

Research on the Implementation Path of the Reform of "Three TEACHs" Promoted by the Integration of "Posts, Courses, Competitions, and Certificates": Taking the Application of Virtual Reality Technology as an Example

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Abstract: "Posts, Courses, Competitions, and Certificates" is a kind of technical skill talent training mode, is an effective means to solve the problem of "What to learn" and "How to learn" for vocational college students, and is an important measure to promote the high-quality development of vocational education in the new era. This paper takes the professional construction of virtual reality technology application based on the "Posts, Courses, Competitions, and Certificates" as an example, and combines the integration standards of vocational Posts, vocational skill standards, curriculum standards, skill competition standards, vocational qualification certificate standards, etc., to reconstruct the course structure, optimize the structure of Teaching materials, build a Teacher team, and comprehensively improve the quality of training technical skills.

1. Introduction (Research Background and Significance)

As the basic requirements of the implementation plan of vocational education reform in China, the reform of the "Three TEACHs"(Teachers, Teaching materials and Teaching methods) was put forward in the National Vocational Education Conference held in April 2021, that "the vocational education system of middle-level, higher vocational and undergraduate education shall be designed in an integrated manner, the reform of Three TEACHs shall be deepened, and the comprehensive education of 'Posts, Courses, Competitions, and Certificates' shall be promoted"; In October 2021, The General Office of the State Council issued the Opinions on Promoting the High-quality Development of Modern Vocational Education. Put forward the idea of "Perfecting the comprehensive education mechanism of the "Posts, Courses, Competitions, and Certificates", Design and develop courses according to actual production and job requirements". On February 8, 2022, the Ministry of Education issued the main points of work for 2022, which clearly emphasized the need to enhance the adaptability of vocational education, which highlighted the need to "promote the education of "Posts, Courses, Competitions, and Certificates", cultivate talents comprehensively." Posts, Courses, Competitions, and Certificates" refers to Posts, courses, competitions and certificates. Post is the core, course is carrier, competition and certificate is the

booster and evaluation standard for the improvement of talent cultivation quality. The comprehensive education of post-set courses, training people by courses, receiving courses by competitions and verifying courses with certificates helps to promote the professional talent cultivation path of "Three TEACHs" reform and comprehensively improve the talent cultivation quality of vocational education[1].

2. Idea Structure

The "Posts, Courses, Competitions, and Certificates" refers to the corresponding work posts, curriculum course system, vocational skill competition and vocational skill grade certificate. Among them, the post is the core, and the curriculum course system is the carrier. Based on the characteristics of the course of virtual reality technology application, the curriculum course of "Virtual reality model making, 3D animation making, Virtual reality project design, Program design, Interface interaction design, Software and hardware system construction and maintenance, Virtual reality and augmented reality engine rendering technology, Engine interaction technology" and other professional courses related posts and Teaching target as the guideline, Posting the development goal of professional "Posts, Courses, Competitions, and Certificates" as training designers for virtual reality products, programmers for virtual reality software, Engineer for Virtual Reality System Implementation and Operation & Maintenance, Virtual reality and augmented reality engine applications, 3D Modeler, 3D animators of Skilled talent [2,3]. Therefore, aiming at the relevant post groups belonging to the virtual reality technology application specialty, analyze the corresponding courses, skill competitions and relevant vocational skill grade certificates, and establish the skill-oriented talent training mode of "Posts, Courses, Competitions, and Certificates" through post courses, course competitions, course certificates and post certificates[4], as shown in Table 1.

Table 1: Corresponding Table of "Posts, Courses, Competitions, and Certificates" of Virtual Reality Technology Application Major

Professional posts	Docking courses	Skill competitions	"1+X" Skill Certificates
Virtual Reality Product Designer	Virtual Reality Project Design and Social Culture in Virtual Space	Digital Product Design and Development	Application of Virtual Reality Engineering Technology
Virtual reality software programmer	Programming, Interface Interaction Design	Digital Product Design and Development	Virtual Reality Application Development
Virtual Reality System Implementation and Operation & Maintenance Engineer	Software and hardware system construction and maintenance, interface interaction design	Virtual Reality Engineering Technology	Virtual Reality Application Development
Virtual Reality and Augmented Reality Engine Application	Virtual Reality and Augmented Reality Engine Rendering Technology and Engine Interaction Technology	Virtual reality application design and manufacture, digital product design and development, virtual reality engineering technology	Virtual reality application design and production, virtual reality application development
3D Modeler	Digital image processing, 3D software technology foundation, virtual reality advanced model making	Digital Art Design	Design and Manufacture of Virtual Reality Application
3D animator	Video editing and synthesis, 3D animation	Digital Art Design	Virtual reality application design and production, animation production

3. Implementation Path Study

3.1. Upgrading Thinking of Professional Construction of collaboration with enterprises Based on "Posts, Courses, Competitions, and Certificates"

Based on the principle of co-construction and win-win cooperation between schools and enterprises, the university and enterprises cooperate in the design of professional posts, the development of talent training scheme, the construction of curriculum system, the co-construction of Teaching materials, the construction of Teachers and the evaluation of talent training quality, as shown in Figure 1.

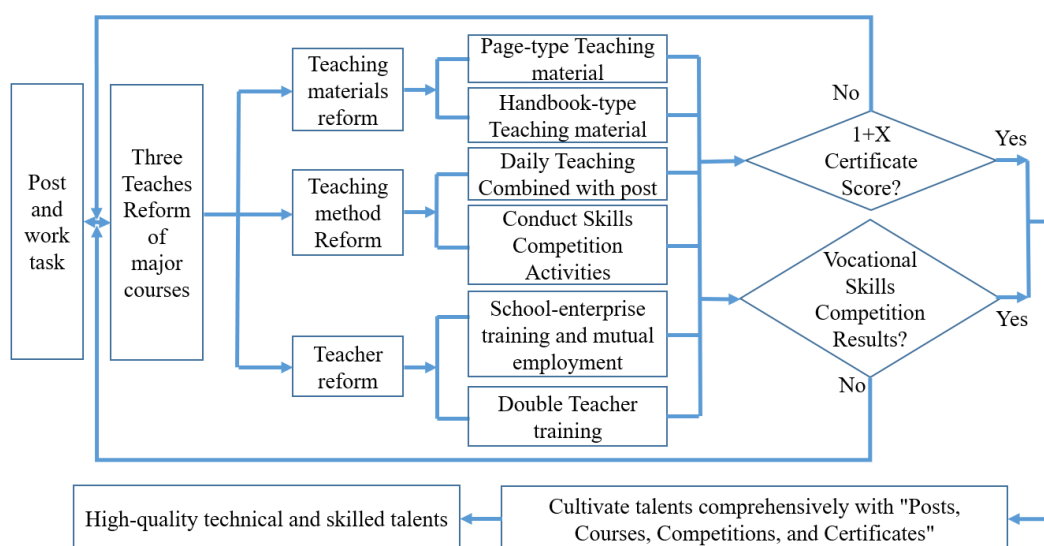


Figure 1: Professional construction ideas

3.1.1. Revise the Talent Training Plan and Promote the Reform of Teaching Materials

Schools and enterprises shall jointly develop the Teaching scheme, jointly formulate the talent training scheme for the application specialty of virtual reality technology, determine the basic approach of talent cultivation, and define the core curriculum course system, practical training conditions, teacher conditions and loose-page type teaching material construction requirements. In succession, they shall cooperate to develop core courses, design typical teaching cases (projects), and jointly develop loose-page type teaching materials for systematic courses in working process. The main development ideas are as follows: First is to discuss the development standards of new-type teaching materials, strengthen the types and characteristics of vocational education, strengthen the cooperation between schools and enterprises, based on the demands of enterprise work tasks, integrate the teaching standards of virtual reality technology application specialty and vocational posts into the teaching materials; Second is to divide the Teaching tasks with typical work tasks. According to the teaching content selection, the task book, Introduction, the learning situation is compiled into a plurality of teaching tasks in the form of a guide book and the like, prepare teacher work pages and student work as well, developed into a manual, a loose-leaf type Teaching material, Satisfy the teaching demand of different course units; Third, in accordance with the idea of "student-centered, learning results-oriented, and promoting independent learning", the teaching materials are developed and designed with work tasks and job requirements, occupational standards, and work processes as the main content; Fourth, the "moral education and curriculum course thinking government" are organically integrated into the manual-type teaching materials and

loose-page type teaching materials[5].

3.1.2. Joint Cultivation of Talents and Innovation of Teaching Method Reform

Enterprises regard the cultivation of professional talents as a key link to enhance the core competitiveness of enterprises, and send technical backbones as part-time teachers to participate in the teaching process of virtual reality technology application majors; Daily teaching takes students as the main body, pays equal attention to learning and practice, is proficient in common core software, and cultivates students' professional and technical comprehensive quality ability by organizing clubs, participating in skill competitions, and serving social practice activities in their spare time[6].

3.1.3. Realize Win-Win between Schools and Enterprises, and Promote Teacher Reform

Through the mutual employment of teachers in schools and enterprises, full-time and part-time "dual-teacher" teachers are jointly trained. The core path of school-enterprise cooperation is to achieve a win-win situation between school and enterprise. Virtual reality technology application major, through order-based training and other methods, school-enterprise joint cultivation of talents, enterprises absorb students who meet the quality of different levels of requirements into the workplace, so that enterprises can obtain the required talents. Enterprises not only train students, but more importantly, train teachers and promote the improvement of teachers' skills. Improve teachers' technical skills through vocational skills competitions and teacher training, professional teachers' winter and summer vacation enterprise practical training, and "1+X" vocational skills teacher training.

3.2. Construction of Virtual Reality Technology Application major Implementation Path Based on "Posts, Courses, Competitions, and Certificates"

3.2.1. Set Courses with Posts and Build a Curriculum Courses System that Integrates Posts and Courses

Set courses with posts and build a curriculum courses system that integrates posts and courses, the process of constructing the curriculum system is shown in Figure 2.

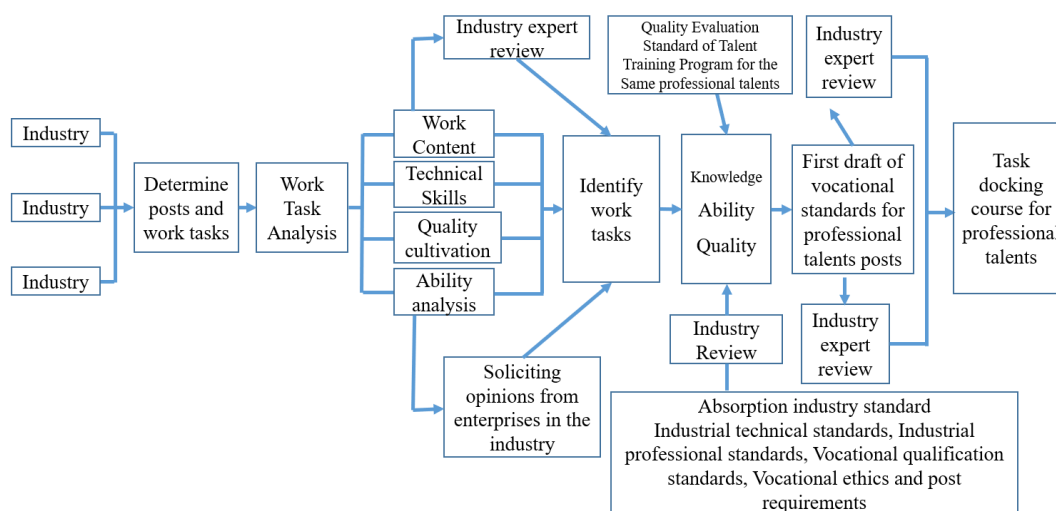


Figure 2: The process of constructing the curriculum system

3.2.2. Lead the Course with the Competition, and Determine the Practical Teaching Mode of "Course Competition Integration"

The Teaching mode of competition confrontation and test of learning results is used to strengthen the classroom construction, turn the classroom into a competition arena, let the skill competition run through the teaching process, enhance the participation and competitiveness of students, so as to achieve the purpose of testing teaching effect and improving the quality of talent training through skill competition [7], The specific practical teaching mode is shown in Figure 3.

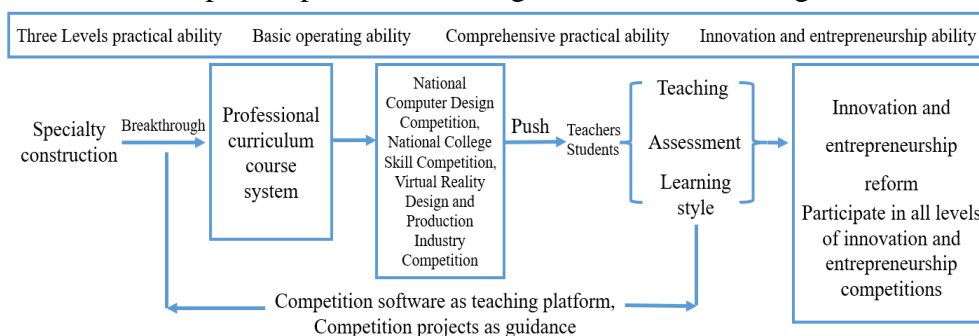


Figure 3: Specific practical teaching mode

3.2.3. To Realize Seamless Connection of Courses and Certificates Content by Verifying Courses with Certificates

"1+X" certification is an important reform measure in the process of vocational education, which has a great role in promoting students' in-depth learning of courses and mastery of vocational skills in this specialty. Students majoring in virtual reality technology application, while learning the theoretical knowledge of virtual majors, should combine the job requirements and skill needs of relevant virtual enterprises to integrate the corresponding vocational skill requirements and standards into the curriculum. In this way, students can not only obtain vocational skill level qualification certification, but also promote the construction of related courses. Taking the virtual reality application design and production vocational skill level certificate as an example, modeling, programming, VR/AR engine development, etc., are important assessment points of "X" certification, in the special core course virtual reality model production, programming, virtual reality and augmented reality engine rendering technology, engine interaction technology, integrate the certificate training content, or select the certificate teaching materials to carry out teaching activities, and integrate industry standards and teaching cases into classroom teaching, which can effectively improve the training effect, so that the "integration of Courses and Certificates" in the virtual reality technology application specialty teaching has been implemented [8-10].

4. Practical Results

The three-year reform of virtual reality technology application specialty construction from 2020 to 2022 has achieved remarkable results. This is mainly reflected in the improvement of student competition awards, 1+X vocational skill level certificate examination rate, and teachers' teaching ability. The main ones are: First, the award-winning, virtual reality technology application specialty students participated in the 2022 National Vocational College Skills Competition senior vocational group "virtual reality (VR) design and production" competition, and won the national third prize 1 time; Under the guidance of teachers, this specialty students participated in the "Virtual Experimental Development" category of the National College Student Computer Design Competition, and won 2 provincial first prizes, 3 second prizes and 3 third prizes; The teachers of

this specialty team participated in the "National College Virtual Reality (VR) Courseware Design and Production Competition" and won the second prize of the national competition. In total, the participation rate of teachers and students reached 80%. Second, the "1+X" examination, this specialty students take the "1+X" virtual reality application design and production vocational skill level examination, the exam participation rate reaches 100%, and the success rate of certificate collection is 95%. Third, the improvement of the ability of specialty teachers, and specialty teachers participate in "1+X" teacher training, technical skills teacher training examination, etc., and obtain 6 certificates.

5. Conclusions

The "Posts, Courses, Competitions, and Certificates" is a systematic "Teaching and Learning" project, which requires vocational education to take the post and post group as the core, correspond to the curriculum courses system, skills competition and vocational certificates, fully reflect the sociality and comprehensiveness of vocational education, and guide the comprehensive education of specialty construction. So that the curriculum design of the virtual reality technology application specialty meets the requirements of post talents, improve the professional matching rate of graduates, promote the reform of "Three Teaches" to play a substantive role, promote the high-quality development of vocational education, and provide high-quality talent resources support for promoting economic and social development and national competitiveness.

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