

RESEARCH ON INNOVATION AND ENTREPRENEURSHIP EDUCATION MODEL IN COLLEGES AND UNIVERSITIES

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ABSTRACT

With the arrival of the era of digital intelligence, the importance of innovation and entrepreneurship education in applied local undergraduate colleges and universities is becoming more and more prominent. On the basis of exploring the domestic and international research status and problems of innovation and entrepreneurship education model in applied local undergraduate colleges in the era of digital intelligence, we carry out the exploration of digital intelligence-enabled model, and construct the two-way model of teachers and students, the "digital three-platform" model, the "school-society" model, and the diversified assessment model of the innovation and entrepreneurship education model of digital intelligence-enabled model. We also constructed the two-way model of teachers and students, the "digital three platforms" model, the "school-society" model, the "school-society" dual-axis model and the diversified assessment model. We hope that the research results can provide certain reference for the innovation and entrepreneurship education of applied local undergraduate colleges and universities.

Keywords: Innovation And Entrepreneurship Education; Model Exploration; Digital Intelligence Empowerment; Applied Universities

Introduction

With the rapid development of the global economy, innovation and entrepreneurship have become an important engine to promote economic growth and social progress. Therefore, the social demand for talents with innovative spirit and entrepreneurial ability is increasing, and innovation and entrepreneurship education in colleges and universities has emerged. With the acceleration of globalization, international vision has become an important part of innovation and entrepreneurship education in colleges and universities. Through exchanging and learning from international advanced experience, universities can continuously improve the level of innovation and entrepreneurship education and cultivate talents in line with international standards. The report of the 20th Party Congress even proposes to "accelerate the implementation of innovation-driven development strategy^[i]"; China's socialist modernization construction has entered a new stage of innovation-driven high-quality development^[ii]. The digital-enabled innovation and entrepreneurship education model is of great significance for education transformation, cultivating digital talents, supporting economic and social development and constructing new national competitive advantages^[iii]. Colleges and universities across the country are also actively implementing the spirit of the Implementation Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in Colleges and Universities and actively exploring the integration of innovation and entrepreneurship education into the whole process of transforming innovative and entrepreneurial talents of college students. They have taken a series of measures, including offering innovation and entrepreneurship courses, organizing entrepreneurship practice activities, and establishing entrepreneurship incubation bases, in order to cultivate students' innovation and entrepreneurship abilities and awareness. These initiatives provide more opportunities and platforms for students to get practical exercises and entrepreneurial experience on campus, laying a solid foundation for them to become innovative and entrepreneurial talents in the future. The advancement of this reform has a positive role in promoting the cultivation of innovative and entrepreneurial talents among college students. Therefore, how to integrate innovation and entrepreneurship education with professional teaching, and explore the operation of effective models and so on to solve a series of problems existing in the process of innovation and entrepreneurship of college students has become an important content of the current training of innovative talents^[iv].

Innovation and entrepreneurship education in foreign universities and colleges has an early start, and research on innovation and entrepreneurship education is evolving and receiving increasing attention in higher education. Through educational reforms, school cooperation, innovation centers and incubators, interdisciplinary research and community support, foreign educational institutions are providing students with more opportunities and resources for innovation and entrepreneurship. They have accumulated rich experience and distinctive features in educational concepts, operation modes and teaching methods of innovation and entrepreneurship education^[v]. Some foreign regions have even established entrepreneurial

communities and innovation ecosystems to provide resources and support to entrepreneurs. These communities can promote communication and cooperation in innovation and entrepreneurship and provide a favorable environment for entrepreneurs. Domestic research on innovation and entrepreneurship education is in a rapid development stage, and governments at all levels, colleges and universities, research institutes and all sectors of society are beginning to pay more and more attention to the development of innovation and entrepreneurship education. In the future, with the continuous promotion of China's economic transformation type and innovation-driven strategy, the importance of innovation and entrepreneurship education will be more prominent, and its research and practice will receive more attention and support. In the past 10 years, the country has introduced a number of education policies to promote technology to empower and increase the effectiveness of innovative talent cultivation^[vi]. However, due to various reasons, the success rate of innovation and entrepreneurship in different countries is not high. The continuous investment and inefficient development of innovation and entrepreneurship education in colleges and universities nowadays^[vii] are diminishing the role of innovation and entrepreneurship talent cultivation in boosting China's economic development. In this paper, on the basis of exploring the domestic and international research status and problems of innovation and entrepreneurship education model of applied local undergraduate colleges and universities in the era of digital intelligence, we carry out the exploration of digital intelligence-enabled model, and construct the two-way model of teachers and students, the "digital three-platform" model, the "school-society" model which combined dual-axis model in the model of innovation and entrepreneurship education. We also constructed the two-way model of teachers and students, the "digital three platforms" model, the "school-society" model, the "school-society" model and the diversified assessment model.

Problems of Innovation and Entrepreneurship Education in Applied Local Undergraduate Colleges and Universities

With the development of the times, the innovation and entrepreneurship education in China's applied local undergraduate colleges and universities is constantly developing and has received more and more attention in recent years. But there are also many problems in the development, such as after the investigation and research found that some colleges and universities have lagging behind in the concept of innovative talent cultivation, a single teaching method and the teaching content is not targeted, the lack of practical links and incomplete innovation and entrepreneurship education assessment system. Specifically as shown in Figure 1.

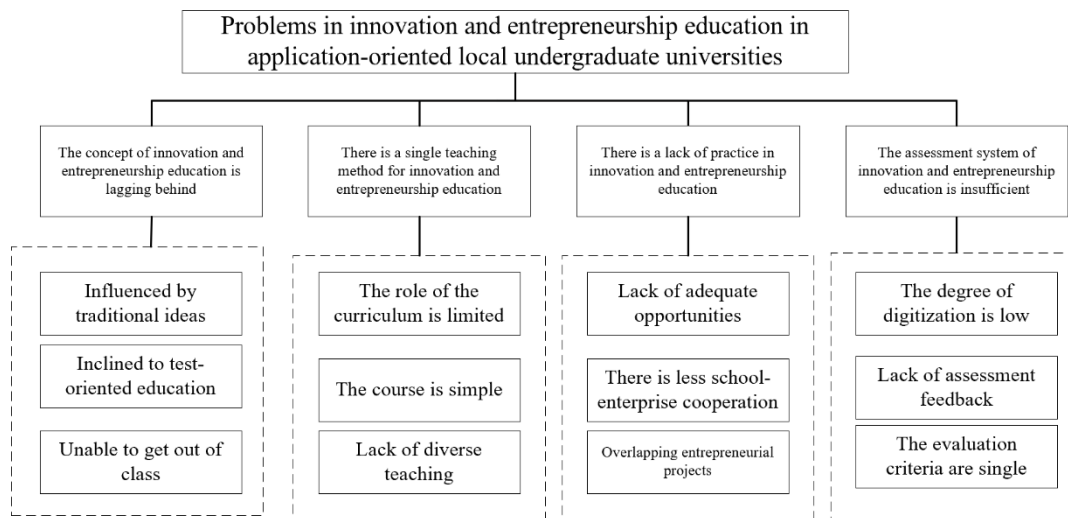


Figure 1. Problems of innovation and entrepreneurship education in applied local undergraduate colleges and universities

Lagging educational concepts of innovative talent training

Only with a correct understanding of the educational concept of innovative talent cultivation can we implement successful innovation and entrepreneurship education. At present, China's applied local undergraduate colleges and universities on innovation and entrepreneurship education exists a lack of all-round, multi-perspective analysis and other problems. Students in colleges and universities are not sensitive enough to reflect their thinking in innovation and entrepreneurship, and there is the phenomenon of hasty utilitarianism and following the wind and blindly following the phenomenon of innovation and entrepreneurship activities. If only through copying the "factory assembly line" type of innovation, it is impossible to break through the boundaries of thought and truly innovative practical activities. Influenced by the traditional concept, students attach much more importance to professional education than innovation and entrepreneurship education, and hold a respectful attitude towards new innovation and entrepreneurship. Under the current education system, the tendency to focus on knowledge transfer and test-taking education is more obvious, while the cultivation of students' creativity, thinking ability and practical ability is lacking. This lagging educational concept leads to the lack of innovation ability and the shortage of innovative talents. Innovation and entrepreneurship education requires a large amount of resource support. These resources include venues, equipment, funding, mentors and so on, and in reality, these resources are still relatively limited and difficult to meet the needs of students. Therefore, it is difficult for innovation and entrepreneurship education (to be detached from the classroom and go to the real business environment and practice opportunities. At the same time, traditional innovation and entrepreneurship education is mainly based on classroom teaching and lacks real business environment and practice opportunities. In the classroom, students only passively receive knowledge and skills training, and it is difficult for them to truly experience the process and challenges of innovation and entrepreneurship. As a result, the problems and

difficulties encountered by students in practice are also difficult to be solved. In addition, the current domestic innovation and entrepreneurship culture atmosphere is not strong enough, especially in some traditional enterprises and organizations, there still exists conservative and old-fashioned thinking and culture, which also brings certain difficulties to the promotion and practice of innovation and entrepreneurship education. Entrepreneurship education itself is an innovation in the field of business administration education, which needs to pay attention to the process, to make students know entrepreneurship and understand the difficulties of entrepreneurship through teaching and learning activities. Entrepreneurship education includes the training of creative thinking, cultivation of entrepreneurship, mastery of entrepreneurial knowledge, and improvement of skills. Correct awareness of innovation and entrepreneurship and advanced educational concepts are the primary task and ultimate goal of innovation and entrepreneurship education in applied local undergraduate colleges and universities. This awareness includes the understanding of the importance of innovation and entrepreneurship, as well as the cultivation of students' ability to be proactive, risk-taking, cooperative, and good at problem solving. At the same time, the education concept also needs to be combined with the market hotspot, the needs of the times and the school's own situation to ensure that the innovation and entrepreneurship activities can be closely adapted to the actual situation.

Teaching methods are single and insufficiently focused

Most colleges and universities set up innovation and entrepreneurship education courses as general education for freshmen, and the courses are simple and do not really serve as an initiation for innovation and entrepreneurship education for students. In addition, they do not set up higher-level courses for senior students, but focus more on professional courses, which makes it impossible to extend further. At the same time, innovation and entrepreneurship education often adopts a single teaching method, such as classroom lectures, case studies, etc., which is based on the transmission of book knowledge and lacks targeted and diversified teaching methods. This single teaching method is difficult to meet the different learning needs of students and the cultivation of innovation and entrepreneurship. Traditional innovation and entrepreneurship education is mainly based on classroom teaching, focusing on the teaching and analysis of theoretical knowledge. This teaching method tends to favor the learning of theory and lacks the opportunity and experience of practice. Students only passively accept the knowledge, and it is difficult to truly understand and apply it to actual innovation and entrepreneurship. In addition, innovation and entrepreneurship involves knowledge and skills in several fields, such as market research, business model design, team management and so on. However, it is difficult for traditional teaching methods to comprehensively cover these fields and provide diverse learning experiences and practical opportunities. Proper teaching methods for innovation and entrepreneurship education should focus on the comprehensive training of multiple aspects such as practice, case studies, creative thinking development, and interdisciplinary learning.

Through effective teaching methods, students' innovation and entrepreneurship abilities can be improved and a solid foundation can be laid for their future entrepreneurial or innovative work.

Lack of practical sessions

Innovation and entrepreneurship education should focus on the cultivation of practical ability, but at present, many colleges and universities innovation and entrepreneurship education lacks sufficient practice opportunities, and students tend to stay only at the theoretical level and lack the opportunity of practical operation and project practice. Some applied local undergraduate colleges and universities pay little attention to the practical aspects of innovation and entrepreneurship education, professional competitions are not publicized enough, and students are not highly motivated to participate in them, and they lack the exercise of professional projects. At the same time, most of the professional competitions carried out are based on business plan or enterprise simulation, and there is a gap between them and the real situation, so that students' practical ability can't be better improved. Innovation and entrepreneurship education in colleges and universities usually has the problem of being out of touch with the actual market and industrial environment. Colleges and universities usually have relatively little cooperation with enterprises, which makes it difficult for students to get in touch with the real business environment. The lack of opportunities to cooperate with enterprises prevents students from understanding important information such as industry needs, market trends and business models, which limits the cultivation of their practical ability. Students lack the opportunity to practice in real scenarios, which prevents them from truly understanding the challenges and difficulties in the process of innovation and entrepreneurship and makes it difficult for them to develop the practical ability to operate and solve problems. There may be information asymmetry and insufficient sharing among universities. Due to poor information transfer or poor information communication channels, it is difficult for different HEIs to learn about similar programs being conducted by other HEIs. As a result, they may carry out similar innovation and entrepreneurship programs independently, resulting in waste and redundancy of resources and overlapping of entrepreneurship programs. Secondly, there is a competitive relationship between colleges and universities in pursuit of reputation and ranking. In order to achieve outstanding results in the field of innovation and entrepreneurship, certain universities may choose to duplicate their attempts on projects that have already been carried out by other universities in order to compete for resources and honors. Such competition often leads to overlap between programs and a lack of opportunities for collaboration and cooperation, which is far from conducive to improving students' innovation and entrepreneurship practice.

Inadequate assessment system for innovation and entrepreneurship education

Innovation and entrepreneurship education aims to cultivate students' comprehensive ability, including creativity, teamwork, communication ability, problem-solving ability and so on. A scientific assessment system for innovation and entrepreneurship is not only conducive to teachers' comprehensive understanding

of students, but also can comprehensively demonstrate students' qualities. However, the assessment system of innovation and entrepreneurship education in some colleges and universities often focuses only on students' mastery of knowledge points, ignoring the examination of practical ability and innovation and entrepreneurship traits. Although this kind of assessment can reflect students' learning, it can't comprehensively show students' practical ability. At the same time, the degree of mastery of students' basic data is not high, and due to the lack of scientific data collection and evaluation system, the assessment system of innovation and entrepreneurship education in many colleges and universities still stays at the stage of traditional subjective evaluation, and does not make full use of modern technological means to carry out data-based assessment. It cannot comprehensively demonstrate students' practical ability and innovative and entrepreneurial qualities. The current assessment system of innovation and entrepreneurship education often focuses only on the theoretical knowledge of students, but lacks assessment feedback on students' practical ability and innovation and entrepreneurship qualities. This results in students not being able to fully realize their potential, and it is difficult for them to get enough feedback and guidance. Colleges and universities only focus on students' mastery of knowledge and ignore the examination of innovation and entrepreneurship practical ability. Many colleges and universities only take students' examination results in innovation and entrepreneurship courses as the only criterion for assessing students' ability, neglecting students' performance in actual operation and the cultivation of practical ability. Innovation and entrepreneurship involves several aspects of abilities and qualities, including creativity, leadership, teamwork, business sense, execution ability and so on. If only a single evaluation criterion is used, it is impossible to comprehensively assess students' multiple abilities. A single assessment criterion may easily lead to stereotyping and one-sided evaluation of students' abilities, neglecting their individual differences and multi-faceted development needs. This may limit students' room for development and affect the cultivation of their all-round qualities.

Exploration of Numerical Empowerment Innovation and Entrepreneurship Education Model in Colleges and Universities

Digital Intelligence Empowers Innovation and Entrepreneurship Education 's Two-Way Model for Teachers and Students

Through the application of digital technology, students can develop themselves better and realize free and comprehensive growth. Therefore, teachers should innovate their cultivation and education concepts in the cultivation of students' innovation and entrepreneurship education. Stimulate students' innovative thinking and bring into play their individual creativity in teaching. Encourage students to take the initiative to ask questions, research and pursue knowledge, and cultivate their curiosity and desire to solve problems. Guiding students to learn to actively search for problems and solve them through creative thinking. Guide

students to think about problems from different perspectives and cultivate a diversified way of thinking. Discussions, group activities and case studies can be used to stimulate the diversity of students' thinking. Innovation and entrepreneurship education should focus on practice and project-driven, so that students can personally participate in actual innovation activities. Through practical projects, students can exercise problem-solving skills, teamwork skills and the development of creative thinking.

Teachers should train their students in innovative problem solving, that is, in the process of solving uncertain problems in a creative way in the field of practice. In the educational model, the unidirectional relationship between teachers and students as "issuers" and "implementers" of tasks should be changed. On the one hand, encourage students to "self-organizing" learning system to build, as far as possible to authorize students to be independently responsible for the various local aspects of the classroom management process, the teacher is responsible for reviewing and checking; the establishment of innovation and entrepreneurship culture and education, colleges and universities can actively advocate the culture of innovation and entrepreneurship, encouraging students to be brave to try and fail to cultivate their innovative spirit and sense of teamwork. innovative spirit and teamwork consciousness. They can organize activities such as entrepreneurs' sharing sessions and creative demonstrations to create a good atmosphere of innovation and entrepreneurship, and at the same time provide students with financial and technical support to stimulate their creativity and entrepreneurial potential. In addition, attention should also be paid to "informal communication" in teaching and innovative teaching methods. Through various forms, such as course arrangement, group activities, inviting in and going out, innovation and entrepreneurship support, etc., the limitations between majors, colleges and universities and the society are broken, and the boundaries of majors are completely eliminated. While receiving unified management and education in the intensive course, students are also free to form various small, loose and flexible "informal organizations". In this way, students are able to complete the tasks in the classroom independently, and make attempts of innovation and entrepreneurship after class. They become the initiators and leaders of the process of knowledge acquisition and collision of ideas. This is shown in Figure 2.

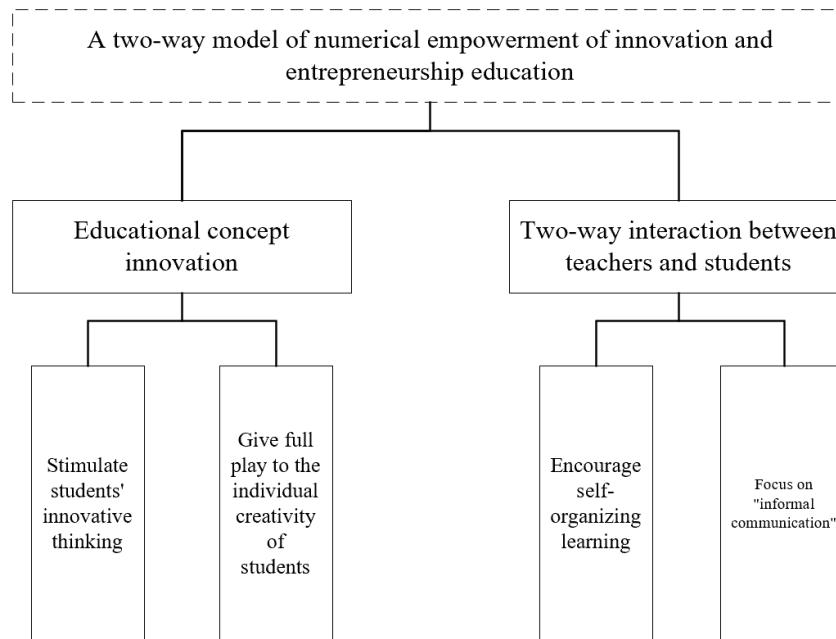


Figure 2. A two-way model for teachers and students in digital intelligence-enabled innovation and entrepreneurship education

The "Digital Triple Platform" Model of Innovation and Entrepreneurship Education Empowered by Digital Intelligence

Digital Intelligence Enabling Innovation and Entrepreneurship Education refers to the use of digital technology and data resources to provide support and assistance for innovation and entrepreneurship education in order to promote the development of students' innovative thinking and entrepreneurial ability. In the digital era, digital intelligence-enabled innovation and entrepreneurship education will provide students with a broader learning space and richer learning resources to help them better understand and apply the concepts and methods of innovation and entrepreneurship, so as to cultivate more talents with innovative spirit and practical ability. To this end, universities can build digital platform functions about innovation and entrepreneurship education, which can include digital acquisition platform, digital analysis platform and digital evaluation platform, as shown in Figure 3.

Establish a digital collection platform. Data collection is carried out on the premise of ensuring the security of student data information. First, import data using the volunteer application system and college student registration entry system before students' enrollment, and collect student information such as students' personal relationships, home addresses, interests and archival records. Second, the dynamics of the digital collection platform is utilized to continuously enter students' ability level, innovation and entrepreneurship participation, social activities and recreation and leisure data during their college years. Finally, while collecting digital information, the intrinsic mechanism of the data is explored to help students understand more deeply the nature of entrepreneurship education data and how it is applied. By exploring

the intrinsic mechanisms of data, students can gain a deeper understanding of the role and value of data in innovation and entrepreneurship, and develop data thinking and data-driven innovation capabilities. This will help them better cope with the increasingly data-driven social and economic environment and become data-intelligent innovation entrepreneurs.

Digital Analysis Platform for Innovation and Entrepreneurship Education, an educational support tool based on digital technology, aims to provide personalized innovation and entrepreneurship education services and support for teachers and students through data analysis and visualization presentation. Data cleaning and pre-processing are performed on the collected digital information of students, including operations such as removing duplicate data, filling in missing values, and converting data formats to ensure data integrity and accuracy. Perform data mining and modeling to analyze and model the cleaned data using machine learning and data mining techniques to discover the hidden patterns and trends in the data and provide students with personalized innovation and entrepreneurship education services and support. The results of data analysis are presented to students, teachers and administrators in the form of charts and reports. This helps students understand their learning and innovation and entrepreneurship abilities more intuitively, and also facilitates teachers and administrators to provide personalized guidance and management to students. The digital analysis platform for innovation and entrepreneurship education can help students better understand their learning situation and innovation and entrepreneurship ability, and provide personalized education services and support for students, realizing the innovation and entrepreneurship digital intelligence empowerment mode in a real sense.

The Digital Evaluation Platform for Innovation and Entrepreneurship Education (DEPIE) is an online platform for assessing and measuring the competencies and performance of students in innovation and entrepreneurship education. It uses digital technology and data analytics to collect, analyze and present students' achievements and development in the field of innovation and entrepreneurship, resulting in the drawing of a digital portrait of students. The platform collects and analyzes student assessment data, generating reports and charts that help schools and teachers better understand overall student performance and trends. The data can also be used to formulate teaching plans and improve educational methods by embedding the collected data into the results of comprehensive student evaluations, making their evaluation more scientific.

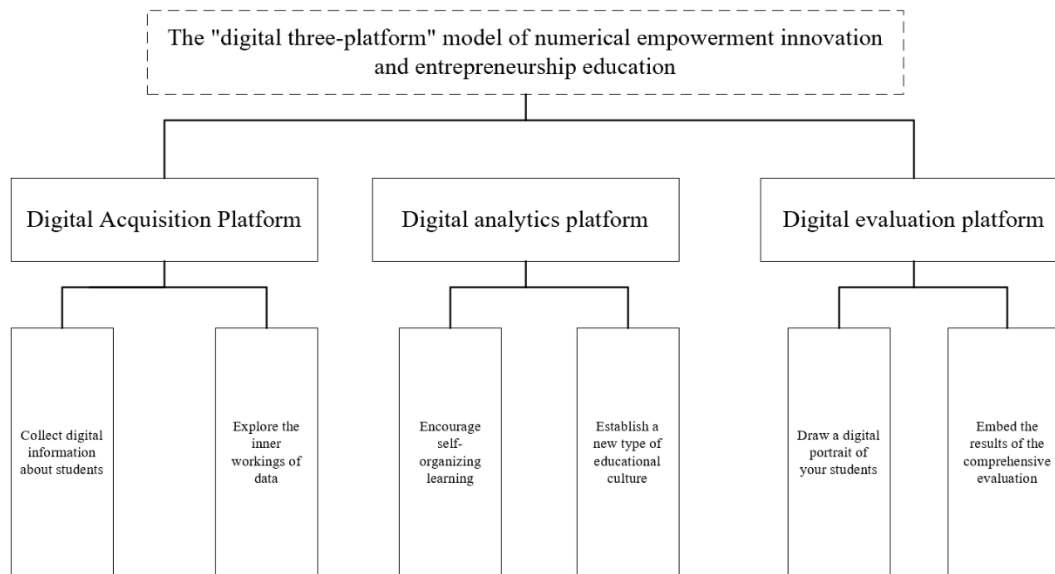


Figure3 The "Digital Triple Platform" model of digital intelligence-enabled innovation and entrepreneurship education.

The dual-axis model of "school-society" cooperation in innovation and entrepreneurship education empowered by digital intelligence

Students are always the core element in the education model, and the innovation and entrepreneurship education model, through the core concept of "students as the main body", has formed a synergy between the stimulation of students' entrepreneurial aspirations and potentials, the leading role of teachers, and the docking of social resources to cultivate students' hands-on innovation and entrepreneurship skills. The Digital Intelligence Enabling Innovation and Entrepreneurship Education Model requires strengthening interdisciplinary cooperation, and digital innovation and entrepreneurship often requires knowledge and skills from multiple disciplines. Colleges and universities can encourage students from different majors to form teams and work together on innovation and entrepreneurship projects. At the same time, they can promote cooperation between different colleges to carry out interdisciplinary curricula and research projects to cultivate students' comprehensive quality and innovation ability. Colleges and universities can establish innovation and entrepreneurship support organizations to provide innovation and entrepreneurship support services. Provide students with support services such as entrepreneurship training, program evaluation, and intellectual property protection. These institutions can stimulate students' enthusiasm for innovation and entrepreneurship and provide necessary guidance and assistance by holding entrepreneurship lectures and organizing entrepreneurship competitions. Let students really understand the challenges and difficulties in the process of innovation and entrepreneurship, and make it difficult to develop practical and problem-solving abilities.

The Digital Intelligence Empowerment Education Model has reconstructed the cooperation model of

"university and society", providing students with the opportunity to verify and improve their innovation and entrepreneurship in social practice. Different from the traditional teaching concept, innovation and entrepreneurship education should be closely linked with social practice, so that the innovative knowledge in the classroom "goes out" and the successful entrepreneurial experience "is brought in". Successful entrepreneurs, entrepreneurs or professionals should be invited as mentors to provide students with guidance and experience sharing. This mentor-mentee relationship can help students build up practical entrepreneurial networks and resources. Integrate actual projects and cases into classroom teaching by offering university-enterprise cooperation courses. By cooperating with enterprises, students can better understand the industry needs and practical operation, and develop innovative and entrepreneurial thinking and ability. By cooperating with the society, universities can provide education and training that is more practical and in line with market demand, helping students better adapt to the innovation and entrepreneurship environment and contribute to social innovation and economic development. Establish partnerships with enterprises, business incubators, non-profit organizations, etc. to provide opportunities for students to participate in practical projects. For example, organizing students to participate in social research, entrepreneurship competitions, community service and other activities, so that students can experience the process of innovation and entrepreneurship first-hand and provide opportunities for social practice. The details are shown in Figure 4.

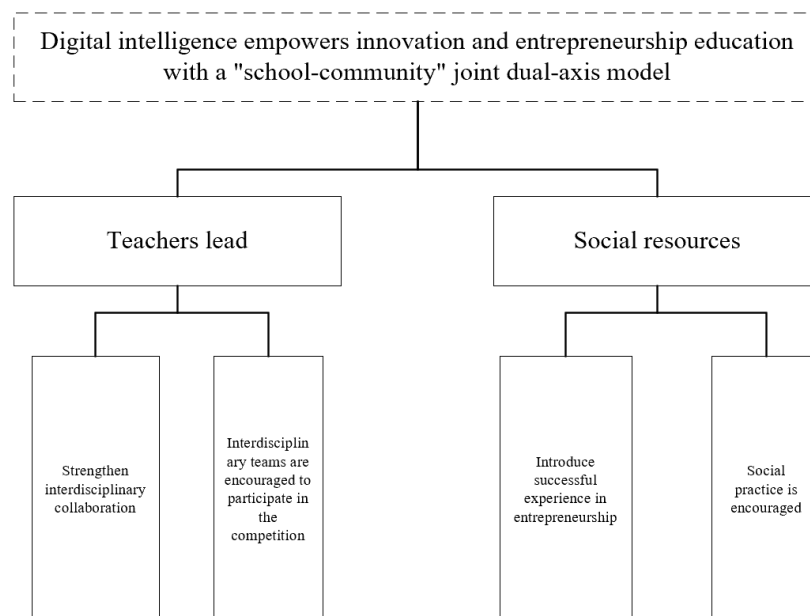


Figure 4. The dual-axis model of "school-society" collaboration in innovation and entrepreneurship education empowered by digital intelligence.

Diversity Assessment for Digital Intelligence Enabled Innovation and Entrepreneurship Education model

Establishing a diversified assessment model, adopting scientific evaluation methods and modern technological means to carry out data-based assessment, comprehensively demonstrating students' practical

abilities and innovative and entrepreneurial qualities, and providing students with more scientific and objective feedback and guidance. Integrating internal and external resources, designing a curriculum system that meets the market demand, arranging mentors to guide them, opening practice programs, establishing evaluation mechanisms, and making good publicity and promotion efforts to help students achieve all-round education and career development, in order to create an innovation and entrepreneurship education system that integrates academic and professional careers. At the same time, break the traditional assessment system and build a multifaceted digital intelligence ecosystem. Utilizing diversified digital technology, students' innovation and entrepreneurship education is assessed and evaluated in multiple aspects to create a conscience cycle. The multifaceted assessment model can comprehensively assess the comprehensive ability and practical achievements of students in innovation and entrepreneurship education, promote the overall development of students, and cultivate talents with innovation and entrepreneurship literacy. At the same time, the assessment process should focus on regular feedback and guidance to help students discover their strengths and weaknesses and provide personalized support and guidance. As shown in Figure 5.

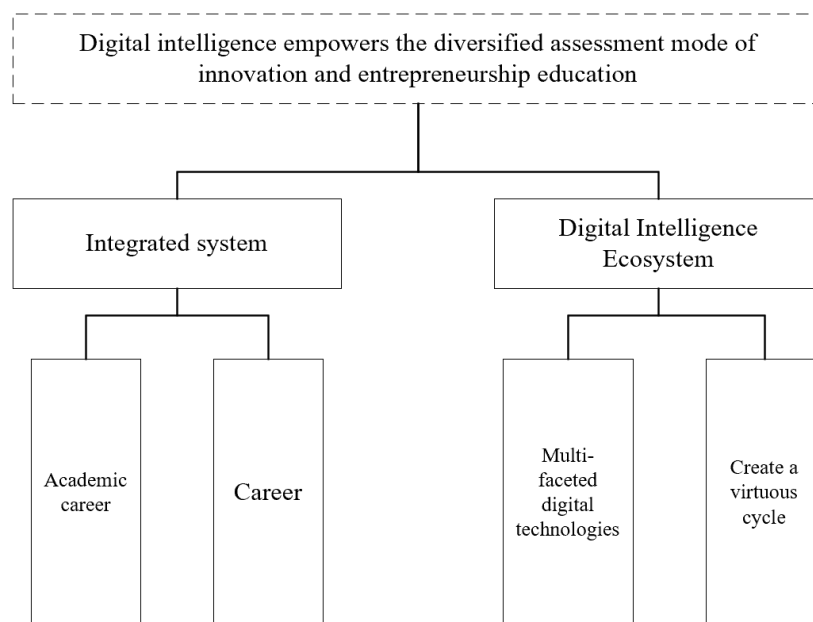


Figure 5. Diversified assessment model of innovation and entrepreneurship education empowered by digital intelligence

Conclusion

Digital-intelligent innovation and entrepreneurship education model puts forward higher requirements for education governance, and the digital-intelligent transformation and high-quality development of open education urgently requires the exploration of new governance modes and governance countermeasures. Through the exploration of innovation and entrepreneurship education in applied local undergraduate colleges and universities in the era of digital intelligence, this paper constructs a two-way mode of teachers

and students, a "digital three-platform" mode, a two-axis mode of "school and society" cooperation and a diversified assessment mode for the innovation and entrepreneurship education model empowered by digital intelligence. Positive and effective innovation and entrepreneurship education is the strong backing for the success of innovation and entrepreneurship of college students in the new era. The digitalized innovation and entrepreneurship education model is conducive to accelerating the implementation of innovation and entrepreneurship education in colleges and universities, which helps to improve students' innovation and entrepreneurship ability and adapt to the development needs of the digital era.

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