

# Application of Computer Aided Costume Design Course Based on Digital Simulation Technology\*

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**Abstract**—The innovation and application of costume digital simulation technology is one of the important measures of teaching research under the new situation and reform an development of fashion education. In recent years, a large number of modern digital forms have been applied into teaching, and the role and influence of teaching methods and teaching forms are becoming more and more significant. Modern teaching media has become a significant tool to spread education information. The application of costume digital simulation technology in the computer aided costume design course will inevitably bring about changes in teaching approaches, methods and concepts of fashion education.

**Keywords**—digitalization; simulation technology; computer aided costume design; application

## I. INTRODUCTION

In order to thoroughly implement “the Thirteenth Five-year Plan for Educational Informatization”, comprehensively enhance the ability of information technology’s supporting and leading education innovation development, and accelerate the modernization of education, the development of education informatization has made great progress since “the Twelfth Five-year Plan”. The development and application of digital educational resources have continued to deepen, and the construction of educational resources and education management platform has been steadily promoted, and the informatization awareness and capabilities of teachers have been significantly enhanced. However, in general, compared with the trend of digital, network, and intelligent development in the world, and compared with the requirements of realizing the educational modernization, the development level of costume education informatization needs to be improved. Applying costume digital simulation technology to the teaching or practical operation of the computer aided costume design course can better realize the seamless connection with the design, production, and management of garment enterprises in the digital era. Meanwhile, it can also save investment in teaching funds, and improve students' interest in learning, so as to improve teaching efficiency and results.

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## II. OVERVIEW OF COSTUME DIGITAL SIMULATION TECHNOLOGY

The costume digital simulation technology is a multi-disciplinary comprehensive technology that serves the garment industry. It can be understood as a technological means that applies modern simulation technology computers and special equipment to store various information (such as text, graphics, colors, relationships, etc.) of costume in digital form in computers and operate it, and uses a system model to perform dynamic tests on actual or envisioned systems and finally presents it again in different forms or sends it to an executive agency in digital form [1].

The application of digital simulation technology has developed rapidly in the garment industry. Especially in recent years, the digital technology has been developed from the two-dimensional garment sample design, grading and layout to the application of current three-dimensional clothing CAD software in virtual parameter adjustment, two-dimensional paper pattern design, sheet bar sewing, fabric treatment, three-dimensional simulation presentation, made virtual clothing and e-commerce platform selling.

## III. THE APPLICATION OF DIGITAL SIMULATION TECHNOLOGY IN THE COMPUTER AIDED COSTUME DESIGN COURSE

The computer aided costume design course is one of the most important teaching contents in the clothing colleges and universities. This course widely adopts practical teaching mode of modern digital technology, learns and applies the existing professional knowledge while finishing the designed project, and improves students' comprehensive abilities. At present, the digital technology teaching of computer aided costume design course is still in the stage of exploring and trying. The traditional teaching methods have no longer adapted to the needs of talent cultivation of education information development, therefore, what kind of teaching mode is adopted in the teaching jobs will directly affect the students' learning interest and teaching effect. The application practice of modern digital technology in the computer aided costume design course will subvert teaching modes, teaching approaches and teaching ideas, and vigorously promote the development process of costume digital education. At present,

the digital simulation technology that applies to fashion major includes three-dimensional measurement image technology, virtual simulation technology, virtual presentation technology and so on [2].

The fashion design of digital simulation technology mainly refers to the whole process of fashion style design, structural design, process design, and it is a kind of manifestation that utilizes clothing CAD (computer aided design) and clothing VR (virtual reality technology) to conduct some digital designs, including fashion style, sample plate, virtual fitting effect. This technology includes digital clothing customized, three-dimensional virtual fitting technology, transformation from two-dimensional paper pattern to three-dimensional sample dress in clothing CAD, and virtual simulation presentation of texture and action of fabric. All the above technologies are the new manifestations of reform and practice of computer aided costume design course under the digital simulation technology [3].

The digital simulation technology uses the scanning data of three-dimensional human body measurement technology to establish human body virtual model in the computer, simply operate the virtual model to try on the clothes in the clothing storage, present the fitting effect simulated by the computer and this technology can also simulate different three-dimensional overhanging effect in various shell fabric [4]. Besides, it can also watch the dressing effect in different angles by 360 degrees of rotation function, and timely carry out design and modification of style, fabric matching and design and modification of costume color according to the requirements, until the products are satisfied. For example, based on Vidya three-dimensional virtual fitting software, the clothing design can make the customers learn about the appearance, style, color and other visual information before the clothes are produced through digital human modeling, digital sample dress fitting and modification (garment piece modeling, garment piece sewing, collision detection, fabric simulation technology), dressing body modeling in sports and modify the three-dimensional virtual clothing through the way of man-machine interaction.

How to use the information network technology to realize the digitization, information management and promote the structural adjustment of China's clothing educational enterprise and clothing industry and achieve technology upgrading is the problem to be solved to realize the development of Internet + education and digital clothing industry[5]. The application of this technology in the teaching process of computer aided costume design and other courses will greatly enhance students' interest in learning and their spirit of exploration.

#### IV. APPLICATION VALUE OF DIGITAL SIMULATION TECHNOLOGY IN COMPUTER AIDED COSTUME DESIGN COURSE

The digital simulation technology has not only changed the traditional teaching means and methods in garment major, but also created a new design concept, which has extensive development and increasingly prominent application value.

##### A. Suitable for the Social Demands of Technical Talents for Application

The application of digital simulation technology in computer aided costume design course aims to cultivate the garment application technology talents in the era of internationalization, technology and digitization. Under the background of transformation and upgrading of the garment industry, it provides a guarantee for cultivating the garment application technology talents who are suitable for social needs. Traditional education regards imparting knowledge as the educational objectives, classroom teaching as an entry point, and inheritance education as the main feature. Application-oriented technology education aims to the education objective of cultivating innovative spirit, innovation ability and practical ability and fully-developed individual, takes students' participation in social practice, research training, and research projects as an entry point, and regards innovative education as the main feature, emphasizing the comprehensiveness between the subjects[6]. The curriculum can be integrated with the market and adapt to the society, so as to ensure the cultivated students can better meet the requirements of social occupation posts.

##### B. Conducive to Improving Teaching Quality and Learning Interest

Through the application of costume digital simulation technology, the new model of applied technical talents training can be continuously improved. This application provides practical new ideas and new methods for education reform and innovation, as well as theoretical support for training high quality applied talents, and supplies reference for improving the teaching quality.

1) *Better express design ideas and present realistic visual effects:* By using the digital simulation technology, the costume designer turns the idea into reality through the digital virtual technology of computer. This technology develops the fashion effect drawing that reflects the design intention of the costume designer and captures design inspiration from the traditional pure hand drawing to computer digital era, as well as the virtual effect that develops from two-dimensional surface to three-dimensional dressing[7]. This technology may better express the ideas of costume designer, provide better communication platform for fitter, designer, pattern maker and craftsman, and offers more vivid visual effect.

2) *Convenient, fast, accurate and efficient:* Digital simulation technology is convenient, fast, accurate and efficient, which can greatly shorten the design cycle, improve design efficiency and enhance expressive force. By using the computer for computer, we can easily modify, amplify, twist, adjust the color at any time. The speed and accuracy of the computer are extremely high, and we can copy and diversely combine the works to enlighten the design idea[8]. The costume design adopts computer aided digital simulation technology to carry out garment style design, color matching, automatic pattern scaling and visual pattern correction, which greatly shortens the design cycle of the clothing and improves the reaction speed of the product market.

3) *Real-time interaction, increasing interest, and resource sharing*: This technology can make clothing by 3D visualization technology, achieve interactivity and enhance learning interest, meanwhile, it can also reduce the costs of clothing, achieve the unlimited use and copy, reduce the possibility of artificial damage. The key is that it can also solve some problems, such as the demands of clothing enthusiasts for clothing design, the incomplete skill training apparatus and equipment, so as to optimize the resource library[9]. Under the background of modern global network integration environment, we can fully utilize the network resources to realize the cooperative training, collaborative training and remote training of clothing application skills to achieve the sharing and distributed effect of resources.

### C. *Contribute to Improving Teachers' Teaching Level and Students' Learning Level*

At present, the application of clothing digital technology in China's clothing teaching is still at the stage of development. There are still many technical problems that need to be solved. In terms of many problems that are unsatisfactory and cannot meet actual demand, we need to make technological improvement in the process of development [10]. For example, the lack of digital and informational talents with professional knowledge of clothing, the lag of three-dimensional digital clothing design, informatization software system's lacking of personalized service for different levels of clothing enterprises, mismatching of clothing enterprises' operation mode and information needs and informatization software, clothing enterprises' decision-making level lacking of adequate awareness of clothing digitalization and informatization construction and so on. To a certain extent, these factors have limited the rapid and large-scale development of clothing digital technology teaching and enterprise application. The cultivation of competence is inseparable from the practical teaching link. Based on the reform and application of computer aided costume design course of costume digital simulation technology, we will make full use of modern clothing digital simulation technology to guide and design our costume design teaching. Through participating in the practical research of modern costume technology or completing the design practice under the guidance of teachers, students can master the overall penetration of professional knowledge and the application of technical innovation, which can better cultivate the professional ability of teachers and students, as well as the practical ability to analyze and solve problems, and can improve teachers' teaching level and students' learning level.

## V. CONCLUSION

The spread of any technology cannot be accomplished overnight, which is based on people's knowing and understanding of it, and it is a long process of application and improvement. Therefore, the application research and development of digital simulation technology for fashion design is a long-term task for the development of costume education teaching and clothing industry. The application of costume digital simulation technology in computer aided costume design courses is an effective measure to embody the

modernization and informatization development of education. It can integrate professional courses into educational informatization and ensure that the cultivated students can meet the requirements of the social and professional posts. To further promote the development of information technology in clothing education is an inevitable choice and strategic measure to adapt to the current educational reform and the application trend of information technology innovation, realize educational modernization on schedule, and provide strong technical and skilled talents support for national economic and social development.

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