

# INNOVATION AND PRACTICE OF APPLIED TALENT CULTIVATION MODE FOR INDUSTRY-EDUCATION INTEGRATION OF NEW BUSINESS STUDIES BASED ON TOPIA

Qian Jiang<sup>1</sup>, BingYe Wu<sup>2\*</sup>

<sup>1</sup>University of Sanya Graduate Studies Office, Sanya 572000, Hainan, China.

<sup>2</sup>University of Sanya Laboratory Management Center, Sanya 572000, Hainan, China.

Corresponding Author: BingYe Wu, Email: [wubingye\\_0827@163.com](mailto:wubingye_0827@163.com)

**Abstract:** In the context of the major change of "cognitive revolution - business reshaping - management logic - technology empowerment" evolution initiated by the fusion application of "Great Intelligence, Mobile, Cloud, Physical Area", the TOPIA Modern Industrial College Learning Organization (TOPIA) has been established based on the framework of "Four Chains + Five Communities" fusion. Based on the "four-chain + five-community" integration framework, TOPIA Modern Industrial College puts forward the industry-education integration and applied talent cultivation model, i.e., "Knowledge-Competence-Quality" target system (Target), establishes the Modern Industrial College Learning Organization, relies on the three-dimensional composite value platform (Platform), connects with the modern industrial college, and provides a platform for the development of the modern industrial college. Platform, linking the integration of resources of multiple subjects, multiple interfaces, multiple levels and multiple dimensions, carrying out a series of activities for the integration of industry and education, and realizing the cultivation of composite and applied talents in modern industrial colleges; based on the parallel and distributed processing action mode, using the theory of multi-stage and multi-loop, identifying the key innovation of talent training mode in the process of the integration of industry and education in modern industrial colleges. Based on the parallel distributed processing action model, using the multi-stage multi-loop theory, identifying the key elements of talent cultivation mode innovation in the process of industry-teaching integration of modern industrial colleges, we have constructed and implemented the talent cultivation program of "equal emphasis on theories and practices, double goodness of technology and profession, and integration of knowledge, ability and quality"; we have carried out the cultivation of practical ability and innovation ability throughout the reform of teaching contents and teaching methods, the construction of curriculum system and teaching materials, and the construction of teaching staff and personnel. The program promotes the improvement of employment quantity and quality.

**Keywords:** TOPIA; New business; Applied talent cultivation; Innovative models

## 1 INTRODUCTION

Along with the implementation of policies such as "China Education Modernization 2035" and "Outline of the 14th Five-Year Plan for the Development of National Education", and the major changes of "cognitive revolution - business reshaping - management logic - technological empowerment" initiated by the convergence of new technologies such as big data and cloud computing, economic management theories based on the industrial revolution have fallen into confusion about the theoretical interpretation of the digital economy<sup>[1]</sup>. The major change of "cognitive revolution - business reshaping - management logic - technology empowerment" and the theoretical explanation of the digital economy based on the economic management theory of the industrial revolution have fallen into a maze, and the multiple superposition of new pattern, new technology, new mode, new theory and new requirements will inevitably bring about paradigm shifts and challenges to the traditional business education<sup>[2]</sup>. How to break through the path dependence, give full play to industrial advantages, highlight the role of enterprise education, and deepen the integration of industry and education has become the key factor to solve the problem of seamless articulation of "industry, academia, research and application of funds", and how to innovate and practise diversified talent cultivation modes through the integration of industry and education has become the key to the reform of higher education with high-quality development as the center of the reform, and to comprehensively improve the ability of talent cultivation and create a large number of talents who are needed by industries<sup>[3]</sup>. The innovation and practice of diversified talent cultivation mode of industry-teaching integration has become an effective way to reform higher education focusing on high-quality development, comprehensively improve talent cultivation capacity, and create a large number of high-quality composite, innovative, and applied talents needed by industries<sup>[4][5]</sup>.

The main pedagogical issues addressed in this study are as follows:

- (1) It solves the problem of how to cultivate applied talents in the new business discipline by focusing on students to meet the needs of business talents for economic and social development, and cracks the "black box" of "knowledge-capability-quality" transformation efficiency in the whole process of teaching.
- (2) It solves the problem of how the integration of industry and education between school and enterprise subjects in the process of cultivating applied talents in the new business discipline can be shifted from loose connection to physical embedding, and realize the overall leap in the ability of collaborative education and industry in educating people.

(3) It solves the dilemma of talent cultivation orientation of applied undergraduate colleges and universities in the stage of massification of higher education, responds to the value demands of multiple educational interests including society, enterprises and even families, and promotes the achievement of the goal of high-level applied talent cultivation.

## 2 CONSTRUCTION OF THE THEORETICAL FRAMEWORK OF "TOPIA" INDUSTRY-TEACHING INTEGRATION AND APPLICATION-ORIENTED TALENT CULTIVATION MODEL

Against the background of the major change from "cognitive revolution - business reshaping - management logic - technology empowerment" initiated by the integration application of "big intelligence, mobile, cloud and object area", the six concepts of talent training for the new business discipline are put forward: the view of the times, the view of digital intelligence, the view of values, the view of the system, and the view of specialties, The practical view<sup>[6]</sup>; with the new concept, the professional talent cultivation goal is clarified, and the new business integration TOPIA applied talent cultivation model is created, i.e. builds the target system of "Knowledge-Competence-Quality" for the integration of industry and education, establishes a new form of organization of the modern industrial college, and relies on the three-dimensional composite value platform (organization), which is the most important platform in the industry<sup>[7]</sup>. The three-dimensional composite value platform (Platform), linking multi-subject, multi-interface, multi-level and multi-dimensional resource integration (Integration), carrying out a series of industry-education integration activities (Activity), to realize the cultivation of new business majors of composite, innovative and applied talents ; construction and implementation of the "Theory and practice, technology and professional both good, knowledge, ability and quality" target system (Target). ; construct and implement the talent cultivation program of "both theoretical and practical, technical and professional, and integrating knowledge, ability and literacy", and carry out the cultivation of practical ability and innovation ability throughout the reform of teaching content and teaching methods, the construction of curricula and teaching materials, and the construction of teaching staff, etc., so as to promote the improvement of the quantity and quality of employment.

### 2.1 Target

Establishment of "knowledge-capability-quality" application-oriented talent cultivation target. Following the social demand, adapting to the practical development requirements of the industry and enterprises, combining with the characteristics of local colleges and universities and the unique attributes of new business majors, and fitting in with the cultivation concepts of the era view, numerical wisdom view, value, system view, characteristic view and practical view, we will establish a high-level applied talent cultivation target of "knowledge-capability-quality" for the integration of industry and education and the all-round development of morality, intellectuality, physical fitness, aesthetics, labor and so on. It also aims to establish the goal of cultivating high-level applied talents with the integration of industry and education, and to solve the contradiction between supply and demand, which is the mismatch between the specifications of talent cultivation and the ability demand of enterprises' positions.

### 2.2 Organization

Creation of "Modern Industrial College", a new form of industry-education integration organization. We have established "Shengbao Financial Technology Industry College", "Jingdong Intelligent Logistics Industry College", "Transfar Supply Chain Industry College" and "Fosun Intelligent Tourism Industry College" together with the head enterprises. Fosun Wisdom Tourism Industry College", forming the industrial development chain of "resource demand, job demand, technical service and achievement transformation", the talent team of "on-campus professional tutor + innovation tutor + entrepreneurship tutor + enterprise tutor", and the "theoretical foundation + entrepreneurship tutor + enterprise tutor" chain. chain, professional education chain of "theoretical foundation + professional direction + industrial direction", and innovation training chain of "creative ability + innovation ability + entrepreneurial ability", to build the modern industrial college of "resource sharing - professional co-construction - technical It builds the talent cultivation model of "resource sharing, professional co-construction, technology co-research, win-win development and value consensus" of Modern Industrial College, and effectively promotes the members of the organization to transform "knowledge-capability-quality" into the practice of industry-teaching integration.

### 2.3 Platform

Build a composite value platform to realize the seamless connection of official department, industry, academia, research and application. A teaching platform, a research platform, a practical training platform and an innovation and entrepreneurship platform have been set up to realize the three-dimensional interaction and organic integration of teaching and research, theory and practice, inside and outside the classroom, online and offline, innovation and entrepreneurship. ① Teaching platform. Theoretically, we have built a framework system of basic knowledge, specialized knowledge and technical knowledge, and practically, we have constructed modules of industry cognitive internship, single quality training, comprehensive quality training, digital skills and innovation and entrepreneurship; ② scientific research platform. Relying on Hainan Silk Road Business Civilization and other three provincial research bases, China Human Resource Development Research Society and other more than 10 academic organizations to hold academic conferences and thematic activities, to carry out research on horizontal and vertical topics; ③ practical

training platform. According to the actual labor demand of enterprises, we reasonably formulate and adjust the talent training program, scientifically arrange practical teaching, and dispatch students to Geely Group, Sanya Atlantis, Shanghai Disney and other more than 20 head enterprises in stages to carry out various types of practical teaching including "3+1" internship mode, forming the process of talent training from theory to practice, multiple cycles, effective and efficient. It forms a closed loop of multiple cycles and effective feedback from theory to practice, realizing accurate talent cultivation according to the needs of industry positions; ④ Innovation and Entrepreneurship Platform. We have set up an innovation and entrepreneurship incubation base for college students and an academic guidance center to incubate and guide many on-campus innovation and entrepreneurship teams.

## 2.4 Integration

linking the value resources of multiple subjects, multiple interfaces, multiple levels and multiple dimensions to realize value co-creation. In the practice of industry-education integration, we adhere to the principles of "administrative guidance, school leadership, expert guidance, teacher-student leadership and enterprise counseling", relying on online and offline resources, promoting resource integration, information sharing and knowledge updating, establishing a common vision, forming a team to learn, improving the mental model, adhering to the systematic thinking, and realizing self-transcendence.

## 2.5 Activity

Relying on the interface of "cultivation goal + industrial college + value platform + resource integration", we will carry out the integration of industry and education to jointly formulate cultivation programs, faculty construction, curriculum and teaching materials construction, practical teaching and employment, scientific research, and the transformation of achievements and technical services, so as to effectively promote the cultivation goal of "giving equal importance to theory and practice" and "integrating knowledge, ability and literacy". The integration of industry and education has effectively promoted the cultivation goal of "equal emphasis on theory and practice, double excellence in technology and specialization, and integration of knowledge, ability and literacy".

## 3 TOPIA NEW BUSINESS INTEGRATION OF INDUSTRY AND EDUCATION APPLIED TALENT TRAINING INNOVATION PATH

### 3.1 Model Innovation: Proposing a New Business "TOPIA" Applied Talent Training Model

With the goal of cultivating compound and applied new business talents, we innovatively put forward the "TOPIA" applied talents cultivation model, i.e., the target system of "Knowledge - Ability - Quality", set up a new organizational form of modern industrial college (Organization), rely on a three-dimensional composite platform (Platform), and connect the integration of resources of multiple subjects, multiple interfaces, multiple levels and multiple dimensions (Integration). Organization), relying on the three-dimensional composite platform (Platform), linking multi-body, multi-interface, multi-level and multi-dimensional resources integration (Integration), to carry out a series of industry-education integration activities (Activity).

### 3.2 Organizational Innovation: Adhering to the Principle of "Four Chains and Five Common", Creating a Learning Organization for Modern Industrial Colleges

We have created four modern industrial colleges with the common vision of cultivating new business applied talents, namely, the formation of the industrial development chain of "resource demand, job demand, technical service and achievement transformation", the talent team chain of "on-campus professional tutor + innovation tutor + entrepreneurship tutor + enterprise tutor", the professional education chain of "theoretical foundation + professional direction + industrial direction" and the innovation cultivation chain of "creativity ability + innovation ability + entrepreneurship ability". It is the organic integration of four chains, namely, the industrial development chain of "resource demand, job demand, technology service and achievement transformation", the talent team chain of "on-campus professional tutor, innovation tutor, entrepreneurship tutor and enterprise tutor", the professional education chain of "theoretical foundation, professional direction and industrial direction" and the innovation cultivation chain of "creativity, innovation and entrepreneurship". Professional co-construction - technology co-research - development win-win - value consensus" five common linkage of industry-teaching integration and applied talent cultivation model.

### 3.3 Platform Innovation: Integrating "On-Campus + Off-Campus" Resources, Building a Three-Dimensional Composite Value Platform

A four-in-one platform of "teaching platform + scientific research platform + practical training platform + innovation and entrepreneurship platform" has been set up to realize the three-dimensional interaction and organic integration of teaching and scientific research, theory and practice, in-course and out-of-course, online and offline, innovation and entrepreneurship.

### **3.4 Institutional Innovation: Integrated Institutional Innovation of "System + Team + Governance + Technology"**

Scientific positioning of talent cultivation objectives according to the actual needs of enterprises and industries, and the realization of interdisciplinary and inter-professional cross-disciplinary and continuous iteration of cultivation specifications and curricula; innovation of cross-boundary co-construction system of team: "on-campus + off-campus" mentor team of multiple subjects co-teaching and co-learning; innovation of dual-governance system of governance: dean's responsibility system as the core, and the enterprise Dual governance system innovation: the dean's responsibility system as the core, the enterprise's professional staff as the axis, supplemented by the dual governance structure of the Teaching Committee and the Academic Committee; digital-enabled system innovation: with the goal of cultivating applied talents, the scientific governance and organic integration of the four key links of teaching decision-making, teaching implementation, teaching supervision and teaching evaluation are driven by data governance and information sharing.

## **4 RESPONSES AND RECOMMENDATIONS**

### **4.1 Focus on the Integration of Industry and Education and Deepen the Reform of Professional Construction**

Applied talent training should focus on the integration of industry and education, and deepen the reform of professional construction. Specialization is the basic unit of personnel training, the integration of industry and education background, the training of applied personnel to the professional chain and industrial chain of two different individuals can really integrate highly dependent on the professional co-construction between colleges and universities and industry enterprises, only the industrial chain and the professional even the depth of the docking, the professional into a "gold specialist". First, top-level design. School level should set up the integration of industry and education office, external cooperation office, and various faculties of the integration of industry and education leading group, improve the integration of industry and education system design, the introduction of a series of guidelines conducive to the integration of industry and education, at the same time, the colleges according to the top-level design of the school were introduced to correspond to the faculty of the integration of industry and education landing guidelines to determine the top-down "co-ordination of joint deployment and joint action, prioritize the development of Synchronized updating, bottom-line thinking of the head standard, and strength enhancement of results evaluation" are the basic principles of integration of industry and education, and the path of integration of industry and education with multi-departmental, multi-level, and multi-dimensional linkage is established, so as to compact the organs, strengthen the colleges, and press the delivery platform, and to promote the integration of industry and education and the work of downward sinking and downward shifting of the center of gravity. Focusing on the overall strategic goal of industry-education integration, making full use of the eco-chain resources of external industry enterprises to jointly build modern industry colleges, industry-education integration communities and other virtual-realistic cross-organizational cooperation units, based on the real business processes of enterprises, developing and optimizing the applied undergraduate talent cultivation system with head enterprises, identifying the core key of the industry industry, aligning with the mid- and upper-streams of the industry chain, and connecting with the needs of high-value positions in the enterprises, and Revise the talent cultivation program; build a curriculum system in line with the talent cultivation orientation of modern industrial colleges, customize and develop modular courses based on the whole production and manufacturing scenarios of business flow, information flow and data flow of the head enterprises, and improve the application-oriented curriculum system; promote the classification and evaluation, and guide the second-level colleges and majors to determine the development orientation and school running direction according to the content planning of the work of industry-industry-teaching integration, and highlight the characteristics of the education that closely combines the practice of industry-industry-teaching integration with the industry The special education that closely integrates with enterprises, the dissertation (graduation design) guidance from the front line of production, and the evaluation of the degree of integration between the development of graduates and professional education, etc., will form the collaborative practice results of the professional benchmarking outputs and the head enterprises' bidirectional running, collaborative symbiosis, mutual empowerment, and mutual honor. Introducing enterprise front-line operation platforms, application scenarios and real production practice cases on campus, "real problems really do", realizing the synchronization between the quality of talent cultivation and the standards of industry positions, and advancing with the industry, combining the urgent and future needs of industry and industry, as well as the innovativeness of the cultivation of applied talents, and carrying out the declaration of relevant new majors, the development of new directions and the innovation of characteristics of school-enterprise cooperation on a regular basis every year. We regularly carry out a series of work such as declaration of new majors, development of new directions of majors, and construction of school-enterprise cooperation classes of innovative talents with special characteristics every year. Aiming at the goal of high-value jobs corresponding to specialties, the university improves the concepts and methods of education and teaching, and continuously focuses on cultivating talents who are widely welcomed by the jobs of related organizations in the industries.

### **4.2 Focus on Product Thinking, Deepen the Curriculum Teaching Reform**

Education reform to the depths of the curriculum, the curriculum is the core element of talent training, applied talent training curriculum should be closely combined with the development of the industry and the establishment and promotion. Under the background of the integration of industry and education, the cultivation of applied talents to break the asymmetric knowledge barriers between the professional chain and the industrial chain is highly dependent on the co-construction of the curriculum between universities and industrial enterprises, which in turn promotes the chemical reaction of students' knowledge learning and the quality of the leap. Focusing on products, linking with industries and targeting high-value jobs, we explore the curriculum teaching reform based on product thinking through ability inversion, knowledge reorganization, anchoring employability enhancement, accelerating team transformation, evaluation steering, and promoting productivity revitalization. Driven by market and customer thinking, starting from the competency of organizational high-value positions, inverting the curriculum knowledge map, focusing on the production of enterprise products from the perspective of the industrial Internet, promoting the docking of course content with the actual business processes of enterprises, the articulation of the course system with the industrial division of labor system, and the linking of the course ecosystem with the industrial ecosystem, and carrying out all-around product-thinking oriented featured courses with the emphasis on the reorganization and integration of the course teaching contents. Reform, highlighting the curriculum construction in line with the actual teaching of the curriculum and the needs of industry and enterprises and the cultivation of students' practical ability, constructing a dual-combination curriculum teaching reform operation mechanism of "combining the process with the results, combining on-campus and off-campus", evaluating the curriculum and the effect of the curriculum with a result-oriented approach, emphasizing the "business ability cultivation" of the applied curriculum, and providing a comprehensive and comprehensive training system for the students. We emphasize the "cultivation of management ability" in the applied courses, and at the same time innovate and enrich the forms and methods of the courses with the "flow thinking", so as to attract the students to benefit from the course learning in a sustainable way. Continuously aiming at the requirements of high-value positions and employment needs of enterprises, dynamically adjusting the curriculum and teaching arrangements, designing modularized teaching contents, synchronizing the contents of the curriculum and teaching materials with the actual business of production and operation of enterprises, and keeping them innovative and forward-looking, integrating the activities of pre-service training of enterprise employees and other in-house training activities as the front-end of the professional cognition and guidance for new students' enrollment, graduation and employment guidance, etc., and integrating the production line, business flow and other information of industry enterprises into the teaching and learning process of the school. The company will move the actual scenes of production lines, business processes, operation and management of industrial enterprises into the campus, invite technical personnel of enterprises to carry out skills training in the school, incorporate the quality management standards into the students' experimental and practical training assessment, and incorporate the production standards, technical standards and safety standards into the evaluation system of the course teaching, so as to let the evaluation standards realize the combination of process and result, and the combination of on-campus and off-campus, and check whether the quality of the course teaching really reaches the intended goal, and construct the production and training system. Whether to really achieve the intended goals, build a new ecology of the integration of production and education curriculum construction, through the integration of production and education "last kilometer".

### **4.3 Focus on Industry Needs and Deepen the Reform of the "Industry-Teaching" Faculty**

Education reform to the pain is the teacher, industry-teaching integration of applied personnel training quality really plays a role in determining the teacher, and industry-teaching integration of applied personnel training of the faculty if there is no industry-teaching through the new "dual-teacher" that is a fantasy, therefore, the integration of industry-teaching is the cultivation of industry-teaching through the new "dual-teacher" teachers. Therefore, the integration of industry and education is the necessary way to cultivate new "dual teachers" of industry and education. Specifically, highlighting the employment goal orientation of teaching quality, focusing on cultivating teachers' industry experience, part-time jobs and social contribution of technical achievements and support for talent cultivation, etc., to accurately categorize the teaching force, integrate the stock of resources, take the integration of industry and education as an opportunity to strengthen the construction of a new type of "dual-teacher" teachers, and promote the "introduction of enterprises into the teaching" program. With the opportunity of industry-teaching integration, we will strengthen the construction of new dual-teacher talents of "industry-teaching", promote the collaborative education mode of industry-teaching integration of "attracting enterprises into teaching" and "pushing teaching into enterprises", actively promote the construction of teacher teams by schools and enterprises, and jointly promote the convergence of curriculum content and technological development, the docking of the teaching process with the production process, and the fusion of talent cultivation with industrial demand. Adopt online and offline hybrid teaching mode, and jointly create the "expert class" for industry-enterprise integration. Strengthen the interaction and exchange of teachers, build the cooperative unit of industry-teaching integration (modern industrial college, industry-teaching integration community, etc.) into a high-quality "dual-teacher, dual-competence" teacher training base, regularly send teachers of different classifications to work in the industry-enterprise, coordinate with the enterprise mentors to teach in the school, and build a team of teachers with profound theoretical foundation and rich practical experience. The team of high-level teachers with complementary advantages and synergistic linkage. Focusing on the results of the integration of industry and education and the ability to transform the results, we vigorously carry out the improvement of teachers' education and teaching ability and digital literacy training; according to the characteristics of different disciplines and positions,

we adhere to the classification and evaluation, and encourage the teachers to apply the theoretical innovations and cutting-edge technologies to solve the major engineering and technological problems of the industry (enterprises), and at the same time feed back to the classroom teaching, so that a group of high-level dual-teacher, dual-capable teacher team can be formed.

#### **4.4 Focus on Digital Transformation and Deepen the Blended Teaching Reform of Industry-Teaching Integration**

With the multi-dimensional changes embedded in the expansion of social information, the ubiquity of educational resources, the rapidity of occupational mobility, the empowerment of science and technology, the normalization of lifelong learning, and the personalization of learning content, traditional teaching is no longer able to satisfy the above dynamic scenarios, and focusing on digital transformation has become a must to solve the above dilemma. Educational reform is transformation in practice, the formation of new educational resources and technological innovation to enhance educational capacity, research and development of high-quality integration of industry and education combined with the digital construction of the curriculum path, digital technology to achieve the educational objectives of the integration of industry and education, and the use of digital technology to enhance the effectiveness of education and teaching evaluation. Make full use of digital teaching platforms and highly immersive teaching scenarios, share expert resources, technical resources and scenario experience resources of the industrial ecology, as well as school and enterprise online course resources taught by academicians, experts, industry leaders, management and technical backbones, etc., and teacher resources, course resources and experimental condition resources jointly built by schools and enterprises, etc., while focusing on the construction and accumulation of databases and corpora required for specialties, courses and cases, etc., and actively promote online and offline hybrid construction. It also focuses on the construction and accumulation of databases and corpora required for specialties, courses, cases, etc. It actively promotes the reform of online and offline blended teaching, develops online teaching evaluation standards, improves the digital literacy of teachers through the all-round digital cultivation of teachers, and initiates the development of the phased evaluation of the growth of students' learning achievements and the evaluation of the whole process of four years of study in universities. Encourage the research and development of virtual simulation experimental and practical training teaching software, realize the extension of the production line of enterprises to the teaching line of the school, and bring the real problems in the industrial frontier and enterprise practice into the teaching link. According to the characteristics of disciplines and specialties, select outstanding backbone teachers to carry out online and offline blended teaching "brand courses" and "star teachers" team construction, so as to enhance the adhesion and enthusiasm of students' online course learning. In-depth study of changes in the student population, fully explore the educational needs of future students, scientifically formulate evaluation standards based on data, strengthen process evaluation based on data, explore the development of stage evaluation of students' learning outcomes and the whole process evaluation of four-year university study, establish big data files and digital portraits of students' growth covering learning literacy, scientific literacy, digital literacy, etc., and realize the "one student, one family" principle. "Establish big data files and digital portraits covering learning literacy, scientific literacy, digital literacy and other aspects of students' growth, so as to realize the goal of personalized cultivation for thousands of students. Explore the establishment of a growth achievement system and incentive mechanism for teachers and students in online education, personalized teaching management and services for teachers in combination with the platform data information, and effective guarantee of online teaching quality.

#### **COMPETING INTERESTS**

The authors have no relevant financial or non-financial interests to disclose.

#### **FUNDING**

General Project of Hainan Higher Education Teaching Reform Research, Innovation and Practice of Industry-Teaching Integration and Diversified Talent Cultivation Mode of Modern Industrial College Based on the Integration of "Four Chains + Five Communities" (Project No.: Hnjg2022-99).

#### **REFERENCES**

- [1] YAN Cailing, LI Peng. The Experience and Inspiration of Germany's "Learning Factory"--Another Discussion on How to Pass the "Last Kilometer" of Industry-Education Integration. *Journal of National Institute of Education Administration*, 2020(10): 70-77.
- [2] Yi Zhuo. Exploration of Industry-Teaching Integration Mode under the Perspective of Organizational Sociology of "Introducing Teaching into Enterprises". *Research on Higher Engineering Education*, 2021(05): 134-140.
- [3] HUANG Bin, YAO Yuhua. New engineering modern industrial college: logic and path. *Research on higher engineering education*, 2019(06): 37-43.
- [4] Zhou Jiliang. Organizational attributes and institutional innovation of modern industrial colleges. *Inner Mongolia Social Science*, 2021, 42(03): 197-204+213.

- [5] SUN Zhenzhong, HUANG Huiyu. A new model of modern industrial colleges' collaborative co-construction--Taking the example of Dongguan Institute of Technology's Advanced Manufacturing College (Chang'an). *Research on Higher Engineering Education*, 2019(04): 40-45.
- [6] Suh Y, Woo C, Koh J, et al. Analysing the satisfaction of university-industry cooperation efforts based on the Kano model: a Korean case. *Technological Forecasting and Social Change*, 2019, 148(5): 741-749.
- [7] Franco M, Haase H. University-industry cooperation: researchers' motivations and interaction channels. *Journal of Engineering & amp. Technology Management*, 2015, 36(4-6): 41-51.