

Challenges and Optimization Strategies for Vocational College Students' Career Adaptability in the Age of AI

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Abstract

The rapid iteration of AI technology is reshaping workplace competency standards. In light of national policies such as the “Double High-Level Plan”, educational modernization initiatives, and stable employment mandates, existing cultivation systems and relevant theories exhibit notable deficiencies, necessitating systematic research on the cultivation of vocational college students' career adaptability competencies. Current university career competency cultivation suffers from prominent shortcomings across five dimensions—university-industry collaboration, teaching systems, students' comprehensive literacy, digital employment services, and supportive guarantee mechanisms—which exacerbate the structural mismatch between talent supply and demand. Taking a problem-oriented approach, this paper addresses the five practical dilemmas outlined above by introducing measures covering school-enterprise joint training, pedagogical reform, competency development, digital employment support and auxiliary guarantees, forming a closed-loop vocational competency improvement framework. Multidimensional collaborative cultivation reforms are expected to address students' deficiencies in digital adaptability, alleviate the supply-demand contradictions in the AI-driven job market, and provide both theoretical and practical support for the reform of digital talent cultivation in higher education institutions.

Keywords

Artificial Intelligence, Career Adaptability, Digital Education

1. Introduction

As artificial intelligence permeates various industries and new quality productive forces accelerate their development, this study responds to the national educa-

tional strategic requirements outlined in the “Double High-Level Plan” and China’s Education Modernization 2035, particularly the goal of high-quality full employment (Cai, 2021). Traditional educational models are inadequate for cultivating compound digital technology talents. By bridging the education chain, talent chain, and the digital intelligence industry chain, this research provides a feasible implementation pathway for advancing educational modernization and implementing the stable employment strategy. In the process of college student employment, the structural imbalance induced by AI penetration across sectors and the expansion of new digital positions presents a critical challenge, rooted primarily in the tripartite contradictions among industry, higher education institutions, and students (Tao & Tang, 2021). This study explores a novel pathway for enhancing vocational college students’ career adaptability in the digital intelligence era, leveraging individualized instruction to address the dilemmas inherent in standardized mass cultivation, outdated curriculum updates, and the absence of personalized development within higher education. The research is expected to assist students in compensating for deficiencies in career adaptability competencies, including human-machine collaboration, lifelong learning, and innovative responsiveness, while enabling universities to achieve sustainable development in cultivating students’ career adaptability. Existing studies predominantly focus on traditional industry-education integration and conventional professional literacy cultivation, lacking systematic investigations in the context of AI-driven transformation. This study incorporates human-machine collaboration and digital dynamic adaptability into a comprehensive career competency framework, refining the precise cultivation logic of “intelligent profiling, demand matching, and human-machine co-education”. It addresses the digital perspective gap in current theoretical research, thereby providing a robust theoretical foundation for higher education talent cultivation reform and subsequent empirical investigations.

2. The Significance of Research on Vocational College Students’ Career Adaptability

Artificial intelligence is accelerating the rapid evolution of industrial models and job functions. Coupled with the implementation of a series of national policies—such as the “Double High Plan”, educational modernization, and high-quality, full employment—this study is of practical necessity. Relevant national documents have clearly defined three major tasks: cultivating industry-aligned skilled talent, implementing tailored instruction and personalized education, and addressing the imbalance between talent supply and demand. The development of AI technology has further widened the gap between traditional talent development models and the demands of the digital and intelligent workplace; existing standardized education models are unable to meet these demands (Zhou, Dang, & Sun, 2020). This study explores the logic behind cultivating vocational college students’ career adaptability in an AI environment and establishes a feasible pathway from program implementation to practical application at educational institutions. The develop-

ment of AI technology has led to a reduction in entry-level positions while indirectly promoting the growth of new digital roles, highlighting students' shortcomings in areas such as human-machine collaboration, self-directed learning, and occupational adaptability. By systematically examining the practical challenges and development pathways for cultivating vocational college students' occupational adaptability, this study is expected to alleviate the three-way dilemma involving enterprises' recruitment difficulties, the lag in higher education's talent development, and students' insufficient occupational adaptability.

3. Practical Challenges in Developing Vocational College Students' Career Skills

3.1. School-Enterprise Collaboration in Education Remains Superficial, and the Dual-Track Education System Is Not Fully Effective

Industrial transformation and upgrading have exacerbated structural imbalances between supply and demand in the talent market. There is a significant shortage of workers for technical positions in enterprises, while graduates generally face issues such as unclear career goals and poor job stability. The core issue lies in the inadequacies of the university-enterprise collaborative talent development mechanism. The initiative in talent cultivation is concentrated in universities; a regularized mechanism for enterprises to deeply participate in talent development has not yet been established. University-enterprise cooperation remains limited to short-term on-the-job internships, enterprises do not participate in the design of undergraduate curricula, and the scope of integration through formats such as industry colleges and order-based classes remains limited (Liu, 2020). Full-time faculty lack consistent opportunities for hands-on training at the grassroots level in enterprises; in the educational process, they tend to emphasize students' theoretical learning, often neglecting the development of their practical skills. Supporting systems for enterprise mentors stationed on campus have not been fully implemented, and classroom instruction requires practical industry case studies to reinforce learning. Universities tend to prioritize the development of explicit competencies in their students, often neglecting the cultivation of implicit professional qualities such as the spirit of craftsmanship, resilience under pressure, and professional responsibility. Consequently, the university's "Three-Pronged Education" philosophy struggles to permeate the entire process of developing students' professional competencies. These circumstances can easily lead to a mismatch between students' comprehensive competencies and corporate job standards, further exacerbating the structural misalignment between the talent supply and industry labor demand.

3.2. The Development of the Educational System Has Fallen behind, Hindering the Implementation of Personalized Instruction

Universities employ standardized teaching programs to deliver mass instruction

to students, without implementing a tiered curriculum tailored to individual students' academic foundations, interests, strengths, and career development paths. The lack of a digital profiling system for students' professional competencies makes it difficult to accurately identify individual students' skill gaps, hindering the implementation of the educational goal of teaching students according to their individual aptitudes (State Council, 2018). In advancing the construction of digital education, universities must strive to tackle prominent challenges, including inadequate protection of data privacy, imperfect informed consent mechanisms for users, flawed data quality, and implicit bias embedded in algorithmic recommendation systems. Shortcomings in the development of specialized course systems, coupled with instructors' tendency to prioritize theory in their lesson planning, result in insufficient practical training hours. The publication cycles for textbooks used in universities are relatively long, making it difficult to promptly incorporate emerging industrial technologies and new industry standards into course materials. As a result, existing teaching content lags behind cutting-edge developments in the industry. There is a gap between the equipment and operational processes in on-campus training facilities and real-world production environments in enterprises. Universities schedule students' training weeks at the end of the semester; even if students identify gaps in their professional knowledge and skills during practical training, they do not have sufficient time to address these deficiencies.

3.3. Imbalance in Students' Skill Sets and Misconceptions regarding Career Perceptions

Some students have unrealistically high employment expectations, lack a rational assessment of their career positioning, subjectively reject entry-level frontline positions, and have not developed a clear career plan, which results in insufficient job stability. Students generally lack proactive self-directed learning in their daily lives; they do not actively keep up with cutting-edge industry trends or update their professional knowledge, leading to insufficient ability to quickly adapt to job roles and improve independently; Students possess only a superficial grasp of basic professional content and lack relevant training in interdisciplinary integration, digital practical skills, and handling complex problems, making it difficult for them to meet the market's demand for versatile roles; students lack systematic development of transferable workplace skills such as communication and collaboration, innovative thinking, self-management, and emotional regulation, resulting in significant shortcomings in their ability to cope with work pressure and respond to unexpected workplace challenges.

3.4. Employment Guidance Lacks Precision, and There Is No Long-Term Follow-Up Mechanism in Place

Most universities have not established an integrated big data platform that combines academic performance data, competency assessments, corporate job requirements, and alumni employment information. As a result, they struggle to achieve

intelligent and precise matching between students' comprehensive qualities and job openings, and the role of digital technology in empowering career guidance has not been fully realized. The relevant courses designed by universities often remain limited to basic instruction on resume writing and interview skills, lacking simulations of real-world workplace scenarios. The counseling teams formed by universities—comprising full-time career advisors, corporate HR professionals, and distinguished alumni—are limited in size and unable to provide students with precise one-on-one career guidance, resulting in a significant gap in the provision of personalized career services. Universities also lack comprehensive follow-up surveys on graduates after they leave campus and do not have an information management system to track alumni updates. As a result, universities are unable to continuously obtain information on graduates' job fit, reasons for career transitions, and skill gaps, making it difficult to truly establish a complete closed-loop system for employment-oriented education.

3.5. Campus Culture Is Ineffective in Fostering Student Development, and Supporting Mechanisms Are Inadequate

The spirit of vocational education within campus culture has not been fully harnessed. Educational platforms such as professional clubs, skills competitions, and peer support programs operate in a fragmented manner, failing to systematically foster students' collaborative abilities and innovative competencies. Furthermore, the spirit of craftsmanship, the ethos of model workers, and labor education are not sufficiently integrated into campus activities. At the same time, there are shortcomings in the supporting incentive systems for school-enterprise cooperation, innovation and entrepreneurship, and the commercialization of practical achievements. The mechanisms for converting credits earned through skills competitions, research projects, and grassroots social practice into academic credits remain unstandardized, and a comprehensive support system to sustainably enhance students' professional competencies has yet to be established.

4. Optimal Pathways for Enhancing Vocational College Students' Professional Competencies in the Era of AI

4.1. Deepen the Dual-Track Collaboration between Schools and Enterprises to Build a Diversified Co-Education System

Higher education institutions should innovate and diversify platforms for industry-education integration, broaden avenues for in-depth university-enterprise collaboration, steadily advance the implementation of industry-oriented colleges, specialized classes, and apprenticeship programs, promote collaborative talent development between universities and enterprises, and adopt a training model where "enrollment equals employment, and entering the university equals joining the company", thereby fully stimulating enterprises' intrinsic motivation to participate deeply in talent development. Universities should incorporate the "1 + X" certificate system into curriculum development and encourage students to obtain

industry-specific skill-level certificates (Ma, 2023). Higher education institutions should cultivate versatile, multi-skilled professionals to bridge the gap between campus coursework and practical enterprise operations. They need to improve the training system for dual-qualified faculty, establish a regular mechanism for full-time faculty to undertake on-the-job training at enterprises, and encourage faculty to participate in hands-on project work on the front lines of enterprises to help them accumulate practical industry experience. Higher education institutions must collaborate with corporate technical experts on curriculum development and invite these experts to serve on campus to conduct classroom instruction, compile teaching materials, and provide practical training guidance, thereby building a teaching faculty equipped with both theoretical knowledge and practical skills. Universities must comprehensively integrate ideological and political guidance, labor education, and the spirit of craftsmanship into students' learning environments. They should incorporate specialized vocational training courses into the curriculum and regularly organize activities such as "Craftsman Lectures", sessions featuring model workers, and case studies on professional ethics. These efforts will continuously help students develop an intrinsic professional character marked by dedication, integrity, responsibility, and a sense of duty, thereby fostering the simultaneous development of professional skills and professional ethics.

4.2. Promote Reforms in the Educational System and Implement Tiered, Student-Centered Instruction

Universities need to regularly survey job requirements in the corporate sector and dynamically update their curriculum based on industry needs. University teaching and research teams should collaborate with industry experts to jointly develop projects and course materials, promptly incorporating cutting-edge technologies and real-world business cases. This approach can help universities address the issues of traditional teaching that overemphasizes theory at the expense of practice and the lag in updating course content. Universities should restructure the full-cycle practical education chain, move away from the model of concentrated end-of-term internships, and implement a mechanism of "alternating work and study with phased on-the-job training". By coordinating resources such as on-campus training bases, corporate R&D centers, and innovation and entrepreneurship labs, they can build an integrated, multi-tiered practical training platform (Shi, 2022). Strictly implement a dual-mentor system featuring both on-campus theoretical mentors and corporate practical mentors to guide students in deeply engaging with core corporate R&D projects and business operations. Through routine reflection activities—such as internship logs, practical summaries, and project defense presentations—students can transform their practical experiences into transferable core professional competencies. Universities should utilize digital technologies to integrate data on students' academic performance, competition awards, and career assessments to construct personalized digital profiles of their profes-

sional competencies. Based on these data, they should implement tiered and categorized training for students. For example, universities can provide foundational practical skills training for students with weaker academic backgrounds, open research projects to students with outstanding innovative potential, and establish differentiated skill-enhancement workshops tailored to individual interests and career plans, ultimately achieving the educational goal of teaching students according to their individual aptitudes. Universities should establish a diverse and comprehensive evaluation system for faculty, moving beyond the traditional, single-dimensional on-campus evaluation model. They should create full-cycle student growth portfolios that incorporate classroom performance, practical training outcomes, skills competitions, volunteer service, and evaluations from corporate internships into faculty evaluations. Universities should use the results of these scientific and systematic evaluations to drive the optimization of curriculum systems and practical instruction, thereby forming a closed-loop talent development mechanism.

4.3. Cultivate Comprehensive Professional Competencies and Foster a Rational Approach to Employment

Higher education institutions need to establish a phased career education framework and offer career courses structured around career awareness, skill development, and targeted job search strategies. Schools can provide students with support for career orientation and job hunting by forming peer support teams composed of full-time career counselors, corporate HR professionals, and outstanding alumni. Schools should regularly organize employment seminars and sessions featuring successful alumni to help students develop a sound perspective on their careers. Universities offer courses on occupational mental health, providing students with channels for psychological counseling and stress relief. These initiatives help students prepare psychologically for entering the workforce, enhance their emotional management skills, tolerance for workplace stress, and ability to handle unexpected situations, thereby comprehensively improving their adaptability to the workplace environment. Universities focus on cultivating students' lifelong learning competencies and establishing integrated online learning platforms (Yuan, 2025). The university regularly invites seasoned industry professionals to share their career experiences, guiding students to build a solid foundation of skills for sustainable career development and adapt to the ever-evolving job requirements of the industry.

4.4. Establish a Digital Employment Platform to Facilitate Precise Matching of Job Supply and Demand

Higher education institutions should leverage digital tools to improve long-term mechanisms for employment services and establish a comprehensive, closed-loop system for employment-oriented education. Universities need to build an integrated big data sharing platform for employment, breaking down data silos across

all stages of the student experience. Through data mining, they can analyze and assess dynamic industry talent needs, providing data support for talent development reforms and targeted job searches (Long, 2017). Higher education institutions should refine data governance rules, bolster privacy safeguards, enforce informed consent, enhance data quality control and algorithm oversight to defuse diverse risks in digital education. Universities should conduct regular specialized training for their career counseling teams and use algorithms to match students' skills and characteristics with suitable job positions (Li et al., 2026). By regularly providing students with career advice, universities are expected to reduce the dual costs associated with student job searches and corporate recruitment. At the same time, universities should establish a dynamic alumni database, conduct regular follow-ups, and collect alumni feedback to provide guidance to alumni seeking career transitions or skill enhancement. Universities need to form a sustainable educational cycle characterized by “on-campus cultivation, workplace feedback, and instructional optimization”.

4.5. Optimize the Campus Cultural Environment and Improve Supporting Mechanisms

Higher education institutions must simultaneously optimize both the campus cultural environment for education and the supporting systems to provide dual support for enhancing students' professional competencies. Schools should foster a professional educational atmosphere on campus by organizing regular academic forums, professional skills competitions, and distinctive activities such as “Artisans on Campus”. They can also leverage project-based practical training to hone students' communication and collaboration skills, thereby fully harnessing the immersive educational value of campus culture. Universities should establish comprehensive incentive mechanisms for both faculty and students. For faculty, they should allocate special funds for industry-academia collaboration and innovation and entrepreneurship; for students, they should incorporate practical training, skills competitions, grassroots volunteer service, and the commercialization of research outcomes into their credit assessment systems. Universities should refine incentive policies for faculty secondments to enterprises and for industry experts to teach on campus, and establish a long-term cultivation mechanism based on “data profiling, needs matching, and human-machine co-education”.

5. Conclusion and Research Limitations

AI technology has permeated every industry, driving a shift in corporate hiring standards; proficiency in AI applications has evolved from a “bonus” for job seekers to a core “entry requirement”. Efforts to cultivate professional competencies among vocational college students face shortcomings in five key areas: university-industry collaboration, the educational system, student competencies, employment services, and support mechanisms. In response, this paper proposes a comprehensive, closed-loop optimization system centered on the integration of indus-

try and education, personalized instruction, and targeted talent development (Wang et al., 2025). This paper proposes five optimization pathways, including deepening dual-track collaboration between universities and enterprises, advancing educational reform, cultivating students' comprehensive competencies, establishing a digital employment platform, and optimizing campus culture and support mechanisms. These measures address the shortcomings in existing research on university education from a digital perspective, provide theoretical and practical references for talent development reforms in higher education, and help alleviate the mismatch between labor supply and demand. By smoothing the connectivity among the education chain, talent chain and digital industrial chain, higher education institutions can better fulfill the task of cultivating interdisciplinary technical and skilled professionals, ease the two-way contradiction of "labor shortages for enterprises" and "employment difficulties for graduates" in the workplace, and enrich the theoretical framework of individualized instruction and human-machine collaborative education in the digital era. After adopting this framework for educational practice, universities can systematically evaluate the practical effects of the cultivation system on improving students' career adaptability through indicators including vocational competency assessment, person-job matching degree, job retention rate and follow-up feedback of graduates. Moving forward, research teams could conduct empirical studies tailored to different types of institutions and disciplinary characteristics, refine tiered and categorized implementation guidelines, and further enhance the relevance and practical effectiveness of this research approach, thereby supporting the implementation of educational modernization and employment stabilization strategies.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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