Research Paper

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Research on the Development of Vocational Undergraduate Education in China: Evolution, Characteristics, and Practical Directions

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Abstract: Exploring vocational education at the undergraduate level and advancing the development of vocational undergraduate institutions are crucial for improving the modern vocational education system, addressing the realistic needs of economic and industrial transformation, and aligning with the trend of differentiated higher education development. The evolution of vocational undergraduate education in China can be divided into three stages: the framework construction and exploration phase, the critical phase of expansion and quality improvement, and the phase of deepening connotations and development. The practices of vocational undergraduate education in China exhibit three key characteristics: diverse and innovative approaches, industry-education integration with collaborative governance, and regulated operations under the standard-guidance. To further develop vocational undergraduate education, it is proposed to clarify institutional positioning to avoid "academic drift", emphasize serving industries by cultivating innovative talent, promote the internationalization of vocational education to achieve industry-education alignment, and facilitate high-quality employment to reshape value recognition.

Keywords: vocational undergraduate education; undergraduate-level vocational education; modern vocational education system

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Vocational undergraduate education, as the final link in the "secondary vocational-college-undergraduate" vocational education system, marks a significant shift in China's vocational education from scale expansion to a focus on type-based education. It is a strategic measure to address the bottleneck in high-level technical and skilled talent supply, optimize the education structure, and facilitate talent development pathways. As the primary practitioners and platforms for institutional innovation in vocational undergraduate education, vocational undergraduate institutions in China have experienced rapid growth in recent years. Since the Ministry of Education approved the establishment of the first 15 pilot vocational undergraduate institutions in May 2019, the number has risen to 87, with their unparalleled global development in speed and scale.

Therefore, reviewing the development of vocational undergraduate education in China, summarizing its characteristics, and clarifying future directions in practice are not only crucial for advancing industrial upgrading, cultivating high-level technical talent, and achieving the goal of building a strong education system, but also represent a valuable exploration of China's vocational education governance model in the context of global talent competition and industrial transformation.

1 Background of the Development of Vocational Undergraduate Education in China

1.1 Policy Requirements for Improving the Modern Vocational Education System

Since the late 20th century, countries worldwide have actively explored vocational undergraduate education to meet the demand for high-quality technical and skilled talent. Germany formally established the Baden-Württemberg Cooperative State University on March 1, 2009, while Japan revised legislation in 2017 to create professional vocational colleges and short-term vocational colleges. Similarly, Australia's TAFE institutes have offered undergraduate-level certification courses, and the UK has implemented degree apprenticeships and T-level programs. Thus, vocational education at the undergraduate level has become an essential component of modern vocational education systems in developed countries. When reviewing that in China, we find that China's vocational education has long been confined to the "secondary vocational education-higher vocational education" levels, facing a significant "ceiling effect" in its development. This structural deficiency not only limits the systematic cultivation and sustainable development of high-quality technical and skilled talent but also undermines the attractiveness and competitiveness of the vocational education system. As a result, the "type-based" identity and status of vocational education have struggled to be fully established in the whole process.

As early as June 2014, the State Council issued the "Modern Vocational Education System Construction Plan (2014–2020)", which proposed "building a modern vocational education system, developing application-type universities, and cultivating vocational talent at the undergraduate level. Application-type universities are an important part of the higher education system". However, this transformation effort fell short of expectations, highlighting the challenge of "integrating" vocational attributes within the traditional general education framework. In response, the 2019 "Implementation Plan for National Vocational Education Reform" explicitly proposed "piloting undergraduate-level vocational education", marking a strategic shift toward establishing vocational undergraduate programs. By 2022, the newly revised "Vocational Education Law of the People's Republic of China" legally affirmed vocational education as an independent education type of equal importance to general education, providing a solid legal foundation for vocational undergraduate education.

Vocational undergraduate education differs from application-oriented undergraduate programs. It is neither a downgraded version of general undergraduate education, nor a mere extension of higher vocational education. It simultaneously belongs to both higher education and vocational education, embodying distinct type-based characteristics. Unlike general undergraduate education, which follows the logic of academic development, vocational undergraduate education adheres to the logic of work systems, focusing on transforming the world. Compared to application-oriented undergraduate programs, vocational undergraduate education emphasizes technical practice and innovation, catering to frontline industrial needs. Compared with higher vocational education, vocational undergraduate education represents the advanced form of the vocational education system, aiming at high-end development and cultivating elite technical talent with undergraduate qualifications capable of undertaking creative tasks such as technological research, product development, and service design. It highlights the nature of vocational education in an elite-oriented manner. A stable modern vocational education system is characterized by a well-defined hierarchy within vocational education and clear positioning (Lv and Xu 2022), complemented by seamless internal and external pathways, forming an independent yet interconnected educational structure. Therefore, the development of vocational undergraduate education is both essential for showcasing the type-based attributes of vocational education and critical for improving the modern vocational education system.

1.2 Practical Needs for Meeting the Economic and Industrial Transformation

China's accelerated digital transformation and leap toward new-quality new quality productive forces have imposed unprecedented demand on the knowledge

structure, skill level, and innovative capacity of technical talent. This highlights the urgent need for vocational undergraduate education to address the significant gap in high-level technical and innovative talent, providing core momentum for industrial upgrading. On the one hand, China is at a critical stage of industrial transformation and economic growth model reform. Key industries are shifting from mass production to small-batch production and from standardized manufacturing to personalized and customized production (Yu et al. 2023). Meanwhile, as significant parts, digital technologies such as artificial intelligence, big data, and the Internet of Things are deeply integrating with the real economy, giving rise to new industries like smart manufacturing, industrial Internet, and digital twins, and driving industries toward high-end, intelligent, and green development. According to the "China Digital Economy Development Research Report (2024)" released by the China Academy of Information and Communications Technology, the scale of China's digital economy reached 53.9 trillion yuan in 2023, accounting for 42.8 % of GDP. By 2025, the digital economy is expected to exceed 60 trillion yuan, and by 2032, it will surpass 100 trillion yuan. This transformation is reshaping the labor market, with many traditional jobs being automated while creating new ones requiring a deep understanding of foundational technology logic, as well as system integration, data analysis, and process optimization skills. On the other hand, the development of new quality productive forces imposes fresh capability requirements on vocational education. President Xi Jinping emphasized that "developing new quality productive forces is an inherent requirement and key focus for promoting high-quality development". At its core, new quality productive forces are driven by technological innovation, innovative resource allocation, and deep industrial transformation. They requires workers not only to possess proficient skills but also to apply new technologies to production, optimize processes, solve complex engineering problems, and even engage in technological improvements and localized innovation. In light of these changing labor demands, China's existing higher vocational education and general undergraduate education fall short. According to the previously released "Manufacturing Talent Development Plan", by 2025, the talent gap in China's top ten manufacturing sectors will approach 30 million, with a shortage rate of 48 %.

Vocational undergraduate education serves as a strategic lever to address this structural imbalance. Data shows that the initial cohort of vocational undergraduate graduates achieved an employment rate of 87.07 %, with over 90 % of them employed in manufacturing and other real economy sectors. This highlights the unique talent cultivation role of vocational undergraduate education in developing high-level technical talent capable of solving complex technical problems and driving innovation, effectively bridging the gap between the theoretical focus of general education and the operational focus of higher vocational education. Therefore,

advancing vocational undergraduate education is a strategic measure to address talent shortages and directly support economic and industrial transformation.

1.3 Adapting to the Era Trend of Categorized Development in Higher Education

According to the 2024 National Statistical Bulletin on Educational Development, China's gross higher education enrollment rate has reached 60.80 %, transitioning from universalization to post-universalization. Martin Trow posits that the mission of higher education in the elite era, as well as that in the mass era and universal era cannot be fulfilled by homogeneous universities (Kuang 2020). As the enrollment rate increases, universities undergo differentiation beyond the original scope of the higher education system, leading to the emergence of new institutions that break the limitations of traditional perceptions. Therefore, this differentiation occurs based on talent cultivation goals, functional expansion, knowledge specialization, and market influence. The 2024–2035 master plan on building China into a leading country in education defines the basic positioning of universities as research-oriented, application-oriented, and skills-oriented, emphasizing the need to advance reforms and development in higher education through classification. Drawing on international education standards and China's practical experience, Professor Pan Maoyuan categorizes China's higher education into three types: academic universities, application-oriented colleges, and vocational technical colleges. Talent cultivation in higher education is divided into academic talent, engineering talent, and technical and skilled talent. Correspondingly, academic universities focus on imparting fundamental theoretical knowledge and conducting advanced research to cultivate academic talent. Application-oriented colleges emphasize adding industry-specific practical teaching to traditional elite training models, primarily cultivating engineering talent, including those specializing in engineering planning and design. Vocational technical colleges prioritize developing technical and skilled talent, mainly focusing on technical talent while addressing the needs of high-tech industries that require theoretical knowledge for skilled roles (Kuang and Li 2021). These three types of institutions play distinct yet indispensable roles in talent cultivation for social development and economic construction, fulfilling unique tasks respectively.

On the other hand, as higher education becomes more universal, public expectations have shifted from "access to education" to "access to quality education". The establishment of vocational undergraduate education offers more diverse educational options, alleviating growing social anxiety about education while providing students and parents with more freedom in education and studying, which allows higher education to evolve from "selective education" to "choice-based education".

Therefore, promoting vocational undergraduate education is not only a vital pathway for cultivating high-quality technical and skilled talent but also a necessary measure to align with educational development trends, enhance the functions of higher education, and adapt to global trends in vocational and higher education development.

2 Evolution of Vocational Undergraduate Education in China

Since the State Council issued the "Implementation Plan for National Vocational Education Reform" in January 2019, proposing the "pilot of undergraduate-level vocational education", China has continuously explored vocational undergraduate education, progressing through three stages: the framework constructionand exploration phase, the practice adjustment phase, and the rapid development phase.

2.1 2019–2021: Framework Construction and Exploration Phase

In 2019, the escalation of Sino-U.S. trade tensions underscored the importance of developing the real economy, advancing manufacturing industries, and optimizing the economic structure. Vocational education, most closely tied to economic and social development, plays a critical role in cultivating high-level technical talents. However, on one hand, challenges persisted that China had not yet established a seamless "secondary vocational-college-undergraduate" educational pathway, leading to traditional college-level vocational education struggling to meet social demands for talent. On the other hand, traditional bias favoring academic education over technical education remained prevalent in the society, with employers prioritizing candidates with undergraduate or higher degrees. Against this backdrop, the "Implementation Plan for National Vocational Education Reform" proposed piloting undergraduate-level vocational education in January 2019. In May, the Ministry of Education approved 15 private vocational colleges as the first batch of pilot institutions. To diversify vocational undergraduate education models, the Ministry of Education issued the "Implementation Plan for Accelerating the Conversion of Independent Colleges" in May 2020, suggesting that some independent colleges either convert independently or merge with vocational colleges to form undergraduate-level vocational institutions. From 2020 to 2021, another 17 vocational undergraduate institutions were established, with 9 converted from independent colleges and 1 upgraded from a public vocational college (Nanjing Vocational University of Industry and Technology). By the end of this phase, China had established 32 vocational undergraduate institutions.

To ensure the smooth development of vocational undergraduate education, relevant policies were introduced during this period to establish an independent vocational undergraduate education system. In January 2021, the Ministry of Education issued the "Standards for the Establishment of Undergraduate-Level Vocational Schools (Trial)" and the "Management Measures for the Establishment of Undergraduate-Level Vocational Education Programs (Trial)", clarifying the standards, conditions, and procedures for setting up vocational undergraduate schools and programs. These policies provided both support and a regulatory framework for the development and management of vocational undergraduate institutions and programs. In March 2021, the Ministry released the "Vocational Education Program Catalogue", which included 247 vocational undergraduate programs, a 260 % increase, effectively aligning with the modern industrial system and meeting the demand of high-quality economic and social development (Zhang 2023). In October, the General Office of the CPC Central Committee and the State Council issued the "Opinions on Promoting the High-Quality Development of Modern Vocational Education", proposing that vocational undergraduate enrollment reach no less than 10 % of higher vocational education enrollment by 2025, clarifying the phrased target and accelerating the development of vocational undergraduate education. In November, the Academic Degrees Committee of the State Council issued the "Opinions on Bachelor's Degree Authorization and Conferral for Undergraduate-Level Vocational Schools", integrating vocational undergraduate education into the existing bachelor's degree system and granting degrees by discipline, thereby initially establishing a vocational education degree system equivalent in quality to general education. Through these efforts, vocational undergraduate education successfully transitioned from a conceptual framework to an established reality during this period.

2.2 2022–2023: Critical Period for Expansion and Quality Improvement

In May 2022, China implemented the revised "Vocational Education Law of the People's Republic of China", which legally established vocational education as an education type equal in importance to general education and defined its structure as comprising "secondary, college, and undergraduate" levels. This new legal framework elevated vocational undergraduate education from a policy initiative to a legal mandate, providing strong legal support for its further development (Zhao et al. 2022).

However, challenges remain. On the one hand, influenced by traditional cultural perceptions, social status, and institutional design, vocational education

in China has long been viewed as lower-tier education. As a new concept, vocational undergraduate education still struggles with low social recognition. On the other hand, among the 32 vocational undergraduate institutions established, 22 (68.75 %) are private schools, which are the main part of such universities and face significant gaps in resources and quality compared to public schools. According to the report, in the 2022 National Vocational Skills Competition, only two private vocational undergraduate schools participated, winning just three medals – less than 1/22 of the total medals won by public schools (Liu and Qian 2025). Additionally, private institutions often mimic application-oriented universities, leading to unclear positioning and development goals. In December 2022, the General Office of the State Council issued the "Opinions on Deepening the Reform of the Modern Vocational Education System", emphasizing the leading role of vocational undergraduate education in building the modern vocational education system. Therefore, in this stage, the vocational undergraduate education was in a critical phase of expansion and quality improvement. First, the expansion of its enrollment. In 2022, vocational undergraduate institutions enrolled 76,300 students, an increase of 34,900 (84.39 %) compared to the previous year. This growth continued in 2023, significantly enhancing the capacity to cultivate high-level technical talent. Second, upgrading actively high-quality vocational colleges into vocational undergraduate institutions. In 2023, Shenzhen Polytechnic, known as the "leader" among vocational colleges, was upgraded to a vocational undergraduate institution. Its first cohort of undergraduate admissions achieved remarkable results, with the highest score exceeding the key undergraduate admission line by 56 points and the lowest score by 16 points (Zhang 2024), surpassing many established universities in Guangdong. This move set a strong example for other vocational colleges nationwide through pointing out the direction and pathway of development, and significantly boosting the appeal and public recognition of vocational undergraduate education. Third, labor market validation. In 2022, the first cohort of 9,220 vocational undergraduate graduates received bachelor's degrees, achieving an average employment rate of 87.07 %, 4.5 percentage points higher than the national average for undergraduate institutions. This validated the accuracy of vocational undergraduate education's talent cultivation positioning, filled gap of talents in the existing education system, and demonstrated the unique value of vocational undergraduate education as a distinct type of education.

2.3 2024 to Present: Phase of Deepening Development and Quality Enhancement

Following Shenzhen Polytechnic's successful upgrade to a vocational undergraduate institution and its positive social impact, a trend emerged for public vocational

colleges to lead the establishment of vocational undergraduate institutions. This marked a new stage where rapid expansion and quality improvement coexist in the development of vocational undergraduate education. In January 2025, the CPC Central Committee and the State Council issued the 2024–2035 master plan on building China into a leading country in education, emphasizing the need to "enhance the key capabilities of vocational schools, optimize the implementation of high-level vocational school and program construction plans, and build a group of high-level vocational undergraduate schools with distinctive characteristics". By 2023, there were 33 vocational undergraduate institutions nationwide. In 2024, another 27 vocational undergraduate schools were established, representing an 81.8 % growth rate. As of June 2025, the total number of vocational undergraduate institutions in China reached 87, with Guangdong Province having the highest concentration. Additionally, 19 more institutions are planned for undergraduate-level vocational education (Figure 1).

Vocational undergraduate education is experiencing rapid expansion. According to the "National Educational Development Statistical Bulletin" released in June 2025, vocational undergraduate enrollment in 2024 reached 109,600 students, accounting for 2.19 % of total undergraduate enrollment. The number of vocational undergraduate students in school reached 406,800, making up 1.95 % of all undergraduate students. In terms of program development, the latest vocational undergraduate program catalogue includes 19 major categories, achieving 100 % coverage across vocational undergraduate institutions. In a detailed way, as of June

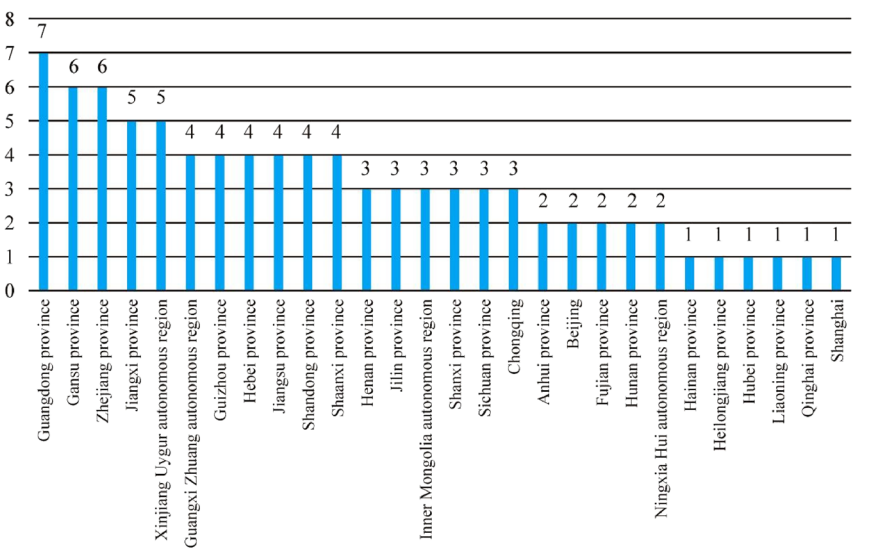

Figure 1: Regional distribution of established vocational undergraduate institutions.

2025, data from the National Smart Education Public Service Platform's "Sunshine National College Entrance Examination" on vocational undergraduate program setting shows that the top five program categories by the number of offerings are Electronics and Information Technology, Equipment Manufacturing, Finance, Economics and Business, Civil Engineering and Architecture, and Culture and Arts. Electronics and Information Technology leads with 186 program points, as the highest among them. Additionally, some vocational undergraduate institutions have aligned their program setting closely with regional vital industrial needs. For example, Guangzhou Vocational University sets programs such as Intelligent Manufacturing Engineering Technology, New Energy Vehicle Engineering Technology, Software Engineering Technology, and Fintech Applications. In 2025, it enrolled 470 students, making it a vocational undergraduate institution with the highest first-year undergraduate enrollment in Guangdong province (Figure 2).

Meanwhile, quality improvement has become a key focus. An increasing number of "Double High" (High-level Vocational Schools and High-level Professional

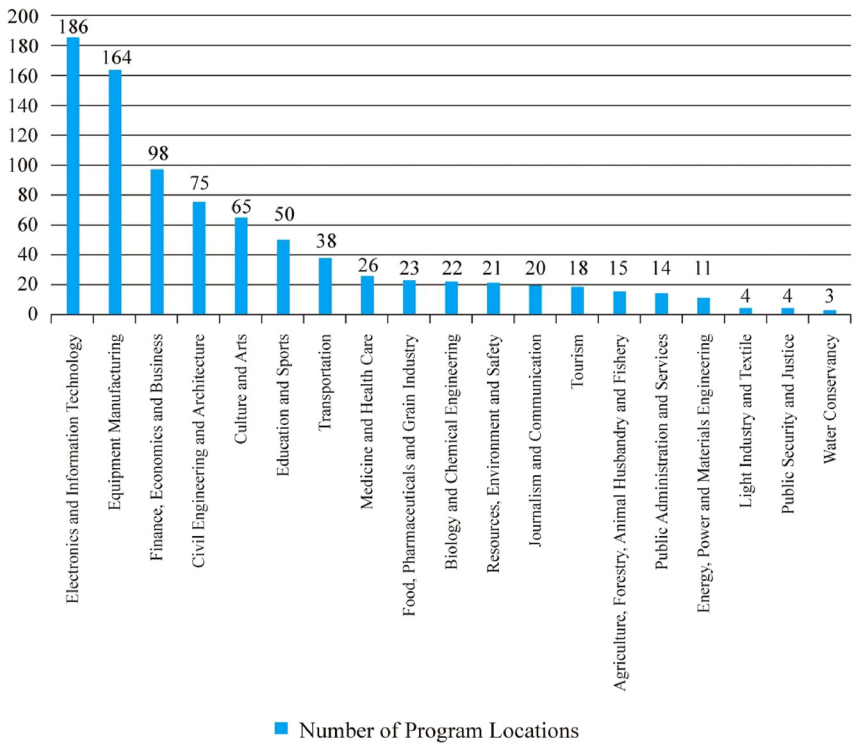

Figure 2: Number of program points by major categories.

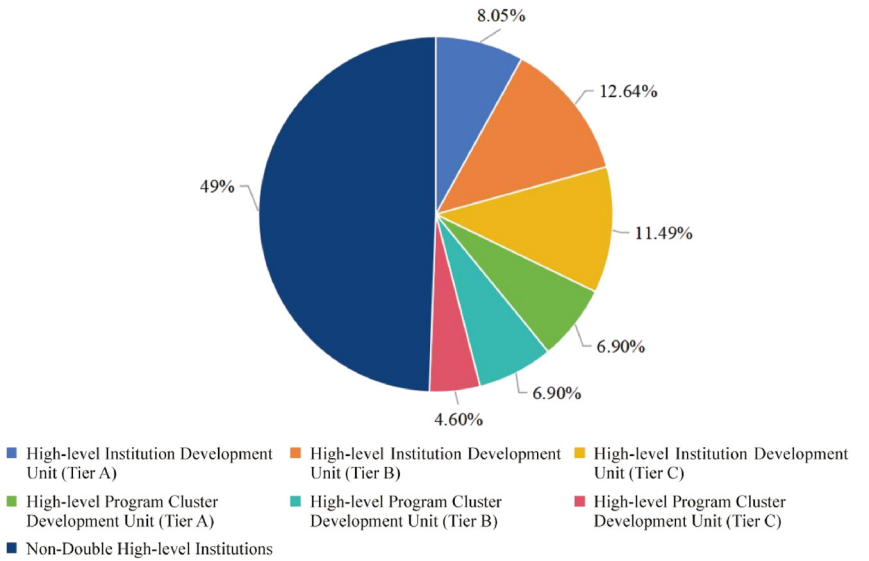

Figure 3: Proportion of "Double High" institutions within vocational undergraduate education.

Clusters) institutions have joined vocational undergraduate education. As of June 2025, 44 vocational undergraduate schools, accounting for 51 % (Figure 3), are "Double High" institutions, injecting significant momentum and vitality into improving the quality of vocational undergraduate education. These institutions relatively possess advantages in program development, faculty, and teaching resources, playing a vital role in enhancing the educational level and social reputation of vocational undergraduate institutions. For instance, Shenzhen Polytechnic University, after its upgrade, has maintained its focus on cultivating high-level technical talent, aligning with national strategies and regional industrial needs while emphasizing the vocational nature of its programs. Its curriculum system is designed around the comprehensive capability development, producing high-quality graduates to support regional economic growth. Data shows that 95.80 % of its 2024 graduates secured employment within the province, ranking among the top "Double High" institutions nationwide, reflecting strong public recognition of its educational quality.

In March 2025, considering the new demand for vocational undergraduate education in the new era, China issued the "Interpretation of the Evaluation Indicators for Undergraduate Teaching Work in Undergraduate-Level Vocational Schools (Trial)" based on the "Evaluation Indicators and Basic Requirements for Undergraduate Teaching Work in Undergraduate-Level Vocational Schools (Trial)". This document systematically explained the basic requirements, core aspects, and

evaluation priorities of the assessment indicators, providing strong guidance for vocational undergraduate institutions. During this period, the development of vocational undergraduate education shifted from focusing solely on expanding levels and scale to emphasizing the distinct characteristics of vocational education and improving the quality of vocational undergraduate programs. This transition enables vocational undergraduate education to better fulfill its leading role within the modern vocational education system.

3 Characteristics of Vocational Undergraduate Education in China

By analyzing the evolution of vocational undergraduate education in China, three prominent characteristics emerge: diverse forms of operation, integration of industry and education, and the standard-based guidance.

3.1 Diverse Forms and Innovative Practices

Since the 2019 "Implementation Plan for National Vocational Education Reform" proposed piloting vocational undergraduate education, China has explored various forms of vocational undergraduate institutions, categorized into four main pathways (Figure 4). The first pathway involves the independent upgrading of private vocational colleges to vocational undergraduate institutions. This model leverages market-oriented mechanisms as its core competitive advantage, offering greater flexibility and innovation in program design, curriculum adjustment, and innovate models. Private institutions are also highly responsive to regional economic needs and employment demands, aligning talent cultivation directly with enterprise job requirements, thereby promptly supplying urgently-needed technical talent for regional development. However, on the one hand, private institutions often face instability in running schools due to their simple economic structure, over reliance on tuition income and limited government support, resulting in weaknesses in faculty development and research investment (Yu et al. 2025). Additionally, the combination of their private nature and the vocational education label exacerbates doubts among students and parents regarding the value of the degree. Some institutions also prioritize scale expansion over quality enhancement, highlighting the need for further improvement in educational quality.

The second one is the independent colleges transitioning to vocational undergraduate institutions. This model leverages the undergraduate education foundation of former independent colleges, providing the first-mover advantage in teaching management systems, disciplinary development experience, and

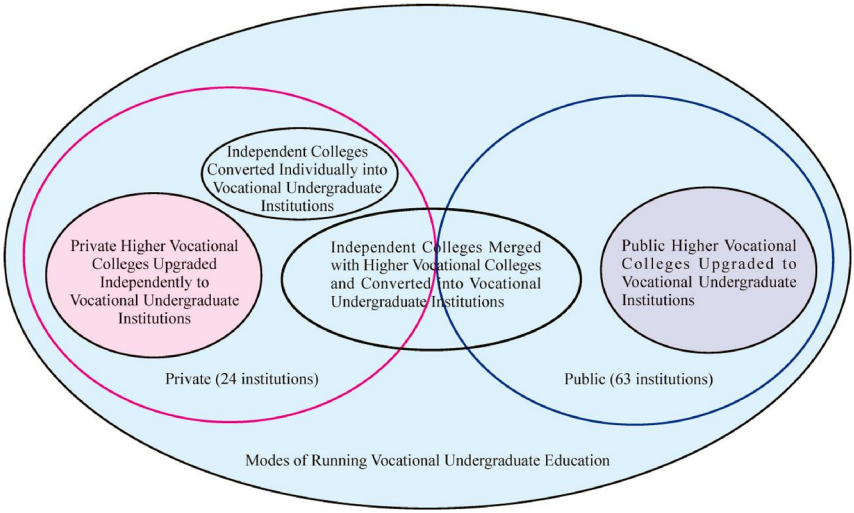

Figure 4: Forms of vocational undergraduate education.

student recruitment resources. The transition process is relatively straightforward, effectively avoiding the integration challenges associated with mergers. However, independent colleges often rely heavily on their parent universities, leading to problems such as unclear institutional positioning and weakened vocational attributes. Additionally, they face shortcomings in building dual-qualified teaching teams and establishing internship and training bases.

The third one is merging independent colleges with vocational colleges to form vocational undergraduate institutions. This approach maximizes the resource advantages of both parties, enabling shared faculty, training facilities, and industry-academia collaboration networks, thereby significantly shortening the development cycle for vocational undergraduate education by integration. The interdisciplinary integration of programs can foster emerging fields to meet the demand of cross-industry development. However, differences in management systems and institutional cultures present challenges during the merger process, particularly in areas such as governance structures, personnel integration, and cultural alignment (He 2023). Public perception also poses a hurdle, as vocational undergraduate education is often misunderstood as a downgrade in academic status, leading to strong resistance from parents and students.

The fourth one is upgrading public vocational colleges to vocational undergraduate institutions. Public vocational colleges have a solid foundation in vocational education for a long period, with the steady base of industry-education integration and a high proportion of dual-qualified faculty. This ensures that

their institutional positioning remains aligned with the vocational education model. Meanwhile, supported by government funding, the advantage of policies is favorable, which makes them guarantee the high standards and quality of education. However, public vocational colleges often lack experience in managing undergraduate-level education and have weak research foundations, facing challenges in building academic teams and research platforms. Furthermore, social recognition of vocational undergraduate education remains low, so that graduates still encounter biases in the job market regarding the perceived value of their degrees.

In summary, China's vocational undergraduate education has developed a diverse and flourishing landscape through multiple pathways of practice and exploration. Each model has its unique foundation and development approach, and they also face phrased challenges such as quality enhancement, resource integration, and social recognition. But these efforts have provided valuable practical examples and reform experience for further innovation in educational models and the construction of a vocational undergraduate education system with Chinese characteristics.

3.2 Industry-Education Integration and Collaborative Development

The 2024–2035 master plan on building China into a leading country in education explicitly calls for building an industry-education-integrated vocational education system. As a key component of this system, vocational undergraduate education reflects characteristics of industry-education integration in its practices. Positioned between traditional application-oriented undergraduate education and vocational college education, it combines the basic characteristics of application-oriented undergraduates and the advantages of vocational undergraduate education, focusing on cultivating advanced technical talent (Bie 2022). Industry-education integration in vocational undergraduate education involves deep collaboration of main bodies of education between educational institutions and industries in talent cultivation, technology development, and social services, aiming to align talent supply with industry demand in essence through answering the industry demand (Wang 2025).

The reflections are in four fields, and the first one is in the talent cultivation goals. Vocational undergraduate education targets the development of high-level and high-quality technical talent to meet industry upgrading needs. Compared with vocational colleges, it emphasizes cultivating talent for high-end industry sectors, requiring solid technical knowledge, interdisciplinary technical skills, and a focus on technological application and innovation of students.

The second one is in the curriculum design. Without deriving from the disciplinary system or a simple aggregation of job skills, vocational undergraduate curricula system is developed through a collaborative "co-research, co-development, co-responsibility" mechanism, focusing on industry advancements and cutting-edge technology. In a detailed way, the course content is derived from real-world enterprise projects, technological improvement challenges, and advanced standards, with teams of industry experts and faculty transforming them into modularized learning materials. In contrast, the curriculum integration of application-oriented undergraduate education focuses on the introduction and adaptation of established theoretical technologies, grounded in academic systems, and incorporates enterprise case studies and application scenarios. Its core goal is to develop students' abilities in scientific application, engineering planning, and implementation. However, vocational college education emphasizes alignment with the specific job tasks of current positions, with course content closely tied to existing operational standards and procedural skills, aiming to achieve proficiency in practical operations.

The third one is in the practical teaching. Vocational undergraduate education places greater emphasis on practical teaching compared with application-oriented undergraduate programs, with practice hours accounting for no less than 60 % of total instructional hours, as stipulated in the latest revision of the "Vocational Education Professional Teaching Standards". Compared with vocational college education, vocational undergraduate programs exhibit a higher level of integration between teaching and production. Targeting advanced technical talent, vocational undergraduate education demands rigorous technical training and partnerships with leading enterprises equipped with cutting-edge technology and production capabilities. These partnerships provide students with opportunities to tackle complex technical problems and engage in innovative practices. This deep integration not only equips students with current technical skills but also develops their abilities to address complex engineering challenges and drive technological innovation.

The fourth one is in the social services of vocational undergraduate education. Analysis of the program structure at multiple vocational undergraduate institutions shows a high proportion of secondary industry-related programs, with a strong focus on strategic emerging industries such as Intelligent Manufacturing Engineering, Software Engineering, and Big Data Engineering. These programs align closely with the strategic needs of building manufacturing power. Vocational undergraduate programs demonstrate a high degree of alignment with regional industrial structures, with 97 % of institutions closely matching local high-end industrial development trends (Song and Zhao 2025). This alignment enables them to effectively support regional economic growth and drive industrial transformation and upgrading.

3.3 Standards-Driven Development for Regulated Operations

Operational standards serve as the framework for the development of vocational undergraduate education. During the exploration of vocational undergraduate education practices, China has successively introduced operational standards, professional teaching standards, and degree conferral systems to promote the standardization, specialization, and type-based development of vocational undergraduate institutions and talent cultivation.

In terms of operational standards, the Ministry of Education has continuously refined the institutional framework. In January 2021, the Ministry issued the "Standards for the Establishment of Undergraduate-Level Vocational Schools (Trial)", setting entry thresholds across eight dimensions, including institutional positioning, governance capacity, and operational scale, to enforce strict requirements for vocational undergraduate establishment. Concurrently, the "Management Measures for the Establishment of Undergraduate-Level Vocational Education Programs (Trial)" outlined conditions and procedures for program establishment, emphasizing features such as "dual-qualified" faculty and the integration of work and study. In March 2025, the "Interpretation of the Evaluation Indicators for Undergraduate Teaching Work in Undergraduate-Level Vocational Schools (Trial)" was released, systematically elaborating on evaluation priorities based on updated standards to meet contemporary needs. This provided clear guidance for institutional quality improvement and established a comprehensive "entry-process-evaluation" policy model framework for vocational undergraduate education.

Compared with vocational college education, which focuses on ensuring students master mature technologies and standardized operations for specific roles and emphasizes the proficiency and standardization of skills, vocational undergraduate education emphasizes solving complex technical problems, optimizing processes, and fostering initial abilities in technological innovation. The revised 2025 "Vocational Education Professional Teaching Standards" introduced 64 vocational undergraduate program standards, standardizing education elements such as the program design and curriculum system while allowing institutions space for innovative practices on their own. the Mechanical Manufacturing and Automation program as an example, the new standards integrate content like industrial robot programming and digital design into core courses to meet the demand of intelligent manufacturing. Schools are encouraged to tailor courses based on regional and industry needs, education positioning and talent development, adopting modular curriculum designs. The standards also strengthen quality control by requiring institutions to establish professional teaching quality monitoring systems and emphasizing the significant role of enterprises in evaluating practical teaching. A

notable breakthrough in the new standards is the shift from traditional graduation thesis to practical outcomes such as process improvements and patent development as parts of graduation projects. Additionally, in November 2021, the State Council Academic Degrees Committee issued the "Opinions on Bachelor's Degree Authorization and Conferral for Undergraduate-Level Vocational Schools", incorporating vocational undergraduate education into the existing bachelor's degree system. This document standardized the authorization process, criteria, standards and management for vocational undergraduate degrees, affirming their equal value to general undergraduate degrees and laying the foundation for the vocational undergraduate degree system initially.

Overall, compared with application-oriented undergraduate education, vocational undergraduate standards more distinctly emphasize the "vocational" attribute. While application-oriented undergraduate standards are embedded within traditional academic frameworks, vocational undergraduate standards are designed from the outset to break away from academic logic, aiming to build an independent quality framework centered on cultivating innovative technical talent, with deep involvement from industry and enterprises in formulation and evaluation. However, as a new form of higher and vocational education, vocational undergraduate education lacks accumulated operational experience, leading to less mature standards. Some standards still reference the general undergraduate criteria and fail to address deep institutional elements. Therefore, the vocational undergraduate standard system requires further refinement and improvement.

4 Practical Directions for Vocational Undergraduate Education in China

4.1 Clarifying Institutional Positioning to Avoid "Academic Drift"

American sociologist T. Burgess defines "academic drift" as the phenomenon where non-university higher education institutions adopt university-style practices (Zheng and Ouyang 2022). In the field of vocational undergraduate education, academic drift refers to vocational undergraduate institutions shifting toward the model of general undergraduate institutions, including generalizing student recruitment, academicizing curriculum design, focusing on academic skills in talent cultivation, and moving away from skill-oriented employment (Wu and Xu 2023). Additionally, since vocational undergraduate education in China primarily evolves from upgrading vocational colleges, there is a tendency to align with vocational college-level talent cultivation, overlooking the distinct requirement of

undergraduate-level education. To address this, it is essential to clarify institutional positioning and prevent academic drift.

First, accelerate the development of a vocational undergraduate standard system that reflects its unique type-based characteristics to guide institutional development. There are four steps. The first one is to further refine operational and professional teaching standards for vocational undergraduate education, leveraging their foundational and guiding roles. The second one is to build a scientifically structured standard system tailored to vocational undergraduate education, including curriculum standards, internship standards, and equipment specifications, ensuring alignment with national conditions and fostering its high-quality development. The third one is to establish an independent quality evaluation system distinct from general undergraduate education, incorporating dimensions such as societal adaptability, resource adequacy, process compliance, outcome satisfaction, contribution impact (Cui et al. 2022), and brand influence to highlight vocational education's unique attributes. The inclusion of vocational undergraduate institutions in the 2025 second round of the "Double High Plan" breaks away from traditional reliance on the general undergraduate evaluation criteria, encouraging a focus on practical teaching, school-enterprise collaboration, and the cultivation of students' vocational skills.

Second, clarify institutional positioning and define talent cultivation goals. It is necessary to differentiate between vocational undergraduate education from higher vocational colleges that focus on specialized skills, general undergraduate programs that emphasize rich theoretical knowledge, and application-oriented undergraduate programs that train applied talent. Based on economic and labor market demands, vocational undergraduate education should focus on cultivating high-level technical talent aligned with industrial development. As a part of higher education in level and vocational education in type, it must establish a scientific development orientation that balances higher education characteristics with vocational attributes.

Third, strengthen efforts to direct upgrading public vocational colleges to vocational undergraduate institutions, and enhance their leading role. High-level public vocational colleges often have strong foundations in industry-education integration, abundant practical teaching resources, and mature academia-industry partnerships. Their transition can quickly create a demonstration effect for vocational undergraduate education. Institutions like Shenzhen Polytechnic University and Nanjing Vocational University of Industry and Technology have leveraged existing resources to improve quality and standards. Additionally, upgrading public vocational colleges can optimize resource allocation in vocational education, address the current shortages such as its limited number and uneven distribution of vocational undergraduate institutions, and enhance the overall competitiveness

of the vocational education system. This provides a solid foundation for vocational undergraduate education to insist on its type-based positioning and avoid academic drift.

4.2 Emphasizing Industry Alignment and Cultivating New-Quality Talent

In response to the strategic need for developing new quality productive forces, vocational undergraduate education must align closely with the forefront of industrial transformation and establish a development model centered on technological iteration and talent alignment.

First, establish a dynamic professional adjustment mechanism. On one hand, focus on strategic emerging industries such as artificial intelligence and new energy, as well as integrated industries like the industrial Internet and digital creativity. Introduce new disciplines such as virtual reality technology applications and intelligent connected vehicle engineering, integrate cutting-edge technologies, processes, and standards into curricula to ensure talent cultivation aligns precisely with industrial advancements. On the other hand, leverage industry development roadmaps to digitally and intelligently upgrade traditional disciplines. For example, transforming mechanical manufacturing into intelligent manufacturing engineering by incorporating modules such as industrial robot programming and digital design, thereby enhancing the role of vocational undergraduate education in driving industrial upgrading.

Second, align with the demand of new quality productive forces by cultivating students' three-tiered abilities: foundational skills, professional expertise, and innovative literacy. The curriculum design should break down disciplinary boundaries, develop interdisciplinary modules, and emphasize comprehensive ability development. Teaching methods should adopt problem-based learning and project-based instruction, using real enterprise projects to enhance students' ability to solve complex engineering problems.

Third, further deepen the integration of industry and education, promote the transformation of school-enterprise cooperation from project-based collaboration to the construction of a community with a shared future, and explore diversified collaborative education models. Strengthen the cooperation among various stakeholders in areas such as program development, curriculum design, and textbook compilation, aligning course content with job practices and the teaching process with production processes. Innovate school-enterprise benefit-sharing mechanisms by introducing incentives such as profit-sharing from technological research and development and rewards for joint talent cultivation, thereby enhancing enterprises' enthusiasm for participation.

Fourth, strengthen the functions of technological research and development as well as social services. Fully leverage the advantages of vocational undergraduate education in talent cultivation and technological innovation, positioning it as a "booster" for industrial innovation. Establish technology research centers and industrial innovation bases to focus on solving technical challenges faced by enterprises through collaborative efforts. Additionally, provide services such as skills training, technical consulting, and standards formulation for industries, offering digital transformation training courses for traditional enterprises and participating in the development of industry vocational skill level standards. Encourage faculty and students to engage in innovation and entrepreneurship projects, promoting the transformation of research achievements and fostering a virtuous cycle of "technology research – achievement transformation – industrial upgrading". This approach enables mutual empowerment between vocational undergraduate education and industrial development.

4.3 Promoting Global Development of Vocational Education and Advancing Industry-Education Synergy

Under the background of global industrial restructuring and the accelerated internationalization of Chinese manufacturing, vocational undergraduate education must align with enterprises going global, taking a leading role in vocational education development overseas.

First, under the policy framework of "education following industry, education and industry advancing together in synergy", vocational undergraduate institutions should actively adapt to the national Belt and Road Initiative and the layout of international capacity cooperation, as well as establish mechanisms tailored to industry needs. Through improving the policy system for opening up, establish an education cooperation framework at the top-level design stage that aligns with enterprises' global operations. Promote vocational undergraduate institutions to sign multilateral or bilateral agreements with BRI participating countries, ensuring the normativity and sustainability of cross-border industry-education collaboration from legal and institutional perspectives. Meanwhile, vocational undergraduate institutions must enhance quality development, focusing on overseas business needs of enterprises. By systematically aligning program offerings and talent cultivation plans with industry demand, they can develop a deeply integrated "education chain – industry chain" development model, providing customized technical talent to support the global operations of Chinese-funded enterprises.

Second, establish international cooperation platforms to enhance collaboration in the vocational undergraduate program development, such as its curriculum design, faculty training, and student cultivation. Innovate cooperation

models by leveraging platforms with specialities such as “Luban Workshops” and “Silk Road Colleges” to explore new approaches to Sino-foreign joint education and promote localized operations of overseas educational institutions (Li et al. 2025). Integrate China’s vocational education curriculum systems, teaching standards, and enterprise technical specifications for systematic output, break the traditional one-way communication barrier in cross-border education cooperation. This ensures alignment between educational supply and enterprises’ overseas development needs, addressing workforce adaptability issues while supporting enterprises in integrating into local markets and mitigating cultural conflicts through localized talent cultivation and technical training. This creates a virtuous cycle where “education serves industry, and industry supports education”.

Third, export standard systems to enhance international influence in vocational education. Vocational undergraduate institutions should collaborate with leading enterprises to develop and export international vocational education standards. Align China’s vocational education standards with globally accepted norms, transitioning from “following” to “leading” in the field of standards gradually. Vocational undergraduate institutions should focus on core areas such as teaching and professional standards to build an internationally advanced Chinese vocational education standard system, providing a solid theoretical and practical foundation for exporting “Chinese solutions”. This not only offers guidance for vocational undergraduate education but also elevates China’s voice in global vocational education governance by participating in international rule-setting, showcasing vocational education’s role in serving national strategies and demonstrating China’s leadership as a major power.

4.4 Promoting High-Quality Employment and Reshaping Value Recognition

Although vocational undergraduate education has been legally affirmed in China and recognized as a critical component of the modern vocational education system through various policy documents, and its unique value distinct from general undergraduate education has been theoretically substantiated by many experts and scholars, it still faces significant social recognition barriers in education practice. Its educational value and talent cultivation quality have yet to gain widespread public acceptance, leading to deep-rooted challenges in social recognition. From the perspective of social constructivism, within the existing educational system and labor market, academic qualifications serve as a key screening tool, with higher degrees perceived as indicators of greater competitive capital. Under this filtering mechanism, social perceptions of occupational stratification and hierarchy are further

internalized, resulting in differing levels of social recognition for various professions (Hao and Shi 2022). Students from vocational undergraduate institutions, due to the perceived disadvantage of their qualifications, are often viewed by the public as being at a disadvantage in the job market, making it difficult to establish value recognition.

Therefore, to address the social recognition challenges faced by vocational undergraduate education and rebuild its value recognition, it is essential to leverage its unique advantages in promoting employment, achieving high-quality employment, and alleviating educational anxiety.

On one hand, for the vocational undergraduate talent cultivation, a high-level structured workplace learning system should be designed and implemented. This learning model, with clear educational objectives and systematic planning, places students in real and structured work environments where they progressively take on actual job responsibilities, as well as help students develop the ability to handle complex tasks, strengthens their technical skills, and fosters their abilities in teamwork, project management, and reflective thinking during practical work, ensuring a close connection between theory and practice (Kuang and Jiang 2025). Consequently, structured learning tasks, hierarchical team structures, and continuous reflection mechanisms should be implemented, focusing not only on current skill requirements but also on forward-looking skill development. This enhances students' comprehensive capabilities in the job market, enabling high-quality employment.

On the other hand, for general undergraduate talent cultivation, a "bridge-like" academic transfer pathway should be established, allowing students from general universities to transfer to vocational undergraduate institutions to acquire practical skills, while also supporting vocational undergraduate students in pursuing advanced theoretical studies at general universities. This would diversify talents' choices in development pathways. Additionally, a course-sharing system should be implemented, where vocational undergraduate institutions offer core technical and skill-based courses to general university students. Short-term, intensive micro-courses and micro-programs, such as "Smart Manufacturing Equipment Operation" or "Cross-Border E-commerce Practical Skills", should be developed to focus on specific skill areas, meeting the personalized development needs of general education students, enhancing their practical skills, and improving their employability.

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References

Bie, Dunrong. 2022. “On Definition, Characteristics and Requirements of Academic Undergraduate, Practical Undergraduate, and Vocational Undergraduate.” *China Higher Education Research* (08): 61—8+75.

Cui, Qiyong, Yun Cai, and Juan Shi. 2022. “Research on the Construction of Vocational Undergraduate Education Quality Index.” *China Higher Education Research* (03): 94—8.

Hao, Tiancong, and Weiping Shi. 2022. “Social Identity Dilemma of Undergraduate Vocational Education and its Resolution Strategies: An Investigation from the Perspective of Social Constructivist Epistemology.” *Journal of Nanjing Normal University (Social Science Edition)* (06): 34—43.

He, Chaoping. 2023. “Value, Problems and Strategies for High-Quality Development of Vocational Undergraduate Education in the Context of Merger and Transformation.” *Education and Vocation* (04): 64—9.

Kuang, Ying. 2020. “The Confusion of the Higher Trait of Higher Vocational and Technical Education and its Current Solution.” *Journal of East China Normal University (Educational Sciences)* 38 (01): 12—22.

Kuang, Ying, and Mengsheng Jiang. 2025. “The Key to High-Quality Vocational Undergraduate Education Lies in High-Level Structured Workplace Learning.” *Research in Educational Development* 45 (09): 36—43.

Kuang, Ying, and Qi Li. 2021. “The Undergraduate Programme is Not the So-Called One: The Essence of Vocational Undergraduate Programme and its Development Strategy.” *Research on Educational Development* 41 (03): 45—51.

Li, Jianguo, Xuemin Wu, Wei Dai, and Bingqing Yang. 2025. “Vocational Undergraduate Education that Actively Responds to Industrial Transformation and People’s Educational Demands — New Progress in Research and Practice of Vocational Undergraduate Education in 2024.” *Chinese Vocational and Technical Education* (02): 63—75.

Liu, Xiao, and Jiannan Qian. 2025. “High-Quality Development of Vocational Undergraduate Education in Building an Education Powerhouse.” *Journal of Hebei Normal University (Educational Science)* 27 (01): 93—101.

Lv, Yuman, and Guoqing Xu. 2022. “From Strengthening to Optimization: The Practical Path to Establish the Type Attributes of Vocational Education.” *Modern Education Management* (02): 111—8.

Song, Yafeng, and Kangjian Zhao. 2025. “Research on the Adaptability of Major Structure of Vocational Undergraduate Colleges to the Upgrading of Industrial Structure.” *Education Research Monthly* (02): 26—33.

Wang, Zifei. 2025. “Inner Mechanism and Practical Approaches of Industry-Education Integration in Vocational Undergraduate Education from the Perspective of ‘New Double High-Level’ Construction: Based on the Theory of Loose Coupling.” *Education and Vocation* (08): 13—9.

Wu, Qiuchen, and Guoqing Xu. 2023. “Study on Developmental Characteristics of Vocational Undergraduate Colleges Academic Drift.” *Journal of Vocational Education* 39 (02): 24—31.

Yu, Lin, Guijin Zhou, and Jinggui Cui. 2023. “Realistic Dilemma, School-Running Orientation and Practice Path of the Development of Vocational Undergraduate Education.” *Adult Education* 43 (08): 73—8.

Yu, Qinglan, Zeqiang Fang, and Jiming Zhang. 2025. “Value, Dilemma and Action: The Logical Pathway of Current Developing Private Vocational Undergraduate Colleges.” *Journal of Vocational Education* 41 (04): 12—8.

Zhang, Xiaomin. 2023. “Theoretical Basis, Development Paths and Quality Standards of Vocational Undergraduate Professional Construction from the Perspective of Knowledge Creation by Enterprises.” *Education and Vocation* 14: 11—8.

Zhang, Ping. 2024. “How to Eliminate Bias: Reconstructing the Social Impression of Undergraduate Vocational Education on Vocational Education.” *Journal of Vocational Education* 40 (08): 31—8.

Zhao, Huili, Dongliang Gu, and Yapeng Wang. 2022. “Policy Evolution, Intrinsic Connotation, and Developing Strategy of Undergraduate Vocational Education.” *Journal of Vocational Education* 38 (06): 24—30.

Zheng, Wenlong, and Guanghua Ouyang. 2022. “Risks of Classified Discipline Evaluation and the Avoidance.” *Jiangsu Higher Education* 10: 51—7.