

An Overview of Historical Development and Emerging Challenges of Vocational Education: A China's Higher Education Perspective

Jingwen An, Nur Aira Abdrahim

¹Department of Professional Development and Continuing Education (JPPPL), Faculty of Educational Studies, Universiti Putra Malaysia Selangor, Serdang, 43400 UPM, Malaysia

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Abstract

The development of higher vocational education is essential for providing a post-secondary form of education that combines theoretical and practical studies for individualized growth of students to meet industry specific demands for competence. Over the years, vocational education in China has made significant progress, and its importance in higher education has been widely recognized. Higher vocational education is integral to the overall framework of Chinese higher education. China has made substantial strides in this field, with a significant increase in the number of vocational colleges and universities. As a core component of the national education system, China's higher vocational education aims to cultivate skilled personnel necessary for social and economic development. The development and reform of vocational education in China is critical to meeting the needs of industrial development and advancing national economic goals. Overall, vocational education in China is evolving to meet changing economic conditions and social needs, with an increasing emphasis on practical skills and industry relevance. The first part of this paper describes the historical development of vocational education in China's higher education. The second part of this paper presents an analysis of the current situation, challenges and opportunities that exist in higher vocational education in China. It also puts forward a series of counter-measures designed to address these issues.

Keywords: Historical Development, Challenges, Counter-measures, Higher Vocational Education.

Introduction

Vocational education has become an essential component of China's higher education system, evolving in response to the nation's economic and workforce development needs. This study explores the historical development and emerging challenges of vocational education within China's higher education framework. The significance of this research lies in its potential to enhance understanding of how vocational education can contribute to producing a highly skilled workforce that aligns with the demands of a rapidly evolving economy.

The foundation of the modern university system can be traced back to the 19th century when German educator Humboldt founded the University of Berlin, envisioning it as a "temple for scientific research" where professors and students alike engaged in scholarly exploration (Liu, 2003). Similarly, British educator Newman (1987), characterized the university as a "kingdom of all knowledge," embracing universal learning across arts, sciences, history, and philosophy. These early views shaped the academic mission of higher education, which vocational education complements by emphasizing practical, career-oriented skills.

Higher vocational education, a concept combining "higher education" and "vocational education" (Shi, 1992), has become an integral part of China's educational landscape. It represents a high-level, employment-oriented form of education that plays a significant role in preparing students for professional careers (Xiang, 2004). While inspired by Germany's dual-track vocational education model—where private enterprises collaborate with public vocational schools (Gao, 2007)—China's vocational education is uniquely adapted to its social and economic needs. Emerging in the 1980s as a "Chinese creation," this model aims to equip high school graduates with practical skills suited to specific occupational fields, through both undergraduate and specialized training programs.

China's dual-track school system further emphasizes this distinct approach, developing both academic and vocational talents through separate but compatible pathways (Meng, 2020). This model allows for flexibility, as general undergraduates can obtain vocational degrees and technical undergraduates can pursue academic qualifications (Li, 2003). Academic education in China focuses on cultivating research and engineering skills, which are applied intellectually to societal needs, while vocational education trains senior technical and applied talents to work on the front lines of production and service, translating academic research into practical applications (Li, 2007).

This paper examines higher vocational education as a critical component of China's higher education system, emphasizing its role in cultivating skilled professionals equipped for immediate entry into industry (Liu & Liu, 2009). This study holds significance for several key stakeholders. For policymakers, it offers insights that can inform targeted educational reforms and align vocational training with national economic objectives. Educators and curriculum designers benefit by understanding how to structure programs that prioritize applied skills, thereby enhancing students' readiness for industry roles. Employers also stand to gain, as a technically proficient workforce strengthens productivity and supports industry competitiveness. Through a focus on practical skills and innovation, this model prepares graduates to meet the evolving demands of the labor market and to make substantial contributions to China's economic and social development.

Key Historical Development of Vocational Education in China Higher Education

Vocational education in China originated in the 1920s and 1930s, and one of the most prominent scholars in this field was Mr. Huang Yanpei. He put forth the proposition that vocational education should be structured in a manner that is respectful of the individual developmental trajectory of students. The principal objective of vocational education is to equip students with the fundamental competencies required for survival and to facilitate the effective integration of theoretical and practical knowledge in the context of work (Zhou, 2022).

Lu Zuofu, a renowned patriot, industrialist, and educator, underscored the necessity of integrating vocational education into the entirety of an individual's life, encompassing not only pre-vocational training but also on-the-job learning, with the objective of securing a livelihood. The content of education should not be limited to a single skill; rather, it should encompass the development of morality, physical fitness, and aesthetics. Furthermore, he advocated for the implementation of vocational education in a manner that dissolves the boundaries between the school and the enterprise, as well as between education and society. (Li, 2010) The concept of vocational education in China is generally understood to be an educational pathway that prepares individuals for gainful employment. Consequently, it places significant emphasis on the acquisition of practical skills. This underscores the importance of developing internships and work placements. Additionally, it acknowledges the necessity for collaboration with various societal stakeholders, including the government and private enterprises (Shi & Mi, 2011).

After the 1990s, China conducted research on vocational education in higher education. In 2014, the first formal exploration of vocational education in higher education was proposed. However, there are numerous varying perspectives on the true nature of vocational education in higher education. Higher vocational education constitutes a form of cross-border education that integrates elements of vocational and undergraduate studies (Sun et al., 2022). It is fundamental in fostering outstanding technical and skilled professionals and in the development of a skill-oriented society. The progression of higher vocational education (undergraduate-level vocational education) in China has been delineated by three distinct phases: the emerging phase, the exploration and practice phase, and the policy formulation and robust development phase.

(i) The Initial Stage of Higher Vocational Education (1990s-early 2000s)

In 1998, the Plan of Action for the Revitalisation of Education for the Twenty-first Century advocated for the creation of higher vocational technology colleges within select undergraduate institutions, aiming to facilitate the advancement of graduates from vocational and technical colleges into higher-level academic education. The execution of this approach led to a substantial progress in higher vocational education. The execution of undergraduate vocational education has been carried out systematically and methodically. Subsequently, a number of provinces and cities initiated preparations for the pilot implementation of specialised education programmes, while universities commenced offering higher vocational education. In the initial stages of development, China established a dual structure comprising undergraduate students administering higher vocational colleges and undergraduate colleges offering vocational education. This phase is conducted on a more limited scale, with institutions concentrated in coastal and riverine areas, resulting in significant regional disparities. (Liu & Zhang, 2024)

In 2000, the Ministry of Education's "Opinions on Strengthening Talent Cultivation in Higher Vocational and Specialised Education" emphasized that "higher vocational and specialised education constitutes a vital component of China's higher education." In 2005, the State Council's "Decision on the Vigorous Development of Vocational Education" explicitly mandated that, in general, the specialization of vocational colleges and universities offering vocational education would not be elevated to the next level prior to 2010. At this juncture, the state released pertinent documents to delineate the legal status of the vocational

education system and has underscored at the national level that vocational colleges and specialized universities will, in principle, not be elevated to undergraduate institutions, thereby significantly guiding the advancement of vocational colleges and universities towards their intrinsic development. Despite the relatively recent emergence of higher vocational education and the policy's restriction to "specialised level education," there are proponents within the academic community advocating that higher vocational education should be regarded not as a level of education, but as a distinct type of education, urging for active exploration in this domain (Xiong & Wang, 2023).

(ii) Exploration and Practice of Higher Vocational Education (2011-2018)

As of 2011, the total number of higher vocational institutions and universities across the nation had attained 1,280. The establishment of national model schools and backbone schools has significantly improved the strength, service quality, and outreach capacity of higher vocational institutions and universities. Higher vocational education has progressively emerged as the predominant force in vocational education in China. (Yu & Chen, 2023) The framework for educating professionals via the equivalent of applied higher education.

In 2014, the State Council's decision to expedite the advancement of modern vocational education first suggested the exploration of undergraduate-level vocational education, leading certain provinces and public undergraduate institutions to initiate pilot programs for specific undergraduate vocational education disciplines. In the same year, the Ministry of Education, along with six other departments, proposed a construction plan for the modern vocational education system (2014-2020), aimed at developing applied technology colleges and universities to train vocational talents at the undergraduate level, achieving a certain scale of undergraduate vocational education. This year, higher vocational education accelerated its connotative development, and undergraduate-level vocational education was highlighted by the state as a novel type and tier of vocational education. (Xiong & Wang, 2023) In 2015, the Ministry of Education's "Action Plan for the Innovative Development of Higher Vocational Education (2015-2018)" mandated the promotion of the transformation and development of select local general undergraduate institutions, directed several independent colleges to evolve into universities of applied technology, and emphasized the organization of undergraduate-level vocational education.

(iii) Undergraduate-Level Vocational Education Policy Taking form (2019-present)

In 2019, the State Council released the "Implementation Programme of National Vocational Education Reform," known as the 20 articles of vocational education, which for the first time advocated for the "pilot implementation of vocational education at the undergraduate level," signifying a significant advancement in the evolution of vocational undergraduate education. Vocational undergraduate education has entered an entirely new developmental phase.

In September 2020, the Ministry of Education, alongside nine other departments, released the Action Plan for Enhancing the Quality and Excellence of Vocational Education (2020-2023), which advocates for "supporting qualified high-level vocational institutions with Chinese characteristics to conduct undergraduate-level vocational education programs on a trial basis," thereby positioning the advancement of undergraduate-level vocational

education as a pivotal element in the enhancement of the contemporary vocational education system.

In April 2021, President Xi Jinping provided significant directives on vocational education, underscoring the need to "optimize the categorization of vocational education types and progressively advance vocational education," thereby offering ideological, operational, and theoretical guidance for the advancement of vocational education in China (Chen & Li, 2022).

In October 2021, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council released the Opinions on Promoting the High-Quality Development of Modern Vocational Education, which underscored the "steady development of vocational undergraduate education," thereby facilitating the comprehensive advancement of vocational undergraduate education. (Li et al., 2022). By 2025, the enrollment in vocational undergraduate education was about 10% of the total enrollment in higher vocational education (Xiong & Wang, 2023).

The Vocational Education Law of the People's Republic of China, effective 1 May 2022, legally establishes that "vocational education is of equal importance to general education," thereby laying the groundwork for vocational education's classification and advancement. It delineates the nature of vocational education, its positioning, its significant role, and the direction of its development, while enhancing the overarching framework of the contemporary vocational education system. The overarching framework of the contemporary vocational education system, facilitating and advancing the integrated progression of vocational and general education, while steering the effective evolution of vocational education (Li et al., 2022). The law mandates that "higher vocational education shall be administered by higher vocational schools and ordinary colleges at the level of specialization, undergraduate education, and above," indicating that vocational education ceases at the specialization level where the academic "ceiling" has been surpassed (Xiong & Wang, 2023).

Emerging Challenges of China Higher Vocational Education

Based on the analysis of current literature, this paper identifies the current situation that presents both challenges in practice and opportunities that exists in higher education in China for consideration of future research in this area.

(i) Lack of Clarity in Talent Cultivation Standards

Higher vocational education faces a number of unclear problems in talent cultivation, which not only affect the quality of education, but also constrain the students' career development and the matching of social needs. First of all, the lack of clarity of talent cultivation objectives is a prominent problem. Many higher vocational colleges and universities fail to fully consider industry needs and market changes when formulating talent training programs, resulting in a disconnect between training objectives and actual needs (Wang, 2024; Chen, 2019). For example, with the development in society need for composite skilled persons, the conventional single-skill cultivation mode can no longer match the diversified needs of the market, thus it is required to examine and change the talent cultivation objectives (Xie, 2020).

Secondly, the outdated curriculum and instructional materials significantly contribute to the ambiguity in talent development within higher vocational education. The curriculum systems of numerous higher vocational colleges and universities are not updated promptly, adhering to outdated teaching content and techniques, and inadequately integrating developing technologies and industry growth trends (Sai, 2020; Han, 2019). The mathematics curriculum is crucial in higher vocational education; yet, its content and pedagogical approaches frequently do not align with the professional curriculum, leading to deficiencies in students' essential competencies and practical application skills (Han, 2019). This deficient curriculum negatively impacts students' overall quality and employability.

The limited capacity of the faculty significantly contributes to the ambiguity in talent cultivation. There exists a prevalent misalignment between professional qualifications and instructional demands in higher vocational institutions, with educators lacking adequate practical experience and pedagogical proficiency to effectively mentor students in vocational skills training (Jiang & Zhao, 2020; Liu et al., 2019). To enhance educational quality, it is imperative to augment teachers' professional development and practical training, enabling them to meet the exigencies of contemporary vocational education. Furthermore, increased support is essential, encompassing both policy initiatives and research-backed frameworks, to attract and retain highly qualified vocational instructors, thereby fostering sustainable careers in vocational higher education in China.

The inadequacy of school-enterprise collaboration additionally limits the efficacy of talent development in higher vocational institutions. Despite national policy promoting school-enterprise collaboration, the actual partnership between numerous higher vocational colleges and enterprises remains tenuous, lacking substantial interaction, which consequently hampers students' internship and employment opportunities (Zhang, 2021; Ren et al., 2020). Establishing deeper school-enterprise relationships can significantly boost the relevance and practicality of talent cultivation, allowing students to adapt more successfully to business expectations.

(ii) Lack of Adaptability of Vocational Education

The lack in adaptation within vocational education mostly manifests as a disjunction between the curriculum content and industrial advancements. The swift advancement of technology has caused numerous vocational education programs to fall behind, inadequately aligning with current industry trends, so creating a disparity between the information and skills acquired by students and the actual requirements of businesses. Simultaneously, the curriculum framework of certain vocational institutions and universities continues to adhere to a conventional academic model, inadequately transitioning to a paradigm more aligned with practical job experience, and lacking precise development of required workplace abilities.

The disparity between the curriculum and industry requirements significantly impacts the role of higher vocational education in regional economic growth. In the context of swift economic expansion and industrial advancement, higher vocational education must quickly confront the challenge of effectively aligning with regional economic development, industrial transformation, and technological innovation. The study by Ren (2019), reveals a misalignment between the professional structure and the industrial structure in Zhejiang Province's higher vocational education, underscoring the necessity for professional

restructuring to align with industrial development. Pan's (2024) study examines the difficulties encountered by higher vocational education in developing specialized skilled workers aligned with the demands of the vehicle industry, utilizing Hubei province's automobile sector as a case study. She indicates that despite the swift advancement of the automotive sector in Hubei province generating a pressing need for highly skilled technical professionals, particularly in new energy vehicles and intelligent vehicle technology, higher vocational education has not adequately aligned with the actual requirements of enterprises regarding curriculum updates, educational reforms, and synchronization with industrial technology.

(iii) Lack of teaching quality and implementation of educational reforms

Numerous issues and obstacles exist in enhancing the quality of instruction and executing educational reforms in higher vocational education. The assurance of teaching quality is a fundamental objective of higher vocational education reform. Despite the advancement of quality education in China, numerous higher vocational colleges and universities have implemented changes in teaching content and methodology; yet, the persistent challenge of enhancing teaching quality continues to be a significant issue during the reform process (Qian, 2019). Research indicates that the assurance of teaching quality must be holistically assessed across various dimensions, including instructional input, process assurance, and evaluation, to achieve educational objectives (Qian, 2019; Gu, 2020).

Furthermore, the professionalism and pedagogical competence of teachers directly influence the quality of instruction. Teachers in higher vocational colleges and universities typically encounter challenges such as inadequate practical teaching skills and a lack of ambition for professional advancement, which hinder the enhancement of teaching quality (Zhang, 2019; Qiu & Lang, 2020). In this setting, it is essential to form a "dual type-teacher, dual-capable" instructional team, meaning educators must possess both robust professional knowledge and extensive practical experience and pedagogical skills (Zhang, 2019). By means of policy guidance and training enhancement, the overall quality of educators can be significantly elevated, hence advancing the level of instruction.

Furthermore, the gap between the curriculum and market need constitutes a significant issue in the restructuring of higher vocational education. As social demand for trained persons rises, curriculum content and instructional methodologies must evolve to align with the contemporary economic and social landscape (Zhang, 2021; Ma et al., 2024). The curriculum reform grounded in Outcome-Based Education (OBE) prioritizes student-centered learning and aims to enhance students' innovative and practical skills, significantly contributing to the improvement of teaching quality in higher vocational institutions (Huang & Yan, 2024).

The enhancement of school-enterprise collaboration is a crucial method for elevating the quality of instruction in higher vocational education. By collaborating closely with firms, we may gain a deeper insight into industry requirements, refine the curriculum, and improve students' practical skills and employability (Ma et al., 2024; Guo, 2020). This collaborative educational paradigm enhances students' professionalism while fostering talent for firms, so facilitating a positive relationship between education and the economy.

Counter-Measures for Growth and Advancement of China Higher Vocational Education*(i) Raising the standard of talent development*

In order to address the lack of clarity in the objectives of vocational education, a systematic and continuously updated system of vocational education standards needs to be developed and implemented at the national level. This will help ensure that all vocational institutions follow uniform educational and teaching guidelines and keep pace with industry development. Through school-enterprise cooperation and in-depth research, talent cultivation programs can be formulated to match market demand, thus realizing the precise match between cultivation objectives and market demand (Wan, 2024).

Simultaneously, higher vocational institutions and universities must periodically reassess and delineate the objectives of talent development in accordance with industry demands and market fluctuations. By collaborating closely with businesses and industry groups, they perform market research to understand current talent demands and skill prerequisites, subsequently developing more focused talent training initiatives. The implementation of the "1+X" certificate system promotes student engagement in occupational skills training alongside the acquisition of academic certificates, hence augmenting their employability (Wang, 2024). Furthermore, universities must assess and enhance the curriculum to guarantee its alignment with industry standards and technological advancements.

Regarding curriculum reform, to enhance talent cultivation, higher vocational colleges and universities must augment the practicality and applicability of their curricula, integrating modern technologies such as big data and artificial intelligence to develop students' practical and innovative capabilities (Chen & Sun, 2024; Chen, 2020). The concept of "craftsmanship" can be integrated to enhance the curriculum through actual work, hence improving students' professionalism and skills (Chen, 2020). Simultaneously, emphasizing the professional growth and practical competencies of educators, instructors are urged to engage in industrial practice and continuing education to improve their pedagogical skills and adaptability to industry demands (Xie, 2020). Higher vocational colleges and universities need to form "dual type-teacher" instructional teams by incorporating industry specialists and company mentors to enhance instructing quality and students' practical experience (Wang & Song, 2018). Facilitate students' acquisition of practical job experience and skills through collaborative curriculum development, internship program design, and orientation training with businesses. Establish the contemporary apprenticeship framework to align the genuine requirements of businesses with the development of skills that satisfy market demand (Ma et al., 2024).

It is essential to develop a systematic and rational evaluation framework for talent development. This entails a thorough evaluation of students' performance across multiple dimensions, including theoretical knowledge, practical skills, and vocational literacy, utilizing diverse assessment methods such as program evaluation, internship assessment, and enterprise feedback to gauge their overall quality and capabilities (Ren et al., 2020; Mei & Zhu, 2021). This evaluation system will establish a foundation for the ongoing enhancement of vocational education and guarantee the clarity and achievement of talent development objectives.

(ii) Enhancing the adaptability of vocational education

The adaptability of vocational education primarily pertains to the alignment between the professional framework of higher vocational education and the industrial structure, which is directly linked to the relevance and practicality of talent development. According to Ren (2019), the scientific and progressive characteristics of specialty setting are crucial for the adaptability of higher vocational education to industry development requirements. In this context, it is imperative to consistently refine the current academic programs while concurrently establishing pertinent disciplines in response to emerging industrial trends, such as the evolution of "smart manufacturing," to meet the new demands imposed by developments in technology.

Secondly, reforming the curriculum and pedagogical innovation are essential methods to enhance the adaptability of higher vocational education. The conventional curriculum framework and pedagogical approach may inadequately address the diverse talent requirements of the contemporary industry. Consequently, higher vocational education must enhance the overall quality of students by integrating professional theory with practical abilities through a modular curriculum, strengthening practical application, and fostering interdisciplinary integration. According to Wu & Su (2017), the integration and modularization of the curriculum system can invigorate students' learning motivation and effectively improve their practical skills.

Ultimately, policy support is crucial for addressing the issue of adaptation in higher vocational education. The government and pertinent departments must implement additional incentive policies to facilitate and enhance the reform and advancement of higher vocational education, including augmenting investment, refining practical training conditions, and promoting teacher development as well as student innovation and entrepreneurship. Simultaneously, it is imperative to enhance collaboration with firms and develop a talent cultivation model that integrates school-enterprise cooperation, so aligning education more closely with industry realities and improving both the employment rate and quality of employment for graduates.

(iii) Improving Teaching Quality and Implementing teaching reforms

This section concentrates on the obstacles and solutions associated with improving teaching quality and executing educational reform in higher vocational education. Improving teaching quality is the fundamental objective of advancing higher vocational education, and pedagogical reform is a crucial method to achieve this enhancement. The necessity and urgency for reform in the contemporary educational system have reached an unprecedented degree.

The first responsibility to enhance teaching quality is the upgrading of instructional content. As society rapidly evolves, the continuous emergence of new information and technology need periodic updates to the curriculum content of higher vocational education to maintain the relevance and applicability of students' learning. The teaching reform trend of "service-oriented, employment-oriented" underscores the close alignment of instructional material with practical requirements. Secondly, the reform of pedagogical approaches is essential for enhancing teaching quality. The conventional theoretical teaching model is insufficient to address contemporary educational demands; thus, it is imperative to adopt a

"combination of engineering and learning, learning and doing" approach, such as project-based and task-driven methodologies, which can significantly enhance students' practical and innovative capabilities. The role of teachers should transition from knowledge transmitters to learning facilitators and project mentors (Chao et al., 2019; Liu & Gu, 2015).

Moreover, enhancing practical instruction is a crucial method for elevating instructional quality. Given that higher vocational education aims to cultivate superior abilities, it is indispensable to enhance the practical teaching element, enabling students to acquire and implement their knowledge and skills in authentic or simulated work settings. This practice develops students' practical skills and improves their career adaptability and competitiveness in the labor market (Zhang, 2020). In light of the national focus on an innovation-driven development strategy, vocational colleges must incorporate innovation and entrepreneurship education into their professional curriculum. Yang (2020), asserted that innovation and entrepreneurship education enhances students' overall quality and boosts their employability. Consequently, higher vocational schools and universities must provide a comprehensive innovation and entrepreneurship education framework to encourage student engagement in practical activities, so fostering their innovative thinking and practical abilities.

Conclusion

Through a comprehensive literature review of the historical evolution of higher vocational education in China, we recognize several problems pertaining to flexibility, talent training standards, and teaching quality. This encompasses the disparity between the professional framework and the industrial framework, the deficiencies in the educational system, and the inadequacy of service capability. The superficial collaboration between higher vocational colleges and enterprises results in a disjunction between students' skill development and the employment requirements of enterprises, thus impacting students' employability and career development (Liu, 2022).

In order to address these difficulties, proposed solution solutions concentrate on the following critical areas: enhancing multi-stakeholder collaboration, refining the teaching and learning framework, improving service quality, and intensifying the integration of industry and education. It is essential to engage various stakeholders, including government, enterprises, industries, and educational institutions, to establish a productive link between educational resources and industrial demand through policy support and resource allocation. Furthermore, the development of "dual type-teacher" educators should be reinforced to enhance students' practical skills and innovative capabilities, while the relevance and applicability of instruction should be augmented through initiatives such as the establishment of virtual simulation training centers via school-enterprise collaboration. Simultaneously, other research has suggested strategies to enhance the establishment of specialties (clusters), refine the arrangement of specialties, and elevate the quality of talent development to ensure that the advancement of higher vocational education aligns with contemporary demands and more effectively supports regional economic and social progress (Wang, 2021).

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