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Statistics and Analysis on the Learning Effect of Virtual Reality Technology Course

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Abstract: With the rapid development of artificial intelligence technology, the development of virtual reality technology has received increasing attention in various fields. Based on the difficulties in the course construction of "Virtual Reality Technology", this paper adopts a questionnaire survey method to study the learning effects of students majoring in digital media technology at Guangxi University of Finance and Economics regarding the "Virtual Reality Technology" course. The research mainly involves four aspects: learning content, teaching effectiveness, learning experience, and future development needs. The research analysis in this paper not only provides strong support for the construction of a first-class course in "Virtual Reality Technology" but also offers references for the course construction of digital media technology majors in other universities.

Keywords: Virtual Reality Technology; Course construction; Learning effect

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1. Introduction

At the 2024 National Education Conference, General Secretary Xi Jinping pointed out: "We must coordinate the implementation of the strategy of rejuvenating the country through science and education, the strategy of strengthening the country through talent, and the innovation-driven development strategy, and promote the integrated development of education, scientific and technological innovation, and talent cultivation." Currently, the application ecology of "AI + industrial development" in Guangxi has taken initial shape, and the research and development of large AI models for vertical industries and the innovative application of new-generation information technology will accelerate. However, the development of the digital economy still faces many problems and bottlenecks. In the process of promoting the construction of the digital economy, it faces a severe shortage of talent resources, as well as a "double lack" of cross-industry talents with digital technology and industrial experience, and junior digital-skilled talents.

With its three-dimensional visualization and strong interactive features, Virtual Reality (VR) technology has become an important tool to break through the limitations of traditional classrooms in time and space.

Meanwhile, the deep learning and data analysis capabilities of Artificial Intelligence (AI) technology have provided new paradigms for precision and personalization in the educational process [1]. The deep integration of the two is driving a profound transformation of education from "technology-assisted" to "intelligent reconstruction" [2]. As a local finance and economics university, it is urgent to address key issues such as how to meet the talent demands of digital economy construction, thoroughly implement the construction concepts of new engineering and new finance disciplines, and promote the development of "Artificial Intelligence + Industry." Based on this, this article explores the necessary capabilities for talent cultivation in the field of virtual reality technology, in combination with the course construction of "Virtual Reality Technology."

2. Current status of "Virtual Reality Technology" course development

2.1. Dilemma in ideological and political education: Severe shortage of high-quality digital technology innovation talents

In the era of accelerating the development of the digital economy and promoting digital industrialization and industrial digitization, data has become a new means of production, and digital labor has emerged as a new form of work. This has comprehensively reconstructed the social space we live in, greatly expanded human autonomy, and made digital literacy a core competency for citizens in a digitalized society. Courses in the context of the digital economy should not only adapt to the trends of digital economic and social development but also precisely guide people's ideologies and value orientations. It is imperative to implement and accurately fulfill the strategic task of cultivating digital literacy in the digital economy era, promoting the modernization of individuals, and supporting the strategic development of the digital economy. Therefore, to address the new challenges posed by the development of digital technology in shaping the values of college students, it is necessary to deepen the understanding and application of socialist core values [3].

2.2. Dilemma in curriculum education: The content system of virtual reality courses is not complete, and students lack core digital capabilities in the field of virtual reality

The current teaching resources for "Virtual Reality Technology" are uneven and do not match social needs, leading to a lack of core digital capabilities among students in the field of virtual reality. Currently, most of the cases selected for courses are classic cases from traditional development, lacking practical cases in the context of the digital economy era, such as the application of artificial intelligence. Without analyzing the economic development laws of the digital economy era, the teaching content of these courses has not kept up with the development of information technology. In real life, many information technology problems can be solved with the latest information technology, but currently, this course has not been deeply integrated with the real needs of society and remains at the traditional textbook level. This mismatch with social needs results in students lacking core digital economy capabilities in the field of virtual reality [4].

2.3. Dilemma of personalized learning: Lack of personalized learning support

In the teaching of "Virtual Reality Technology" courses, the problem of insufficient personalized learning support is particularly prominent. Due to the strong practicality and operability of virtual reality courses, students need differentiated learning based on their own knowledge base, learning ability, and interests during the learning process. However, the existing teaching mode fails to fully consider the individual differences of students. For example, some students with a weaker foundation may not be able to keep up with the course progress, while students with a better foundation may find the course content too simple to meet their learning

needs. In addition, the learning resources of virtual reality courses cannot optimize learning content in real time based on students' learning behavior and effects. Meanwhile, the interaction between teachers and students in a virtual reality environment is relatively weak, making it difficult for students to obtain timely feedback and support when encountering problems in their learning, further exacerbating the lack of personalized learning support [5].

2.4. Dilemma of AI-integrated applications: Insufficient AI practical capabilities

In the course of learning, there is a noticeable issue of insufficient practical capabilities regarding the integrated application of AI technology. Currently, although there are numerous AI tools available (such as Deepseek, Doubao, Tencent Yuanbao, etc.), students' use of these tools during the learning process often remains at the basic application level, lacking opportunities for deep-level practical operations. This results in weak understanding and application abilities of AI tools among students. Furthermore, the inherent complexity of virtual reality technology requires students to simultaneously master multiple skills in VR development and AI algorithms during their learning journey, posing high demands on their comprehensive abilities. However, the existing curriculum content system fails to effectively bridge the gap between the integrated application scenarios of these two technologies. More importantly, there is a lack of alignment with actual enterprise needs in the teaching process. Students' practical opportunities are primarily concentrated in classroom experiments or on-campus simulation projects, making it difficult for them to gain exposure to real industry scenarios and enterprise cases. Consequently, when students enter the workforce after graduation, they face difficulties in quickly adapting to practical work requirements and cannot solve complex problems. The high potential of AI technology in the field of virtual reality remains untapped, and there is an urgent need to enhance students' practical capabilities in AI-powered virtual reality environments.

3. Statistical analysis for the course development of "Virtual Reality Technology"

To better promote the course development of "Virtual Reality Technology," a questionnaire survey was specifically designed and conducted among the students taking the course. The questionnaire was primarily designed based on the existing difficulties, covering four aspects: learning content, teaching effectiveness, learning experience, and future development needs. To ensure the validity and reliability of the questionnaire, the author invited two senior professional teachers to revise the structure of the questionnaire and selected six students for a small-scale prediction. After multiple revisions, the formal questionnaire was formed. The survey targeted third-year students majoring in Digital Media Technology at Guangxi University of Finance and Economics. A total of 90 questionnaires were distributed, and 88 were returned, resulting in a response rate of 97.8%. All 88 returned questionnaires were valid, with a 100% validity rate. Among the 88 surveyed students, 43 were male, accounting for 48.86%, and 45 were female, accounting for 51.14%.

3.1. Learning content

The teaching content of virtual reality technology is very rich, including VR hardware equipment (head-mounted displays, controllers, positioning and tracking systems), VR interaction technology (gesture recognition, gamepad interaction, eye tracking), VR development engine fundamentals (such as Unity/Unreal Engine for VR), principles of VR application design (immersion, interactivity, imagination), VR content production processes (modeling, animation, scene construction), basic concepts of 3D graphics in VR, etc. Survey statistics show that students have learned this content. After the survey, it was found that "the coverage

of learning content meets the needs of students" is relatively high (**Figure 1**). The proportion of "comprehensive and above" is 60.23%, "average" accounts for 23.86%, "relatively lacking" accounts for 5.68%, and "very lacking" accounts for 10.23%. The main reason for "very lacking" is that students are not familiar with VR interaction technology, which leads to relatively high learning pressure.

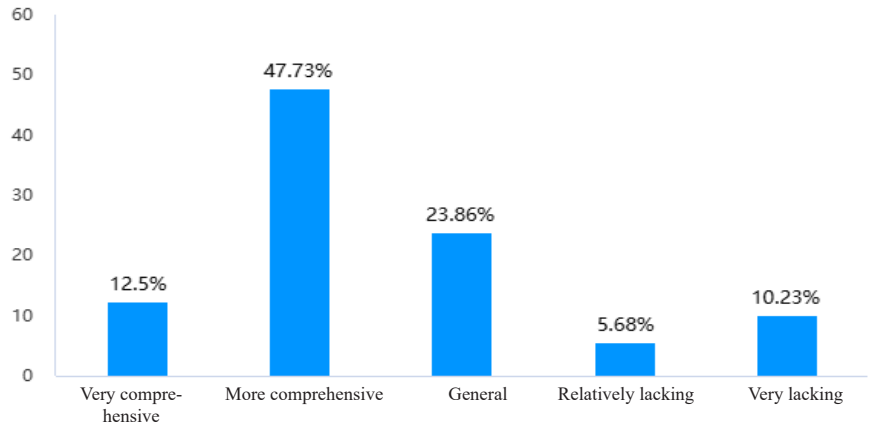

Figure 1. Coverage of learning content.

In addition, the statistical results of "the rationality of the proportion of theoretical and practical content in the curriculum" are shown in **Figure 2**, which has been highly recognized by the students. The very unreasonable proportion is only 6.82%, indicating that the mode of combining theory with practice in the teaching process is more popular among students.

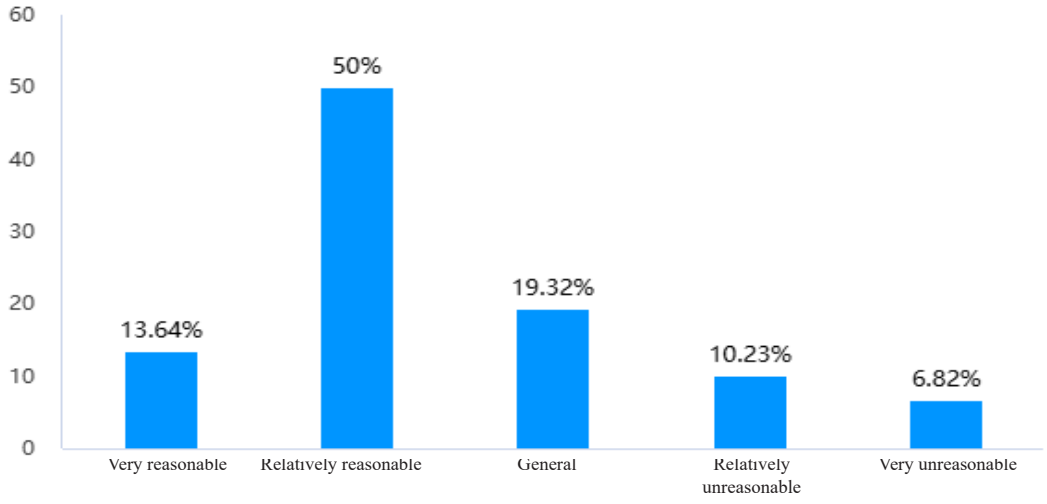

Figure 2. Proportion of theoretical and practical content in the course.

3.2. Teaching effectiveness

In terms of teaching effectiveness, the questionnaire was designed mainly based on three aspects of the course materials/primary learning resources provided: "clarity and ease of understanding of knowledge explanation," "practicality and enlightenment of examples/cases," and "alignment with actual technological/industry developments."

Student feedback was relatively consistent regarding the performance of the course materials/primary

learning resources in terms of "clarity and ease of understanding of knowledge explanation" (**Figure 3**), with a proportion of above average reaching 90.91%.

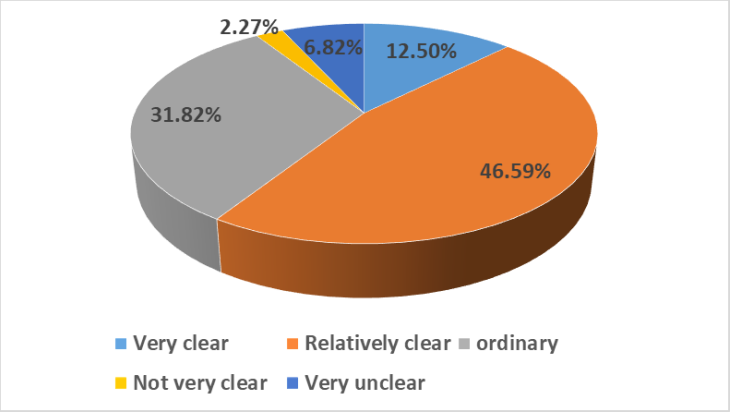

Figure 3. Performance of "Clarity and Understandability of Knowledge Explanation."

The textbooks/main learning materials provided by the course showed consistent performance in terms of "Practicality and Insightfulness of Examples/Cases" and "Fitness with Actual Technology/Industry Development." Both of these statistical data accounted for more than 90% of the "average" rating and above. Therefore, the teaching effectiveness has been recognized by the students.

3.3. Learning experience

In addition, student satisfaction with the adequacy, usability, and advancement of the experimental equipment (VR hardware, development software environment, etc.) provided by the course is also very high (**Figure 4**). The proportion of "very satisfied" is 14.77%, "relatively satisfied" is 43.18%, "average" is 25%, "not very satisfied" is 3.41%, and "very dissatisfied" is 13.64%. Through analysis, very dissatisfied students are mainly due to the infrequent use of experimental equipment, high requirements for the experimental environment, and group-based learning, which causes some students to fall behind in their learning progress.

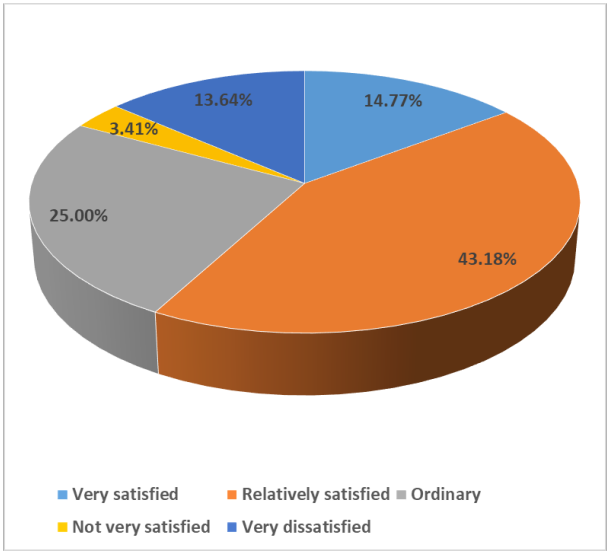

Figure 4. Student satisfaction with the experimental equipment provided in the course.

In the survey on "the degree of integration of AI technology into course learning," students were relatively satisfied with the integration of AI technology into the curriculum (**Figure 5**). The proportion of students who felt it was "very cutting-edge" was 10.23%, "fairly cutting-edge" was 60.23%, "average" was 20.45%, "fairly lagging" was 1.14%, and "very lagging" was 7.95%.

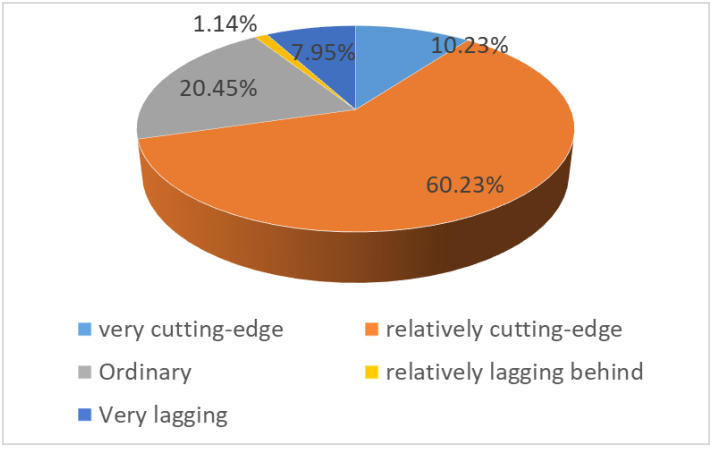

Figure 5. Degree of integration of AI technology in course learning.

3.4. Future development needs

In terms of future development needs, the main consideration is students' career development and abilities. Two multiple-choice questions were designed in the questionnaire. Among them, the survey on "Which career-related content do you hope to add during the course construction process" found that the proportion of students who hoped to add "VR industry job skill requirements" reached 69.32% (**Figure 6**), the proportion of "resume and portfolio guidance" was 53.41%, and the proportion of "company visits or internship opportunities" was 61.36%. This fully reflects that students place great importance on the future development of virtual reality technology and hope to master solid skills to prepare for entering related industries.

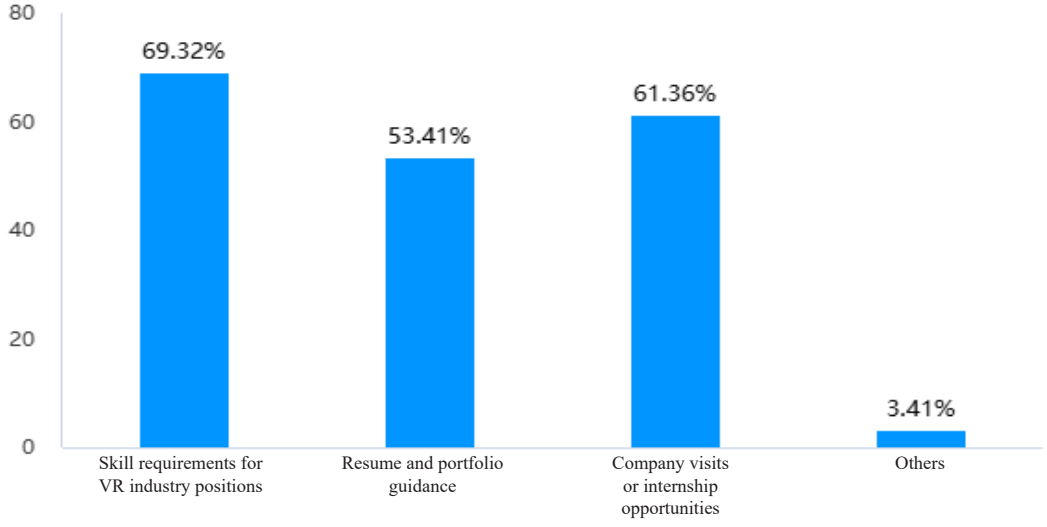

Figure 6. Adding professionally relevant content during the course of study.

Furthermore, the survey results for "The most potential areas for VR technology in the future" are shown

in **Figure 7**. The proportion of "Games and Entertainment" is as high as 90.91%, "Education and Training" accounts for 63.64%, "Medical Treatment and Rehabilitation" accounts for 63.64%, and "Industrial Design" accounts for 50%. These data also reflect that students' current applications of VR technology are mainly focused on games and entertainment, and there is not enough emphasis on applications in areas such as industrial design, medical health, and others. Therefore, it is very necessary to increase internships and practical training in professional fields, so that students can better understand the importance of virtual reality technology in professional fields.

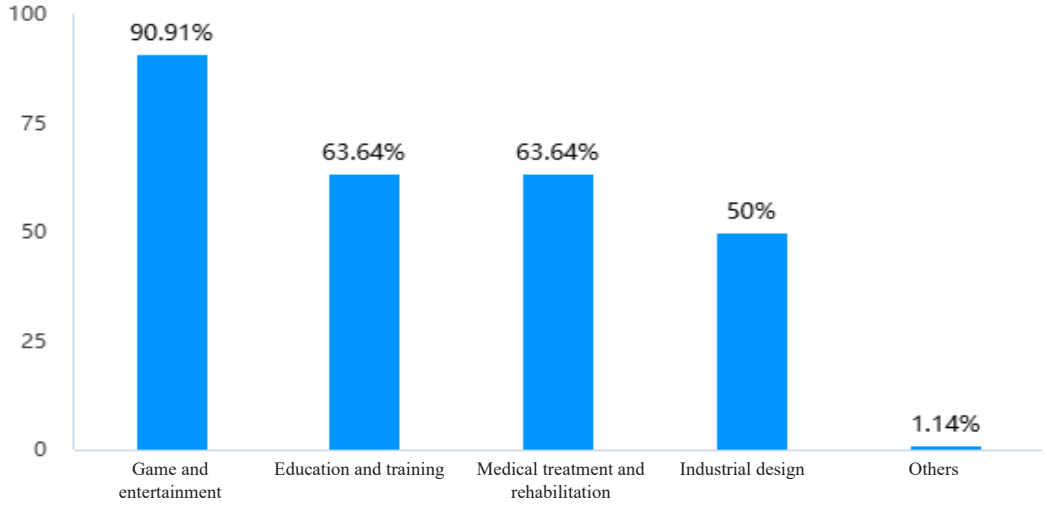

Figure 7. The most potential areas of VR technology in the future.

4. Suggestions for the course construction of "Virtual Reality Technology"

Based on statistical data and analysis, it can be seen that there are still deficiencies in the course construction of "Virtual Reality Technology", especially in terms of matching students' professional needs and abilities, and there is not enough depth and understanding of societal needs. To better cultivate students' abilities and promote the construction of the "Virtual Reality Technology" course, the following course construction suggestions are proposed.

4.1. Ideological and political education

Construct an integrated ideological and political education model of "digital + ideological and political" to cultivate students' patriotism of "rejuvenating the country through science and technology." Based on the requirements of digital literacy for people in the digital age, scientifically construct the ideological and political teaching content of the course [6]. The project focuses on the "Virtual Reality Technology" course and can add practical courses, with "VR + red culture, VR + finance and economics, VR + art" as the characteristics to build an integrated theoretical and practical curriculum for ideological and political education, as well as practical training links; relying on the new round of general education courses in artificial intelligence, develop comprehensive literacy in ideological and political education within the curriculum, and cultivate students' patriotism of "rejuvenating the country through science and technology".

4.2. Curriculum education

To meet the demand for high-quality innovative talents in the digital economy, this course is guided by the OBE (Outcome-Based Education) concept, reconstructing the teaching system of the "Virtual Reality Technology" course. It deeply integrates AI technology into the entire teaching process, building an AI-driven, student-centered, and outcome-oriented, efficient teaching model.

Firstly, through research and industry demand analysis, the core competitiveness requirements for graduates in the field of virtual reality (VR) development and AI technology application were clarified, and new teaching objectives of "knowledge mastery + ability improvement + quality cultivation" were established. Secondly, the course content system was reconstructed, integrating AI technology into each link of virtual reality development, forming a course module with the main line of "VR basic theory - AI technology empowerment - practical ability improvement."

Finally, learning outcomes are transformed to upgrade practical application skills. To ensure that students can translate what they have learned into practical application skills, curriculum reform focuses on aligning with social and corporate needs, building a collaborative education mechanism between "schools, enterprises, and students," and strengthening practical skills training. On one hand, relying on school-enterprise cooperation practice bases, we develop curriculum projects tailored to industry needs, allowing students to apply what they have learned in real projects and enhance their practical abilities. The industry sets the problems, and we invite virtual reality technology-related enterprises to actively participate in cultivating digital technology innovation talents. This enables timely acquisition or 储备 of advantageous talents needed for enterprise development and leads the latest standards for cultivating digital technology innovation talents. We also invite corporate experts into the classroom to co-construct with teachers and students. On the other hand, relying on digital media laboratories, we carry out multidisciplinary and cross-fusion virtual reality practice projects to cultivate students' ability to solve complex problems. Through the mechanism of outcome transformation, teaching achievements are closely integrated with industry demands, promoting dynamic updates of course content. This ensures that students not only master theoretical knowledge upon graduation but also possess practical skills and innovative thinking to solve real-world problems.

4.3. International cooperation in education: Relying on Sino-British cooperative education projects to broaden students' international horizons

By deepening international cooperation, we aim to broaden students' international horizons. We will strengthen international exchanges and cooperation, vigorously cultivate high-quality digital technology innovation talents who have a solid foundation in scientific and technological innovation, master digital technology, possess a global perspective, and meet the development needs of the times, and enhance students' international horizons.

5. Summary

Through the statistics and analysis of the survey results, we can find that: Firstly, in terms of learning content, students have a relatively high level of satisfaction. However, some students are not familiar with virtual reality technology equipment, which leads to poor learning effects. Secondly, in terms of teaching effectiveness, students are more concerned about the clarity of knowledge explanation and its fit with the actual industry development, and their demand for professional knowledge is relatively evident. Thirdly, in terms of learning experience, students are more satisfied with teaching equipment, teaching environment, and AI integration, but some students cannot adapt to the new teaching mode of teachers. Fourthly, in terms of future development

needs, students expect to strengthen their skills to meet the demands of VR industry positions, receive guidance on resumes and portfolios, and have more opportunities for corporate internships. This is precisely the purpose of conducting the survey.

Based on the above survey results and analysis, it has reflected the students' learning effectiveness and existing problems in the course construction process of "Virtual Reality Technology," which is very helpful for future course construction. With the application of AI technology in the field of education, "Virtual Reality Technology" will conduct in-depth practical research in building higher-quality teaching resources and student job skills. By adopting rich and diverse teaching methods, it will promote the renewal of teachers' teaching concepts, enhance students' learning effectiveness, and thus drive deep changes in teaching methods in universities. This will pave the way for building a first-class "Virtual Reality Technology" course and lay a solid foundation for cultivating high-quality talents in the field of virtual reality technology for society.

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Exploration and Research on the Construction of Teaching Resources for the "Virtual Reality Technology" Course in the Context of Artificial Intelligence

Disclosure statement

The authors declare no conflict of interest.

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