The Application of Clothing Patterns based on Computer-Aided Technology in Clothing Culture Teaching

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Abstract. With the continuous development of the times, the concept of computer-aided design is constantly optimizing and updating our current teaching system. The original teaching mode and course structure can no longer meet the development requirements of the industry. There is a shortage of clothing pattern design talents in the market, and this situation has become the key direction of the future development of clothing design schools. Therefore, fashion design schools need to establish a fashion culture teaching system that is compatible with the development of enterprises. This article focuses on the teaching content of the clothing pattern course in the clothing culture teaching, and explores the teaching mode of combining digital technology and art design in the clothing design course. With the continuous development of social economy, the teaching system of clothing culture has undergone earth-shaking changes. The traditional costume culture teaching system is facing structural optimization and content reconstruction. In this paper, the design of clothing CAD pattern making and clothing culture teaching system is taken as the research object. This paper takes the modernization transformation path of clothing culture as the research subject, and applies the pattern-making technology of clothing CAD to the plate-making process of the clothing culture teaching system. This method is used to explore the relationship between the clothing culture teaching system and the industrial plate-making system. This paper thinks that the pattern making technology of garment CAD includes four steps: "original style-prototype copying-pattern comparison-creating finished product". This technical process realizes the modern transformation of traditional national costume design. This paper expounds the related research background and current situation of clothing CAD plate making and clothing culture teaching system design. The paper summarizes the main ideas and research methods of the existing research. In this paper, the technology of clothing CAD plate making is regarded as the breakthrough point of clothing culture

teaching, and the modern transformation path of clothing culture teaching system design is constructed. This method will promote the development of the creative industry of clothing pattern culture in the clothing culture teaching system.

1   INTRODUCTION

With the development of the times and the progress of society, the education scale of fashion design major is also expanding rapidly. Fashion design has become one of the most popular majors in Chinese universities. Fashion culture teaching is an important and necessary part of fashion design teaching. Costume culture teaching is the professional basic content of modeling and design disciplines in colleges and universities. Zhang et al. [1] believed that the teaching content plays a leading role in cultivating students' clothing pattern observation ability and clothing pattern expression ability. For students majoring in painting and fashion design, this method is of great help to improve students' artistic aesthetic accomplishment and aesthetic judgment ability. This method can stimulate students' creative thinking on the application of clothing patterns. The education of clothing culture in the fashion design industry should not only meet the needs of contemporary art creation practice, but also meet the needs of artistic commercial design.

On the one hand, the development of information technology has changed our daily life, and on the other hand, it has also subverted the traditional working methods of fashion designers. Sheludchenko et al. [2] believed that there have been studies using computer CAD technology in the field of clothing pattern design, and the technology is no longer high-tech at this stage. In this normalized way of working, Tuna [3] believed that the design content of clothing patterns has become a key concern in the fashion industry. With the rapid development of information technology, computer-aided design has penetrated into all walks of life. The technology is also constantly impacting the current teaching system, and the original teaching mode and course structure can no longer meet the development of the industry and social needs. Lu et al. [4] believed that the domestic good garment industry foundation has a very large demand for talents.

The types of talents needed in the domestic fashion design field are also relatively wide. However, there is a very shortage of applied talents with practical experience in the field of computer clothing design. The lack of such talents has become a bottleneck for the rapid rise of garment enterprises. Therefore, cultivating talents who meet the needs of enterprises is a social responsibility that higher vocational colleges must undertake. Nag et al. [5] believed that the higher vocational colleges need to solve the contradiction between supply and demand between clothing education and clothing enterprises. Higher vocational colleges need to make clothing education meet the employment needs of modern highly automated clothing enterprises. This is also a subject faced by all clothing professions. Since the late 1990s, professional education in clothing began to try to combine digital technology with artistic design. The school uses advanced digital technology to design unique works of art and explore the path of "combining art and technology". At present, the fashion design industry has formed a large number of successful fashion computer-aided design software. This software have improved the actual production efficiency and brought significant commercial value in the practical work of apparel pattern design. Therefore, the clothing teaching team needs to establish an information-based clothing design concept suitable for the enterprise.

Clothing pattern design has become an important element of modern clothing design. Montes et al. [6] believed that there are deficiencies in the research of fashion design theory and practical application. At present, there are mainly two problems in the teaching of clothing culture in China. On the one hand, the educational concept is relatively backward. Kim et al. [7] believed that the current clothing education is still guided by theory and practice, and still remains in the research

stage of traditional painting and clothing patterns. Liao et al. [8] believed that the school's clothing teaching method is relatively simple. Soo and Yeon [9] believed that the current school clothing expression is still mainly based on the reproduction of clothing patterns and still life copying. Clothing design basically stays in the stage of hand-drawing, and does not make good use of modern drawing processing software to educate clothing culture. Adam and Matthew [10] believed that there are many deficiencies in clothing pattern education in two aspects, which leads to many students not being able to successfully enter the enterprise after graduation.

1.1 The Relevant Research Results of Clothing Culture Teaching System

Fashion culture teaching is an important part of fashion design work. With the continuous changes of Chinese culture, the languages, costumes, and national lifestyles of ethnic minorities are undergoing earth-shaking changes. The pattern decoration in traditional clothing is also influenced to some extent. The inheritance of minority costume culture will face many difficulties. The application of computer technology has impacted the clothing design industry dominated by traditional manufacturing. Combined with the latest trends in the development of computer technology, this paper has carried out some basic explorations in a targeted manner. This paper attempts to use computer technology to establish a database of clothing culture teaching system. The database can collect and summarize the characteristic graphic styles of ethnic clothing patterns. This design method not only retains the original data, but also explores an effective clothing pattern inheritance path. At the same time, through computer technology, some unique ethnic clothing styles are structurally improved and applied to the plate-making technology of modern clothing.

At present, the research on the inheritance of clothing culture mostly focuses on field investigation and other methods. On this basis, scholars have carried out systematic monographic studies using the method of multidisciplinary research. At present, the research on clothing patterns in academia is mainly based on the overall and macroscopic research. The research content involves the history, culture, economy, customs and religion of the nation. In addition, scholars have also discussed from the aspects of clothing patterns and patterns' composition, aesthetic implication, and cultural connotation. This provides us with a lot of valuable reference material. Some scholars use modern computer technology to study traditional costume culture.

Scholars specifically conduct research on the methods, types, materials, production techniques and construction techniques of traditional costumes. Scholars have used digital technology to systematically summarize and summarize a set of digital protection methods for traditional clothing patterns. At the same time, scholars have also established a relatively systematic and complete digital database. The study also distinguishes the distinctive decorative patterns and clothing styles of each branch of ethnic minorities. The research also builds a graphic database of digital clothing design technology accordingly. These research results are of great significance to the protection, inheritance and modern application of ethnic minority traditional costume culture. Some scholars have used multi-disciplinary research ideas and methods such as ethnology, religious anthropology, and folklore to investigate and explore the issue of ethnic beliefs and their industrialization. The research adopts the analysis method combining literature collection, field demonstration and theoretical construction. Some scholars have made an in-depth analysis of the history, culture, artistry and development status of ethnic minority costumes. The organizational structure of the auxiliary teaching platform for costume culture design is shown in Figure 1.

1.2 The Main Research Ideas and Methods

At present, existing research focuses on the systematic design of clothing patterns, emphasizing the combination of theory and practice. This paper firstly recognizes, sorts out and classifies the connotation of cultural resources in the clothing culture teaching system. On this basis, this paper conducts in-depth research on the existing clothing pattern design styles, which constitute the premise and foundation of the development of cultural industries in China's ethnic regions.
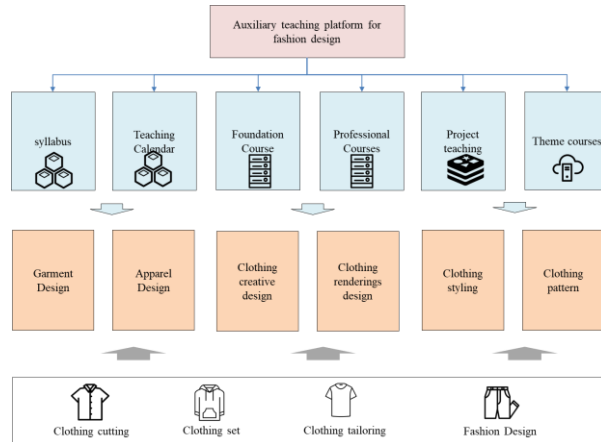
Figure 1: The organizational structure of the auxiliary teaching platform for costume culture design.

Secondly, with the help of new computer technology, this paper applies the structure of national traditional costumes. Through the improvement of traditional design technology, this paper builds a clothing culture database with comprehensive patterns. Finally, this paper uses the CAD technology of clothing design to deeply excavate the connotative value of Chinese national costume culture. The research results can effectively protect national cultural resources and explore a broader market space for the development of national costume culture.

This paper has carried out a systematic literature collection, arrangement and refinement. The research on the structure of national costumes in this paper can be divided into two parts. First of all, this study takes the human torso as the main wrapping object, and uses the paper pattern comparison method to illustrate. For example, the structure of clothes and pants. However, the study of clothing structure takes the method of direct exposition. At this stage, the CAD technology of clothing design mainly completes the basic layout drawing. Secondly, the research needs to carry out in-depth and detailed field investigation and market research of garment industrialization. This research not only conducts field investigation, but also conducts market research on garment industrialization. Under this premise, this paper conducts in-depth research on the CAD design method of clothing pattern, focusing on the preliminary analysis of the application method of the clothing culture teaching system. These research and analysis can give readers a comprehensive understanding of the overall content of the national clothing pattern improvement and clothing industrialization market. Finally, this paper systematically analyzes the application of clothing CAD technology in the industrialized production of ethnic clothing with the help of the advanced experimental equipment of the clothing studio in the National Costume Art and Design Institute. Afterwards, this paper focuses on the development and research of national costume product series samples, and designs and manufactures a series of national costumes conforming to the modern fashion style.

Scholars have deeply explored the main decorative features of ethnic minority costumes. Based on long-term field surveys of ethnic minorities, some scholars have elaborated on the development status of ethnic minority costume craftsmanship. Scholars interpret the modeling structure and production process of ethnic minority costumes from the perspective of craftsmanship. At the same time, the study also shows the dressing process of ethnic minority costumes in a graphic and textual way. Some scholars further study the artistry of ethnic costumes, and analyze the cultural elements in ethnic costumes from the perspective of design. The study also analyzes the value and reference methods of ethnic elements in international trends. Combined with the author's experience and feelings of field investigation in various ethnic

areas, this research interprets the design elements in ethnic costumes from the styles, patterns, craftsmanship and other aspects of ethnic costumes. The study deeply discusses the ideas and methods of integrating ethnic elements with clothing design. This research is the accumulation of the author's years of experience in national costume art research and teaching practice. Most of the research pictures are personal first-hand information, and the information is highly ornamental and readable. This research combines the pattern-making of clothing CAD with the teaching system of national costume culture, and focuses on establishing a database for the pattern structure with great characteristics in clothing. This research compares and optimizes the advantages and disadvantages of clothing structure, filling the gap in previous research. This study summarizes the plate-making technology of the clothing culture teaching system from vertical and horizontal perspectives, and builds a set of effective inheritance paths.

2 THE APPLICATION THOUGHT OF COMPUTER AIDED TECHNOLOGY IN THE TEACHING OF COSTUME CULTURE

2.1 CAD System can Support Clothing Pattern Design

Garment plate making is an important project in industrialized garment production. Specifically, the plate-making project of industrialized clothing consists of three major parts: structure, technology, and style design. Clothing plate making can also be called structural design, which is an extension of style and the basis of process design. The industrialization of clothing specifically includes three steps, including the creation and design of clothing. Specifically related to clothing fabrics, clothing patterns and styles. Structural design of clothing, including plate making, pattern making, and specific specifications and dimensions of each part. The technological design of clothing, including the sewing method and process of finished clothing. The plate-making link is just in the middle and plays the role of linking the previous and the next, and it is the most important link in the clothing design. Based on this background, this paper focuses on the pattern design and improvement methods in the clothing culture teaching system. This paper uses the CAD technology of clothing design to construct the pattern data. In this paper, the calculation method of grid system is used to solve the error existing in the estimation of ethnic version. The Intelligent clothing pattern design process supported by computer-aided technology is shown in Figure 2.

The CAD system can classify the irregular shapes of the fabrics in the patterns of ethnic costumes. The system can compare and analyze the design pattern and the industrial pattern, and improve the unreasonable parts of the clothing culture teaching system. Through the application of this technology, the clothing pattern structure in the clothing culture teaching system has been effectively inherited and developed. In this paper, the application of computer CAD technology to the design of clothing patterns has many advantages. First of all, CAD technology can be used in all aspects of clothing design. These links mainly include clothing style CAD design system, clothing technology CAD design system, three-dimensional clothing CAD design system and clothing fitting and tailor-made system. Enterprises can also use CAD technology to carry out computer-aided manufacturing, garment enterprise management and many other tasks. Fashion design CAD technology can be perfectly combined with the designer's design concept. This technology is beneficial to complete image processing, data acquisition and other work. This technology can make clothing design as efficient and accurate as possible, and provide designers with some quick technical methods.

2.2 The Advantages of Computer CAD Technology in Clothing Pattern Drawing in the Information Age

There are more than 10,000 sets of CAD design systems used by Chinese clothing manufacturers and clothing design colleges. Among these systems, China's CAD design system occupies nearly 80%.
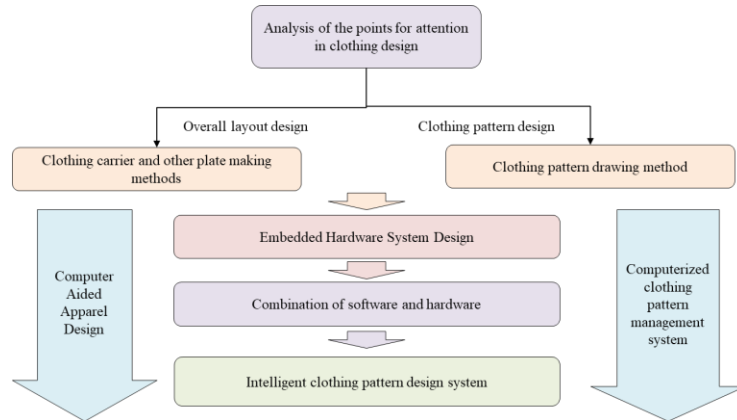
Figure 2: The Intelligent clothing pattern design process supported by computer-aided technology.

Through the CAD design system, clothing designers can use the expression techniques of clothing painting more abundantly. The system can also draw patterns in finer detail. Although computer drawing is still more difficult than traditional hand drawing, designers can make the design effect flexible and changeable through their own expression methods. In addition to the scheme design system, the garment CAD pattern design system mainly draws the pattern through computer technology. This method can improve the design accuracy, and it is more convenient and time-saving to modify the clothing. In addition, the garment process CAD system mainly provides two functions of push plate and nesting. Fashion designers use computers to design samples, creating images or data information in a module. This design method can more accurately express the design intent.

At present, the teaching curriculum system of clothing culture in the clothing design industry is relatively fixed. Teachers cannot combine computer software well to carry out the course teaching of clothing pattern composition. In addition, it is also difficult for teachers to apply the imitation design method of fabric clothing patterns to real clothing pattern design work. In the current stage of clothing design work, it is necessary to make clothing design results into clothes. Only by wearing the clothes on the model can the actual three-dimensional clothing color matching effect be tested. However, the school's teaching system has not been updated accordingly, and students can't well use clothing color matching and fabrics in clothing design in actual work. At present, there are still deficiencies in the teaching content system in the application of clothing patterns and clothing culture in higher vocational colleges. At present, the development trend of China's fashion design industry has been iterating in the direction of digital technology. The application effect of computer CAD technology in the design of clothing renderings is shown in Figure 3.

2.3 CAD Technology can Support the Rapid Display of Design Effects

The fashion design industry urgently needs to carry out comprehensive research on computer CAD technology and fashion culture design. At present, the technical problems that need to be solved in the fashion design field are as follows: First, in the teaching of fashion culture, the design field needs to combine modern software (PS, CORLDRAW, AI, etc.) to carry out modeling design. Designers need to build a set of computer practice question banks including clothing pattern attributes, hues, and color matching skills. In this link, the design work requires the cooperation of professionals from art design, software design and clothing design. The design results are finally presented in the form of CD-ROM. Second, designers need to apply the theory and skills of clothing patterns to clothing matching. The existing CAD clothing software design system combines the software and hardware equipment of clothing design.
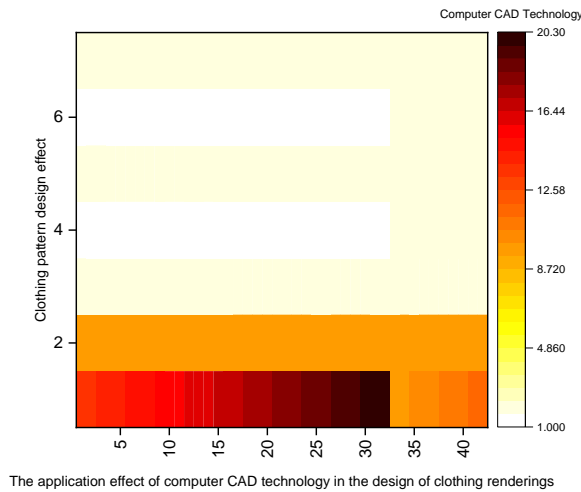
Figure 3: The application effect of computer CAD technology in the design of clothing renderings.

Fashion designers can quickly change the color matching of clothing by simply clicking the mouse, and then show the effect of three-dimensional clothing design. The core design problem to be solved by the three-dimensional clothing color matching system is to systematically display the real fabric effect in the computer. In this process, clothing designers need to present the most realistic presentation of a series of indicators such as thickness, hardness, drape and so on of different fabrics. At the same time, clothing designers can perform color replacement according to the general clothing pattern system in the field of clothing design. The information-based clothing CAD clothing pattern teaching system can improve the efficiency of clothing pattern teaching. Colleges and universities need to reduce the waste of resources caused by traditional teaching models. At the same time, colleges and universities also need to improve students' practical ability to reduce the running-in period between students and enterprises after graduation. The main content of intelligent clothing cutting based on computer CAD technology is shown in Figure 4.
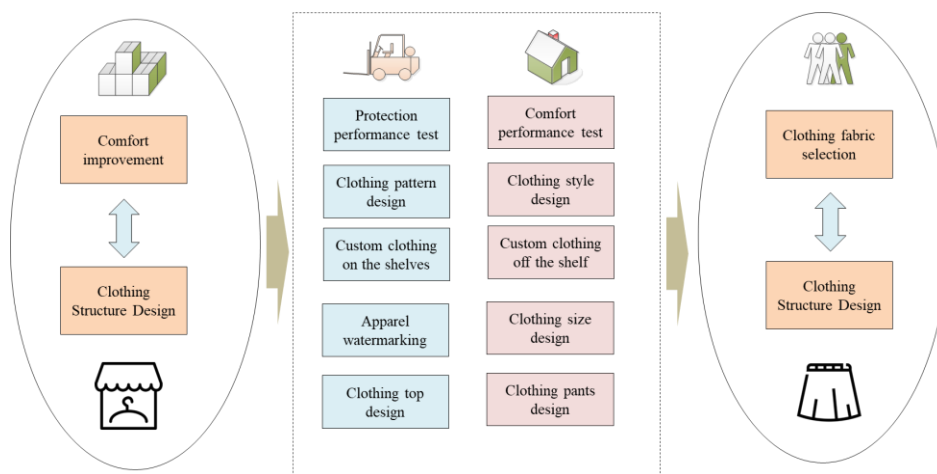

Figure 4: The main content of intelligent clothing cutting based on computer CAD technology.

3 THE APPLICATION STRATEGIES OF COMPUTER-AIDED TECHNOLOGY TO SUPPORT CLOTHING CULTURE TEACHING

3.1 The Application of Computer Technology in the Color Matching of Clothing Patterns

On the other hand, the three-dimensional clothing color matching system developed by the school can further improve the students' clothing and clothing pattern matching skills. The technology can be applied to the field of e-commerce sales and fabric development. Designers use textile design theory and 3D human clothing modeling theory to design. Based on the three-dimensional scene of the real human body, the clothing designer builds a virtual fitting system and a virtual clothing color matching system. The 3D scene of the real human body is a brand-new design environment. In this scenario, the three-dimensional virtual clothing color matching system can comprehensively use a variety of digital design technologies. These technologies include digital photography technology, laser digital scanning technology, wireless mobile communication technology, telecommunication software, computer software and hardware technology, computer database technology and other technical systems. In the Internet and wireless mobile communication environment, this technology can display the real human body digital three-dimensional model, and the system can support customers to virtually try on various clothes. The system can also synthesize the real human body three-dimensional clothing color matching effect. Designers can adjust and modify the effect of clothing patterns at will. Designers only need to change the fabric, color and printing to change the style of clothing. The application of CAD aided design technology in garment modeling and typesetting is shown in Figure 5.

The system uses SQL statements to perform database operations such as data addition, modification, deletion, and query. In addition, the data access layer is an important part of the interaction between CAD business content and data sources. The system provides the data access interface necessary for the business layer, and the logic of the business layer completely depends on the services provided by the data access layer. The CAD design service provided by the system is functionally connected to the outside through the interface. The system separates the data access layer, which helps to provide a better data storage strategy. The system update only needs to change the data access layer, without affecting the complex business logic.
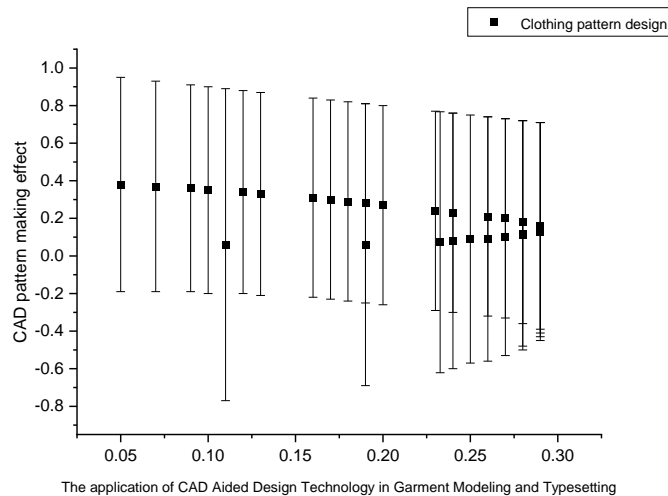

The application of CAD Aided Design Technology in Garment Modeling and Typesetting

Figure 5: The application of CAD aided design technology in garment modeling and typesetting.

3.2 The Artistic Value and Characteristics of Apparel CAD Design Technology

The similarity retrieval method of multimedia data can be simply understood as the feature expression of different media materials. The clothing pattern design effects are searched and sorted in the corresponding feature space. There are two ways to express features: one is the visual features extracted by traditional methods, such as key point features, color histograms, etc. The other is the deep learning method, which is used to extract the underlying basic or deep features of the pattern. Specifically, the Meatus Deep Hash system is a large-scale multimedia data retrieval system based on deep hashing technology. The system relies on massive multimedia data, and is divided into two modules: algorithm and service. Fashion design has never been limited to textile design, other materials can also be used as artistic expressions. Materials such as leather, fur, plastic, glass, metal, wood, etc. Fashion styles, whether simple or complex, must be reflected in design fabrics. However, the texture, physical properties, and plasticity of materials limit the styling characteristics of garments. The application of CAD design technology in garment design and garment tailoring is shown in Figure 6.

In clothing design, clothing patterns can most intuitively show the effect of the overall visual elements of clothing. Different ways of matching clothing patterns will have different degrees of influence on the emotions of customers. It can be seen that clothing patterns play a vital role in the overall artistic atmosphere of clothing and the aesthetic feeling of customers. Clothing patterns do not exist alone, they will be jointly influenced by the texture and texture of the fabrics. The same color reflects different effects on fabrics with different textures and textures. The designer's use of clothing patterns cannot stay on the inherent cognitive understanding, and should fully grasp the inherent relationship between fabric materials and clothing patterns. Designers need to flexibly control the proportional relationship between clothing patterns, the relationship between cool and warm, the relationship between purity and transparency, and the relationship between contrast and complementarity.
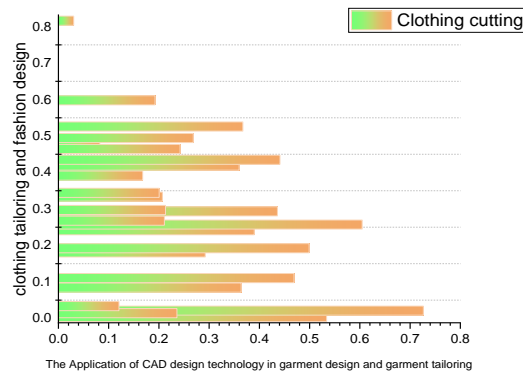

Figure 6: The application of CAD design technology in garment design and garment tailoring.

3.3 The Design Ideas and Application Strategies of Fashion Designers

Designers' ideas are rich, but the most important thing is to turn designers' ideas into reality. Clothing style diagrams are the best way for designers to express themselves. The drawing effect of the hand-drawn style diagram is relatively simple, which can quickly reflect the characteristics of the style diagram. Therefore, designers of clothing enterprises are mainly engaged in graphic style drawing work. Fashion designers need to quickly record the characteristics of clothing while watching fashion shows or conducting market research. Fashion designers draw clothing styles on the basis of learning the latest design concepts. The line performance of the clothing style map should be clear, sleek and smooth. Clothing design should consider the separation of virtual and

solid lines. The virtual and solid lines in the clothing pattern represent different technological requirements. The clothing pattern design effect in intelligent clothing pattern design system is shown in Figure 7.
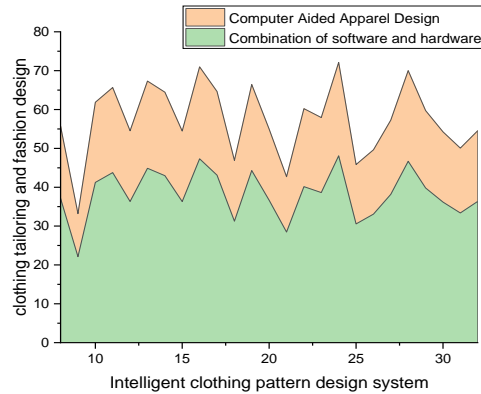

Figure 7: The clothing pattern design effect in intelligent clothing pattern design system.

4   CONCLUSION

With the progress of the times, the clothing industry chain has also developed rapidly. Consumers have higher and higher requirements for apparel products. The modernization and transformation of national costumes is conducive to the excavation and arrangement of the resources of the costume culture teaching system. Clothing CAD plate making technology has innovative value in the design of clothing culture teaching system. This value is manifested in that the version of the clothing culture teaching system needs to be sorted out. CAD technology can effectively promote the modernization and transformation of the minority clothing culture teaching system. The establishment of the clothing pattern database in the clothing culture teaching system can effectively apply the clothing culture teaching system to the industrialized clothing production work. Fashion designers need to design clothes that meet the needs of modern consumers in combination with market innovation requirements.

After entering the enterprise, students cannot use the clothing design ability to carry out related work. At the same time, the current school's teaching of fashion design only stays in the theoretical aspect. Students also lack experience in actually applying the skill. Traditional teaching methods lead to low learning efficiency of students. School teaching also consumes a lot of paper, color, consumables and other resources. The traditional clothing teaching work does not completely match the contemporary technology application ability. Therefore, this paper hopes to build an efficient and low-carbon teaching model. This teaching mode can fully understand the characteristics and changing laws of clothing patterns. Colleges and universities need to improve the teaching methods of clothing culture. The focus of college clothing pattern design work is to organically combine design theory, skills and computer operation technology. Fashion design is a comprehensive discipline that integrates theory and practice.

Based on the concept of information design, vocational colleges need to start with the teaching of clothing culture and seek ways to use CAD technology in clothing design. The most of the garment CAD design software on the market is used for the layout and fabric pattern design of the garment production process. In terms of clothing copy design, there is still a lack of corresponding design software support. This paper implants the concept of information design from the source design stage of clothing patterns, and builds an intelligent clothing color matching system based on the existing clothing CAD software system. This article focuses on the teaching content of the

color course in the clothing culture teaching, and explores the teaching mode of combining digital technology and art design in the clothing design course. With the continuous development of social economy, the teaching system of clothing culture has undergone earth-shaking changes. The traditional costume culture teaching system is facing structural optimization and content reconstruction.

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