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Research on the Teaching Reform of Garment Pattern Design and Technology Course in Higher Vocational Education in the Internet Age: The Integration of Virtual Simulation Technology and Traditional Culture

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Abstract: In the context of the Internet era, modern technology has advanced rapidly, with the integration of digital intelligence emerging as a significant trend in the reform of higher vocational education and teaching. This paper uses the higher vocational clothing design and technology major as a case study. It first analyzes the current state of the discipline within the Internet era, and then explores the significance and pathways of integrating virtual simulation technology into the teaching of traditional cultural elements in clothing pattern design and technology courses. The purpose of this paper is to drive educational reform in vocational clothing design further, providing robust support for the sustainable development of the fashion design industry.

Keywords: Internet era; Higher vocational college; Virtual simulation technology; Teaching reform; Traditional culture integration

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1. Introduction

In the Internet era, modern information technology such as big data and virtual simulation has developed rapidly, and all aspects of life have begun to transform and upgrade in the direction of information and digitalization [1]. On the one hand, for the garment industry, China's garment industry is constantly pioneering and innovating with the assistance and support of modern information technology. Whether it is the production design or publicity and marketing of clothing, it fully demonstrates the advantages of modern information technology and greatly improves the market competitiveness of China's garment industry. On the other hand, for the education industry, China's Ministry of Education issued the "Education Information 2.0 Action Plan" policy document, emphasizing

the importance of the integration of information technology and education [2,3]. Therefore, the fashion design major in higher vocational colleges should conform to the development trend of the social times, actively integrate modern technological means into the curriculum teaching, promote the reform and development of education information, and cultivate more fashion design talents with advanced skills. The shape, cut and other elements of traditional Chinese clothing contain cultural symbols. Through virtual simulation technology, students can be immersed in learning, experience the beauty of traditional culture, and stimulate the idea of innovative applications.

2. Analysis of the current situation of garment design in higher vocational colleges in the Internet era

2.1. The current situation of fashion design in higher vocational colleges in China

The "14th Five-Year Plan" points out that China should build several world-class enterprises during the "14th Five-Year Plan" period, and promote the transformation and upgrading of the traditional clothing industry and enterprises to the direction of information, digitalization and integration [4–6]. Under "Fourteenth Five-Year Plan," various regions began to promote the digital transformation of clothing enterprises, on the other hand, they are also exploring a talent training system that is more in line with the development needs of the social era. For example, some fashion brand enterprises use virtual simulation technology when displaying new clothes or participating in major shows, which brings a good interactive experience to the audience. Some college students majoring in fashion design have also begun to use virtual simulation technology in their graduation works. It can be seen that under the background of the Internet era, both China's clothing industry, enterprises and clothing design majors in higher vocational colleges have begun to transform to digital development.

However, at present, there are problems such as the disconnection between talent training and enterprise demand and the high number of professional cancellations in garment design majors in higher vocational colleges. Especially since 2019, China's fashion design profession has become the "hardest hit area" of revocation [7]. Relevant statistics show that there are 16 colleges and universities of fashion design that have been revoked in 2019, 10 in 2020 and 19 in 2021 [8]. In the face of such a high amount of cancellations, the talent training pressure of garment design majors in higher vocational colleges in China is increasing, and the employment situation of students is becoming more severe. Therefore, under this situation, how to reform the specialty of fashion design in higher vocational colleges, how to train more refined composite professionals who are more suitable for the development needs of the Internet era, and how to help the specialty of fashion design break through the dilemma have become a key issue that all colleges and universities need to solve urgently.

2.2. Characteristics and teaching status of clothing pattern design and craft course

In clothing and clothing design, clothing pattern design is a link connecting clothing design with clothing production and processing, and it is also a necessary professional skill for designers [9]. Therefore, this requires higher vocational clothing pattern design and technology courses should not only teach students basic professional theoretical knowledge and basic practical skills but also pay attention to the cultivation of students' comprehensive design ability and professional quality. However, from the current point of view, there are generally the following problems in the teaching of clothing pattern design and technology courses in higher vocational colleges:

First, there is a lag effect in the teaching content, which is easy to leads to the disconnection between the

course teaching carried out by teachers and the actual industrial demand, which is not conducive to the future employment of students. Second, the setting of practice links is insufficient. Affected by various factors, higher vocational colleges lack the corresponding experimental equipment and training base, so students' professional courses are prone to problems such as disconnection between truth and practice, which is not conducive to the coordinated development of students' professional knowledge and professional skills. Third, the teaching method is simple. At present, although information teaching methods are gradually popularized in higher vocational colleges, some teachers still rely too much on traditional teaching methods for the teaching of clothing pattern design and technology and lack the integration and application of modern technology means, which will not only affect the teaching effect but also gradually kill the original enthusiasm of students.

To better cope with the problems existing in the clothing pattern design and technology course in higher vocational colleges, virtual simulation technology provides a new model for the core teaching of traditional clothing majors, and provides a new path for the inheritance of traditional culture. Through 3D modeling, students can observe and learn the structure and process of clothing in a more time-saving and intuitive way in the virtual space. This immersive experience not only helps students grasp the essence of traditional design but also inspires them to innovate the application of traditional cultural elements in modern clothing design.

3. The significance of applying virtual simulation technology to clothing pattern design and craft course teaching in the Internet era

3.1. Beneficial to stimulate students' creative inspiration

The introduction of virtual simulation technology into the teaching of garment pattern design and craft courses in higher vocational colleges can bring brand new learning experiences for students majoring in fashion design. In the learning process, students can participate in various virtual simulation practice activities, experience the whole process of clothing pattern design and production, combined with traditional clothing as the carrier of the project content, feel the charm of digital technology, and implement the integration of technology and culture. For example, students can use virtual simulation technology to design and complete their homework. They can have a rich experience of clothing design through visual observation and in-depth experience of different clothing design elements of traditional Chinese clothing pattern design, including Qipao design, fabric texture and color matching, in the virtual world. This will provide more inspiration for them to carry out innovative clothing design [10].

In addition, the teaching application of virtual simulation technology can provide a new way of visual communication and creative cooperation for students majoring in fashion design in higher vocational colleges. Students can visually present their new ideas through virtual simulation technology. Compared with language expression, this way can provide convenience for teachers, students and students to exchange new design ideas. In addition, teachers and students can put forward their opinions or suggestions based on their professional experience and visual effects, which is conducive to ensuring that students can revise and optimize their work in time.

3.2. conducive to promoting the realization of low-carbon teaching in fashion design majors

First, virtual simulation technology can simulate the production process of various materials. In this way, students can try on different clothing styles through virtual simulation technology to understand the impact of different material choices on clothing performance, comfort, environment, etc., so that they can choose the material with

the least impact on the environment more consciously when designing clothing patterns [11]. In addition, when students use virtual simulation technology to design clothing patterns, they can also learn about the clothing pattern design steps and clothing production steps with more material waste, which is conducive to guiding students to pay more attention to the choice and use of environmentally friendly materials in the design, so that they can gradually develop good design habits.

Second, virtual simulation technology can effectively solve the problem of insufficient teaching resources and high-cost input. In the traditional clothing pattern design and technology course teaching, student practice usually needs to consume a lot of materials and experimental equipment, the required investment of teaching cost is high. But with the help of virtual simulation technology, students can immerse themselves in the virtual environment to learn and practice training, without the need to spend real materials and experimental equipment. In this way, students can not only practice repeatedly, their practice process will not produce a variety of waste gas, waste and other pollutants, which is conducive to ensuring the quality of teaching, reducing teaching costs while realizing low-carbon teaching [12].

4. The path of applying virtual simulation technology to clothing pattern design and craft course teaching in the Internet era

4.1. Optimizing the objectives of curriculum teaching reform

In the context of the Internet era, the application of virtual simulation technology to higher vocational clothing pattern design and technology courses has three main teaching reform goals: First, teachers can effectively improve the teaching quality by using virtual simulation technology to assist course teaching. Second, by using virtual simulation technology, teachers can give full play to its advantages such as visualization and real-time feedback, optimize the course teaching form, teaching strategy and teaching content, and select appropriate teaching equipment to assist students in learning and training according to the technical difficulty of clothing pattern design, so as to realize the education information reform. Third, teachers should further explore the integration path of virtual simulation technology and clothing pattern design, such as clothing pattern design and production, material selection, clothing virtual fitting, etc., in order to deepen students' understanding of theoretical knowledge and professional skills and bring them a good learning experience, so that they can fully feel the whole process of clothing pattern design.

4.2. Optimizing the teaching content of virtual simulation experiment in the course

Curriculum resources are the important support and basic guarantee for teachers to carry out the teaching process and achieve the teaching objectives of the course. in the Internet era, in order to further promote the organic integration of virtual simulation technology and course teaching, teachers can use virtual simulation technology to transform the cutting-edge scientific research results related to clothing pattern design into experimental teaching cases, such as clothing pattern design technology and equipment based on virtual simulation technology [13]. Thus, teachers can integrate course resources into experimental teaching with the help of virtual simulation technology, which is conducive to ensuring the forefront of what students learn. Moreover, teachers can use the virtual simulation experiment sharing cloud platform to integrate enterprise cooperation cases into the virtual simulation experiment teaching to deepen the integration of production and teaching. In the learning process, students can also upload their completed clothing pattern design work to the cloud platform, which can not only provide convenience for teachers, enterprises and the social market to test students' learning results, but also

promote the co-construction and sharing of school-enterprise resources.

4.3. Relying on virtual simulation experiment to simulate the key and difficult points of teaching

In the course of clothing pattern design and technology teaching, teachers can use virtual simulation technology to simulate the important and difficult points of teaching, such as the change of the internal structure of clothing pattern design and the teaching simulation of the work forming process, so as to help students better understand and master professional knowledge and skills. With the help of virtual simulation technology, teachers can reproduce the scene of clothing pattern design and production, which is conducive to realizing the visualization of context, simplifying the process of students acquiring knowledge and reducing the difficulty of students learning. In practical practice, teachers can also divide the virtual simulation experiment teaching of clothing pattern design and craft course into five modules [14]: theoretical cognition, equipment training, principle learning, process design and three-dimensional virtual imitation and real operation. Among them, teachers can let students complete the three modules of theoretical cognition, equipment practical training and principle learning in the pre-class stage, so as to lay the foundation for subsequent teaching. In classrooms, teachers can use virtual simulation technology to complete theoretical teaching and practical teaching of relevant important and difficult points, so as to promote the coordinated development of students' theoretical foundation and practical skills. After class, teachers can ask students to combine the content of the process design module for innovative practice, and display their own clothing pattern design works through the three-dimensional virtual imitation of real operation module, so as to further promote the effective docking of theoretical teaching and practical training of the course.

4.4. Strengthening practical teaching by relying on virtual simulation platform

In the course practice teaching, teachers can use the virtual simulation platform to promote the deep combination of production, learning and research. In addition to introducing the enterprise production link in the course teaching mentioned above and simulating practical teaching with the help of virtual simulation technology, teachers can also cooperate with enterprises to jointly establish a shared cloud platform for virtual simulation experiments and build a "1 + 4 + X" training mechanism for practical teaching talents. "1" refers to the student-centered Fashion Design Industry Research Institute established by both the university and the enterprise as the practice base; "4" refers to the four abilities of students, which are: professional basic ability, comprehensive knowledge application ability, creative design ability and innovative practice ability; "X" refers to that both the university and the enterprise guide students to participate in X practical activities according to their majors, such as allowing students to use the virtual simulation platform to carry out clothing pattern design experiment operation, participate in enterprise production practice, participate in vocational skills competition, etc. [15] In this way, the teaching effect of the course can be effectively guaranteed, and the cultivation of students' innovation consciousness, innovation ability and practical ability can also be realized.

5. Conclusion

In the Internet era, virtual simulation technology provides a new practical idea for the teaching reform of clothing pattern design and craft course in higher vocational colleges. In the specific teaching, teachers can optimize the teaching content, simulate the important and difficult points of teaching and strengthen practical teaching based on the clear objectives of curriculum teaching reform, so as to promote the organic integration of art, science

and technology and education. In the future research, the combination of virtual simulation and other modern technologies, such as artificial intelligence and big data analysis, can be further explored to improve the teaching effect and students' practical ability, and bring more possibilities for fashion design education.

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Disclosure statement

The authors declare no conflict of interest.

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