



Industry and Education Integration for Chinese University of Applied Science and Technology Based on the Triple Helix Theory

Xi Zhao^{a*}, Lei Wang^{b*}, Lin Chen^{c*}

School of Economics and Management, Hefei University, Hefei, China

^{a*}zhaoxi@hfu.edu.cn, ^{b*}1143547876@qq.com

^{c*}chenl@hfu.edu.cn

Abstract. The integration of industry and education is the key for Chinese University of Applied Science and Technology to cultivate applied talents needed by the society. In the process of implementing the integration of industry and education, China's application-oriented universities are also faced many problems. Based on the triple helix theory, this paper analyzes the existing problems of China's industry-education integration, including the structural contradiction between the settings of university majors and industry demand, the imperfect system and mechanism of school-enterprise cooperation, and the impact of the pandemic on the industry-education integration. Based on the analysis, it finally puts forward countermeasures and suggestions to promote the development of industry-education integration for Chinese University of Applied Science and Technology from three aspects: playing supervision role of the government for top-level design, playing innovation role of enterprises in the industry-education integration implementation process, and playing practice role of colleges and universities for taking the advantages of serving local development.

Keywords: integration of industry and education; triple helix theory; Chinese University of Applied Science and Technology.

1 Introduction

The integration of industry and education is a school-running mode formed by strengthening the cooperation between schools and enterprises, cultivating high-quality technical talents, effectively connecting education, talents and industries, and constantly improving the teaching system(Zhu, A., 2019)^[1]. It promotes the complementary advantages of resources and cooperative innovation between education and industry, and is of great significance to social and economic development. As one of the main paths for Chinese universities to transform into application-oriented universities(Zou, 2021)^[2], the integration of industry and education is different from the concepts of school-enterprise cooperation and industry-university-research cooperation proposed before(Yin, C., 2023)^[3]. The integration of industry and education is a

more comprehensive and in-depth collaboration model aimed at enhancing students' practical and innovative capabilities. Compared to previous concepts, the integration of industry and education places greater emphasis on practical application and hands-on experience, emphasizing the cultivation of students' professional competence and innovation ability. Furthermore, it also contributes more to the advancement of industries and societal progress by the school-enterprise cooperation (Etzkowitz, H., Leydesdorff, L., 1998)^[4]. With China's changing economic structure and the increasing demand for applied talents in the labor market, which led to the transformation of higher education system, it has become an urgent issue to explore how Chinese Universities of Applied Science and Technology (UASTs) can effectively implement cooperation with the industry sector and promote the integration of industry and education.

Extant studies have shown that the integration of industry and education has positive impacts on the UASTs. For example, Runtaek Lee (2023) studied on the application of German Dual Education System on Chinese universities and found that collaborative projects with industries can provide practical opportunities for students to apply theoretical knowledge and enhance their employability^[5]. Additionally, Yang Yusheng (2023) pointed out that students engaged in industry collaborations are more likely to find jobs related to their majors and enjoy higher salary^[6]. Despite the positive results identified by scholars in the field of industry-education integration, there are still research gaps. One of the issues is how to ensure that the cooperation between industry and education can be sustainable and get win-win situation by theoretical guidance and involving the significant role of government. Some studies indicate that certain collaboration projects tend to be one-sided, with industries primarily providing resources and support, while educational institutions and government have limited involvement in project design and implementation (Ma, 2023)^[7]. Therefore, while the extant studies have achieved fruitful results, in-depth research is still needed to explore the countermeasures of practical collaborations between the industry and education sectors by integrating all participants, including the government, and enhancing theoretical foundation.

The Triple Helix theory emphasizes the cooperative relationship between universities, industries and governments. It was first proposed by Professor Henry Etzkowitz of Stanford University in the United States and Professor Loet Leydesdorff of the Netherlands in 1995. It provides a strong theoretical support for the development of industry-education integration in UASTs. The triple helix theory holds that the government, enterprises and universities are the three elements of the social innovation system in the era of knowledge economy. Under the condition of market economy, the spiral relationship of the three forces is formed (Ma, H.B., 2016)^[8]. Application-oriented universities form knowledge chain and education chain in knowledge inheritance, scientific research and talent training. Enterprises form innovation chain and industrial chain in product research and development, scientific and technological development and achievement transformation. The government forms policy chain in policy formulation and implementation, public service, supervision and management. The three chains realize the flow and sustainable development of

knowledge flow, information flow and talent flow through integration and interaction (Fig. 1).

For a long time, the goal of the integration of industry and education in China has been to cultivate high-level applied talents, and it has been practiced more at the level of vocational colleges(Zhu, S., 2022)^[9]. With the transformation of the economic society to a high-quality development strategy, China’s industry is facing transformation and upgrading, and the skill requirements for high-level applied talents are getting higher and higher. The exploration and practice of industry-education integration has also expanded from vocational colleges to UASTs(Zhang, Q., Li X., Hu P., Ning L., 2018)^[10]. However, due to the short history of development, there are still some common problems in the integration of industry and education in application-oriented universities in China, such as the lack of motivation for multi-subject cooperation among universities, governments and industries, and difficulty of implementation of school-enterprise cooperation (Gao, X., Su, X., 2021)^[11]. How to actively improve the development mechanism of the industry-education integration, and innovate the training mode of high-level applied talents, are the key to the development of UASTs in China. From the perspective of triple helix theory, this paper aims to explore the problems existing in the industry-education integration of UASTs, and tries to put forward countermeasures and suggestions to promote the development of the industry-education integration for the UASTs in China.

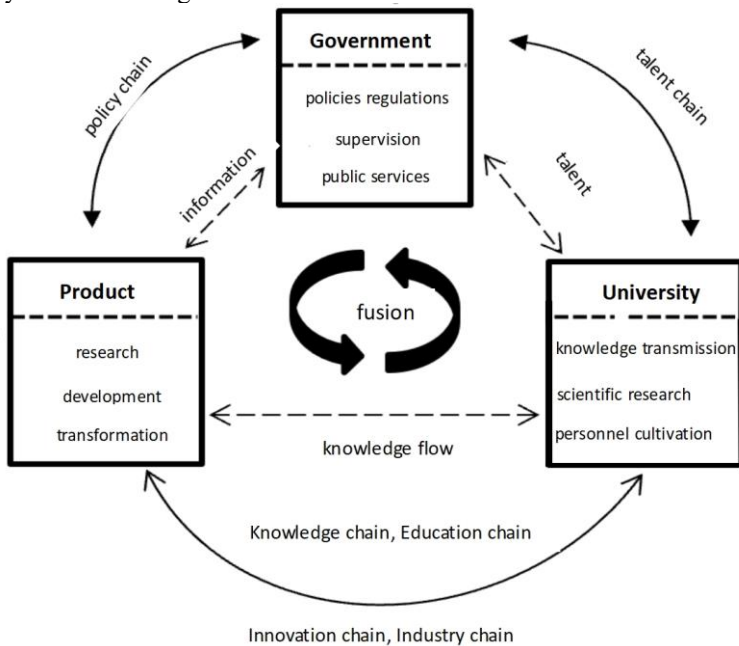


Fig. 1. The schematic diagram of the integration model of industry and education

2 Development and existing problems of the industry-education integration in China

2.1 The development stage of China's industry-education integration

The development of industry and education integration in China has gone through three stages: germination stage, development stage and deepening stage(Ma, Q.,2019)^[12]. The germination period began in 1949, when the Ministry of Education of the Central People's Government issued the 'Decision on the Implementation Plan of Renmin University of China', emphasizing that college teaching should be combined with practice. For the first time in China, the initial concept of integration of industry and education was put forward in the form of official policy. Subsequently, during the period from 1952 to 1958, the state carried out the adjustment of university departments, and promoted the integration of industry and education through administrative instructions and industry running schools under the planned economy.

From the reform and opening up in 1978 to the Third Plenary Session of the 18 th Central Committee of the Communist Party of China in 2013, the integration of industry and education has entered a period of rapid development. During this period, China formally put forward the concept of integration of industry and education. Through supportive laws and regulations corresponding to the integration of industry and education in vocational education, the development of integration of industry and education is promoted from the school level, but the practice of industry participation is still being explored(Li, L., 2022^[13]; Tian, L., 2020^[14]).

In 2014, with the issuance of the "Decision of the State Council on Accelerating the Development of Modern Vocational Education", the integration of industry-education in China has entered a deepening period. The "Opinions on Guiding Some Local Undergraduate Universities to Transform to Application-oriented" issued in 2015 pointed out the direction for local universities to transform to application-oriented and deepen the integration of industry and education. In 2017, the General Office of the State Council's "Several Opinions on Deepening the Integration of Industry and Education"(No.95 issued by the State Council) emphasized the importance of enterprises' participation in the integration of industry and education, and proposed that the main goal of deepening the integration of industry and education is to gradually improve the participation of enterprises in running schools, and form a development pattern of education-industry integration and benign interaction. In 2019, several government departments jointly issued the "National Pilot Implementation Plan for the Construction of Industry-Education Integration" to further promote the organic connection of education chain, talent chain, industrial chain and innovation chain. This policy was carried out and emphasized again in 2022, which aimed to improve the industry-education integration system and expand it throughout the whole country.

With the introduction of relevant policies on the integration of industry and education in China, both the government, universities and enterprises have fully realized that the integration of industry and education is the only way to cultivate high-level applied talents and build a society with skilled labor force. In the process of continuous promotion of the integration of industry and education, the roles of government,

universities and industries in the triple helix development model are also changing (Guo, Z., 2015^[15]; Li, Z., 2023^[16]). The role of government has gradually changed from a leader to a guide, actively providing policy and financial support for universities and enterprises, while the role of universities and enterprises in the integration of industry and education has been continuously strengthened in exploration.

2.2 Problems existing in the integration of industry and education in UASTs in China

UASTs mainly refer to professional, multi-disciplinary or single-disciplinary universities with application-orientation (Hu, L., 2017)^[17]. They mainly serve local economic development by cultivating application-oriented talents, transferring scientific knowledge, and developing scientific and technological achievements. At current stage, China's domestic industry-education integration has achieved a series of achievements, but there are also many problems in the implementation process. From August 2020 to July 2023, our research group have carried out a series of investigations on UASTs by visiting 40 applied universities and interviewing 12 members of the Applied Undergraduate University Alliance in the Yangtze River Delta Region. Deep interviews were also conducted to the government officers in Education Department and managers in enterprises.

The Yangtze River Delta region is located in the lower reaches of the Yangtze River in China, including 41 cities in Shanghai, Jiangsu Province, Zhejiang Province, and Anhui Province. This region is not only one of the regions with the most active economic development, the highest degree of openness, and the strongest innovation ability in China, but also the region with the most intensive science and education resources in China. It holds a pivotal strategic position in the national modernization construction and comprehensive opening up. Based on the field investigation, literature review and text analysis, it is concluded that the problems existing in the integration of industry and education in UASTs are mainly concentrated in the following three aspects.

The structural contradiction between the setting of university majors and industry demand.

Structural contradiction refers to a long-term and difficult to solve adversarial relationship that exists in the social and economic system. It is within the social structure, not as a contradiction of individuals, but as a contradiction of the entire social system, making it difficult to solve through a single individual action. In recent years, there has been a structural contradiction in the employment of college students in China, which illustrates the coexistence of "labor shortage" for enterprises and "employment difficulty" for university or college graduates. According to national statistics, from 2019 to 2021, the number of undergraduate majors revoked by Chinese universities each year was 367, 518, and 804 respectively^[18], reflecting the increasing mismatch between university majors and industry demand.

This structural imbalance between supply and demand in the employment market results in the waste of human resources, which is unbeneficial to the improvement of

the overall quality of talent training (Shi, G., Tan, Y., Chen, H., 2015)^[19]. This problem for universities is embodied in the homogeneous setting of majors, pursuit of large and comprehensive discipline construction, serious convergence of talent cultivation, and lack of distinctive features and core competitiveness(You, W., Yan, X., Chen, H., 2015)^[20]. The mismatch between the training of talents in the supply-side, namely universities, and the requirements of employees in demand-side, that refers to enterprises, results in the structural unemployment of college graduates, which has become prominent as an obstacle to the coordinated development of China's economy and society. The problem that the industrial chain, innovation chain, education chain and talent chain cannot be effectively connected, seriously limits the industrial transformation and economic development(He, T., Shi, W., 2019)^[21].

The imperfect system and mechanism of school-enterprise cooperation.

The system of industry-education integration lacks clear and specific tasks, thus the support policy of school-enterprise cooperation is difficult to implement. In the mean time, there is a lack of supporting policies and operability for 'capital+finance+land+credit' given to enterprises with integration of industry and education. The current school and enterprise management system also restricts the comprehensive integration of resources, personnel, technology, management and culture between the two sides. Although China has introduced many measures for the integration of industry and education, the cooperation between schools and enterprises is not deep, and specific measures are difficult to implement. For example, there are still no standards in the implementation process regarding how application-oriented universities can obtain compensation through school-enterprise cooperation and how to assess performance-based wages in a certain proportion, making it difficult in practice(Zhang, Z., 2021)^[22].

Therefore, the depth of the integration of industry-education is still insufficient and the form of school-enterprise cooperation is limited in terms of curriculum setting and teaching plan. From the perspective of enterprises, the school-enterprise cooperation still remains at a relatively superficial level, for example, many enterprises do not have clear systems for accepting student internships and employment, lack guidance for student training and career planning. In addition, the programs jointly set by schools and enterprises are relatively few, and the needs of both parties cannot be well balanced. The interests of enterprises cannot be completely met, resulting in low participation enthusiasm and directly affecting the effectiveness of cooperation between both parties. At present, the breadth and innovation of school-enterprise cooperation need to be strengthened, and the scope and connotation of industry-education integration need to be further expanded.

The impact of COVID-19 pandemic on the integration of industry and education.

The sudden outbreak of COVID-19 pandemic in 2020 has had a great impact on the integration of industry and education. On the one hand, the pandemic has had a direct negative impact on students' practical training. For example, during the pan-

demic, many schools have started classes in a staggered manner, changing the class time and location or directly cancelling courses. Due to lockdown and quarantine policies, many students were unable to return to school in time, resulting in delays of the internship. Many interns were unable to return to their work positions on time, leading to many practical training interruptions or stoppages. In addition, the pandemic has suppressed market growth, leading to reduced production and layoffs in enterprises. The decreasing demand for labor in the job market has led to a narrowing of employment channels for college graduates and a shortage of internship positions for students, which situation entering a vicious cycle. Under the pressure of the pandemic, some enterprises are facing difficulties in their own operations, making it difficult to continue supporting practical training for school students, resulting in problems in the talent cultivation process.

On the other hand, the pandemic has also brought about an acceleration of digital transformation and innovation in school-enterprise cooperation models. For example, during the pandemic, many companies were forced to accelerate their digital transformation and adopt online office and online business. This has prompted new cooperation between applied universities and enterprises through online platforms and technical tools. Meanwhile, during the pandemic, universities and enterprises are exploring innovative cooperation models, such as conducting online internship projects, or collaborating on the development of new products, like e-learning, smart campus, etc. This innovative cooperation helps to improve students' practical abilities in the education chain. However, the accelerated digital transformation of school-enterprise cooperation has also brought some new challenges. Firstly, there are technological challenges. Digital transformation requires the use of new technologies and tools, including cloud computing, big data analysis, artificial intelligence, etc. Enterprises and schools need to invest a significant amount of time and resources to learn and master these technologies, and apply them to collaborative projects. At the same time, digital transformation involves a large amount of data and information exchange, and security has become an important challenge, too.

3 Countermeasures and suggestions for the development of industry-education integration

According to the triple helix theory, the development process of the industry-education integration in China's UASTs emphasizes in three aspects, covering the education sector represented by UASTs, the industrial sector represented by enterprises, and the supervision sector represented by local government. The main body of innovation in the three sectors, through the link of market demand, is organically linked around the production and transformation of knowledge, personnel training and supply, forming a triple helix relationship of mutual influence, interaction and spiral rise of the three forces. Compared to the former double helix relationship model, namely 'university-industry', 'university-government', or 'industry-government', the triple helix model highlights the knowledge chain, education chain, innovation chain, industrial chain and policy chain. Through the integration and interaction, knowledge

flow, information flow and talent flow in industry-education integration is realized. Therefore, from the perspective of triple helix theory, this paper puts forward some countermeasures and suggestions for the development of industry-education integration in the UASTs, emphasizing that we should give full play to the top-level design function of the government, play an innovation role of involved enterprises, and take advantages of serving local development for colleges and universities. At the macro level, the government, enterprises and colleges jointly formulate a long-term mechanism for the integration of industry and education; at the meso level, the enterprise formulates the talent training plan according to the market; and the college formulates the teaching implementation plan according to the talent training goal. Finally, enterprises and colleges implement specific training programs and teaching programs at the micro level, and realize the organic integration of enterprise training and teaching units through internal coordination (Figure 2).

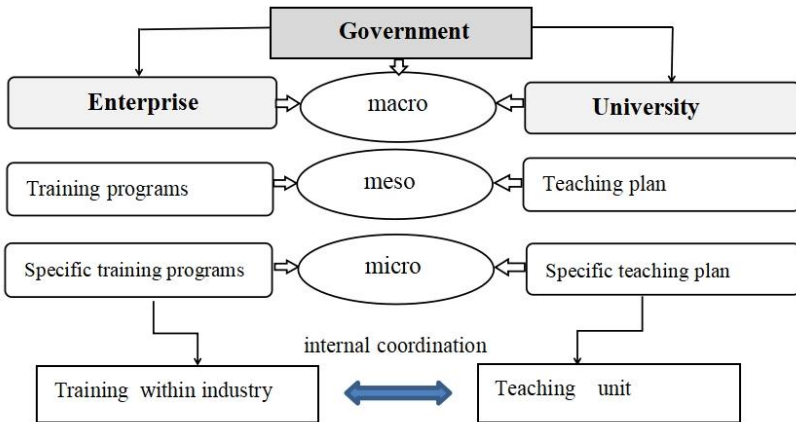


Fig. 2. A schematic diagram of the implementation mechanism of the industry-education integration

4 Playing supervision role of the government for top-level design of industry-education integration

By means of top-level design, the central government can integrate resources from universities and enterprises, formulates relevant laws and regulations, and promotes the standardization and institutionalization of industry and education integration. At the regional level, government departments can act the role of coordination between education sector and industrial sector, jointly formulate and actively implement preferential policies to promote school-enterprise cooperation. Meanwhile, a supervision and evaluation system should be established, and the evaluation results are incorporated into the annual assessment system of universities, linked with the preferential policies enjoyed by enterprises. A unified online resource sharing platform can be established to solve the problem of work-study contradiction in the training programs in enterprises. This helps to cultivate teachers who are knowledgeable in both theory

and operation, and improve the practical ability of high-skilled talents while solidifying theoretical learning. In addition, the government should continue to strengthen the social atmosphere of respecting skilled talents, and enhance the social identity status of highly skilled talents.

Furthermore, the government can give full play to its macro-control functions, regulate educational structures and industrial structures through financial means, and support model enterprises in various fields for the integration of industry and education. For example, we can establish evaluation standards for model enterprises in the industry-education integration, provide certain financial support and tax incentives to enterprises that meet the standards, cultivate a number of new enterprises which can play a leading role in the industry-education integration. By summarizing the feasible experiences from these successful cases, more enterprises can quickly learn and get motivated. In order to adapt the industrial transformation and upgrading, the financial support should be given to the industry-education cooperation projects of UASTs that meet the market demand. Moreover, a special development fund for enterprises and UASTs can be established to support the collaborative research, curriculum development, training bases, and exchange of talents between schools and enterprises.

4.1 Playing innovation role for enterprises in the process of industry-education integration implementation

To fully leverage the role of enterprises, it is necessary to deepen the strategic integration of industry and education from the national level, and promote the organic connection of education chain, talent chain, industrial chain, and innovation chain. Enterprises and institutions should actively connect with each other. Especially for enterprises with government support, they should utilize their own technological production advantages to establish a cooperative education mechanism with schools by order-based trainee program, jointly built industrial colleges, etc. They can also dispatch technical personnel to undertake teaching tasks, jointly develop the talent training plans, and update the teaching content. Under the guidance of the government, enterprises need to further improve their management system of internship, and reasonably arrange the holistic work in the innovation chain. In the process of project implementation, enterprises should play an innovative role, firstly take improving students' practical ability as the starting point, then actively implement the teaching activities and conduct a full process assessment. It is necessary for enterprises to carry out applied research with colleges and universities from the meso level, too.

In addition, non-governmental and non-profit social organizations can be involved and introduced by peer enterprises in the innovation chain to promote common interests(He, T., Shi, W., 2019)^[23]. These organizations include industry associations, chambers of commerce, trade associations, federations, etc. Strengthening the connection between universities and these social organizations has a significant positive effect on supporting universities to actively serve and integrate into the development of industrial sector in the region. It will strengthen technological reform and innovation capabilities of enterprises, and contribute to local socio-economic development. Therefore, enterprises should view the talent acquisition and training from a long-

term perspective. The model enterprises should actively play their leading role, work together with the small and medium-sized enterprises, jointly dedicate to the industry-education integration.

4.2 Playing practice role for colleges and universities to take the advantage of serving local development

With massive technological change and economic transformation, it has become more and more urgent for universities to play active practice role in industry-education integration. In terms of major settings and learning contents, the matching between the talent cultivation and the industry demand has to be further improved. Firstly, colleges and universities need to set more targeted goals for talent cultivation programs. In addition to regular curriculums, schools can regularly organize students to visit enterprises, actively communicate with enterprises and social organizations, and enable students to quickly adapt to specific job demand. At the same time, the UASTs should vigorously establish and adjust their majors to combine the advantages of regional industrial development, and jointly establish industrial colleges to ensure the quality of education. In addition, a school-enterprise cooperation management committee is needed to establish and ensure the timely exchange of information, knowledge and technology between schools and enterprises. By introducing industrial technical standards, universities need to continuously update and restructure their curriculum system according to market demand and so as to adjust the talent cultivation plans.

Secondly, based on existing technological innovation platforms, China's UASTs should establish technology innovation research institutions with industry sectors. Schools and enterprises should utilize the advantages of talent and technology aggregation to establish joint science and technology centers or laboratories and jointly increase the R&D investment. The UASTs can take the lead to integrate various resources by utilizing professional advantages and establishing a platform for technology transfer. It benefits to attract innovation and entrepreneurship teams, such as enterprise innovators and student innovators, which can better serve the local community to achieve a win-win situation. Relying on existing scientific and technological achievements, the universities can well track the development process of the entire chain of knowledge, education, innovation and industry in the triple helix. It can accelerate the incubation and transfer of scientific and technological achievements, and help promote the upgrading of local industrial structures.

Thirdly, to respond to the impact of the COVID-19 pandemic, UASTs need to strengthen cooperation with industry sector by digital transformation and innovation. Schools need to increase investment to master the new technologies required for digital transformation, including cloud computing, big data analysis, artificial intelligence, etc., and apply them to collaborative projects with enterprises. At the same time, schools need to work together with enterprises to pay attention to data security and information protection, and take corresponding measures to ensure data security during the cooperation process. By strategic partnership, the UASTs can establish

service centers for local enterprises, increasing their investment in talent cultivation and scientific research for local development.

5 Conclusion

Integration of industry and education is the inevitable path for UASTs to cultivate social-needed applied talents. The Triple Helix Model emphasizes the “university-industry-government” relations in the increasingly knowledge-based economy and provides a theoretical framework to solve the existing problems in China’s industry-education integration. To deepen the integration of industry and education, the government, enterprises, and universities need to further enhance their joint efforts. This article, through literature review and survey analysis, discusses the problems of industry-education integration in applied universities of science and technology in China from the perspective of the triple helix theory. Based on the analysis, it puts forward countermeasures and suggestions to promote the development of industry-education integration from three aspects: playing supervision role of the government for top-level design, playing innovation role of enterprises in the industry-education integration implementation, and playing practice role for colleges and universities to serve local development. This study contributes to the existing literature by combining the triple helix theory with industry-education integration for UASTs, which enriches the theoretical and practical research on the development of applied universities in the post pandemic era.

Acknowledgments

This work was supported by the key project of undergraduate teaching quality and teaching reform project in Anhui Province in 2021(2021jyxm1257), 2020 Hefei University Undergraduate Teaching Quality and Teaching Reform Project (2020hfujyxm37), the Ministry of Education 's first batch of new liberal arts research and reform practice projects (2021050050), and DAAD Re-invitation Programme for Former Scholarship Holders 2023(57681229).

Reference

1. Zhu, A.Q. (2019) Research on the Construction of Talent Training System and Long term Mechanism in Higher Vocational Colleges - Based on the Integration of Industry and Education [J]. *Journal of Vocational Education*, 2019(03):151-157. CNKI: SUN: ZJLT. 0. 2019-03-025.
2. Zou, D. (2021) Discussion on the Integration Strategy of Industry and Education of Finance and Economics Specialty in University[C]. In: 6th International Conference on Education Reform and Modern Management. <https://doi.org/10.2991/assehr.k.210513.061>.
3. Yin, C. (2023) Research on the Collaborative Education Model for Digital Media Technology Talents in University -Enterprise Cooperation[J]. *Frontiers in Educational Research*, 6(22). DOI: 10.25236/FER.2023.062224.

4. Etzkowitz, H., Leydesdorff, L. (1998) The Endless Transition: A "Triple Helix" of University-Industry-Government Relations[J]. *Minerva*, 1998, 36(3):203-208. 10. 1023/ A: 1017159001649.
5. Lee, R. (2023) The Inspiration of the Dual Education System in Germany to the Education Mode of Vocational Colleges in North China. *Advances in Education*, 13(10), 8087-8092.
6. Yang, Y. (2023) On the Structure and Training Approaches of College Students' Employment Ability. *Educational Theory and Practice*. 2023(3):53-57.
7. Ma, J. (2023) Analysis of Problems in Cooperation between Higher Vocational Colleges and Small and Medium-Sized Enterprises—From the Perspective of Economic Development Transformation. *Advances in Education*, , 2023, 13(10): 7764-7770.
8. Ma, H.B. (2021) Research on the Integration of Industry and Education in Higher Vocational Education Based on the Triple Helix Theory [J]. *Journal of Zhongzhou University*, 2021, 036(006):106-113. 10.13783/j.cnki.cn41-1275/g4.2016.01.023.
9. Zhu, S. (2022) Research on Mechanism Construction and Innovation of Vocational Colleges Based on School Enterprise Cooperation[J]. *Advances in Vocational and Technical Education*, 4(6). 10.23977/AVTE.2022.040608.
10. Zhang, Q., Li X., Hu P., Ning L. (2018) Analysis and Design of the Innovation and Entrepreneurship Training Management System based on School Enterprise Cooperation (Taking the School of Computer and Information Engineering of Beijing University of Agriculture as an example) [J]. *IOP Conference Series: Materials Science and Engineering*, 317(1). 10.1088/1757-899X/317/1/012009.
11. Gao, H., Su, X. (2021) Collaborative Teaching, Innovation and Integration of Government, Industry, University and Research - Research and Practice Exploration on the Construction Model of Industrial Colleges in UASTs [J]. *Journal of Pingdingshan University*, 2021, 036(006):106-113. 1673 -1670(2021) 06-0106-08.
12. Ma, Q. (2019) Curriculum Design and Implementation Based on the Training Mode of School Enterprise Cooperation - Take the "Heart of Service" and "Future Leaders" Courses as an Example[C]//. Atlantis Press. 10.2991/MMETSS-19.2019.152.
13. Li, L. (2022) On the Talent Training Path of "School Enterprise Cooperation and Industry Education Integration" of Accounting Specialty in Higher Vocational Colleges in Hubei Province[C]//. Francis Academic Press. 10.25236/ICHAMHE.2022.029.
14. Tian, L. (2020) Research on the Training Mode of Order-Oriented Talents for School-Enterprise Cooperation in Higher Vocational Colleges[C]//. Clausius Scientific Press. 10.23977/ETSS2020004.
15. Guo, Z. (2015) Evaluation on the Prospects of School Enterprise Cooperation and the Integration of Industry and Education in Vocational Education in the 5G Era[J]. *The Fro*023.051311.
16. Li, Z. (2023) *ntiers of Society, Science and Technology*, 5(13). DOI: 10.25236/FSST.2) Research on school enterprise cooperation mode under the mechanism of "craftsman leading and collaborative education" [J]. *SHS Web of Conferences*, 157. 10.1051/ SHSCONF/ 202315702019.
17. Hu, L. (2017) The Enlightenment of the Integration of Industry and Education in Foreign Countries to Chinese Universities [J]. *University: Research and Management*, 2021 (11):24-26. 1673-7164(2021)42-0024-03.
18. Chu, C.H. (2023) To connect with employment, university disciplines and majors need to be deeply adjusted [N/OL]. *Global Network*. 8th April, 2023.
19. Shi, G., Tan, Y. (2022) The integration of industry and education in vocational education: dilemma, reference and breakthrough - taking accounting major as an example [J]. *Accountant*, 2022(3):3.

20. You, W., Yan, X., Chen, H. (2015) The change of specialty setting and adjustment mechanism in applied undergraduate colleges in China [J]. *Jiangsu Higher Education*, 2015(5):68-71. 10.13236/j.cnki.jshe.2015.05.018.
21. He, T., Shi, W. (2019) From loose connection to entity embedding: the dilemma and breakthrough of the integration of industry and education in vocational education [J]. *Educational Research*, 2019(7):102-110. CNKI: SUN: JYYJ.0.2019-07-012.
22. Zhang, Z. (2021) Research on talent cultivation of digital media art major based on “integration of industry and education” under the background of big data[C]. In: 2021 International Symposium on Artificial Intelligence and its Application on Media: International Symposium on Artificial Intelligence and its Application on Media (ISAIAM). Xi an, China. 2021:86-90.
23. He, T., Shi, W. (2019) From Loose Connection to Entity Embedding: The Dilemma of and the Breakthrough in the integration of Industry and Education in Vocational Education[J]. *Educational Research*, 40(07):102-110. CNKI: SUN: JYYJ.0.2019-07-012.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

