

Research on the Development Path of Innovation and Entrepreneurship Education in Higher Vocational Colleges in the Digital Intelligence Era

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ABSTRACT

To meet the demands of the digital intelligence era, vocational education, closely related to economic and social development, vocational colleges need to accelerate the promotion of innovation and entrepreneurship education to provide strong talent support for national strategic needs and to cope with international development changes. This study, based on the background of the digital intelligence era, first explains its core features and the opportunities and challenges it brings to vocational education. It then systematically discusses the practical necessity for higher vocational colleges to strengthen innovation and entrepreneurship education. Finally, by exploring potential pathways through which digital-intelligent technologies can enable educational innovation, the study proposes a research framework for promoting the high-quality development of innovation and entrepreneurship education, with the aim of providing a reference for constructing a talent cultivation system for innovative technical and skilled talents that meets the requirements of the digital-intelligent era.

KEYWORDS

Digital intelligence era; Higher vocational colleges; Innovation and entrepreneurship; Industry-education integration

1 The Era background and new positioning of innovation

With the in-depth development of the digital intelligence era, the demand for talent capabilities has undergone significant changes. Compared to the traditional industrialization era, which emphasized the training of single professional skills, the current era places greater emphasis on soft skills such as innovation quality, critical thinking, and collaborative communication. Against this backdrop, vocational education faces an urgent need for transformation and upgrading. It must not only focus on the systematic cultivation of university students' digital-intelligent knowledge, technical skills, and related competencies, but also place greater emphasis on guiding them to develop innovative thinking, interdisciplinary integration capabilities, and higher-order cognitive skills. This is essential to enhance their adaptability to the rapidly evolving technological environment and ongoing industrial transformations.

Innovation and entrepreneurship education, as an important educational path that aligns with the requirements of the digital intelligence era, aims to cultivate students' innovative spirit, entrepreneurial awareness, and the comprehensive ability to transform ideas into practical results. It focuses on the all-round growth and personality shaping of students, emphasizing the stimulation of their initiative and creativity through project practices and cross-disciplinary learning, thereby systematically enhancing their innovation and entrepreneurship capabilities in the face of future uncertainties. To further promote innovation and entrepreneurship education, the Ministry of Education issued the "Guiding Opinions on Promoting the High-Quality Development of Innovation and Entrepreneurship Education" in 2021, clarifying the relevant implementation requirements for higher vocational colleges. Guided by this, higher vocational colleges actively combine regional development needs and policy resources to build innovation and entrepreneurship education systems with their own characteristics, aiming to enhance students' intrinsic motivation to participate in innovation and entrepreneurship activities and continuously improve their social competitiveness in the digital intelligence context.

2 The multi-dimensional necessity for higher vocational colleges to strengthen innovation and entrepreneurship education

Under the background of the digital-intelligent era, accelerated technological innovation and profound changes in industrial forms have placed new demands on the competency structure of technical and skilled talents. The necessity of strengthening innovation and entrepreneurship education in higher vocational colleges is primarily reflected in the following four dimensions:

2.1 Serving national strategies and the urgent need to support the development of an innovative economy

Strengthening innovation and entrepreneurship education is an inevitable requirement for responding to the national innovation-driven development strategy and major deployments such as building a digital China. The state has issued policy documents such as "China Education Modernization 2035" and "Guiding Opinions on Promoting the High-Quality

Development of Innovation and Entrepreneurship Education", emphasizing that innovation and entrepreneurship education is a key to cultivating innovative talents in the new era and an important strategic support for building an education power. Currently, in the context of the digital intelligence era, China's economy is transforming from "Made in China" to "Intelligent Made in China", and from factor-driven to innovation-driven. This requires a large number of technical and skilled talents working at the frontline of production, management, and services to possess an innovative mindset and entrepreneurial capabilities, providing foundational support for industrial upgrading. Simultaneously, it supports the transition of China's industrial chain from the medium-low end to the medium-high end, helping to build new advantages in international competition. Therefore, vigorously promoting innovation and entrepreneurship education and driving development through innovation is of irreplaceable strategic significance for providing large-scale, high-quality technical and skilled talents to support the construction of an innovative country.

2.2 Key measures to adapt to industrial upgrading and transformation and address challenges in the digital age

Digital intelligence technologies (such as AI, big data, and the Internet of Things) are disrupting traditional occupations and positions, driving traditional industries to accelerate their transformation towards intelligence and digitalization. This transformation has also had a disruptive impact on the labor force structure. While repetitive and routine positions are being replaced by automation technologies, enterprises urgently need innovative and application-oriented technical and skilled talents with the ability to learn independently and think innovatively. This requires that higher vocational education must cultivate students' future adaptability through innovation and entrepreneurship education. From the perspective of labor market demand, the demand for innovative and application-oriented talents has become dominant. Strengthening innovation and entrepreneurship education is a strategic measure for higher vocational education to respond to changes in talent demands from the industrial end and provide high-quality human resource support for the sustainable development of regional economies and societies.

2.3 An intrinsic driving force for the digital transformation and intrinsic enhancement of higher vocational education / demands at the vocational college level

Innovation and entrepreneurship education mainly cultivates students' innovative thinking, exploration spirit, practical ability, teamwork spirit, and cross-disciplinary collaboration ability through a series of educational and teaching activities, stimulating students' innovative spirit and entrepreneurial practical ability. According to the provisions of the "Higher Education Law of the People's Republic of China", cultivating advanced skilled and application-oriented talents with innovative spirit, social responsibility, and practical ability is the main task of higher vocational education in China. At the same time, as the type of education most closely linked to economic development, vocational colleges have the responsibility to cultivate "innovative workers" who can not only adapt to existing positions but also promote technological progress and industrial transformation. In the context of digitalization, for vocational colleges to effectively respond to the challenges brought by technological changes, it has become an important task for their development to cultivate high-quality innovative talents who can adapt to industrial technological changes and internationalization trends through innovation and entrepreneurship education.

2.4 An important path to enhance personal competitiveness and promote students' comprehensive and sustainable development

Innovation and entrepreneurship education is a means to cultivate students' core competencies and an important approach to enhancing their lifelong development competitiveness. It is also a form of quality education based on the needs of students' lifelong career development, which is crucial to their entire lives. In the context of digitalization, with the acceleration of technological iteration and the normalization of occupational changes, students' future is full of uncertainties. Innovation and entrepreneurship education is a key measure to empower students to adapt to future industrial changes and achieve sustainable personal development. Through innovation and entrepreneurship practices, students can transform knowledge into value, gain a great sense of achievement and self-identity, which is irreplaceable for the establishment of confidence and career planning of vocational college students. Strengthening innovation and entrepreneurship education to enhance competitiveness when seeking jobs also endows students with a lifelong competitiveness that enables them to actively adapt, continuously learn, and even create new situations regardless of future technological and market changes, which is beneficial to the sustainable development of their careers.

3 Pathways for promoting high-quality development of innovation and entrepreneurship education in higher vocational colleges

In response to the new demands of the digital intelligence era, the transformation and upgrading of innovation and entrepreneurship education in higher vocational colleges is by no means a piecemeal local adjustment, but rather the construction of a scientific, efficient and sustainable development path system. The main paths include the following five aspects:

3.1 Deepen top-level design and reconstruct an innovation and entrepreneurship education ecosystem oriented towards digital intelligence

Establish a working mechanism led by the school's leadership and involving the teaching affairs office, student affairs office, information center, and secondary colleges, breaking down barriers and forming a synergy. Formulate a medium- and long-term development plan for innovation and entrepreneurship education that is in line with the development of digital intelligence industries, incorporate digital intelligence literacy and innovative thinking cultivation into the talent training plans of various majors, and achieve top-level design of "integration of professional and innovative education". Elevate innovation and entrepreneurship education from "a competition activity for a few students" to "a quality education for all students", and deeply integrate it with the school's digital transformation strategy.

3.2 Align with regional pillar industries and drive the practical cultivation of innovation and entrepreneurship capabilities through real projects

The cultivation of college students' innovation and entrepreneurship capabilities should fully rely on the main pillar industries in the region. As important subjects of school-enterprise cooperation and industry-university-research collaboration, each secondary college of vocational colleges should adhere to the combination of scientific and technological innovation and industrial development, and have a deep understanding of the current development status of regional pillar industries and the problems encountered in the process of reform and innovation. Through forms such as jointly establishing industrial colleges with enterprises, they should track the technological iteration and business model changes of the industry in real time, and transform real enterprise projects into teaching case libraries. This enables students to understand the logic of innovation in the process of participating in industrial upgrading practices, thereby cultivating their sensitivity to market opportunities and achieving a transformation from theoretical indoctrination to practical training. This promotes the close connection between students' personal employment development and regional industries, and carries out innovation and entrepreneurship education.

3.3 Optimize curriculum settings, improve the hierarchical competition mechanism, and enhance the effectiveness of innovation and entrepreneurship practice education

Building a scientific and advanced curriculum system is the core to ensuring the quality of innovation and entrepreneurship education. In the context of the digital age, the core of curriculum reconstruction lies in promoting the in-depth development of "specialization-innovation integration" and closely linking it with industrial reality. On the one hand, it is necessary to deeply explore the elements of innovation and entrepreneurship education contained in each professional course, promote the organic integration of professional education and innovation and entrepreneurship education, and achieve "specialization-innovation integration", permeating the cultivation of innovative thinking and entrepreneurial capabilities throughout the entire process of professional teaching. On the other hand, it is necessary to systematically improve the innovation and entrepreneurship curriculum system, expanding the coverage of basic courses such as "Innovative Thinking" and "Guidance for College Students' Employment and Entrepreneurship", and further enhancing the content of modules such as innovation and entrepreneurship spirit, business knowledge, and teamwork. At the same time, alumni's typical cases of entrepreneurship can be introduced into course teaching and special lectures to play a leading role. By organically combining course assessment with innovation and entrepreneurship practical activities, students' comprehensive practical abilities can be strengthened.

3.4 Promote an innovation practice education model that drives creation through competitions and progresses step by step

Adhering to the core concept of "promoting learning and creation through competitions", a systematic competition mechanism is an important means to promote innovation and entrepreneurship practice teaching. By leveraging the traction of competitions, an ability training platform that runs through the entire process of talent cultivation can be

effectively constructed. A multi-angle innovation and entrepreneurship practice education model of "gradient division and event stratification" should be established. On the one hand, gradient division refers to dividing by grade, and conducting targeted innovation and entrepreneurship practices based on the cognitive level of high and low grade students towards professional knowledge and personal development, forming a deepened development of innovation and entrepreneurship practices. On the other hand, event stratification involves categorizing innovation and entrepreneurship competitions to promote tiered participation by student teams. At the preliminary level, competitions primarily consist of those organized by various colleges and departments. The intermediate level focuses on discipline-specific contests, while the advanced level aims for prestigious awards in traditional major events such as the "China International College Students' Innovation Competition" and the "Challenge Cup National Entrepreneurship Competition for Chinese College Students." This structure enables innovation and entrepreneurship practice driven by real projects, effectively stimulating the endogenous motivation of student teams.

3.5 Strengthen teacher empowerment and build a "dual-teacher, dual-capability" innovation and entrepreneurship mentor team

The teacher team is the key support for the implementation of innovation and entrepreneurship education reform. Building a "dual-teacher" mentor team that is proficient in digital technology and has the ability to guide innovation and entrepreneurship practice is the core link to ensuring the quality of talent cultivation. On the one hand, regular training on the application of digital technology and innovation and entrepreneurship teaching methods for teachers should be conducted, and they should be encouraged to practice in enterprises to enhance their "dual-teacher" qualities. On the other hand, a three-level guidance system composed of school-enterprise mentors, student affairs mentors, and specialized mentors should be promoted. Specifically, technical experts from partner enterprises can be appointed as primary mentors, responsible for guiding project technology and industrial practice. Class advisors or counselors with extensive student management experience can serve as secondary mentors, focusing on student development and team building. Meanwhile, faculty members with business backgrounds from the innovation and entrepreneurship college can be invited as tertiary mentors, providing support in business models and market transformation. Through the collaborative efforts of these three types of mentors, layered and categorized guidance for students can be established, forming a multi-level synergistic educational force.

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