Journal of International Education and Development
2025, VOL. 9, NO. 1, 130-133
DOI: 10.47297/wspiedWSP2516-250027.20250901

Research on curriculum reform strategy and security system construction of undergraduate level vocational education driven by technology

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ABSTRACT
This article examines the practice of curriculum innovation driven by technology, examines the current state and trends of technology application in undergraduate vocational education, and examines the effects of technological advancement on the reform of undergraduate vocational education courses. suggested reform tactics include creating an industry-aligned curriculum framework, creating core courses that satisfy industry demands, creating innovative teaching materials and textbooks, and enhancing the system for "dual teacher" teacher development. Simultaneously, a guarantee system has been established to improve the quality of education and meet social needs. This system includes integrating design and evaluation mechanisms, strengthening the integration of industry and education, synchronizing technological iteration curriculum systems, innovating textbook resources, and implementing high-quality evaluations.

KEYWORDS
curriculum reform; technology-driven; vocational education; industry-education integration

1 Introduction

Due to industrial upgrades and technological breakthroughs, there is an increasing need for highly qualified and expert professionals in the context of globalization and the knowledge economy. As a vital component of the higher education system for developing practical skills, vocational undergraduate education also has the significant responsibility of producing highly qualified technical and skilled workers for social and economic advancement. Unprecedented developments are occurring in the education sector as a result of the quick advancement of artificial intelligence and information technology.

Undergraduate vocational education must change its curriculum to meet the needs of the market and the new educational environment. Examining how technology propels innovation in undergraduate vocational education programs is crucial from a theoretical and practical standpoint to improve educational quality and satisfy societal demands.

2 The Present Situation and Developments of Technology Use in Undergraduate Vocational Education

2.1 The History and Development of Undergraduate Vocational Education

The need for technical and skilled talent has changed from just high quality to higher level technical capabilities as a result of industry upgrading and changes in the global economic structure. Modern vocational education changes have emerged as a result of this change, especially in undergraduate vocational education pilot programs. These pilot programs aim to develop individuals who possess the ability to effectively use technical skills and use their knowledge and abilities to creatively address challenging technological problems. China now has 51 undergraduate vocational schools as of November 2024, 10% more students will enroll in undergraduate vocational education than in higher vocational education.

Undergraduate vocational education is available in nations like the US, which has community colleges, the UK, which has polytechnic institutes, and Germany, which has universities of applied sciences. These approaches offer our nation's vocational undergraduate education invaluable experience and perspectives.

2.2 Technology Use and Reform in Undergraduate Vocational Education

As artificial intelligence and global information technology advance at a rapid pace, educational models must adapt to new needs and problems. Through curriculum reform, vocational undergraduate education must keep up with technology developments and adjust to new learning contexts and market demands. Vocational education reform now revolves around digital transformation, which involves new models, altered aims, and conceptual adjustments. Vocational undergraduate education requires additional support, particularly in the areas of creative industry-education integration and digital technology integration.

2.3 Status of the Current Application

As of right now, new teaching techniques, digital teaching resources, tailored learning routes, and the development of virtual training environments are all examples of technological uses in vocational undergraduate education. particularly AIGC technology, which is crucial in giving students individualized learning materials and modeling actual work situations, so providing them with a more comprehensive and adaptable educational experience. The use of these technologies not only increases the effectiveness of instruction but also opens up new opportunities for students to advance their skill sets.

2.4 Development Trends

The application trends of technology in vocational undergraduate education will place greater emphasis on deep integration and innovative applications.The innovative application of technology and the personalized content creation of AIGC will jointly shape the future of education, achieving personalization and precision in education, and cultivating high-level technical talent with innovation capabilities and technical adaptability.

3 The Practice of Technology-Driven Curriculum Innovation in Vocational Undergraduate Education

3.1 Constructing a Technology-Driven Curriculum System

In the field of vocational undergraduate education, constructing a technology-driven curriculum system is a key strategy to respond to industrial upgrades and technological innovations. This strategy aims to update and optimize course content by integrating the latest technological knowledge and skills, ensuring that educational outputs are closely aligned with industry demands. A technology-driven curriculum not only requires course content to reflect current technological standards but also demands teaching methods that can promote students' active learning and innovation capabilities. Taking Wuhan Vocational and Technical College as an example, the school collaborated with Huawei to jointly develop a 5G communication technology curriculum system, which is a typical case of a technology-driven curriculum system construction. Through school-enterprise cooperation, combining the latest technological developments, a curriculum system that meets educational goals and industry needs is constructed.

3.2 The Application of Technological Tools

Drives the Reform of Teaching Methods The application of technological tools has played a revolutionary role in vocational undergraduate education. They not only enhance the interactivity and flexibility of teaching but also provide students with a richer and more authentic learning experience. By introducing technological tools such as virtual reality (VR), augmented reality (AR), and artificial intelligence (AI), the reform of teaching methods can better stimulate students' interest in learning and improve teaching effectiveness. Shenzhen Polytechnic has introduced VR and AR technologies in its Digital Media Technology program. Students, through these technological tools, are able to engage in immersive learning and creation within a virtual environment. For example, they can design and test user interfaces in a virtual setting. This change in teaching strategies develops students' creative thinking and problem-solving capabilities in addition to their practical knowledge.

3.3 In-depth Cooperation on the Development of Course Materials Between Educational Institutions and Businesses Based on Technological Innovation

Collaboration between schools and businesses is a crucial strategy for incorporating industry and education and for implementing technology-driven curriculum innovation in undergraduate vocational education. We guarantee the usefulness and forward-thinking nature of educational content by collaborating closely with businesses to collaboratively produce course materials that are closely linked with industry needs.It gives teachers a way to learn about the most recent developments in the business and gives students the chance to experience real work settings.

Together with Chongqing Changan Automobile Co., Ltd., Chongqing Electronic Engineering Vocational College created a new energy vehicle technology course that enables students to study and use new energy vehicle technology in the real production setting of the company.

In addition to resolving the conflicts between the two, In addition to resolving the conflicts between the supply and demand sides of talent cultivation, this deep cooperation model successfully improves students' employability and practical skills, genuinely assisting in the development of highly qualified and technical individuals who can satisfy the demands of the industry and society.

4 Techniques for Technology-Driven Curriculum Reform in Undergraduate Vocational Education

4.1 Developing an Industry-Related Curriculum System

Establish professional teaching standards by benchmarking against emerging industry standards, focusing on the forefront of production to sort out technical knowledge, promoting collaborative curriculum development based on technological iteration, and synchronizing the most recent industry technical architecture curriculum map. The curriculum system should be anchored to high-end industries and the high-end construction of industries.Make sure the course material is closely in line with industry demands and update it often to take into account new developments in the market and technology. To improve the flexibility of vocational education courses with "new courses," implement a mechanism for upgrading courses that iterates tasks, projects, and resources while guaranteeing the course content's timeliness and forward-looking nature.

4.2 Create foundational courses that adjust to industry demands in light of technology advancements

Create foundational courses that are informed by industry demands, precisely outline the course material, and completely conform to industry enterprise standards, international certification standards, and vocational skill standards. Create complex, creative, and demanding core courses to help students develop their higher-order thinking and advanced technical capabilities.

4.3 New Developments in Textbooks and Educational Materials

Collect technical expertise from businesses and university instructors to collaborate on creating top-notch textbooks that showcase dual-system, intelligent, integrative, futuristic, and ideological traits. Create digital textbooks and virtual simulation training materials, innovate textbook formats, make textbooks more interactive and useful, and enhance the educational experience for students.

4.4 Enhance the "Dual-Teacher" Professional Development Framework for Education Specialists and Skill Masters

Reform the teacher certification and staffing system, improve the training program for "Dual-Teacher" educators, and raise the percentage of full-time and part-time instructors with real-world experience.In order to properly combine theory with practice, teachers must have both industry experience and teaching skills.

5 How to Create a Support Network for Technology-Driven Curriculum Reform in Undergraduate Vocational Education

5.1 Combining Mechanisms for Design and Evaluation

Integrating design and evaluation processes is the first step in creating a support system for technologically driven curriculum improvement in vocational education. To guarantee that the curriculum content is scientific, useful, and forward-looking, an interdisciplinary design team made up of professionals in education, business, technology, and corporate practice should be established.Concurrently, provide a scientific evaluation framework to gauge the quality and efficacy of curriculum reform, making sure that learning outcomes closely correspond with business demands.

5.2 Strengthening School-Enterprise Collaboration and Industry-Education Integration

The two main pillars supporting the reform of vocational education programs are school-enterprise collaboration and the merger of industry and education.By working closely with businesses to jointly design curriculum resources that are closely connected with industry needs, educational content may be made practical and forward-looking.In addition to giving teachers a way to learn about current business trends, this collaborative model gives students the chance to interact with real-world work settings.

5.3 Developing a Curriculum Framework in Line with Technological Development

This part, which focuses on improving student competencies, highlights the core subjects of higher education as well as the main topics of the "Four News." It seeks to methodically create a comprehensive and globally renowned core curriculum structure.This entails coordinating the most recent industrial technological architecture course maps, focusing

on the cutting edge of production to arrange technical knowledge, and establishing professional teaching standards by harmonizing with growing industry standards.

5.4 Creative Textbooks and Educational Materials

To handle the responsibilities of gathering, evaluating, and studying supplemental textbooks, assemble educators with extensive teaching backgrounds and scholarly knowledge from leading domestic fields as well as top businesses. Textbooks ought to have dual, intelligent, futuristic, integrative, and ideological traits. They should create digital textbooks and virtual simulation training resources, reinvent textbook formats, make textbooks more interactive and useful, and enhance the educational experience for students.

5.5 Put Continuous Improvement and High-Quality Evaluation into Practice

To encourage the ongoing and comprehensive reform of professional courses, set up a feedback and improvement mechanism that focuses on the development of the professional curriculum system and important aspects of core curriculum development. Enhance the efficacy of curricular reform by putting in place high-quality evaluations, guaranteeing that the reform can be sustained and provide useful outcomes.

6 Conclusion

In order to develop highly qualified individuals who can satisfy industry demands, this study highlights the urgent need for curriculum change in vocational undergraduate education due to technological advancements. Building an industry integrated curriculum system, creating core courses, creating innovative textbook materials, and enhancing the preparation of "dual qualified" teachers are some of the suggested tactics. Reform is supported by the creation of a guarantee system, which includes strengthening the interaction of industry and education and incorporating design evaluation systems. The objectives of these measures are to meet the demand for technical and skilled abilities in social and economic development, enhance the quality of education, and guarantee that educational output is in line with technological advancement.

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