

Exploration on the Joint Training Mode of Vocational Colleges From the Perspective of Regional Industrial Development

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In this paper, the methods that can be realized by vocational colleges in terms of top-level design of education mechanism, measures of education activities, and innovative talent training methods of vocational colleges are analyzed from the perspective of regional industrial development and vocational college education. And the intrinsic relationship and implementation methods from macro industry development to micro education mechanism construction and micro measures for talent training from the perspective of regional development and collaborative education, and, expose the intrinsic relationship between regional development and innovative talent training in vocational colleges was explored by taking the Shenzhen Polytechnic as an example.

Keywords: regional industry, vocational education, collaborative education

Introduction

Regional economy is the foundation of the national economy and an important support for the realization of national strategies and goals. To build a new development pattern, the CPC Central Committee and the State Council issued the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area, which pointed out:

Give full play to the comprehensive advantages of Guangdong, Hong Kong and Macao, deepen cooperation between the Mainland, Hong Kong and Macao, and further enhance the supporting and leading role of the Guangdong-Hong Kong-Macao Greater Bay Area in national economic development and opening up. (The Central Committee of the Communist Party of China and the State Council issued the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area (1)_Relevant Documents of the Central Committee_Chinese Government Website (www.gov.cn))

Regional innovation and development are inseparable from the cultivation of innovative talents. Under the new national development strategy, the cultivation of innovative talents in Guangdong, Hong Kong, and Macao, as

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the main support for economic growth, the biggest project for social livelihood, and the basic content of public services, is a major and urgent theoretical proposition and practical issue facing today's development.

The cultivation of innovative talents in Guangdong, Hong Kong, and Macao is a deep-level educational innovation project involving different regions, different educational fields, different development levels, and multiple stakeholders, which is affected by internal and external factors such as different regional economic development degrees, educational development concepts, and infrastructure conditions, and with the development of society, there are more and more uncertain factors affecting the cultivation of innovative talents, and the relationship between collaborative education and economic and social development is becoming increasingly close and complex, exploring the relationship between regional economic development and collaborative education. Discovering the essence of the coupling between them, and based on the coupling relationship, formulating a reasonable collaborative training model for innovative talents is an important measure to improve the level of innovative talent training and regional economic development.

To explore the training mode of regional development and innovative talents from the perspective of regional development, it is necessary to understand the contemporaneity, timeliness, and multi-stakeholder relationship of regional development, and analyze the educational connotation of regional development and collaborative education from the organic integration of regional industrial chain, talent chain, innovation chain, and education chain. It is of great significance to promote regional education theory, economic development, and the cultivation of innovative talents by exploring the internal law of micro-educational reform and micro-measures for talent training from macroeconomic and industrial development to micro-education, exposing the intrinsic nature of regional development and innovative talent training, and grasping the basic laws of regional economy and collaborative education.

With the development of the national economy, the regional development strategy characterized by contemporaneity and regional nature came into being. Many education scholars and experts have conducted research on regional development and collaborative education relationship and collaborative education model.

Cao (2018) conducted research on the development and coordinated allocation path of higher education in the Beijing-Tianjin-Hebei region, analyzed the collaborative allocation path of higher education in the Beijing-Tianjin-Hebei region based on the educational resources, demand points, and convergence points of education coordinated development in the three cities of Beijing-Tianjin-Hebei, and he pointed out that regional collaborative education requires decision-makers and practitioners (teachers) to form a joint force to achieve collaborative education. Niu (2022) proposed a theoretical framework for higher education-driven economic development with human capital theory and triple helix model as the core mechanism, based on the development and change of university functions with the times, and analyzed the significant effects of regional development and talent training in the Silicon Valley cluster in the United States, Kansai Science City in Japan, and Shenzhen cluster in China. Shi and Wang (2022) conducted research on the evaluation method of "science-industry-education" innovation and integration in urban clusters, and proposed a comprehensive evaluation method of "science-industry-education" effect based on the gray correlation analysis model. This paper analyzed the reasons for the imbalance and inadequacy of the integrated development of "science-industry-education" in the Pearl River Delta urban agglomeration, and pointed out the methods of establishing a supply and demand platform for science and technology, industry, and educational resources guided by market demand, promoting the flow of

resources, and achieving a high degree of in-depth integration of resources in the region. Jiao (2020) used SWOT (Strengths, Weakness, Opportunities, Threats) analysis to analyze the development of collaborative education in the Guangdong-Hong Kong-Macao Greater Bay Area, and pointed out that the Guangdong-Hong Kong-Macao Greater Bay Area should fully integrate international higher education resources within the Bay Area, form strategic alliances, strengthen the introduction of high-quality higher education resources in the world, and build a diversified Sino-foreign cooperative school-running system. To solve the problems of accelerated technological change, poor timeliness of school teaching resources, inconsistency between school talent training goals and enterprise demand goals, Gu, Liu, and Lu (2022) proposed ways to deepen the integration of industry and education by jointly building school-enterprise platforms and giving full play to the role of enterprise subjects. Qin and Mo (2022) analyzed the evaluation mechanism of industry-education integration, and pointed out that the school-enterprise co-construction training model is a multi-dimensional and multi-level matrix cooperation mechanism, which includes both time dimension and spatial dimension, and constructs an evaluation system based on CIPP (Context, Input, Process, Product) model.

Based on the above analysis, it can be seen that the research on regional development and collaborative education in the existing research mostly focuses on the research on collaborative education development decision-making based on the regional economic state, and they does not analyze the innovation model of collaborative education from the perspective of coordinated development of industry and education in the regional economy, especially from the perspective of multi-level organic integration of industrial chain, education chain, talent chain, and innovation chain.

In view of the above problems, this paper intends to study the collaborative education mode in Guangdong, Hong Kong, and Macao from the aspects of regional industrial chain layout analysis, industry-education integration education chain planning, and the construction of specialized integrated cultivation models. It is of great significance to promote regional education theory, economic development, and the cultivation of innovative talents by analyzing the educational connotation of regional development and collaborative education, exploring the internal law of micro-educational reform and micro-measures for talent training from macroeconomic and industrial development to micro-education, revealing the intrinsic nature of regional development and innovative talent training, and grasping the basic laws of regional economy and collaborative education,.

Exploration on the Mode of Vocational Colleges From the Perspective of Regional Industrial Development: Taking Shenzhen Polytechnic as an Example

Analysis of the Coupling Relationship Between Regional Development and Vocational Education Development Space

There is a circular relationship between interdependence and mutual support between regional development status and education development, and the development of regional education can cultivate more talents for regional industries. On the contrary, the development of regional industries drives social and economic development and continues to support the development of education, and industrial development and educational development not only have an interdependent relationship between talent training, but also educational research and industrial development are interdependent (Figure 1).

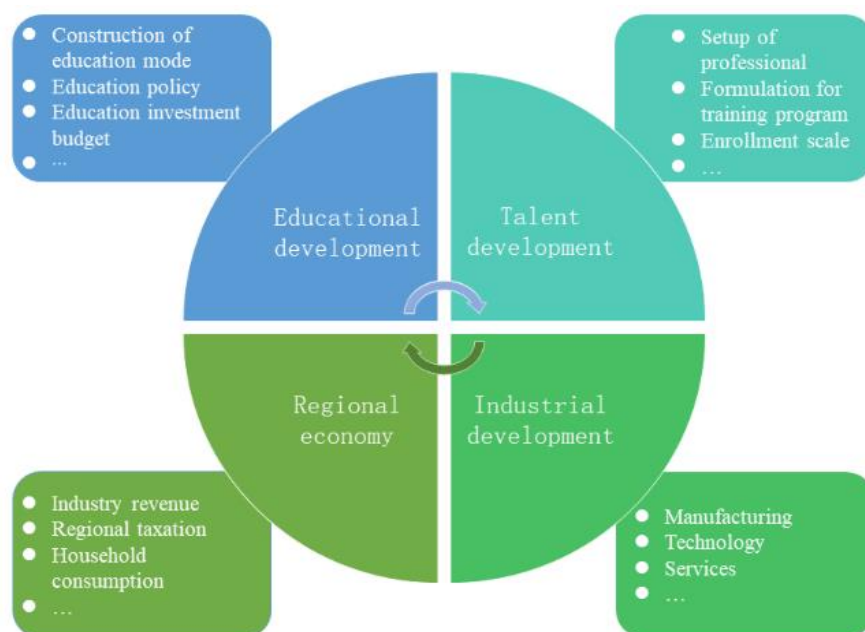


Figure 1. The circular relationship between regional development status and education development.

To discover the relationship between regional development status and education development, the research is carried out using a combination of research analysis and teaching practice. Firstly, through the method of research, the geographical distribution of industries in Guangdong, Hong Kong, and Macao, the industrial advantages in each region, and the status and relationship between the industrial economies of the three regions in the entire industrial chain are analyzed from the perspective of industrial conditions. Based on the analysis of the current situation of industry and collaborative education, the connotation of collaborative training of innovative talents in industrial development is explored, and then, the educational mechanism for collaborative training of innovative talents in Guangdong, Hong Kong, and Macao is formulated, so as to provide a policy foundation for the collaborative cultivation of innovative talents in Guangdong, Hong Kong, and Macao area.

Based on the surveyed information of education and industrial chain resources, the problems existing in collaborative education resources were analyzed, and in view of the problems existing in the current regional collaborative education such as scattered experimental platforms, lack of concentrated research, and integration of industry and education was not well performed. The reform should be performed by integrating the existing experimental platform, technology center, and school-enterprise mutual employment and co-training, which is to give full play to the vitality of existing resources; At the same time, in view of the problems of accelerated technological change, poor timeliness of school teaching resources, inconsistency between school talent training goals and enterprise demand goals, through the methods of “production, education, research and innovation” base co-construction, talent resource sharing, and teaching and production integration, the integration mode of industry and education is innovated, so as to build a solid foundation platform for the cultivation of innovative talents in Guangdong, Hong Kong, and Macao. Taking the college of Automotive and Transportation Engineering of Shenzhen Polytechnic as an example, we conducted the research that named “Research on Thousand Enterprises” on the new energy vehicle technology and related industries in Guangdong, Hong Kong, and Macao area. The purpose of this research was to help us to determine the professional setting, talent training program, and talent

training scale. At the same time, according to the industrial distribution, we analyzed the demand for talents in the process of the development of the entire industrial chain from the perspective of the new energy vehicle industry chain, and make this research result as the basis for the professional setting of the college. Based on this, the college formulated the new energy vehicle technology major for the demand of vehicle manufacturers, an automotive electronics major for the demand of new energy vehicle suppliers, and an intelligent networked vehicle technology major for the future technology development. We also allocated the number of enrolled majors. The analysis of the relationship between regional industrial development and education development can provide a basis for the innovation of collaborative education mechanism of industry-education integration.

Innovative Methods of Integrating Industry and Education and Collaborative Education

The role of education is not only to provide technical talents for the development of the industry. The school also needs enterprises to participate in the activities of educating students. However, the integration of the school and enterprise is not well performed, the teachers from the enterprises only participated in partial activities of the school education, for example, they teach the students only on weekends. And the enterprises obtain order-type directional training of talents from the school. This mode is not conducive to the interests of enterprises, and the enterprises are easy to lose the interests in participating in the co-education. Meanwhile, the order-type training mode is easy to make them receive the limited knowledge since the teachers are always from the same enterprises. This is not conducive to the development and growth of students after moving towards homogeneous jobs. The deep integration of industry and education is not only in the integration of industrial development and education, but also the integration of school research and industrial development, the school's research of "promoting teaching by research" and "promoting learning by research" is an important link between the deep integration of industry and education, collaborative education, school scientific research serves the development of enterprises, enterprise technological progress in turn assists the school to carry out education work, while the scientific research of school teachers can also further promote teaching, not only promote general teaching, but also benefit the teaching of innovation and entrepreneurship. Based on this concept, the school should integrate "science-industry-education" on the basis of the original integration of industry and education, which can promote the application of theoretical research on the one hand, and realize collaborative education on the other hand, so as to maximize the benefits of the three. Schools and enterprises carrying out applied technology research institutes or industrial colleges can provide a solid foundation for the construction of collaborative education mechanism for the integration of industry and education, as well as the deep integration of industry, education, and research. The creation of the industry-education integration and collaborative education mechanism is not only for enterprises to participate in the course teaching of the school, but also to participate in the professional setting of the college, the formulation of talent training programs, the ideological and political teaching of professional courses, and the certification of certificates. At the same time, enterprises are not unilaterally involved in school education, the school sets up corresponding research institutions, aiming to provide enterprises with solutions to some common problems, or assist enterprises to carry out some new technology research, and truly achieve the deep integration of industry, education, and research. The deep integration of industry, education, and research can provide a better cooperation basis for the collaborative education mechanism. Based on the intrinsic relationship between collaborative education and industry-university-research education, we establish BYD Applied Technology Research Institute with BYD, and at the same time we set up the new energy vehicle research institute. Relying on BYD Applied Technology Research Institute, we achieved the goal of collaborative

education. With the new energy vehicle research institute, we participated in the researches of enterprises. This mode combines the advantage of industry-university-research and industry-education integration collaborative education, which maximize the efficiency of enterprises and the function of school education.

Construction of a Specialized and Innovative Talent Training Mode

The integration of industry and education has built a bridge and platform between education and industry, but it has not provided a reference for the innovative development and cultivation of innovative talents in specific industries. Relying on the established industry-education integration platform, based on the constructivist theory, the research on collaborative education knowledge structure method is carried out, and the infrastructure for collaborative cultivation of innovative talents in Guangdong, Hong Kong, and Macao is built. From the perspective of talent needs for enterprise development, enterprise development needs a large number of skilled talents, but also needs innovative talents; industry-education integration is oriented to students' general professional education, but does not consider the cultivation of innovative talents, the development of professional courses of innovation and entrepreneurship education can cultivate innovative talents for enterprises to develop their needs. Innovation comes from interest, for students with innovative interest and innovation ability, providing a platform for them can maximize the release of their innovation potential. For the needs of enterprise development, requirements of school education, and needs of students' personal development, it is necessary to provide a platform for students. In response to the needs of the enterprise, schools, and the students, the school carries out innovation and entrepreneurship courses and establishes innovation and entrepreneurship clubs or organizations, so that there is a platform for common communication between the three parties. Relying on this idea, the Automotive and Transportation Engineering College of Shenzhen Polytechnic used the idea of integration of racing and education, and relies on the China Formula Student Competition sponsored by the China Association of Automotive Engineers, established a Formula Student team, encouraging vocational college students to actively participate in the event and compete with undergraduate students from ordinary colleges and universities across the country. On the one hand, students can apply the theoretical knowledge learned in practice in the process of racing car design and construction, on the other hand, students can independently design and manufacture racing cars according to the rules of the competition, and can give full play to their innovation ability. At the same time, enterprise engineers can participate in the design process and use their practical experience to help students. This mode truly realizes the collaborative education, creative integration, and racing and education integration.

Methods for the Construction of Dual Innovation Courses

Based on the framework of specialization and innovation, education practitioners (referring to teachers) need to carry out the corresponding construction of dual innovation courses, and deeply integrate professional courses with "double innovation" (innovation and entrepreneurship) education, so as to achieve the purpose of cultivating people with virtue and cultivating innovative talents. Based on the phenomenon of industrial development increasing the demand for the comprehensive ability of practitioners and talent cultivators, the cooperation between the professional course teachers and innovative and entrepreneurial teachers was encouraged. At the same time, we introduce enterprise tutors as practical guidance, implement full participation of teachers in the whole process from curriculum system formulation, classroom design, and after-school practical guidance, and we abandoned the one-dimensional evaluation model that only focuses on the score of the students. We evaluate students from professional knowledge, innovation, and entrepreneurship awareness

and students' professional quality, and build a new teach mode (named comprehensive education with three teachers) that need professional course teacher, innovation and entrepreneurship teachers and enterprise mentors fully involve, before, during, and after class, and the "comprehensive education with three teachers" (all-staff, full-course, all-round) dual-innovation course construction method that comprehensively evaluates students from the three dimensions of professional knowledge, innovation, and entrepreneurship awareness and student' professional quality, and carries out research on the construction method of dual-innovation courses from the methods of full participation in education, full-process training, and all-round evaluation of production. This provides theoretical guidance for course teaching practice. In terms of the construction of the "double innovation course" course, Shenzhen Polytechnic set up a maker project, which is jointly declared by students and teachers, of which the instructor can be composed of professional course teachers, innovation, and entrepreneurship teachers and enterprise personnel, and the instructor establishes the innovation and entrepreneurship education course of the corresponding project, the students of the course can be a maker team member, can also be for other interested students, in order to encourage students to actively participate and teachers to take the initiative to open innovation and entrepreneurship courses. The school supports teachers and students from the aspects of teacher performance recognition and student credit acquisition, and at the same time, in terms of course assessment, students are not evaluated with scores as reference, but open evaluation of students from the aspects of innovation and entrepreneurship ability, professional knowledge, and professional quality. At the same time, the school's maker project will be directly connected to the college student Internet + competition and the college student challenge cup competition to achieve the purpose of cultivating innovative and entrepreneurial talents.

Conclusion

This study explores the relationship, essence, and achievable ways of regional development and innovative talent training through the method of progressive analysis, which is to provide reference for the construction of education mechanism and regional coordinated development of vocational colleges.

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