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Research on the Global Innovation and Entrepreneurship Education Model Driven by the Integration of Industry and Education

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Abstract: To enrich the theoretical research experience of innovation and entrepreneurship talent training mode in colleges and universities, and build a set of guiding innovation and entrepreneurship talent training systems, this paper deeply discusses the driving mode of the integration of the middle class and education in global innovation and entrepreneurship education, and puts forward specific countermeasures and suggestions for the innovation and entrepreneurship education reform in general higher education schools under the environment of integration of industry and education. These efforts aim to promote the further development of the production-education integration of innovation and entrepreneurship education.

Keywords: Integration of industry and education; Innovation and entrepreneurship; Education model; Practical curriculum; International cooperation

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1. Introduction

With the rise of the "mass entrepreneurship and innovation" policy, the relevant national guidance documents on "integration of industry and education" have been promulgated one after another [1]. Innovation and entrepreneurship education and application-oriented personnel training of integration of industry and education have become a hot topic of higher education reform in recent years and an important content of higher education research [2]. To carry out innovation and entrepreneurship education is not only the essential requirement of deepening higher education but also the endogenous demand of solving the problem of graduates' entrepreneurship and employment [3]. Under the background of innovation-driven development strategy, the cultivation of innovation and entrepreneurship talents should build an all-round and integrated innovation and entrepreneurship education ecosystem with the help of the integration platform of industry and education, and promote the continuous improvement of talent training quality [4].

2. Analysis of research status of innovation and entrepreneurship education in the mode of integration of industry and education

2.1. Analysis of research status of domestic innovation and entrepreneurship education

Innovation and entrepreneurship education is a brand new educational concept and mode based on quality education. In recent years, innovation and entrepreneurship education has become a hot spot of theoretical research and practical research by domestic and foreign scholars [5]. In September 2018, The State Council issued the Opinions on Promoting High-quality Development of Innovation and Entrepreneurship and Building an Upgraded Version of Mass Innovation and Entrepreneurship, pointing out that innovation and entrepreneurship education and practical courses should be included in the compulsory course system of colleges and universities, support colleges and vocational colleges (including technical colleges) to deepen the integration of production and education and introduce enterprises to carry out productive practical training [6]. The analysis framework of the implementation process of innovation and entrepreneurship education policies is shown in **Figure 1**.

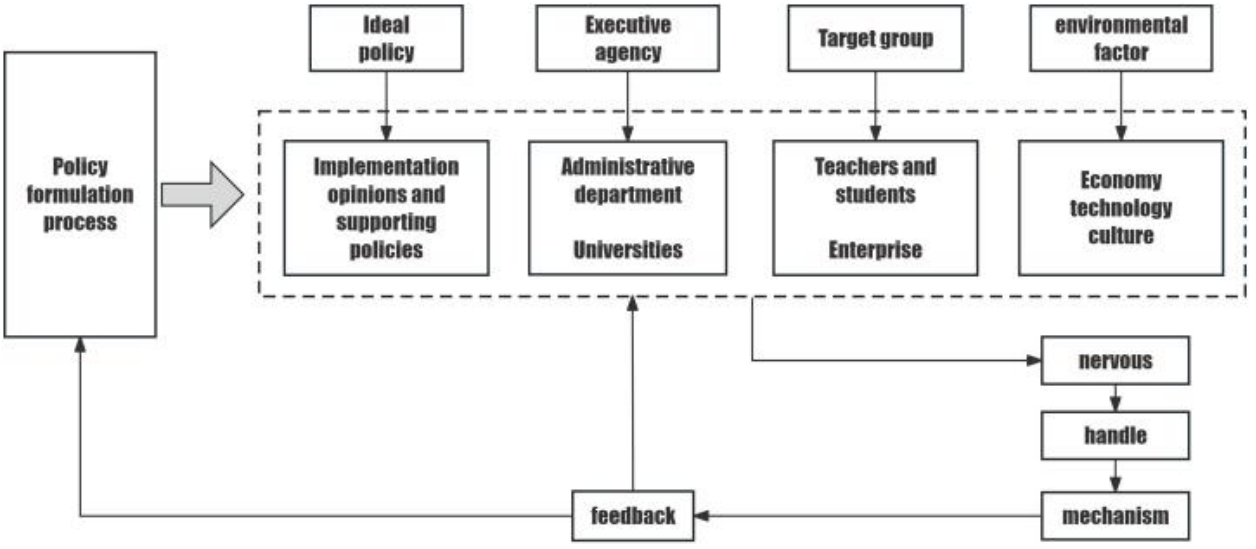

Figure 1. Analysis framework of innovation and entrepreneurship education policy implementation process

Many domestic scholars have conducted in-depth studies on innovation and entrepreneurship education and the integration of industry and education. Lang Jun, aiming at the problem of talent training for the integration of industry and education, put forward the corresponding solutions from the aspects of establishing a scientific concept of talent training, optimizing the communication and coordination mode of talent training, and improving the guarantee system of talen training for the integration of industry and education [7]. Wang Zhanren put forward a "broad spectrum" innovation and entrepreneurship education concept and model, the core concept is "for all students," "combined with professional education" and "integrated into the whole process of talent training" [8]. Lu Baochen proposed that the ultimate goal of universities is to cultivate outstanding innovative and entrepreneurial talents, support innovative and entrepreneurial education through the implementation of multi-disciplinary education, and promote the cultivation of entrepreneurial talents through a sustainable innovation and entrepreneurial talent practice platform [9]. Zhao Qian *et al.* took Hangzhou Business School of Zhejiang Gongshang University as an example to discuss the construction and practice of

innovation and entrepreneurship education model based on the integration of industry and education [10].

2.2. Analysis of research status of innovation and entrepreneurship education in foreign countries

The research on innovation and entrepreneurship education models in foreign countries started early and developed rapidly, and the construction of innovation and entrepreneurship education models has been quite mature. The United States was the first to research innovation and entrepreneurship education, and the research results have been emerging continuously in the past 20 to 30 years. In the UK, at least 45% of universities, such as Oxford University, have offered innovation and entrepreneurship education courses. Some other developed countries, such as Japan, Singapore, Canada, and New Zealand, have incorporated innovation and entrepreneurship education into their national education systems and attach importance to the practical experience of innovation and entrepreneurship.

In 1995, Leydesdorff *et al.* put forward the famous triple spiral relationship, establishing a model of integration of government, school, and enterprise education and production [11]. Dooley and Kirk pointed out through the triple helix model that each entity should not only make full use of its high-quality resources but also strengthen interaction [12]. Jaana Seikkula-Leino *et al.*, from the perspective of teachers, believe that training teachers in entrepreneurship education is conducive to the further development of entrepreneurship education in schools and the whole country [13]. Based on studying the employment guidance of college students, Paay *et al.* analyzed the current situation and existing problems of innovation and entrepreneurship education under the current situation put forward employment suggestions on how to carry out innovation and entrepreneurship education, and established a sound employment guidance system for innovation and entrepreneurship education [14]. Rasmussen *et al.*, from the perspective of students, proposed that entrepreneurship education should be student-oriented, action-oriented, and attach importance to learning activities in a student group environment and network environment, to promote the success of entrepreneurship education [15].

2.3. Research on the current situation of practical courses of innovation and entrepreneurship education driven by the integration of production and education

Through comprehensive literature review and empirical research, this paper systematically reviews the policy support of different countries and regions in the field of innovation and entrepreneurship education, and deeply studies the practical courses driven by the integration of industry and education. This paper discusses the key factors of establishing effective industry-university cooperation practice courses, such as two-way communication platforms, reasonable cooperation agreements, and incentive mechanisms. It emphasizes the gradual and comprehensive training of "knowledge, ability and quality" for students, considers the development of exogenous driving force of market and technology, and brings the three main bodies of government, universities, and enterprises into the ecological construction of mass innovation education, as shown in **Figure 2**. To explore the key elements of cultivating students' innovation and entrepreneurship ability, including creative thinking, teamwork, and risk management.

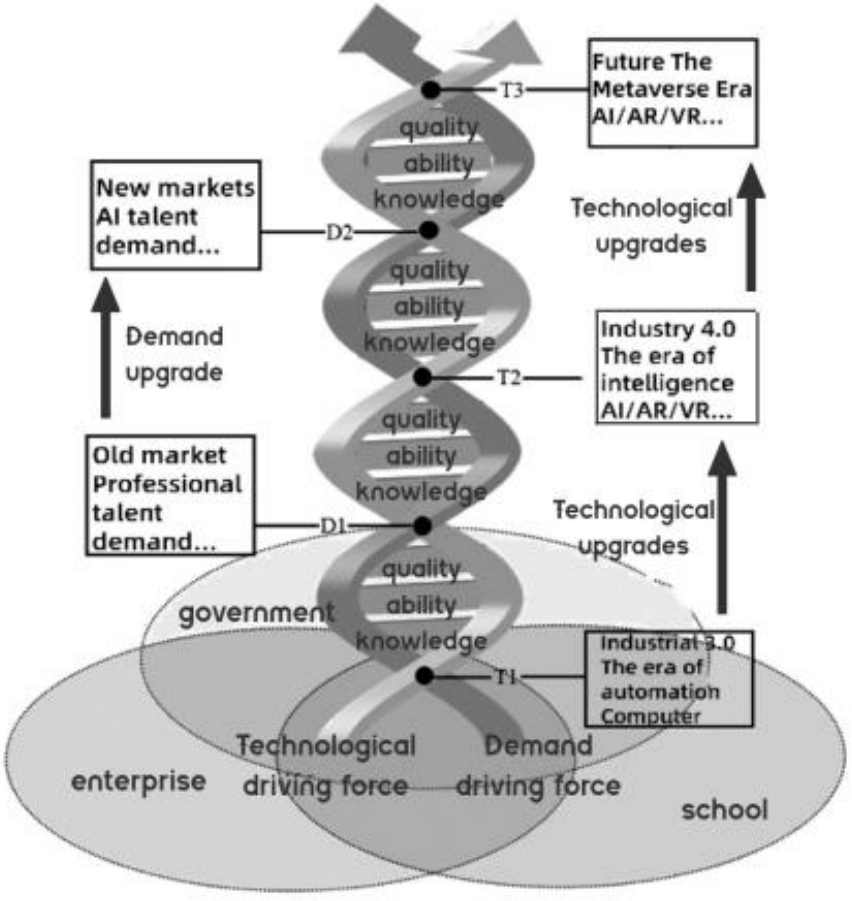

Figure 2. Talent cultivation model under the integration of production and education

3. Construction, application, and challenges of innovation and entrepreneurship education curriculum evaluation system

3.1. Construction of innovation and entrepreneurship education curriculum evaluation system

Colleges and universities should actively carry out extracurricular practical activities to enhance students' ability of innovation and entrepreneurship. The main carrier of assessment mode is students, and the assessment work pays more attention to students' development. The final assessment should present a diversified evaluation system by integrating teachers, students' achievements, parents, and society. Make full use of modern teaching technology, and establish a "visual" relationship with major colleges and universities or scientific research institutes, so that students can better apply the knowledge through a step-by-step evaluation system as shown in **Figure 3**. Through the comparison of international cooperation cases and successful experiences, explore advanced technical means and online education platforms, such as virtual laboratories and distance teaching, to promote the application and exchange of global innovation and entrepreneurship education.

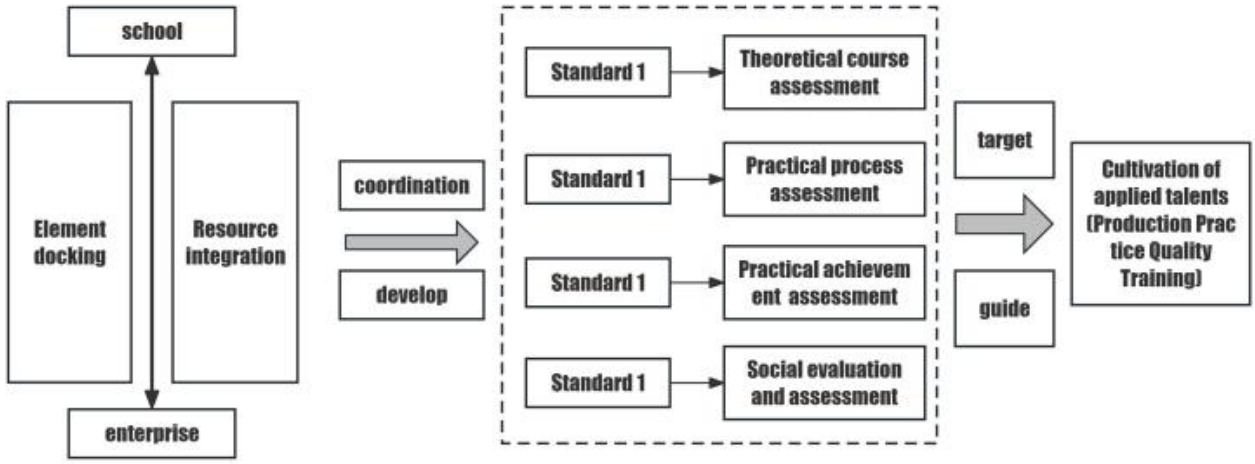

Figure 3. Curriculum evaluation system of innovation and entrepreneurship education

3.2. Challenges in the curriculum evaluation system of innovation and entrepreneurship education

3.2.1. Inadequate global innovation and entrepreneurship education standards and evaluation system quality

The existing standards and evaluation methods still have limitations for the comprehensive evaluation of innovation and entrepreneurship education, such as the lack of consistent standards and indicators, ignoring the practical aspects of the education process. This view highlights the importance of improving and perfecting the global evaluation system for innovation and entrepreneurship education.

3.2.2. The model of integrating industry and education has both advantages and limitations

The integration of industry and education in colleges and universities is difficult to achieve close cooperation between industry and educational institutions and lacks effective cooperation mechanisms. In the teaching process, close industry-academic cooperation should be established, diversified practical opportunities should be provided, interdisciplinary cooperation should be promoted and innovation should be emphasized.

3.2.3. Lack of quantification of innovation and entrepreneurship education results

At present, the methods for evaluating and quantifying the social impact of innovation and entrepreneurship education are insufficient. To ensure the sustainable development of education, research in this field needs to be strengthened urgently.

3.2.4. International cooperation on innovation and entrepreneurship education needs to be promoted

Given the significant differences in cultural backgrounds and education systems of different countries and regions, international cooperation faces many challenges in linguistic, cultural, and legal aspects. To achieve smooth cooperation, these difficulties must be addressed.

4. The innovation of entrepreneurship education in the mode of integration of industry and education

4.1. Features and innovations in academic thoughts and viewpoints

4.1.1. Evaluate the standards and quality of innovation and entrepreneurship education

Comprehensively evaluate the current situation of global innovation and entrepreneurship education through systematic review, reveal the shortcomings of its standards and quality assessment system, and guide improvement.

4.1.2. Further explore the advantages and limitations of the model of integration of industry and education

Through the case study method, the innovation and entrepreneurship education practices in different countries and regions are analyzed in depth. By comparing and analyzing the cases of different models of production-education integration, the advantages and limitations of these models are revealed, which provides empirical support for the optimization and improvement of the model of production-education integration.

4.1.3. Compare the policies and implementation in different countries and regions

Through comparative analysis, the paper discusses the innovation and entrepreneurship education policies, the integration model of industry and education, and the implementation in different countries and regions, to provide a reference for the world.

4.1.4. Global innovation and entrepreneurship education models have common characteristics

The key elements of innovation and entrepreneurship education include the cultivation of innovative thinking, the provision of practical opportunities, and interdisciplinary cooperation. In addition, innovation and entrepreneurship education around the world emphasize cross-cultural communication, social innovation, and sustainable development. These common characteristics lay the foundation for promoting global cooperation in innovation and entrepreneurship education.

To sum up, the innovation points of this paper include evaluating the global innovation and entrepreneurship education standards, exploring the integration model of industry and education, and comparing the policies and implementation of different countries and regions, which will help fill the research gap and promote the development of global innovation and entrepreneurship education.

4.2. Optimization strategy in the process of integration of production and education

In the process of driving the integration of production and education, the implementation of optimization strategies is crucial. To ensure that the integration of industry and education can proceed smoothly and achieve the expected results, the following optimization strategies are worth considering.

4.2.1. Establish a school-enterprise cooperation platform

Through the establishment of a school-enterprise cooperation platform, information exchange and resource sharing between schools and enterprises can be promoted. Schools can adjust the teaching content and curriculum according to the needs of enterprises, while enterprises can provide internship opportunities for students to achieve mutual benefit and win-win results.

4.2.2. Strengthen the construction of teaching staff

The integration of industry and education requires a team of double-qualified teachers who understand both education and industry. Schools should actively introduce enterprise experts and technical personnel with practical experience while strengthening the training and practical ability of existing teachers to meet the needs of the integration of industry and education.

4.2.3. Improve the curriculum system

The optimization of the curriculum system is the key to the success of the integration of production and education. Schools should update the curriculum content in time according to the development trend of the industry and the needs of enterprises, and add practical and applied courses so that students can master the latest technology and knowledge.

4.2.4. Strengthen the evaluation and feedback mechanism of the integration of industry and education

Focus on comparing the models of industry-education integration in different countries and regions, and evaluate their implementation effects and mechanisms. Select representative countries and regions, such as the United States, Germany, Japan, and China, and systematically sort out the model of industry-education integration through in-depth literature research and case analysis. Explore the characteristics, advantages, and limitations of these models. By comparing the similarities and differences of different models, a scientific evaluation system should be established to regularly evaluate the effect of the integration of industry and education, and timely identify problems and make adjustments. At the same time, a feedback mechanism should be established to collect opinions and suggestions from enterprises, schools, and students, and constantly optimize the implementation strategy of the integration of industry and education.

5. Concluding remarks

The research has promoted the integration of innovation and entrepreneurship education with professional education and industrial development, enriched the theoretical research experience of colleges and universities on the training mode of innovation and entrepreneurship talents, and built a guiding system for the training mode of innovation and entrepreneurship talents. In the process of research, in-depth research and exploration are carried out on the industry-education integration driving model of global innovation and entrepreneurship education, which makes up for the lack of research in related fields. In addition, countermeasures and suggestions are put forward for the reform and upgrading of innovation and entrepreneurship education in general higher education schools under the background of integration of industry and education, and the open and collaborative innovation and entrepreneurship education system and mechanism are improved, providing theoretical and technical support for subsequent research on global innovation and entrepreneurship education model through integration of industry and education.

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