

Exploration of Empowering Practical Teaching Reform in Clothing Majors with Virtual Simulation Technology

XiaoXiu Liu

Graduate University of Mongolia, Mongolia Ulaanbaatar 15141, Mongolia

Email: 1197481025@qq.com

How to cite this paper: Liu, X. X. (2026). Exploration of Empowering Practical Teaching Reform in Clothing Majors with Virtual Simulation Technology. Educational and Humanities, 2(2), 13-20. ISSN Print: 3104-4352; ISSN Online: 3104-4360. <https://doi.org/10.63313/EH.9037>

Published: 2026-02-02

Copyright © 2026 by author(s) and Erytis Publishing Limited.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Abstract

With the rapid development of computer technology and simulation technology, the advantages of virtual simulation practical teaching in talent cultivation are becoming increasingly prominent, demonstrating the characteristics and advantages that traditional teaching does not possess. Therefore, this article aims to fully explore the characteristics and advantages of virtual simulation technology in practical teaching of clothing majors, in accordance with the overall requirements of deep integration of modern information technology and education. It focuses on building a virtual reality interactive, online and offline mixed, and in class and extracurricular linkage experimental teaching system; Develop a virtual simulation experiment teaching resource package; Reform the virtual reality interactive experimental teaching mode, implement the four step teaching method of "conception, design, practice, and evaluation", build a bridge between theoretical teaching and practical teaching, cultivate students' practical, innovative, and comprehensive application abilities, and lay the foundation for the cultivation of innovative and applied clothing talents.

Keywords

Virtual simulation technology; Clothing major; Reform of practical teaching

1. Application of Virtual Simulation Technology in the Practice Teaching of Clothing Specialty

In recent years, the application of advanced technologies such as virtual reality (VR), artificial intelligence, and "Internet+" in education has driven the development of innovative teaching concepts and models. This integration of information technology and education has created a new landscape of collaborative innovation, enabling the use of cutting-edge technologies to deliver intuitive, engaging, and efficient teaching experiences. It also provides robust technical support for collecting, consolidating, and utilizing diverse educational resources in teaching

management.

Virtual simulation technology has emerged as a cutting-edge research focus. Its integration into course instruction, particularly practical training, enables the fusion of academic content with virtual environments to create immersive learning spaces. This approach stimulates students' multi-sensory engagement, enhances course participation, and improves teaching effectiveness. Currently, most universities have implemented virtual simulation in courses such as Fashion Design, Garment Structure Design, Pattern Making & Technology, 3D Cutting, and Fashion Display. However, these implementations remain fragmented, lacking systematic practical teaching frameworks or comprehensive curriculum structures. Furthermore, the absence of resource integration has prevented the development of shared teaching packages that synergize theoretical and practical instruction, along with mature interactive virtual simulation models. Additionally, the faculty structure remains limited, and the construction of multi-level practical teaching platforms based on digital virtual reality technology lacks professional management expertise in network equipment maintenance, installation, and system upgrades.

2. Reform and Exploration of Virtual Simulation Technology in the Professional Practice Teaching of Clothing

Leveraging digital education management systems, platforms like Xuetong, and virtual simulation technologies, we establish an experimental teaching framework that integrates virtual reality interactive instruction, blended online-offline teaching, and coordinated in-class/out-of-class learning. This involves developing virtual simulation experiment resource packages, reforming the virtual reality interactive teaching model based on the four-step methodology of "conception, design, practice, and evaluation," building a digital experimental teaching faculty team, and implementing virtual simulation experiment reforms in fashion design programs. The ultimate goal is to achieve innovation and practical application in virtual simulation experiments.

2.1. Designing Practical Teaching Content and Curriculum System

Aligned with engineering education accreditation standards and the "New Engineering" initiative, this program integrates distinctive program features with the fashion industry's demand for innovative applied talents. Breaking away from traditional teaching approaches, it implements an educational model that combines innovative design with engineering technology, while integrating ideological education into curriculum design. The program has optimized teaching content and course structures through virtual simulation technology tailored to fashion education. Using virtual simulation software as the core platform for both cloud-based experimental teaching management and Chaoxing Learning Platform, it enhances the alignment of foundational practice modules, systematic practice modules, and

comprehensive/innovative practice modules. By incorporating industry-academia collaboration projects and real-world cases into classrooms, the program establishes a three-dimensional practical curriculum system featuring interactive virtual simulations, blended online-offline learning, and coordinated in-class/out-of-class activities. This framework prioritizes classroom instruction, supplements with virtual simulation practices, and reinforces through industry partnerships and real-world case studies, significantly enhancing the engineering applicability and comprehensive innovation of practical teaching content.

2.2. Developing Virtual Simulation Practice Teaching Resource Package

Leveraging modern technologies including virtual simulation, "Internet Plus", and digital media, we will develop a comprehensive practical teaching resource package tailored for fashion industry training. Building upon existing professional practice platforms, we will establish industry-academia collaborative innovation platforms and integrated practice innovation platforms to optimize educational resources. By aligning with industry demands, we will deliver high-quality industry-education integrated courses centered on design practice, integrating campus resources with external platforms to achieve resource sharing. The "Dongguan Fashion Designer Workstation" will incubate design talent, while collaborations with Hangzhou Lingdi Technology Co., Ltd. will focus on digital fashion instructor training. Partnering with Dongguan Cultural Center's Intangible Cultural Heritage Department and Dongguan Intangible Cultural Heritage Protection Center, we will establish a creative design platform for heritage products, volunteer networks, and heritage product exhibition spaces. These initiatives will promote cultural heritage development in Dongguan while incorporating external practice modules into curricula. Through comprehensive platforms like the Dalang Wool Textile Research Center and Guangdong College Students Fashion Week's outstanding graduation design exhibition, we cultivate students' multidimensional innovation capabilities for social service collaboration. By jointly developing and sharing virtual simulation teaching resources through industry-academia partnerships, we continuously advance the coordinated development of education, research, innovation, entrepreneurship, employment, and social services.

2.3. Innovative Virtual Simulation Interactive Teaching Model

Implementing the "Integration of Rationality, Virtuality, and Reality" teaching philosophy, we transform traditional single-method instruction by introducing virtual simulation technology. Using 3D Style virtual fitting software as the platform, we combine online-offline hybrid teaching with pre-class "guided learning", in-class "research-based learning", and post-class "assisted learning". This approach fosters collaborative school-enterprise partnerships and integrated internal-external teaching systems. We innovate a four-step teaching method: "conception, design,

practice, and evaluation" through interactive virtual simulation. During the conception phase, students conduct garment pattern simulation experiments using 3D Style to develop divergent thinking and preliminary structural designs. In the design phase, they refine patterns based on simulation results, exploring innovative approaches for complex cuts. The practice phase transforms simulation experiments into real-world applications to enhance hands-on skills and validate structural innovations. The evaluation phase involves comparing virtual simulations with physical prototypes, analyzing discrepancies, and assessing design rationality to encourage critical thinking. This interactive virtual simulation approach not only solidifies theoretical foundations and engineering application skills but also stimulates creative thinking, laying the groundwork for cultivating innovative applied fashion professionals. Specific implementation methods are illustrated in Figure 2.

2.4. Establishing a Multi-level Practical Teaching Platform Based on Digital Virtual Reality Technology Application Platform

Leveraging the "Internet+" online teaching platform, we are establishing a digital practical teaching environment powered by virtual reality technology. The system comprises three tiers: ① Basic Platform: Handles foundational practical training to develop students' professional knowledge and skills, primarily through on-campus laboratories. ② Professional and Comprehensive Innovation Platforms: Support student clubs like Design Competitions, Challenge Cup, Internet+ Innovation, and Creative Engineering through faculty-led research projects. ③ Industry-University Collaborative Platform (Fashion Digital Simulation): After completing the three-tier framework, we're building a VR application platform with 10+ industry partners and 5 internship bases. Key initiatives include: 1) Establishing a "Fashion Designer Studio" with the Fashion & Apparel Association to drive digital transformation; 2) Partnering with the Cultural Center's Intangible Cultural Heritage Department to create design platforms and volunteer networks. These "One Studio, Two Platforms" projects form the foundation for multi-level collaborative innovation in practical education. By establishing a multi-tiered practical teaching platform that integrates in-class and out-of-class activities, as well as on-campus and off-campus collaboration, we advance students' innovation and entrepreneurship education. Faculty and students jointly participate in corporate technical upgrades and R&D projects, fostering a robust school-enterprise partnership for talent development. This platform significantly enhances student initiative, strengthens independent thinking and practical application skills, and supports the cultivation of hands-on capabilities and innovative awareness. The platform operates under an open-access management model, allowing apparel-related faculty, students, and industry enterprises to freely utilize it without violating regulations. Any issues encountered during use are documented for future improvements, enabling continuous

optimization through problem-solving.

2.5. Strengthening the Training of Digital Teaching Staff

Through innovative teaching models like "virtual simulation interaction" and "dual-teacher instruction," professional instructors collaborate with corporate technical experts to cultivate a digital fashion education faculty team. This initiative focuses on building a well-structured faculty with balanced academic titles, age distribution, and full-time/part-time teacher ratios, while fostering deep industry-academia partnerships and interdisciplinary integration. The stable faculty demonstrates high professional competence, strong practical skills, entrepreneurial mindset, and innovative capabilities. A multi-level practical teaching platform combines classroom and extracurricular activities, integrating on-campus and off-campus resources to support digital creative talent development. Key strategies include: 1) Leveraging senior instructors' mentorship to unlock young teachers' potential, enhancing digital teaching, practical skills, and research capabilities while nurturing distinguished educators. 2) Participating in academic conferences, digital training programs, and specialized lectures to reinforce modern pedagogical concepts and improve faculty quality. 3) Engaging corporate engineers and designers as part-time instructors who regularly conduct workshops and share creative experiences. 4) Regularly arranging industry internships for faculty to strengthen practical skills and teaching effectiveness. 5) Establishing comprehensive regulations, refining technical staff accountability systems, and optimizing teacher evaluation mechanisms to ensure sustainable faculty development.

3. The Reform Effect of Virtual Simulation Technology in the Practice Teaching of Clothing Specialty

3.1. Addressing the issue of generic content in traditional practical teaching that hinders the stimulation of students' innovative thinking

Traditional teaching methods have long been confined to standardized textbooks, failing to address the distinctive regional, cutting-edge, and contemporary features of the apparel industry in the Guangdong-Hong Kong-Macao Greater Bay Area. This has resulted in a lack of innovative content such as virtual simulation technologies, advanced process design, and new material applications, thereby limiting the development of students' creative thinking and personalized learning needs. To address this, we propose reconstructing practical teaching content and curriculum systems through virtual simulation technology. This approach not only stimulates students' innovative thinking and enhances their practical application skills but also meets the industry's demand for highly skilled, application-oriented fashion professionals.

3.2. Addressing the challenge of traditional teaching methods in

developing students' engineering application skills

The traditional teaching model of "teachers lecturing and students practicing" was overly conventional and monotonous. Students mechanically replicated teachers' examples and produced similar garments in a rigid manner. While this approach addressed the issue of insufficient practical skills, it neglected to cultivate students' critical thinking about innovative garment technologies and their engineering application capabilities. To overcome this, the innovative virtual simulation interactive teaching model and the "Four-Step" teaching method were introduced. This approach actively engages students in learning, transforming passive learning into active participation. It not only solidifies students' foundational theoretical knowledge and enhances their innovative practical abilities but also improves their capacity for knowledge transfer and engineering application.

3.3. Addressing the Limitations of Monotonous Teaching Methods in Stimulating Students' Learning Interest

The development of teaching resource packages and the establishment of a virtual simulation practice platform have revolutionized the traditional model where a single courseware could deliver an entire lesson. Through showcasing award-winning exemplary works, creating teaching resource packages featuring videos by distinguished educators, and building a shared practical teaching platform, these initiatives have not only diversified teaching methods but also significantly enhanced students' learning engagement.

4. Conclusion

Guided by the mission to meet the needs of fashion education professionals and students, this initiative harnesses virtual simulation technology in digitalized practice teaching. By applying this technology, it enhances students' engineering application skills and innovative capabilities, while optimizing the structure of digitalized faculty teams in fashion education. This approach enables educators and learners to keep pace with the intelligent and digital transformation trends in the fashion industry, ultimately achieving mutual growth and development.

4.1. Establishing a new system of three-dimensional practice teaching

Against the backdrop of higher education digital transformation, this initiative employs virtual simulation technology to develop systematic, modular, phased, and closed-loop monitored practical teaching content. It integrates professional education with ideological and political education in courses, reflecting new demands and technologies in practical teaching while aligning with the requirements of new engineering education. Through university-industry collaboration, virtual simulation experimental teaching resource packages are jointly developed and shared. These resources are optimized and tailored to industry needs, delivering high-quality

industry-education integrated experimental courses centered on virtual simulation. By integrating campus resources with external platforms through a digital teaching management system, the initiative achieves resource sharing and fosters continuous collaboration to promote the coordinated development of experimental teaching and social services.

4.2. Reforming the practice teaching model

Transforming the traditional "teacher-teach, student-learn" model, we implement the "theory-practice-integration" pedagogical philosophy. Our innovative four-phase approach—planning, designing, practicing, and evaluating—paves the way for a virtual simulation-based interactive learning system. Students first acquire foundational theoretical knowledge through offline instruction, then access the virtual simulation platform via PC clients to complete online assessments and hands-on practice. This self-directed process ultimately cultivates their practical skills and innovative capabilities in fashion design.

4.3. Establish a three-dimensional talent cultivation model

We will establish a cultivation model for engineering application and innovation capabilities, featuring a progression from foundational practice to design-oriented, integrated, and innovative practices, followed by goal-oriented design projects, academic competitions, self-organized teams, and interest-driven topic selection, thereby enhancing talent development quality. A multi-tiered practical teaching platform and resource package will be developed, leveraging digital virtual reality technology. This platform will facilitate shared practical teaching reforms, digital resources, and collaborative talent development goals with other majors within the college and fashion programs at partner institutions.

References

- [1] Chen Lili. Exploring Practical Teaching in Fashion Design through Digital Simulation Technology [J]. Screen Printing, 2022.
- [2] Xu Zhonglin. Research and Exploration on Reforming Practical Teaching in Fashion and Apparel Design under the Background of Big Data Development [J]. Journal of Suzhou University, 2022.
- [3] Chen Liangyu; Shen Hong; Guo Yongchao; Li Yannan. Research on Teaching Reform of Clothing CAD Course Based on CLO3D Virtual Simulation Technology [J]. Western Leather, 2023.
- [4] Li M; Fu C. Reform and innovation of practical teaching in fashion design programs at higher education institutions based on industry-education integration [J]. Heilongjiang Textile, 2023.
- [5] Liu J. Application of virtual simulation technology in the teaching of garment structure and technology [J]. Western Leather, 2024.
- [6] Peng Hui. Application of 3D virtual simulation technology in fashion design [J]. Western Leather, 2024.
- [7] Fan Xuezhi; Zhang Jie. Application of virtual simulation technology in tie-dye pattern design [J]. Dyeing and Printing Aids, 2023.

- [8] Liu T. Teaching reform of garment training courses based on virtual simulation technology [J]. Western Leather, 2023.