users, especially beginners. Therefore, the teaching methods of computer-aided design courses need to be adapted to its particularity through extensive research and practice.

A teaching mode that integrates art design and computer courses. In general colleges and universities, there are relatively many targeted professional courses offered by the major of computer art design. For example, the major in the direction of graphic design, which includes Photoshop for processing pictures and images, layout software, and some tools. Specific use, such as Maya and so on. In the process of teaching for a long time, the lecturers of each course generally only aim to teach their own courses well, so they rarely involve the skills of other related professional courses in their own classrooms. As a result, students who study this major are proficient in individual skills, but relatively poor in practical application ability. A relatively complete video animation image covers the creative design of the plane, the three-dimensional design, and the use of computer post-editing. Therefore, reforming the professional teaching system and strengthening the correlation between professional courses will be a necessary condition for us to improve our overall teaching results. Through the blended teaching in the classrooms of the teachers of each course, this can not only effectively improve the students' interest in learning such majors, but also alleviate the students' mental boredom because the courses are too difficult, so that the students can learn more about this subject. The course or even this subject will have more precise goals and expectations, and it will be more effective to improve the comprehensive development ability of students studying this major. After the students of this major have a clearer learning idea and a clear learning purpose for this course, they can apply the knowledge they have learned before as a whole, which can reduce the blindness of the students to the learning purpose, and also make Students can accept and master new knowledge at a faster speed and at the same time, they can better create not only beautiful but also functional pages that are more practical than ordinary web pages. This not only reflects the relative superiority of systematic teaching, but also improves the improvement of the course or the teaching system of the subject studied by the students. Through such a systematic teaching system, not only can we quickly discover and solve some problems that our students have in their learning, it is easy for the teachers who teach this course and the students who study this major. fully developed. The amplitude variation is shown in Figure 2.

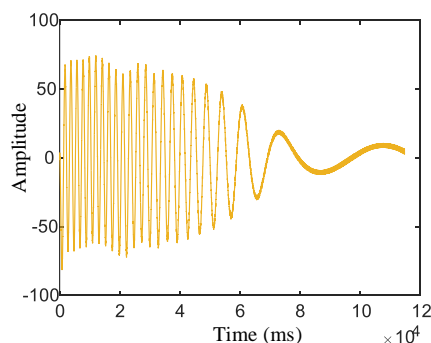


Figure 2: Amplitude variation.

Teachers use multimedia teaching to make courseware, and it is a common example teaching method to give students an intuitive demonstration of the operation process. Since students are new to the new software operation method, it is easy to forget. Therefore, in addition to giving the courseware to the students, teachers can also use screen recording software such as screen recording experts to record the screen, and record the screen and sound of the operating software during the teaching process. Save the special design projects that you operate, and copy them to students for practice and mastery after class, and ask students to write down the operation process, that is, let students write tutorials or courseware by themselves, which can be searched and read at any time. In addition, teachers can also use network tools such as QQ, e-mail, etc. to communicate with students online, and answer questions raised by students at any time. Teachers can also let students find resources shared online, download video tutorials or text tutorials on software operation, and use multimedia and network platforms to improve teaching quality.

Multimedia teaching focuses on interaction. Teachers should avoid introductory teaching, and use case teaching method, that is, take the actual production of a model as an example, or select a case of indoor drawing to describe, and use commands in a comprehensive manner to explain in detail. The operation method and production process, after the lecture, the students are required to practice the projects operated by the teacher outside the classroom, so that the students can exert their talents and study different operation methods. In the next class, arrange students to group or demonstrate one by one, teachers and students communicate with each other, students can use different methods to complete the same project, and then the teacher summarizes the quickest and best method. The predicted value is compared in Figure 3.

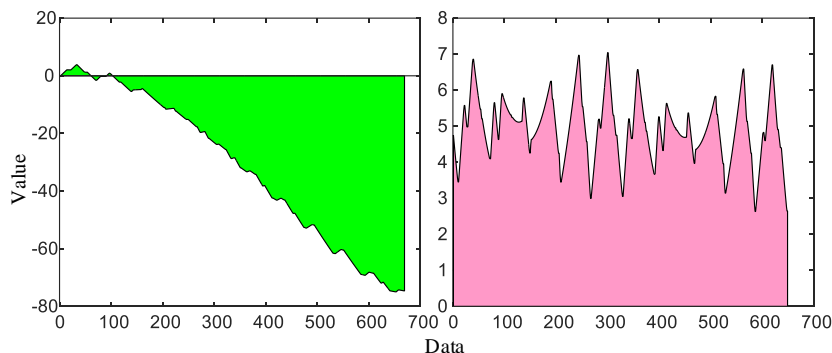


Figure 3: Predicted value.

When making AutoCAD construction drawings, 3dsmax modeling and rendering and photoshop post-effect processing are carried out according to the construction drawings. According to the conventional design process, this is the production step of general renderings. But many people overlook a detail. For students majoring in art and design, they must not only learn interior design, but also master the relevant knowledge and skills of exterior design. The part of exterior design that really determines the plan is the construction drawing and the color floor plan, and finally the bird's-eye renderings and space roaming. Even interior design involves the production of many colorful apartment types in actual work, so the software teaching sequence should be arranged more reasonably in the teaching process. It is suitable for students' professional study, AutoCAD construction drawing production, the combined application of AutoCAD and photoshop to make color screens, the combined application of AutoCAD and 3dsmax to produce indoor and outdoor renderings, and post-processing of photoshop renderings. From the point of view of the demand for software, for the environmental art design major, a single software cannot complete the design, so in the actual teaching process, not only should we pay attention to the order of software teaching, but also strengthen the collocation between software Application explanation, which is more conducive to students' knowledge learning and skills mastery.

In addition, different teaching methods should be adopted according to the different stages of students' learning. In the entry stage, students are still unable to undertake the design work independently. At this stage, teachers should give priority to teaching and guide students to master software operation techniques as soon as possible. But for beginners, there are more and more types of computer-aided design software, and learning computer-aided design software is still a heavy task in the face of numerous commands. Therefore, the main problem facing computer-aided design learning is how to apply software for design creation after getting started quickly.

The traditional software classroom teaching idea is to use the tools and instructions of the software itself as units to explain the functions and operation methods of each tool and instruction one by one. This kind of teaching method is more systematic and comprehensive, but the disadvantage is that the learning cycle is long, relatively boring, easy to forget and confuse. So, how can we overcome the shortcomings of traditional software teaching? The author believes that "copying" is an effective method, which can be combined with the design and fully mobilize the subjective initiative of the students. The percentage of each part is shown in Figure 4.

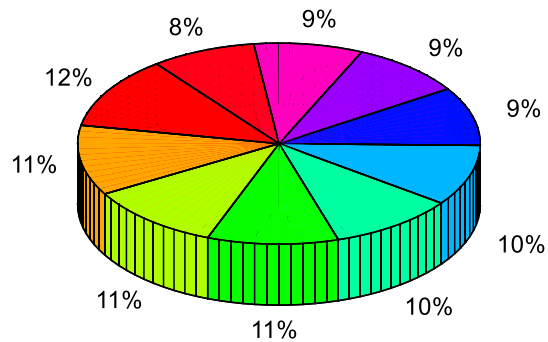


Figure 4: Percentage.

In the implementation of specific classroom teaching, the role of teachers is to demonstrate and lead. Students first know the design software and have no way to start. During the teaching process, the teacher demonstrates the operation method of each step to the students in detail. After the demonstration of one step is completed, let the students operate it immediately, and then proceed to the demonstration of the next step until the entire work is completed. In the process of copying, we should pay attention to "two pauses". One is that after each step is completed, it should be paused to allow students to operate immediately. The other is that after a group of steps is completed, a longer pause should be made, and the teacher should check the students. If you can't keep up with your learning situation, you should adjust the presentation speed. If you encounter a common problem, you should immediately propose a solution. The setting of the demonstration steps should depend on the learning stage of the students. In the introductory stage, each operation should be taken as a step to ensure that students have enough time to digest. In the advanced stage and the improvement stage, the connected operations can be bundled into one step, and the teacher's demonstration time can be extended, leaving time for students to recall and reproduce, making it more difficult.

3 COMPUTER AIDED DESIGN PROCESS FOR ART DESIGN

Because the computer is fast, convenient and easy to operate, it is universal and popular. More design groups, especially the new generation of designers who have just graduated from design schools, operate computers too rigidly and rely too much on it. Academic graduates always think that as long as they master a few images processing software, they can make artistic designs and become so-called designers, which is a bit too contemptuous of artistic creation. Because most

designers lack artistic literacy, design analysis, thinking, and creation ability are greatly lacking, and they do not have a good artistic feeling, so the artistic appeal is stiff, the communication function of the visual language of the works is low, and ultimately the design works lack creativity. Therefore, the key to our artistic creation is not how to master the computer operation level, but how to use the computer as a tool to combine our own ideas, express our unique feelings, and better enrich our art works. We must position the computer as a tool, rather than position the technology of the computer as an art.

Another disadvantage brought by computer-aided design is the "alienation" of design. When designing works, designers often spend much more time on the performance of computer effects than the time when designing the design plan, and they pay too much attention to the results and ignore the process. Therefore, we can often see that some works cover a very comprehensive technology, use a lot of things, and the operation is very complicated, but the actual meaning is very thin. The use of computer-aided design also constrains the freedom of designers to a certain extent. Most of the works have a strong sense of machine, digital, and lack of human touch and sense of humanity. The limitations of computer technology and its software itself and the level of operators have affected design thinking, stifled many solutions, and made the fleeting design inspiration in the creative process to be lost, making users have to give up some designs. The randomness on the computer, and "raise the white flag" to the computer, make the design and artistic creation into a simple industrialized "production". And when we are doing hand-painted works, one stroke is white, one star is dotted, and even if there are some mistakes, it is very random, artistic and changeable. There is sufficient emotion and a sense of randomness throughout the works. Such a strong sense of human touch and free transformation is difficult to express with a rigid program like a computer. The normalized frequency is shown in Figure 5.

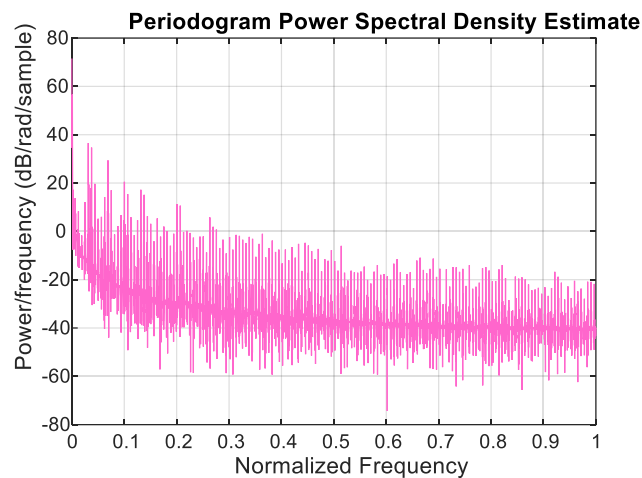


Figure 5: Normalized frequency.

The first consideration in the process of computer-aided design of decorative art design is to reasonably allocate which parts of the entire design process to be completed by the designer and the computer. How to give designers the least amount of work and as much freedom as possible. The workload and the degree of freedom are precisely two opposite relationships, one trades off the other. It is hard to try to find a balance between the two sides.

Computer-aided design is to simulate a real design work on the computer. Thus, we can think of it as creating a virtual environment on the computer to display a design work. In order to display a work in an environment is first of all the work itself: shape and texture, and secondly the external environment around the work: background color, display stand or display plane (for plane works) texture and color, lighting. Such work can be divided into several parts: work modeling,

material settings, lighting arrangements (including environment settings). The modeling part of the work takes the vase as an example. The opening size of the vase, the curvature of the neck, etc. are the parts that the designer must grasp. When the line shape of the edge is determined, the computer can simply create a three-dimensional model by rotating the line shape. Therefore, this part can be drawn by the designer, and the computer will turn it into a three-dimensional model, and automatically adjust it to an appropriate size to suit the display environment and materials. For planes such as tapestries, it is relatively simple under normal circumstances, and you only need to formulate the required width and height. The model is the next step of texture design after the shape of the work is determined. Texture design can be done in two ways. One is to use the standard materials provided in the material library, including natural and artificial materials such as wood, glass, metal, marble, etc. The other is that when the standard material can not meet the needs of the designer, the design can be adjusted manually, and the texture map drawn by the designer in Photoshop can be used. The influence of the environment on the work has been discussed earlier. A good work and the environment are interdependent and affect each other. Therefore, after the work itself is completed, the external environment needs to be set. The design of the external environment is mainly the color tendency of the light source and the color of the background environment. The more adjustable this part is, the more the designer can observe the appearance of the work in different environments. The evaluation is shown in Figure 6. Correspondingly, the data variation is shown in Figure 7.

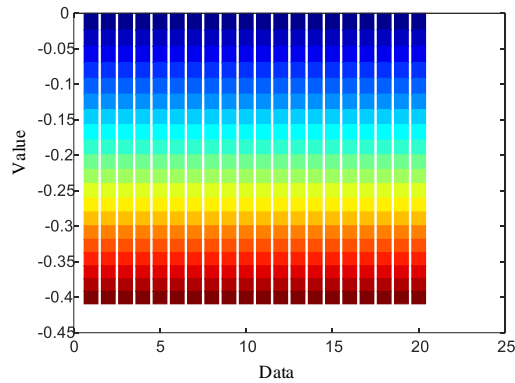


Figure 6: Evaluation.

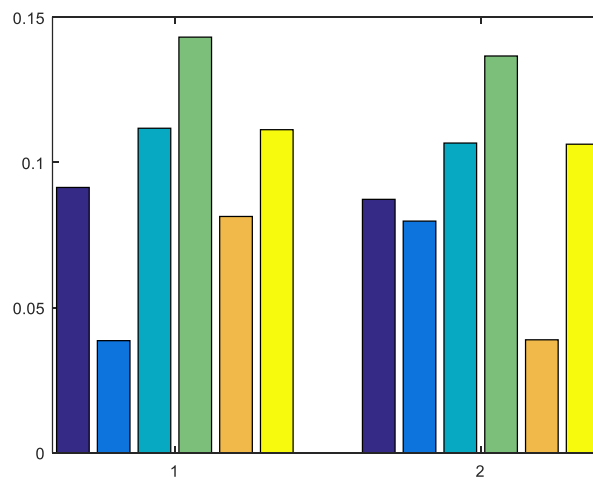


Figure 7: Data variation.

4 CONCLUSION

This paper discusses the following key technologies: how to divide and design the material library to improve the working efficiency of the system; how to simplify the user's operation and improve the usability of the system; how to design the typical environment of the system to make the use of the system more efficient Extensive; in addition, it focuses on the design of the interface part from the aspects of use and technology. In the end, the paper summarizes the application prospects and application fields of the computer-aided design system for art design, emphasizes the important role of the system in the field of education, and analyzes the current deficiencies and future research directions of the program.

5 ACKNOWLEDGEMENT

New Liberal Arts Research and Reform Practice Projects in Henan Province in 2021: Research and Practice on the Mechanism of Production-education Integration and Collaborative Education of Design Majors in Local Universities Under the Background of Construction of New Liberal Arts (No: 2021JGLX046).

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