Research on the Cultivation of Vocational Undergraduate Talents within the Framework of the "Industry-Education Integration Community"

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Abstract. With the continuous improvement in living standards, alongside the ongoing transformation and upgrading of the economy, new demands have arisen for vocational education. Consequently, the cultivation of vocational undergraduate talents has become a pressing concern of our time. Investigating the development of vocational undergraduate education to establish new benchmarks in vocational training is a primary research focus for vocational institutions, both currently and in the foreseeable future. "Industry-education integration" stands as a hallmark of vocational education. The "industry-education integration community" is pivotal in facilitating the efficient alignment of industry and education, paving the way for a new educational ecosystem that achieves deep integration between the two. This approach to cultivating vocational undergraduate talent is instrumental in training high-quality professionals who meet market demands.

Keywords: Industry-education integration community; Vocational undergraduate; Talent cultivation.

1 Introduction

Vocational education is an integral component of the national education system and human resource development [1]. As living standards improve and economic transformations demand higher levels of vocational education, there is a growing public desire for advanced vocational training. The continuous development of society and the economy necessitates more high-quality, innovative technical talent, thus giving rise to the need for the cultivation of vocational undergraduate talents. In June 2014, the Decision of the State Council on Accelerating the Development of Modern Vocational Education introduced the concept of "vocational undergraduate education" for the first time. Subsequently, in January 2020, nine departments of the Ministry of Education released the Implementation Plan for the Reform of National Vocational Education, detailing the execution of pilot vocational undergraduate education programs to cultivate high-end

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technical skills over extended periods of study. In September 2020, the nine departments issued the Action Plan to Improve the Quality of Vocational Education (2020-2023), which provided a timeline and roadmap for this initiative. The plan aims for the steady development of higher-level vocational education and the gradual implementation of pilot vocational undergraduate education programs, underpinning qualified high-level institutions with Chinese characteristics to offer vocational undergraduate specialties. The concept of vocational undergraduate has garnered significant attention and focus from various sectors of society [2]. Conducting pilot programs to explore the training of high-quality, innovative technical talent at the bachelor level has become a key element in perfecting the modern vocational education system and holds profound implications for the high-quality development of vocational education.

Vocational undergraduate education in China is still in its infant stages, facing several key challenges. Firstly, the number of institutions offering vocational undergraduate education is small, and the range of available programs is narrow. The goals, standards, and specifications for vocational undergraduate education are not yet fully developed. Since the initiation of pilot programs in May 2019, only 34 vocational universities have been established, and these programs do not cover all fields relevant to the national economy. Additionally, there is a lack of authoritative standards for defining the objectives and specifications of vocational undergraduate education. Secondly, the quality of faculty teams in vocational undergraduate education needs further improvement. Most pilot colleges have been upgraded from vocational colleges, perceiving them with prominent characteristics in professional construction and a sound talent training system. As a result, their management and faculty hold entrenched philosophies centered around vocational education. The faculty teams lack sufficient research on vocational undergraduate education and lack systematic studies on it. Many faculty members mistakenly equate vocational undergraduate education with enhanced versions of vocational education, simply increasing the difficulty and hours of courses on top of vocational education. Some institutions have merely incorporated ordinary undergraduate courses into their vocational curricula, assuming that this constitutes vocational undergraduate education. This limited perspective and expertise among the faculty hinder the development of vocational undergraduate education. Thirdly, vocational undergraduate education, as a new entity within the vocational education sector, has not yet gained widespread social acceptance due to its short history and inadequate promotion. This has led to a situation where employers are unsure about the appropriate roles and salaries for vocational undergraduates, resulting in a lack of demand for these graduates. Additionally, the lack of societal recognition is further evident in the low enthusiasm among prospective students for enrolling in these programs. Students often perceive them as a last resort when they fail to gain admission to ordinary undergraduate colleges and universities.

By and large, the current stage of vocational undergraduate education is still in the pilot phase. Pilot institutions urgently need to address the question of "what kind of individuals to nurture" in vocational undergraduate education and to define clear objectives and specifications for talent development. In accordance with the requirements of development goals and specifications for vocational undergraduate talents, it is essential to establish standards for vocational undergraduate faculty and cultivate

competent faculty teams. Strengthening the integration of industry and education through collaboration between schools and enterprises is crucial. This entails exploring joint efforts between academia and industry in the cultivation of vocational undergraduate talents, aiming for a scenario akin to "a horse trained by both the divine and a skilled horseman"—a process essential for shaping the unique Chinese experience in vocational undergraduate education.

2 Cultivation of Vocational Undergraduate Talents within the Framework of the "Industry-Education Integration Community"

Industry-education integration" stands as a prominent feature of vocational education. By the end of 2022, the Central Committee and the State Council issued Opinions on Deepening the Reform of the Modern Vocational Education System, proposing a series of significant measures for the reform of vocational education in the new phase. Against this backdrop, the concept of the "industry-education integration community" emerged. It refers to the collaborative participation of industry, education, and societal forces, forming a closely-knit educational ecosystem aimed at aligning talent cultivation with market demands. Led by leading enterprises and high-level higher education institutions and vocational schools, the "industry-education integration community" involves the joint participation of industry organizations, schools, research institutions, and upstream and downstream enterprises, among others. It seeks to establish a set of cross-regional industry-education integration communities that deeply integrate industry and education, efficiently serve market demands, and support industry development. Within this "community," the industry can provide practical work experience and skills training, education can offer professional knowledge and theoretical foundations, and societal forces can provide opportunities for practical experience and employment support. The "industry-education integration community" better aggregates resources from schools, research institutions, upstream and downstream enterprises, and other stakeholders, promoting more profound and more substantial industry-education integration. Through such cooperation, high-quality talents tailored to market needs can be better cultivated. So, within the framework of the "industry-education integration community," how can vocational undergraduate talents be better cultivated?

Currently, vocational undergraduate pilot programs urgently need to address issues related to talent cultivation objectives and positioning specifications. By establishing the "industry-education integration community," it is viable to achieve further clarification of the division of labor regarding talent types, levels, and structures within the industrial chain. This holistic approach helps identify the objectives and positioning specifications for vocational undergraduate talent cultivation. The "industry-education integration community" jointly formulates talent cultivation plans to implement the training of high-quality technical and skilled personnel, providing stable human resources for the industry. They serve industry enterprises in technological transformation, process improvement, and product upgrades [3]. The functional positioning of the "industry-education integration community" extends beyond talent cultivation.

They also engage in technological transformation, process improvement, and product upgrades within the community's enterprises, thereby defining standards for vocational undergraduate faculty and building a team of such faculty. The "industry-education integration community" promotes the continuous deepening of school-enterprise cooperation in industry-education integration, exploring collaborative vocational undergraduate talent cultivation between schools and enterprises. The vocational college where the author is situated, in collaboration with a robotics technology company and a renowned university, jointly leads the establishment of a cross-industry, cross-regional "industry-education integration community" in the fields of robotics and industrial digitization (hereinafter referred to as the "community"). This study within the framework of the "community" focuses on the cultivation of vocational undergraduate talents in the fields of robotics and industrial digitization, primarily concentrating on training objectives and specifications of vocational undergraduate students, teachers, and talents.

(1)The role of the "community" in positioning cultivation objectives and specifications of vocational undergraduate talents.

In the pilot phase of vocational undergraduate programs, the primary focus is on addressing talent cultivation objectives and defining positioning specifications, thereby clarifying the question of "what kind of individuals to cultivate." The revised Vocational Education Law of the People's Republic of China emphasizes that vocational education must adhere to the leadership of the Communist Party of China, follow the socialist direction of running schools, implement national education policies, integrate morality with talent cultivation, merge industry with education, promote collaboration between schools and enterprises, prioritize market orientation, emphasize employment promotion, prioritize practical experience, enhance capabilities, and provide personalized teaching tailored to individual aptitudes [4]. This revised Law sets the course for talent cultivation in vocational education in the new era, aiming to build a great modern socialist country and achieve the strategic goal of the great rejuvenation of the Chinese nation by nurturing individuals who are comprehensive, innovative, and capable of practical application in socialist construction, serving as successors. Based on this overarching goal, vocational undergraduate education, hinging on the "community," revolves around the entire industry chain of the robotics and industrial digitization sector and its related fields, as illustrated in Figure 1. This approach aids in determining the objectives and specifications for the cultivation of vocational undergraduate talents.

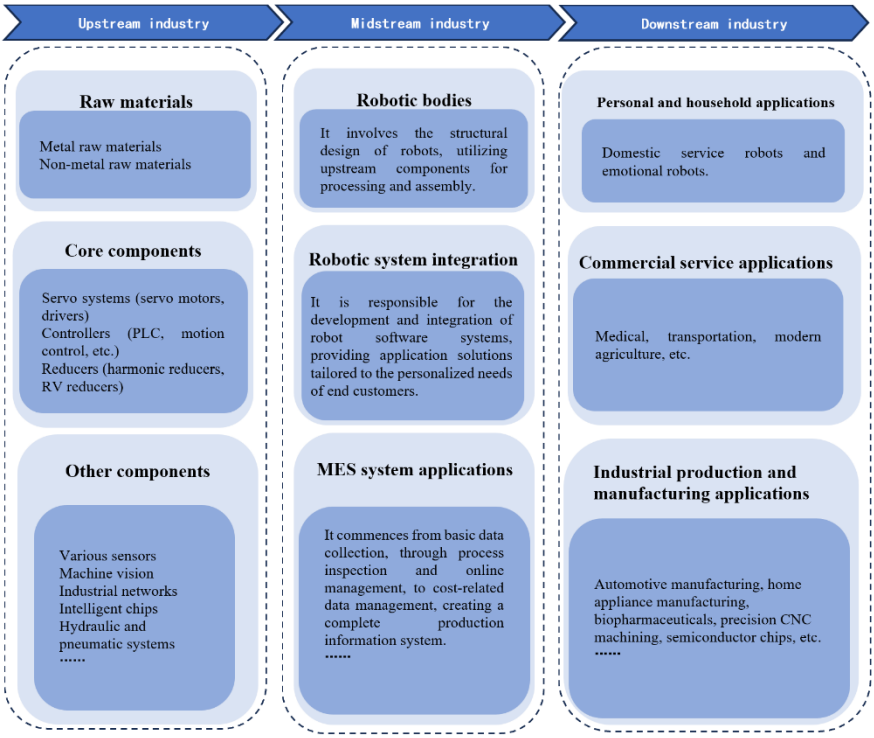

Fig. 1. Industry chain of the robotics, industrial digitization sector, and its related fields

The entire industry chain of the robotics, industrial digitization sector, and its related fields encompasses upstream, midstream, and downstream industries. Through on-site visits to these industries, as well as through policy research, surveys, and big data analysis, we conducted a comprehensive investigation of industry development trends and talent needs. By benchmarking against the entire industry chain and analyzing the required job competencies, we completed industry development and talent research reports. These reports clarified the demand for various levels of talent within the industry chain, accurately positioning vocational undergraduate talent and defining cultivation objectives and specifications. The institution I am affiliated with is located in a national-level economic development zone, where high-end automobile manufacturing enterprises, part of the downstream segment of the robotics and industrial digitization industry, are prevalent. Leveraging the regional economic development characteristics and aligning with the current talent cultivation practices of the institution, we conducted a survey of the technical and skilled talent positions within these enterprises, as detailed in Table 1.

Table 1. Positions related to robotics and industrial digitization at a high-end automobile manufacturing enterprise

No.	Position setting	Position description	Position level
1	Production process	Improvement and optimization of production tools and processes	Senior technician
2	Production process	Advanced PLC programming	Senior technician
3	Production line maintenance	Preventive and predictive maintenance of electromechanical equipment in production areas	Senior technician
4	Production process	Improvement and optimization of production tools and processes	Technician
5	Production process	Advanced industrial robot programming	Technician
6	Production line maintenance	Management of on-site equipment and spare parts	Technician
7	Production line maintenance	Emergency repair of electromechanical equipment on the production floor	Technician
8	Production process	Intermediate PLC programming	Senior worker
9	Production process	Robot operation and maintenance	Senior worker
10	Production line maintenance	Routine inspection and maintenance of production lines	Senior worker
11	Production process	Adjustment of production equipment parameters, setting trajectories, and resetting after shutdown	Intermediate worker
12	Production line maintenance	Basic PLC operation	Intermediate worker
13	Production line maintenance	Routine inspection, maintenance, and spare parts replacement of conveyor equipment	Intermediate worker
14	Production process	Machining of mechanical components	Junior worker
15	Production line maintenance	Basic daily maintenance of production equipment	Junior worker
16	Production line maintenance	Routine inspection of production equipment	Junior worker

The surveyed high-end automobile manufacturing enterprise includes departments such as the stamping workshop, welding workshop, painting workshop, final assembly workshop, engine plant, and power battery plant. While the specific products and processes of each department differ, this paper will not delve into those details. However, positions related to robotics and industrial digitization cover all production departments. Equipment Maintenance Manager A, responsible for managing maintenance technicians in the engine plant, remarked: “When vocational college students join our department for equipment maintenance, they need to have studied relevant courses and will go through a learning and growth process. Some take 1-3 months, while others

might need 6-9 months to advance from junior worker to senior technician. Although some individuals may not aim for rapid advancement, we start middle school, high school, and vocational college students as junior workers. Even if we hire undergraduates, I believe they should start from grass-roots levels, but it's certain that vocational undergraduates will advance faster." From Manager A's insights, it's clear that students need a solid foundation of professional knowledge and learning ability. The growth period varies by education level, with higher education generally leading to faster advancement. Personal initiative is crucial; students must be resilient and willing to delve into technical details to progress step by step. The "learning and growth process" mentioned by Manager A refers to acquiring job experience and adapting to the role. This involves gaining the necessary skills for the job, including understanding the work environment, management systems, execution standards, workflows, and communication skills. These are the capability cultivation goals for students. "Professional foundation knowledge" refers to the knowledge cultivation goals, indicating what and how much students need to learn, and these should be covered in the curriculum. "Personal initiative, resilience, and a willingness to research" are aspects of the comprehensive quality cultivation goals for students. In terms of knowledge goals, the cultivation of vocational undergraduate talents should align with the knowledge requirements for the technician and senior technician roles, establishing standards for vocational undergraduate talent cultivation and refining the curriculum accordingly. Vocational undergraduates need to acquire the knowledge required for technician and senior technician positions and develop excellent comprehensive qualities, allowing them to grow and advance rapidly in practical work to meet the capability goals of these positions. Through the "integration community," we aim to explore and clarify the cultivation objectives and specifications for high-level vocational undergraduates required by the industry, addressing the primary question of "what kind of individuals to cultivate."

(2)Building a high-quality vocational undergraduate faculty team through the "community".

In vocational undergraduate pilot programs, a high-quality faculty team is crucial. As vocational colleges transition to undergraduate institutions, it is imperative to ensure that the overall quality of the newly established vocational undergraduate faculty team meets the standards of undergraduate education and can fulfill the demands of vocational undergraduate teaching positions. These factors directly impact the quality of talent cultivation in vocational undergraduate institutions. Therefore, there is a pressing need to develop a high-quality vocational undergraduate faculty team. The "community" explores how to build a vocational undergraduate faculty team aligned with industry-specific professional groups, effectively integrating with the industry chain. This approach aims to create a "concentric circle" model, with teaching and educating at the core, along with the technology and service industry as the outer ring, as illustrated in Figure 2. This model facilitates the systematic transformation and functional restructuring of the faculty team, promoting the organic integration of the education chain, talent chain, industry chain, and innovation chain.

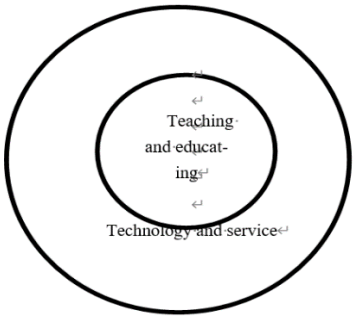

Fig. 2. Concentric circle for teaching and educating along with technology and service under the "community"

To implement the spirits outlined in the Report to the 20th National Congress of the Communist Party of China and fulfill the newly revised Vocational Education Law of the People's Republic of China, efforts have been made to accelerate the high-quality construction of the faculty team for "double-qualified teachers" in vocational education and improve the teacher standards system. At the national level, the Basic Standards for "Double-Qualified" Teachers in Vocational Education (Trial) has been introduced for this purpose. This paper takes this as a commencement point and establishes the training objectives for vocational undergraduate teachers in conjunction with the characteristics of vocational education and the positioning of undergraduate education. These objectives encompass vocational ethics, teaching development and implementation capabilities, research and social service capabilities, as well as the ability to summarize and refine teaching and research-related achievements, as elucidated in Table 2.

Table 2. Relevant abilities and goals of vocational undergraduate teachers

Category	Abilities and goals
Ethics	Teachers should adhere to the Party's educational policies and demonstrate a genuine commitment to vocational education. They must possess exemplary ideological and moral qualities, consciously uphold core socialist values, promote the spirit of model workers, labor, and craftsmanship, and serve as role models while showing care and concern for students. Furthermore, they should implement the fundamental task of moral education and abide by the laws governing vocational education and the development of technical and skilled talents. This entails practicing industry-education integration and fostering school-enterprise cooperation. Teachers should seamlessly integrate work-study approaches, combine moral education with technical skills, and ensure the incorporation of ideological and political education requirements throughout the educational, teaching, and technical skills training processes.
Teaching	Teachers must demonstrate proficiency in both theoretical and practical teaching abilities within their relevant professional fields. They should be equipped with advanced teaching concepts and methodologies, actively participating in curriculum development and engaging in research on teaching reform. It is

	essential for them to stay updated on industrial developments and understand industry talent demands. This involves acquiring relevant work experience in enterprises or actively engaging in frontline production and service positions. Additionally, they must ensure that the duration, form, content, and standards of practical experiences align with the relevant regulations for vocational school teachers' enterprise practice. Teachers should comprehend the relationship between the taught profession and the industry, as well as the industry's development, demands, and changes in occupational positions. They should promptly integrate new technologies, processes, and norms into teaching methods and utilize various teaching modes effectively, leveraging modern information technology for teaching purposes.
Research	Teachers should possess research capabilities and social service abilities in specialized fields. Encouragement should be provided for teachers to engage in practical activities within enterprises, thereby accumulating relevant work experience or practical knowledge and mastering the work processes or technical procedures specific to their specialties. Teachers should strive for outstanding results in school-enterprise cooperation, particularly in areas such as internship and training teaching, equipment transformation, technological innovation, and the transformation of achievements. Such efforts should yield significant economic and social benefits. Teachers should also obtain relevant national vocational qualifications, advanced certificates, or advanced certificates for vocational skills, hold senior positions (titles) in other professional or related fields, or possess corresponding levels of competence.
Achievement	Teachers should demonstrate the ability to transform achievements, applying valuable experiences and data into teaching and scientific and technological achievements for application and promotion. They should ensure that these achievements generate greater economic and social benefits.

If we were to liken vocational undergraduate teachers to a tree, vocational ethics would be the roots, teaching development and implementation capabilities would be the trunk, research and social service capabilities would be the branches and leaves, and the ability to summarize and refine teaching and research-related achievements would be the flowers and fruits of the tree, as illustrated in Figure 3.

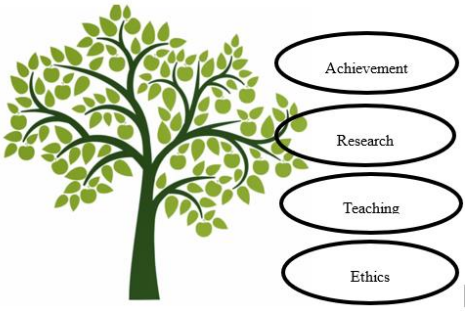

Fig. 3. Ability model for vocational undergraduate teachers

Vocational ethics act as the "roots" of vocational undergraduate teachers. This entails adhering to the Party's educational policies, fostering a passion for vocational education, possessing sound ideological and political qualities, and exhibiting exemplary moral character. Teachers should conscientiously uphold core socialist values and promote the spirit of model workers, labor, and craftsmanship, serving as role models while demonstrating care and concern for students. It is essential to implement the fundamental task of moral education, abide by the laws governing vocational education and the growth of technical and skilled talents, and practice industry-education integration and school-enterprise cooperation. Teachers should seamlessly integrate theory with practice, aligning knowledge with action and combining morality with technical skills. Furthermore, they should implement ideological and political education requirements throughout the educational and technical skills training processes, aiming to cultivate students who are both morally upright and professionally competent.

Teaching development and implementation capabilities serve as the "trunk" of vocational undergraduate teachers. The training of vocational education talents encompasses various industries across society, boasting broad and diverse professional coverage, distinct industry features, and varying scales. These characteristics underscore the significance and urgency of curriculum resource development in vocational education, particularly for courses with prominent industry-specific features. Thus, the responsibility for curriculum development and implementation falls squarely on the shoulders of vocational school teachers. Vocational school teachers should possess theoretical and practical teaching abilities in their relevant professional fields, equipped with advanced teaching concepts and methodologies. They should actively participate in curriculum development and engage in research on teaching reform. Staying abreast of industrial development trends and industry talent demands is crucial. Teachers should have relevant work experience in enterprises or actively engage in frontline production and service positions. The duration, form, content, and standards of such practical experiences should align with the regulations governing vocational school teachers' enterprise practice. Understanding the relationship between the taught profession (or group) and the industry, as well as grasping industry development, industry demands, and changes in occupational positions, are essential. Timely integration of new technologies, processes, and standards into teaching is imperative. Teachers should adopt various teaching modes effectively and utilize modern information technology for teaching purposes.

Research and social service capabilities function as the "branches and leaves" of vocational undergraduate teachers. Propelled by the rapid advancement of science and technology, along with the continuous progress in various industries served by vocational education, vocational school teachers need to stand at the forefront of serving professional fields. They should utilize their professional knowledge and technical advantages to better serve enterprise development and promptly translate the latest achievements into teaching resources for instructional purposes. Vocational undergraduate "double-qualified" teachers are encouraged to obtain relevant national vocational qualifications and advanced vocational skill level certificates or hold senior positions in their own or related fields outside the teaching profession. Emphasis is placed on cultivating research and social service capabilities in professional fields. Teachers are

encouraged to engage in practical activities in enterprises, accumulate relevant work experience, and become proficient in professional work processes or technical procedures. They should achieve outstanding results in school-enterprise cooperation, including internships, training, equipment upgrades, technological innovations, and achievement transformation, thereby contributing significantly to both economic and social benefits.

The ability to summarize and refine teaching and research-related achievements resembles the "flowers and fruits" on the tree of vocational undergraduate teachers. In the current era of rapid economic development and continuous advancement of innovation-driven strategies, alongside the adjustment of economic structures and continual upgrading of industries, China is moving steadily towards high-quality development. Innovation serves as the primary driving force for high-quality development, and future development urgently requires more independent innovation and the possession of more core technologies. While vocational undergraduate teachers shoulder the responsibility of cultivating high-tech talents, they also lead the forefront of technological research and development in industry enterprises. They are firsthand participants in product research and development and technological innovation, embracing abundant experience in cultivating technical talents and holding vast amounts of data on product research and technological innovation. Vocational undergraduate teachers require a certain ability to transform achievements, converting these valuable experiences and data into teaching and technological achievements for application and promotion. This transformation of "flowers and fruits" conjures up greater economic and social benefits.

The "community" aims to cultivate and build a high-quality team of vocational undergraduate teachers. Firstly, it explores a vocational undergraduate teacher training system based on the "interchangeability of teaching and industry positions and the mutual appointment of full-time and part-time teachers." Actively constructing a mechanism for mutual dispatch and appointment between schools and enterprises, it guides and nurtures a group of high-level leading talents, high-level professionals or group leaders, and key teachers through collaborative efforts between schools and enterprises, thereby further enhancing the capacity and quality of the teaching staff. Secondly, it aids in establishing a teacher training mechanism that encourages teachers to engage with enterprises, provide employee training or technical services, participate in new product research and development, and emphasize the transformation and application of technological achievements. This endows teachers with a better understanding and mastery of the latest industry technologies and trends, thereby providing better guidance and services to students. Thirdly, it explores the establishment of "enterprise-teacher workstations" to create training bases for "double-qualified" teacher development. Strengthening deep cooperation between teachers and enterprises facilitates mutual integration and communication between teachers and enterprises, promoting exchanges and collaboration among teachers from schools and enterprises. This platform allows for mutual learning and assistance between specialist leaders and key teachers, enhancing the teaching and research capabilities of vocational undergraduate teachers in a "double-qualified" text.

(3)Cultivation of vocational undergraduate talents centered around the industrial chain through exploring the "community".

The cultivation of vocational undergraduate talents is oriented towards employment, with the cultivation of vocational competency in occupational positions (groups) as the logical focus. This includes both "hard skills" and "soft skills" relevant to the professional roles. For instance, "hard skills" encompass specialized foundational knowledge, technical competencies in related occupational roles, applicable standards, legal regulations, safety protocols, etc. Meanwhile, "soft skills" include abilities like teamwork, communication, presentation, and adaptive learning, which better equip individuals to navigate future economic and social changes. Through learning, students can integrate and apply these "hard skills" and "soft skills" in actual work scenarios. They can successfully accomplish specific tasks in their jobs, such as the improvement and optimization of production tools and processes, advanced PLC programming, preventive and predictive maintenance of electromechanical equipment, as well as tasks like advanced industrial robot programming, management of on-site equipment and spare parts, and emergency repair of electromechanical equipment on the production site. This process allows students to demonstrate initiative, resilience, and a proactive attitude towards learning, effectively translating their acquired knowledge and technical skills into practical job capabilities.

Therefore, the cultivation vocational undergraduate talents should place greater emphasis on nurturing students' comprehensive development abilities. In terms of curriculum, there should be a focus on aligning courses with industry needs and promoting the organic integration of course content with industry standards, industrial demands, and job capabilities, thus creating a curriculum with specialized core and expanded courses. In classroom teaching, leveraging the advantages of the "community" model, it is crucial to develop and utilize practical teaching resources provided by enterprises, fully harnessing their role in vocational undergraduate talent development. Regarding talent assessment, there is an exigent need to establish objective evaluation criteria that adequately reflect the quality of vocational undergraduate talent development, providing enterprises with more objective references for selection and employment.

On the one hand, it holds immense significance to develop courses based on real job positions in enterprises. Courses serve as carriers of knowledge and skills. Vocational undergraduate courses need to bear the knowledge and abilities required for professional positions, closely aligning with industry standards, industrial needs, and actual job requirements. They are built upon real enterprise tasks and organized around job positions, integrating innovative elements such as new technologies, processes, and regulations into teaching standards and content. Capitalizing on technologies like digital twinning, virtual simulation, and augmented reality, virtual simulation teaching resources are co-developed with enterprise technical personnel to compensate for the inadequacies of real production lines in conducting internships, as well as limitations in school teaching equipment and facilities. This approach achieves alignment between courses and job positions, promotes the organic integration of course content with industry standards, industrial needs, and job capabilities, and establishes core professional features and expanded courses. Enterprises, universities, and industry organizations are deeply involved in textbook compilation and course development, designing course systems, and optimizing course structures. They closely monitor industry trends, scientifically align course content with industry standards, processes, and technologies,

accelerate the iteration of the course teaching content, and create high-quality collaborative courses, textbooks, and collections of real industry cases.

On the other hand, it is essential to create classrooms based on real job positions in enterprises. Classrooms serve as the main battlefield for the transmission of knowledge and skills. The "community" innovates talent development models around the robotics and industrial digitization industries and their related fields, promoting efficient integration between education and industry demands and bringing classrooms to the forefront of enterprises. Relevant vocational undergraduate courses are arranged to take place in actual workplaces, allowing students to learn knowledge through real job positions and acquire technical skills in authentic situations, thus truly understanding the significance of learning. Some courses are selected to be conducted directly in enterprises, such as the improvement and optimization of production tools and processes, advanced PLC programming, preventive and predictive maintenance of electromechanical equipment, as well as tasks like advanced industrial robot programming, management of on-site equipment and spare parts, emergency repair of electromechanical equipment on the production site, and other relevant topics. The real work processes in enterprises are adapted to meet the requirements of course teaching, and teaching resources such as loose-leaf work manuals are created to facilitate on-site learning of enterprise technical knowledge. The learning process adheres to enterprise standards and norms, significantly shortening the time it takes for students to grasp key enterprise technologies within a limited timeframe.

Last but not least, course evaluation based on real job positions in enterprises is also imperative. Evaluation serves as the guiding tool for knowledge and skills learning. There is an urgent need to establish a talent evaluation standard system for the cultivation of vocational undergraduate talents that fully and objectively reflects the characteristics of talent cultivation. All stakeholders in the "community" jointly formulate evaluation standards for talent cultivation in vocational undergraduate education. These standards should reflect vocational characteristics and directly reflect vocational abilities. Following the principle of seeking common ground while reserving differences, evaluation standards consider not only the core competencies and general abilities of job positions in the industries and sectors covered by the "community" but also the specific abilities required for different job positions. Employee assessment standards from enterprises are integrated into the evaluation system, creating course evaluations based on real job positions in enterprises. Evaluation is conducted in adherence to the requirements for "prospective employees," comprehensively assessing students' abilities in operation norms, problem analysis, solution, self-directed learning, and collaborative teamwork. Throughout the evaluation process, enterprise standards are incorporated, with emphasis placed on assessing students' actual work abilities and learning capabilities. Through self-assessment, teacher evaluation (including both internal teachers and enterprise mentors), and peer assessment among students, a talent cultivation quality evaluation mechanism suitable for vocational undergraduate programs is established. Simultaneously, corresponding talent selection standards and assessment systems are established for enterprises, achieving joint cultivation of talents akin to "a horse trained by both the divine and a skilled horseman."

3 Conclusion

Developing vocational undergraduate education and strengthening the talent cultivation model for vocational undergraduates is an inevitable measure for China to achieve typified and high-quality development of vocational education [5]. Exploring the cultivation of vocational undergraduate talents has become a critical task in vocational education currently and for the foreseeable future. As essential participants in vocational undergraduate education, we must delve into how to effectively cultivate vocational undergraduate talents that meet the demands of industrial fields. In this context, the "industry-education integration community" forms an ecosystem of vocational education in which industry, education, and social forces participate collectively and are closely connected. Through this new educational ecosystem, we explore the cultivation of undergraduate-level technical and skilled talents that are adapted to market demands.

(1) The "community" facilitates vocational schools to strengthen cooperation with the industry, enabling precise positioning of the goals and specifications for vocational undergraduate talent cultivation. Only by genuinely understanding market demands can we better provide targeted training for students. At the same time, companies can impart their technical expertise and experience to students through collaboration with schools, enhancing students' practical skills and competitiveness in employment.

(2) The "community" promotes the construction of the vocational undergraduate faculty team. Teachers are one of the key factors in vocational undergraduate education. Only with an excellent teaching staff can we provide students with high-quality teaching services. The "community" explores a vocational undergraduate teacher training system based on the "interchangeability of teaching and industry positions and the mutual appointment of full-time and part-time teachers." It strengthens the construction of a "double-qualified" team for vocational undergraduates, enhancing their teaching and research capabilities.

(3) The "community" is instrumental in the updating of teaching content and the innovation of talent cultivation models in vocational schools. With the development of science and technology and changes in society, vocational undergraduate education needs to constantly update its teaching content and further deepen the innovation of talent cultivation models through industry-education integration and school-enterprise cooperation. Only by staying abreast of current trends can we effectively meet market demands.

In conclusion, the "industry-education integration community" is a brand-new educational ecosystem that provides a novel cultivation model for vocational undergraduate talents, ushering in better opportunities and challenges. With the support of the "community," we can better cultivate high-quality talents that meet market demands.

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