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# Research on teaching reform of virtual simulation glasses design based on product art design specialty

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## Abstract

**Against the backdrop of the "Healthy China" strategy and "New Liberal Arts" construction, this study explores teaching reforms in glasses design for product art design majors using virtual simulation technology. Traditional teaching faces challenges such as fragmented integration of aesthetics and technology, and inefficient user needs transformation. Virtual simulation technology addresses these by creating a "digital twin" environment for full-process visualization from conceptual modeling to wearing experience.**

## Keywords

**Virtual simulation technology; Glasses design teaching; Integration of art and Industry.**

## 1. Introduction

Driven by the "healthy China" strategy and the construction of "new liberal arts", glasses design has shifted from functional items to wearable art products that integrate aesthetics, ergonomics and intelligent technology. As a typical field of "integration of art and Engineering", product art design specialty faces problems such as the separation of aesthetic expression and technical verification in traditional teaching, and the low efficiency of user demand transformation. By building a "digital twin" design environment, virtual simulation technology realizes the visualization of the whole process from conceptual modeling to wearing experience, and provides an innovative path for cultivating compound design talents with "artistic perception, technical execution and user insight".

## 2. Teaching status and technology empowerment

The pain points of traditional teaching: art and technology are out of touch, and it is difficult for students to verify the "form following function" (such as the aesthetic and functional balance of mirror frame and nose support); The trial wearing of the real object relies on the standard headform only covering 30% of the face shape data, which leads to the design prone to "man-machine imbalance". Advantages of virtual simulation: vr virtual try on real-time rendering design effect, accurate adaptation of facial data, intuitive verification of aesthetics and functions; The dynamic database automatically calculates the parameters such as the angle of the mirror leg (85°-95°), the contact surface of the nose support (≥1.5cm2), and realizes the "aesthetics mechanics" collaborative optimization.

## 3. Teaching reform strategy

Building a "three-dimensional integration" curriculum system: basic theory module: opening up the "aesthetics structure technology" knowledge link; Practice and innovation module: create a "virtual iteration physical verification" dual track process; Cross border expansion

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module: docking with the frontier of intelligent wearable industry and virtual intelligent glasses laboratory. Innovative "virtual reality symbiosis" teaching method, hierarchical teaching under studio mode, online virtual workshop: carry out online school enterprise cooperation studio teaching through online conference and virtual twin platform. Offline entity mapping experiment: the virtual optimized frame data is imported into the 3D printer to form a closed loop of "digital prototype physical verification algorithm optimization". The project-based learning of the integration of production and education, the embedding of real projects in enterprises, and the use of virtual simulation platform for design verification enable students to be exposed to the real design process during school.

## 4. Reform practice and effectiveness

The virtual simulation module is set up in the course of "3D software design". Students complete the project of "smart glasses design" in groups, and issue the project assignment on the learning platform: it is divided into the early research stage: capturing the key dimensions such as the face data of the crowd, and determining the lightweight and anti-skid design as the core requirements; Scheme iteration stage: problems are found through virtual trial wearing, and the wearing comfort is improved after the optimization of ergonomic algorithm; Achievement transformation stage: the optimal scheme is selected into the enterprise innovation and development cases. The professional ability of the students in the pilot class in the design of smart glasses has been significantly improved, and their performance in the fields of intelligent interaction has been outstanding. Teaching satisfaction has also improved significantly. The following are examples of students' works.


Figure 1. student works

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## 5. Conclusion

By reshaping the knowledge transfer mode and practice logic of product art design specialty, virtual simulation technology has constructed a teaching paradigm of "aesthetic creativity - technology verification - user experience". Virtual simulation technology is not only the iteration of teaching tools, but also the innovation of product art design education concept. Through the deep integration of the perceptual thinking of art design and the rational verification of virtual simulation, it is expected to cultivate "new engineering art talents" with both aesthetic insight and technical realization, and inject innovative vitality into the digital transformation of the glasses design industry.

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