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Building a New Space for the Integration of College Students' Innovation and Entrepreneurship in the Urban Industry Education Consortium Based on Artificial Intelligence Technology

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Abstract Innovation and entrepreneurship education in colleges and universities is a new requirement for the development of college education in China, and artificial intelligence technology is the key content of college technology education at this stage. In order to promote innovation and entrepreneurship education in colleges and universities, based on the analysis of AI social needs and the current situation of college education, this paper proposes a path for the integration and development of AI technology and innovation and entrepreneurship education in colleges and universities for reference by college teaching peers.

Index Terms universities, artificial intelligence technology, innovation and entrepreneurship education, integrated development

I. Introduction

UNDER the current social background of innovation and entrepreneurship, the demand for talents in China's social development has undergone a fundamental change, requiring talents to have the ability to innovate and start businesses and be able to achieve technological innovation and development in related research fields [1]. This paper proposes to integrate the research and training of artificial intelligence technology with innovation and entrepreneurship education in colleges and universities, so as to promote the mutual progress of the two in a two-way way on a certain level, and achieve the goal of better serving the society [2].

A large number of educational artificial intelligence systems that integrate artificial intelligence technologies (such as data mining) have been applied to schools, so as to better use the big data generated in the campus, analyze and predict students' learning performance in school, and provide students with more personalized and diversified learning methods [3]. At present, the AI technologies widely used in the field of education include image recognition, voice recognition, semantic recognition, machine translation, etc. The AI industry chain is shown in Figure 1.

As a new concept in the field of education, the basic value orientation of innovation and entrepreneurship education is entrepreneurial ability, entrepreneurial awareness, and innovative spirit. Based on this, we can learn that innovation and entrepreneurship education is a brand new educational practice,

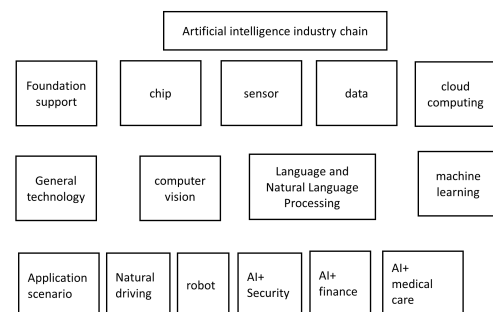


Figure 1: Artificial intelligence industry chain

educational system, and educational theory at the conceptual level [4]. As a new concept, innovation and entrepreneurship can better adapt to social development and is the product of adapting to the trend of the times as a new educational concept and form, innovation and entrepreneurship education is the product of the era of knowledge economy. Innovation and entrepreneurship education can effectively combine professional education, entrepreneurship education and innovation education [5], [6]. In order to help college students carry out innovation and entrepreneurship, the University has taken measures to improve the quality of college students' entrepreneurial practice activities, innovate the teaching mode, improve the self-confidence of college students in innovation

and entrepreneurship, and establish their innovation awareness. And use a variety of higher education methods, college students' innovation and entrepreneurship education methods to improve the comprehensive ability of college students, shown in Figure 2.

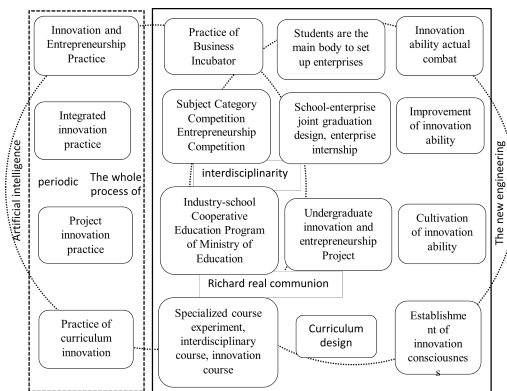


Figure 2: Advanced diagram of innovation and practice ability cultivation under the new background

The hierarchical and phased education system of innovation and entrepreneurship in the new context is shown in Figure 3.

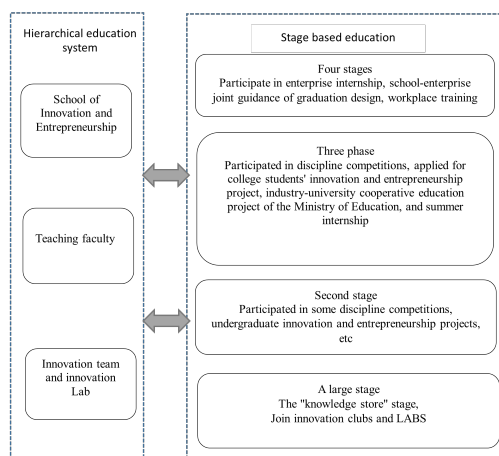


Figure 3: Hierarchical and phased education system of innovation and entrepreneurship in the new context

II. The Impact of AI on Innovation and Entrepreneurship Ability and Innovation and Entrepreneurship Education

For innovation and entrepreneurship, the era of artificial intelligence is of cross era significance. From the perspective of innovation, artificial intelligence is both the object of innovation and the support of innovation. Through this special tool, human beings can understand the material world and human society from a broader perspective and a more extreme micro perspective, greatly enhancing human understanding, research and application of nature, and improving human understanding of philosophical laws and social superstructure. The innovation of human beings has made breakthroughs in

the two directions of entity and virtual, and the two directions are complementary and advancing [7]. From the perspective of entrepreneurship, entrepreneurship in the field of digital economy in the era of artificial intelligence is highlighted. Whether it is innovation in the virtual field or entity transformation based on digital technology empowerment, it has become the focus of government promotion and public participation. The evolution of AI as a substitute for existing industries and the new business forms derived from AI will be the blue ocean tide for young students. Entrepreneurship has become a must for young students [8].

Innovation and entrepreneurship education is closely linked with the trend of economic development, and has been at the forefront of discipline education in terms of industrial adaptability and demand. Digital technology has bridged the knowledge gap between schools and society. Innovation and entrepreneurship education in the era of artificial intelligence has become a contact between social demand and university supply [9]. The scene created by artificial intelligence technology, which is updated in real time with social reality and fed back synchronously, provides nearly unlimited virtual resources and production chain for innovation and entrepreneurship education, greatly reduces the cost of innovation and entrepreneurship education, and builds a warm nest for incubating innovation and entrepreneurship. The application of big data in the era of artificial intelligence has solved the contradiction between standardized teaching and personalized innovation and entrepreneurship. While promoting the improvement of innovation and entrepreneurship education management ability, it has realized the personalization of innovation and entrepreneurship education content and the uniqueness of guidance [10]. In addition, AI has also changed the training and certification oriented innovation and entrepreneurship education with a skilful tendency, increased the substantial support and achievement orientation of the innovation and entrepreneurship process, and changed the evaluation method of innovation and entrepreneurship from assessment to process orientation, supporting trial and error, and supporting the evaluation method of breakthrough and subversive change. The innovation and entrepreneurship education in the era of artificial intelligence has changed from the education mode of textbook, classroom and lecture to substantive innovation and entrepreneurship and accompanying real-time guidance and practical teaching in the virtual creation environment, realizing the education mode of learning by doing, learning by doing and learning by doing at the same time [11].

III. The Current Situation of Innovation and Entrepreneurship Education

The background subject of innovation and entrepreneurship education in Chinese colleges and universities is different from that in foreign colleges and universities. Our main purpose is not to promote economic development, but to alleviate the employment pressure of college students. However, with the change of national development situation, this subject background is changing constantly, that is, promoting inno-

vation and entrepreneurship education has become one of the important development strategies for building an innovative country, promoting the reform of higher education, and especially cultivating innovative and entrepreneurial talents [12]. Under this special background, in recent years, the Ministry of Education of the People's Republic of China and all provinces and cities have successively issued and promoted relevant policy documents on "improving the capacity of independent innovation and building an innovative country" and "driving employment by entrepreneurship". Departments at all levels and universities also actively promote this work by holding or participating in various related training and projects, holding academic and practical exchange meetings and other initiatives [13]. In recent years, innovation and entrepreneurship education in application-oriented undergraduate colleges and universities in China has achieved some growth and progress with the continuous efforts of some researchers and practitioners, and has achieved preliminary results [14]. The following article mainly introduces the current situation of innovation and entrepreneurship education in colleges and universities in China from the four aspects of the development of university students' innovation and entrepreneurship support policies, planned competitions, innovation and entrepreneurship education courses and practice bases.

A. Current situation of innovation and entrepreneurship support policies

The Chinese government attaches great importance to the innovation and entrepreneurship of college students, and the policy support system, training system and service system in this area have been initially formed.

In addition to the support policies issued by the government, many colleges and universities have also released some policies to support the innovation and entrepreneurship education of college students. For example, college students' innovation and entrepreneurship training programs and seed funds set up by some colleges and universities provide sub funds for promising entrepreneurship projects [15]. Some colleges and universities have issued policies to support college students' innovation and entrepreneurship in terms of student status management, minor courses, employment distribution, etc. In short, the state, governments at all levels and colleges and universities have issued many policies, creating a strong atmosphere for college students' innovation and entrepreneurship.

B. Current situation of innovation and entrepreneurship plan competition

The "Challenge Cup" Chinese College Students Entrepreneurship Plan Competition is an important carrier to promote quality education and guide college students to actively participate in the construction of an innovative country. It is instructive, exemplary and mass oriented. In the course of the competition, the participants have to go through the stages of team formation, project selection, market research, training, completion of the writing and defense of the business plan.

Through this competition, the students' abilities in all aspects have been greatly improved.

C. Current situation of innovation and entrepreneurship education courses

As early as 1997, Tsinghua University set up the major of "Innovation and Entrepreneurship Management". In April 2002, in order to promote the development of entrepreneurship education in colleges and universities, the Ministry of Education selected 9 colleges and universities including Tsinghua University as pilot colleges. All pilot universities have explored the innovation and entrepreneurship education curriculum.

In recent years, with the guidance and policy support of the state, the construction of innovation and entrepreneurship education curriculum system in China's universities has made good progress. Not only has the number of innovation and entrepreneurship education courses increased, but also the quality of the courses has been improved, which is more targeted, as shown in Table 1.

IV. Integrated Development Path of AI and Innovation and Entrepreneurship Education

A. Forming the training scheme and curriculum system

Artificial intelligence education closely relies on communication engineering, computer technology and other disciplines, and has the characteristics of multidisciplinary integration. According to the professional characteristics, it highlights the background of new engineering subjects, integrates innovation and entrepreneurship education, actively investigates the industrial needs for the industry, and jointly develops and forms a professional talent training program and curriculum system with the characteristics of innovation and entrepreneurship with enterprises.

The program and system highlight the background of artificial intelligence and integrate innovation and entrepreneurship education. Through studying and adjusting the teaching plan of professional talent training, restructuring the professional curriculum system, we explore various effective ways to develop the training of composite and engineering professionals. Establish an innovation and entrepreneurship practice credit incentive mechanism, deepen the reform of the professional curriculum system, build a new innovation and entrepreneurship practice teaching system, and integrate the new experimental teaching projects, curriculum design and student graduation design originally set up according to the requirements of the university curriculum into the "basic level - comprehensive level - application level - innovation level" practice training level (see Table 2).

B. Enhanced "five in one" platform

It is far from enough to deeply implement the teaching and training mode of innovative and entrepreneurial technical talents within the current education scope of the whole school. Only a complete talent education and teaching system, diversified talent education and training forms and professional talent

Stage	Project subject	Theoretical courses offered	Practical courses offered
Phase I	All students	Fundamentals of innovation and entrepreneurship, creative thinking and innovative methods, spirit and practice of innovation and entrepreneurship, and entrepreneurial economic law	Employment guidance, career planning, career evaluation
Phase II	All students in different majors	Integrate basic knowledge of innovation and entrepreneurship into professional courses	Entrepreneurship research and enterprise visit
Phase III	Students with innovative and entrepreneurial ideas	Subject frontier topics, entrepreneurial management, critical thinking and research methods	*Challenge Cup* Entrepreneurial Plan Competition, Innovation Creation and Patent Application, and Undergraduate Electronic Design Competition
Phase IV	Students who are starting businesses	Innovative strategic thinking, business negotiation and marketing skills, entrepreneurial marketing and market research technology, venture capital	Entrepreneurship lecture hall, entrepreneurship training camp, 1+1 mentor guidance

Table 1: Innovation and entrepreneurship courses at different stages

Level	Methods	Training content	The target
Innovation layer	Graduation Project: Innovation and technology competition	The project practice	The innovation ability
Phase II	All students in different majors	Integrate basic knowledge of innovation and entrepreneurship into professional courses	Entrepreneurship research and enterprise visit
The application layer	Orientation training; Graduation practice	Participate in the development of practical projects of enterprises, cultivate entrepreneurial ability, interpersonal ability and employability	Ability to synthesize and build systems
Composite layer	Practical training in the fifth semester	Algorithm design and analysis course design: network information security course design	Technical knowledge and engineering ability
Composite layer	Practical training in the fourth semester	Computer network course design	Technical knowledge and engineering ability
Composite layer	Practical training in the third semester	Advanced language course design	Technical knowledge and engineering ability
Base layer	Experiment courses	-	Basic Personal Ability

Table 2: Levels, contents, means and objectives of practice training

education mode can truly give college innovation and entrepreneurship talent education a broader development space. For the network engineering major in colleges and universities, the Department has proposed an enhanced version of the "five in one" education model for innovative entrepreneurial talents. Its basic framework is shown in Figure 4 below.

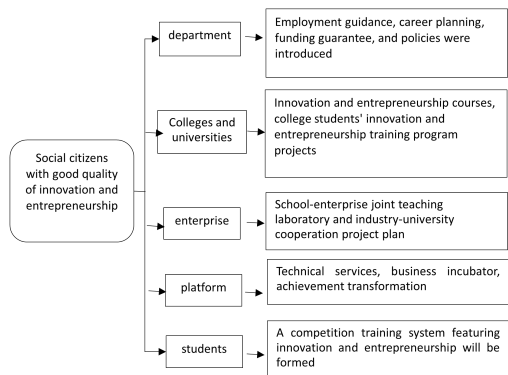


Figure 4: Five in one framework of innovation and entrepreneurship education

This mode fully integrates the new concepts of innovative and entrepreneurial teaching into the daily running of colleges and universities with the "integration of industry and education". From the introduction of college policies, the revision of talent training programs, to the quality monitoring of each teaching practice link and teaching process, it can fully reflect the cultivation of innovative thinking and entrepreneurship of college students, which is very consistent with the school running idea of "new engineering" applied senior talents.

C. Offering innovative courses and interdisciplinary courses

Innovation and entrepreneurship education pays attention to practical training, but the necessary theoretical education is also indispensable. New engineering construction and artificial intelligence education require students to learn and supplement some new interdisciplinary knowledge. At the same time, the idea of innovation and entrepreneurship education should be integrated into the theoretical curriculum. The courses can be offered in various forms, such as general required courses, regular classes for students in the classroom, and relatively easy lectures in innovation laboratories

or innovation clubs. In addition, improve the professional training program to achieve "interdisciplinary, theoretical and practical integration". According to the actual situation, set up appropriate cross courses of AI theory and new engineering credits, and moderately increase some courses in the field of AI, such as machine learning, data mining, computer vision, big data technology, etc. In fact, these basic courses in the field of artificial intelligence can also become important elective courses for science and engineering majors in many colleges and universities. See Table 3 for innovative courses and interdisciplinary courses.

V. Conclusion

The integration and development path of AI technology and innovation and entrepreneurship education in colleges and universities is conducive to the rapid research and development of AI technology, and is also conducive to the cultivation of "high, sophisticated and cutting-edge" innovative high-end AI talents with an international vision of "AI+education".

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References

[1] Duan, S., Zhao, X., & Hu, C. (2023). Interaction Between Public Art Sculpture and Urban Environment and Aesthetic Enhancement Effect Based on Deep Learning Model Evaluation. *Journal of Combinatorial Mathematics and Combinatorial Computing*, 120, 345-354.

[2] Mahariya, S. K., Kumar, A., Singh, R., Gehlot, A., Akram, S. V., Twala, B., ... & Priyadarshi, N. (2023). Smart campus 4.0: Digitalization of university campus with assimilation of industry 4.0 for innovation and sustainability. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 32(1), 120-138.

[3] Buasuwan, P., & Orsuwan, M. (2023). Linking Higher Education to Patterns of Job Mobility and Emergent Technological Change. In *Student and Skilled Labour Mobility in the Asia Pacific Region: Reflecting the Emerging Fourth Industrial Revolution* (pp. 89-106). Cham: Springer International Publishing.

[4] Knight, J. (2024). The evolution of contemporary education hubs: Fad, brand or innovation?. *International Journal of Educational Development*, 104, 102972.

[5] Lepore, D., Testi, N., & Pasher, E. (2023). Building inclusive smart cities through innovation intermediaries. *Sustainability*, 15(5), 4024.

[6] Marisa, S., Gunawan, G., & Susilawati, E. (2024). Global Education Development Plan to Build Sustainable Education Based on Artificial Intelligence. *Qubahan Academic Journal*, 4(2), 38-46.

Course class punishment	Course name	Have a class way
General Studies electives	Theory and Practice of network entrepreneurship	Formal lectures
General Studies electives	Entrepreneurial thinking in the era of big data, Technology and opportunities, employment guidance	Formal lectures
General Studies electives	Entrepreneurship Practice - College students' innovation and entrepreneurship practice	Formal lectures
A training course	Business simulation sand table rehearsal practice	Seminar of Innovation Club
A training course	Entrepreneurship education and training	Seminar of Innovation Club
Cross course in Artificial intelligence	Machine learning	Formal lectures
Cross course in Artificial intelligence	Data mining	Formal lectures
Cross course in Artificial intelligence	Computer vision	Formal lectures
Cross course in Artificial intelligence	Big data technology, etc	Formal lectures
Competition Training Course	Course contests	Seminar of Innovation Club
Competition Training Course	"Internet Plus" innovation competition	Seminar of Innovation Club

Table 3: Innovative courses and interdisciplinary courses

- [7] Georgiev, D., Antonova, A., & Gourova, E. (2023, September). The Place of Academia in the Knowledge Triangle: How Students Recognize the Role of Scientists for Building an Innovation Ecosystem. In *European Conference on Knowledge Management* (Vol. 24, No. 1, pp. 58-66).
- [8] Marquez, R., Barrios, N., Vera, R. E., Mendez, M. E., Tolosa, L., Zambrano, F., & Li, Y. (2023). A perspective on the synergistic potential of artificial intelligence and product-based learning strategies in biobased materials education. *Education for Chemical Engineers*, 44, 164-180.
- [9] Luong, A. (2023). Aligning the Quintuple Helix model of innovation with Vietnam's context: evidence from artificial intelligence innovation dialogues. In *The Elgar Companion to Digital Transformation, Artificial Intelligence and Innovation in the Economy, Society and Democracy* (pp. 254-275). Edward Elgar Publishing.
- [10] Zhang, H., Su, S., & Liu, Y. (2023). Higher education talents strategy in the context of regional talent hub construction: textual analysis and endosymbiotic cooperation model. *Sage Open*, 13(1), 21582440231156152.
- [11] Livina, A., Reddy, G. M., & Horsta, L. (2023). Knowledge Base for Innovations in Higher Education Institutions (HEIs) Toward Smart and Sustainable Future: A Study on EUDRES. In *International Conference on Quality Innovation and Sustainability* (pp. 273-287). Cham: Springer Nature Switzerland.
- [12] Omodan, B. I. (2024). Redefining university infrastructure for the 21st century: An interplay between physical assets and digital evolution. *Journal of Infrastructure, Policy and Development*, 8(4), 3468.
- [13] Zhang, F., Lai, Q., & Zhou, C. (2024). Research on the Innovation of Integration between Industry and Education from the Perspective of Educational Services: A Case Study of Hainan Lingshui Li'an International Education Innovation Pilot Zone. In *2024 3rd International Conference on Humanities, Wisdom Education and Service Management (HWESM 2024)* (pp. 455-464). Atlantis Press.
- [14] Nikolaeva, I. V., Struchkova, T. A., Ivanov, N. Y., & Tsyzak, M. P. (2023). Development of Infrastructure to Support the National Technological Initiative: The Case of the Russian Federation. *European Project Management Journal*, 13(1), 50-60.
- [15] Zilveti, M. A. R. C. O., Conti, M. A. T. T. E. O., Brevi, F. A. U. S. T. O., & Kotter, R. I. C. H. A. R. D. (2023). Integrated multi-disciplinary approaches in higher education to conceive future mobility and transport design practice in extreme scenario. *Amps Proceedings Series*, 1, 206-218.

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