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The Concepts, Principles and Paths of Vocational Undergraduate Course Construction

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Abstract: *Vocational undergraduate education, as a key link in cultivating high-level technical and skilled talents, has entered a high-quality development stage with industrial upgrading and policy support. This article systematically reviews the development process of vocational undergraduate education in China, dividing it into four stages: germination, exploration, pilot rise, and steady development. It focuses on analyzing the core concepts of vocational undergraduate curriculum construction and four principles: integration of morality and skills, progressive ability, industry-education collaboration, and dynamic update. Measures to enhance the construction of undergraduate courses are proposed from five aspects: course objective positioning, course content design, course teaching methods, course resource development, and course implementation and evaluation, providing strong support for cultivating high-quality technical and skilled talents with both theoretical literacy and practical innovation ability.*

Keywords: *Vocational Undergraduate; Course Construction; Concept; Principle; Path*

1. Introduction

With the transformation and upgrading of industries and the acceleration of technological iteration, the demand for high-level technical and skilled talents in society is becoming increasingly urgent. As a key link in the modern vocational education system, vocational undergraduate education shoulders the important mission of cultivating high-level technical and skilled talents with both theoretical literacy and practical innovation ability. In recent years, vocational undergraduate education in China has moved from policy exploration to practical deepening. The newly revised "Vocational Education Law" in 2022 established its status for the first time in legal form, marking a new stage of high-quality development for vocational undergraduate education. Course construction, as the core carrier of talent cultivation, is of great significance to the training of vocational undergraduate talents. This article reviews the exploration history of undergraduate-level vocational education, systematically analyzes the core concepts and basic principles of its curriculum construction, and proposes implementation paths, providing theoretical references and practical paradigms for the high-quality development of vocational undergraduate education.

2. The exploration history of undergraduate-level vocational education

The development process of vocational undergraduate education in our country is a history of evolution from nothing to something and from the periphery to the mainstream. This process not only reflects the adaptive transformation of China's education system to the demands of economic and social development, but also demonstrates the cognitive shift of vocational education from "levels" to "types". According to the changes in policy orientation, educational practice and social demand, its development history can be systematically divided into the following four important stages:

2.1 Embryonic Stage (1860s - 2005): Secondary vocational education was the main body, and the concept of the undergraduate level began to emerge

In the 1860s, the Self-Strengthening Movement established technical schools such as the Fuzhou Shipbuilding School, marking the beginning of modern vocational education. After the founding of the People's Republic of China, secondary technical schools were established by learning from the Soviet model to cultivate junior technical talents. By the 1990s, secondary vocational education accounted for

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half of the senior secondary education. In 1998, the "Action Plan for Revitalizing Education in the 21st Century" first proposed that "some undergraduate institutions could establish higher vocational and technical colleges", but in 1999, the Ministry of Education clearly limited higher vocational education to the junior college level. In 2005, The State Council's "Decision on Vigorously Developing Vocational Education" further stipulated that "in principle, higher vocational colleges should not be upgraded to undergraduate education before 2010", but the academic circle has begun to call for vocational education to be regarded as "type education" rather than "level education", and the concept of undergraduate-level vocational education has begun to sprout.

2.2 Exploration Stage (2006-2014): The typification of higher vocational education and the initial launch of the pilot program for policy relaxation

In 2006, the Ministry of Education proposed that "higher vocational education is a type of higher education", providing a theoretical basis for undergraduate-level vocational education. In 2011, the Ministry of Education encouraged the integrated education of secondary vocational schools, higher vocational colleges and applied undergraduate programs. Economically developed regions such as Jiangsu and Zhejiang took the lead in conducting pilot projects. These regions have explored systematic training paths for technical and skilled talents through models such as "3+2" segmented training and "4+0" joint education. However, due to the essential difference between the academic orientation of regular undergraduate colleges and the practical orientation of vocational education, this joint training model often fails to highlight the type characteristics of vocational education. The year 2014 was a crucial turning point in the development of vocational undergraduate education. The State Council's "Decision on Accelerating the Development of Modern Vocational Education" for the first time proposed at the policy level to "explore the development of undergraduate-level vocational education" and allowed regular undergraduate colleges and universities to transform into applied technology-oriented colleges and universities. The "Modern Vocational Education System Construction Plan (2014-2020)" released in the same year further clarified the inclusion of undergraduate-level vocational education in the modern vocational education system and put forward the development goal of "reaching a certain scale of undergraduate-level vocational education". These policy breakthroughs mark the transition of vocational undergraduate education from theoretical exploration to practical exploration.

2.3 Pilot Rise Stage (2015-2020): Multiple models run in parallel, and the type status is established

In 2015, the Ministry of Education promoted the transformation of local undergraduate colleges into application-oriented ones. Over 300 universities across the country participated in the pilot program. However, due to the deeply-rooted logic of disciplines, most of the transforming universities still followed the academic evaluation system, making it difficult to truly reflect the characteristics of vocational education. In 2019, the "National Vocational Education Reform Implementation Plan" clearly stated that vocational education is "equally important" as general education and launched the pilot program for independent vocational undergraduate education. In the same year, Nanjing Institute of Technology was upgraded to Nanjing Institute of Technology University, becoming the first public vocational undergraduate school in China. At the same time, 15 private higher vocational colleges were also approved for upgrading. In 2020, the Ministry of Education encouraged the merger and transformation of higher vocational colleges and independent colleges, adding nine new public vocational undergraduate schools. However, at this stage, problems have become prominent: the educational strength of private colleges and universities varies greatly, and their mergers and reorganizations face low social recognition. The impetus for the transformation of application-oriented undergraduate programs is insufficient. The joint training model is difficult to reflect the professional characteristics.

2.4 Steady Development Stage (2021to present): The policy guarantee system has gradually improved, and the pace of high-quality development has accelerated

In 2021, the "Vocational Education Professional Catalogue (2021 Edition)" listed undergraduate-level vocational education majors for the first time. Documents such as the "Standards for the Establishment of Undergraduate-level Vocational Schools" have been issued, removing the restriction that "higher vocational colleges should not be upgraded in principle", and completely opening up the channel for upgrading to a bachelor's degree. The new Vocational Education Law of 2022 clearly stipulates that "higher vocational education includes undergraduate and above levels", establishing the legal status of vocational undergraduate education. By 2025, there will be 83 vocational undergraduate schools across

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the country, and the enrollment scale will gradually expand. The policy focus has shifted to "quality improvement", promoting the development of vocational undergraduate education towards high standards and distinctive features. [1]

3. Concepts and principles of vocational undergraduate curriculum construction

3.1 The concept of vocational undergraduate curriculum construction

The construction of vocational undergraduate courses takes "value guidance - ability-based - integrated innovation - sustainable development" as its core concept, emphasizing that courses are not only carriers of knowledge and skills, but also educational venues for fostering virtue and nurturing talent, as well as cultivating both moral integrity and professional skills. The course design takes real professional scenarios as the logical starting point and, through the reverse path of "work process - technical activities - knowledge reconstruction", transforms industrial demands, job standards, and technological frontiers into implementable teaching content, achieving a dynamic match between course content and professional standards. In terms of educational goals, we adhere to the coexistence of academic and vocational aspects. We not only emphasize the "vocational nature" of high-level technical skills but also highlight the "higher nature" of undergraduate education, aiming to cultivate high-quality technical and skilled talents with the ability to solve complex problems, carry out technological innovation, and integrate across disciplines. The course implementation is student-centered, and a teaching model of "integration of theory and practice, and unity of learning and doing" is constructed in a project-based, modular and task-driven manner to strengthen students' subjectivity and creativity, and ultimately achieve sustainable development from "job adaptation" to "career generation".

3.2 The principles of vocational undergraduate course construction

3.2.1 The principle of integrating morality and skills

Course construction needs to break through the traditional model of the binary separation of "moral education" and "skills", and deeply embed the core socialist values, the spirit of craftsmanship, and professional ethics into the knowledge structure and teaching context of professional courses. Through the dual-wheel drive of "course-based ideological and political education + professional context", students can naturally understand professional ethics and social responsibility in the process of technical learning, achieving an organic unity of value shaping, knowledge imparting and ability cultivation. For instance, integrating real enterprise cases into project-based teaching can guide students to balance social benefits and ethics in the design of technical solutions, and cultivate high-level technical and skilled talents who are both morally and professionally competent. [2]

3.2.2 The principle of progressive ability

Curriculum design should follow the spiral upward path of "basic ability → core ability → extended ability", and build a hierarchical and progressive modular curriculum system based on vocational ability standards. The basic stage strengthens professional cognition and technical principles, the core stage focuses on the comprehensive practice of complex tasks, and the expansion stage cultivates innovative transfer capabilities through interdisciplinary projects or cutting-edge technical topics. The course objectives, contents and evaluations at each level must be precisely aligned with the industrial job competency levels to ensure the continuity of students' ability growth and career development.

3.2.3 The principle of industry-education collaboration

Course construction requires the establishment of a deep collaboration mechanism with both schools and enterprises as the "dual subjects". Enterprises should be involved in the entire process of course standard formulation, teaching resource development, teaching process implementation and evaluation standard design. By jointly building industrial colleges, sharing technical platforms and jointly researching teaching projects, real production cases and technical problems of enterprises are transformed into teaching tasks, achieving synchronous iteration of course content and industrial technology. Teachers and enterprise engineers form a "dual-mentor" team, while students complete the identity transformation from "students" to "prospective employees" through the "alternation of learning and positions".

3.2.4 The principle of dynamic update

The course content should establish a rapid response mechanism of "industry demand - technological

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change - course revision", and be systematically updated every 3 to 5 years. Through channels such as industry associations, enterprise alliances, and graduate tracking, real-time signals of technological iterations and job changes are captured, outdated content is promptly eliminated, and new technologies, new processes, and new standards are integrated. Meanwhile, course resources (such as textbooks, case libraries, and virtual simulation training platforms) should remain open and scalable, supporting teachers in flexibly adjusting teaching modules based on regional industrial characteristics to ensure that the courses are always oriented towards the future professional world.

4. The construction path of vocational undergraduate courses

4.1 Course objective positioning: Focus on the cultivation of compound abilities of high-level technical and skilled talents

The positioning of the course objectives for vocational undergraduate education should be distinct from that of higher vocational colleges and regular undergraduate education, highlighting the characteristics of "high-level, compound and innovative". First of all, the course objectives should be clear that vocational undergraduate education aims to cultivate high-quality technical and skilled talents who are competent for complex technology application, process development and production management. Their core competencies include technical application ability, problem-solving ability and innovative practical ability. The course objectives should revolve around the high-end demands of the industry, integrate the requirements of productivity development, and incorporate cutting-edge technological elements such as digitalization and greenization to ensure that students possess the ability to integrate interdisciplinary knowledge and sustainable development literacy. Secondly, the course objectives should emphasize the balance between vocational and academic aspects, avoiding the simple superimposition of theoretical courses or an excessive focus on skills training. For instance, by aligning with X certificate standards or authoritative industry certifications, professional standards can be transformed into course objectives, while strengthening the fundamental role of technical theoretical knowledge to provide support for students' future career development. In addition, the course objectives should also reflect the concept of lifelong learning, cultivate students' autonomous learning ability to adapt to technological iterations, and lay a foundation for their career advancement and transformation.

4.2 Course content design: Centered on technical knowledge, a modular and dynamic content system is constructed

The content of vocational undergraduate courses should break through the traditional disciplinary framework, with technical knowledge as the main body, covering technical theory, technical practice and tacit experience knowledge. Firstly, it is necessary to distill the complex technical knowledge required for the position through professional ability analysis, and organize the content in accordance with the structure of "classic discipline courses + technical discipline courses + ability-based courses" to ensure that theoretical depth and practical orientation coexist. Secondly, the content design should be modular, dividing the technical field modules based on the demands of the industrial chain, and supporting students to flexibly choose according to their interests or career directions. Meanwhile, the course content needs to be updated dynamically and incorporate new technologies and processes in the industry in a timely manner. For instance, real project cases can be introduced through school-enterprise cooperation to transform the technical problems of enterprises into teaching materials. [3] In addition, the design of course content should attach importance to the explicit nature of tacit knowledge. For instance, problem-solving strategies can be refined through expert interviews to form a "technical bible" that can be taught, thereby enhancing students' ability to handle complex situations.

4.3 Course teaching method: Implement a dual model of project-based teaching and industry-education integration

Vocational undergraduate teaching should be dominated by project-based teaching, and promote the advancement of students' abilities through open and comprehensive projects. First, a three-level project system can be designed for course teaching: course-level projects, course cluster-level projects, and professional-level projects, gradually enhancing students' ability to solve complex problems. Second, universities need to deepen the integration of industry and education. They should rely on industrial colleges or training bases, incorporate real enterprise projects into teaching, and implement a "dual-mentor system", where enterprise engineers and teachers provide collaborative guidance. [4] For instance,

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the major of intelligent manufacturing can take the debugging task of industrial robots as the project carrier, and students can learn programming, troubleshooting and other skills in real scenarios. In addition, universities should also integrate digital means, utilize virtual simulation, digital twin and other technologies to build a blended learning environment, support students to collaborate on projects through online platforms, and enhance the flexibility and interactivity of teaching.

4.4 Course resource development: Jointly build an intelligent and shared teaching resource platform

Vocational undergraduate course resources need to break through the limitations of traditional textbooks and build a resource ecosystem of "co-construction by schools and enterprises and open sharing". First, vocational undergraduate universities need to develop intelligent teaching resources, such as digital textbooks based on knowledge graphs and virtual simulation training systems, to dynamically present technical principles and operation processes. Second, universities need to build case libraries and micro-course resources, collect solutions to typical technical problems of enterprises, and form reusable teaching modules. For instance, the cross-border e-commerce major can integrate real data from e-commerce operations and develop data analysis simulation systems. Third, it is imperative to develop a resource sharing platform. This platform will facilitate enhanced communication and resource exchange among educational institutions and between educational institutions and corporate entities, thereby mitigating the risk of redundant infrastructure development. Resource development should focus on standardization. The content of resources should be designed in accordance with industry technical norms to ensure alignment with professional standards. Meanwhile, universities should establish a resource update mechanism, regularly invite enterprise experts to participate in the review, eliminate outdated content and supplement emerging technology cases.

4.5 Course Implementation and Evaluation: Building a multi-party collaborative and process-oriented quality assurance system

The implementation of vocational undergraduate courses needs to strengthen the collaboration between schools and enterprises and establish a "full-process, multi-subject" evaluation mechanism. First, in implementing phased teaching, universities should arrange theoretical learning, practical training and internships, and innovative projects in segments, such as "1 year of foundation +2 years of specialized training +1 year of comprehensive practice", to ensure the progressive improvement of abilities. Second, vocational undergraduate universities can implement diversified evaluations, introducing enterprise evaluations, self-evaluations by students, and third-party certifications, with a focus on students' abilities to solve practical problems. For instance, during the internship, enterprises can assess students based on job performance indicators such as fault repair rate and design compliance rate. Thirdly, universities need to establish a sound feedback and improvement mechanism, analyze learning behaviors and outcomes through big data, and dynamically adjust course content and teaching methods. The evaluation criteria should highlight the characteristics of vocational undergraduate education, not only assessing technical and skill levels but also evaluating innovative thinking and professional qualities, and form value-added evaluation reports to provide a basis for students' individualized development.

5. Conclusion

The construction of vocational undergraduate courses is the core task for promoting the high-quality development of modern vocational education and also an important guarantee for cultivating high-level technical and skilled talents. Facing the new challenges of industrial upgrading and technological innovation, vocational undergraduate education must adhere to the positioning of "type education", take ability as the foundation and demand as the orientation, continuously deepen the integration of industry and education, and optimize the curriculum system. By dynamically updating teaching content, innovating teaching methods, and strengthening school-enterprise collaboration, vocational undergraduate courses will better adapt to the changes in the future professional world, provide students with a solid foundation for career development, promote vocational undergraduate education to a higher level, and supply more compound technical and skilled talents who are both virtuous and skilled, and integrate knowledge with action for economic and social development.

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