

Research on the Promotion Strategy of Scientific and Technological Innovation Ability in Guangdong Vocational Colleges from the Perspective of “Double High” Construction

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Abstract. Improving the technological innovation ability of vocational colleges is a necessary condition for more precise docking of industrial needs and deeper development of school-enterprise integration, which is of great significance for deepening the connotation of "double high" construction. After investigating the mode of improving the scientific and technological innovation ability of vocational colleges in Guangdong, the experience and practice are refined and summarized, and the factors affecting the development of the mode, such as the backward basic conditions of scientific research, the weak consciousness of teachers in scientific research, and the lack of effective mechanism to guarantee the continuous innovation ability of the school-enterprise collaborative innovation platform, are clarified. Some suggestions are put forward that vocational colleges should increase the investment in scientific research and the education of scientific and technological talents, create a good scientific research atmosphere and innovate the cooperation mechanism of scientific research between universities and enterprises.

1 Introduction

On January 24, 2019, the State Council issued The national vocational education reform implementation plan, proposed to launch the Chinese characteristic higher vocational schools and high level professional construction plan, jointly formulated and implemented by the Ministry of Education and Ministry of Finance, so is the launch of “Double High Plan”. [1] This is a significant strategic move after the construction of nation-level model vocational colleges, to support higher vocational school docking technology development trend and the industry development objective need. Through the implementation of the “Double High Plan”, a science and technology innovation ability raise strategy research can be conducted among vocational college, which can lead the reform of vocational education, and motivate a group of colleges to crack problems of vocational education. This is of great importance to improve technical skills talents training in vocational colleges quality, strengthen scientific and technological innovation ability, promote science and technology and society fit, improve service industry transformation and upgrading of enterprises and the contribution of regional economic development, which has become a new standard of the future development of vocational colleges.

2 Science and technology innovation ability promotion mode of Guangdong vocational colleges

The implementation of the “Double High Plan” is an opportunity, a responsibility, but also challenges for Guangdong vocational colleges. Guangdong province took the chance to build a batch of high-quality vocational colleges and high level professional groups, building innovative high quality technical skills talents cultivation highlands, thus to form a mechanism of resource sharing, flexible and output skills efficient technology innovation service platform, and a multi-level, wide coverage, vertical vocational skills training system, which enhanced the core competencies of the vocational colleges, formed scientific and technological innovation ability promotion mode. To sum up, remarkable results have been achieved.

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2.1 Build innovation teams and platforms, and enhance the overall strength of science and technology

2.1.1 Attract and cultivate scientific and technological talents, and build scientific and technological innovation teams

Through improving the conditions of scientific and technological innovation resources, building an atmosphere of innovation culture, and establishing a liaison system for excellent talents at the two levels of colleges and departments, several talents with the titles of doctor and associate senior title or above were successively introduced. A multi-level and multi-channel talent training system was constructed, promoting young and middle-aged teachers to study abroad, and to attend research and doctoral programs. In this way, teaching and research team structure is improving day by day in key professional (group) train excellent personnel.

2.1.2 The five-party linkage of “government, administration, university and enterprise research institute” builds a school-enterprise collaborative innovation platform

With talent as the core, the five-party linkage was implemented, which integrated innovation platform of similar research direction to promote “ordinary university key laboratory” and “the ordinary university engineering technology research, technology development center” at the provincial level. The “Industry-college-institute cooperation” science and technology innovation platform was also constructed.

2.2 Align scientific and technological innovation with openness and sharing, and improve the efficiency of scientific and technological resources

Many vocational colleges in Guangdong have increased investment, gathered personnel, funds, places and other scientific and technological resources, focused on the construction of provincial and college level scientific and technological innovation platforms, and improved platform infrastructure, instruments and equipment and scientific research conditions. For example, documents such as “Notice of Guangdong Food and Drug Vocational College on Issuing Trial Rules for the Management of State-owned Assets Leasing and Lending” (No.6, 2021) can better promote the open sharing of scientific and technological innovation platform, realize the orderly use among team platforms and secondary schools, and promote the open sharing of scientific and technological innovation platforms, instruments and equipment, scientific and technological literature, data resources and project results, eventually improve the efficiency of the use of scientific and technological resources.

2.3 Innovate the management mechanism for scientific research and promote the continuous improvement of scientific and technological innovation capacity

In order to strengthen the construction of scientific and technological innovation platform and team, standardize activities management, improve the quality and efficiency and promote the sustainable scientific development, many Guangdong vocational colleges set goal and task to complete scientific research and technology into the teaching unit, platform team, staff appraisal index system and reward, to motivate them to accomplish tasks. And a series of regulations were formulated, regarding cultivation plan of science and technology, transverse and longitudinal research funding research projects and academic activities, scientific research project funds, teaching unit intermediate inspection, scientific research project review, intellectual property protection and so on, realizing the standardization of the science and technology innovation management. [2] Colleges also comprehensively and systematically reformed the mechanisms for scientific and technological innovation, including improving systems for evaluating and rewarding and application of scientific and technological achievements, the management of evaluation and employment of personnel, the training of high-level personnel, the allocation of scientific and technological resources, and the management and service of science and technology, so as to fully unleash the vitality of innovative factors and form new advantages and characteristics on the basis of establishing new mechanisms.

3 The problems of technological innovation ability improvement in vocational colleges in Guangdong Province

3.1 No mechanism to guarantee the cooperation and continuity of school-enterprise collaborative innovation platform

Vocational colleges have their own limitations, such as unclear cooperation ideas and positioning, which makes it difficult to implement school-enterprise collaborative innovation. The enterprises hold a skeptical attitude for whether cooperating with vocational colleges can help improving technology level, and accessing to greater benefits, making them not willing to cooperate in investment. This is not conducive to the deep participation of vocational colleges in research and development, the establishment of long-term and stable technical skills cooperation, more detrimental to the accumulation of technical skills of enterprises. [3] Moreover, many vocational colleges set up various types of university-enterprise cooperation innovation platform, but they all lack effective mechanism to ensure the continuous innovation. For example, in the process of school-enterprise cooperation, there is a lack of clear legal provisions on technology transfer and achievement

transformation, and there are a series of problems such as unclear rights and responsibilities, which affect the release of the continuous innovation ability of school-enterprise collaborative innovation platform.

3.2 Few high-level scientific research teams and lack of high-level research results to support

Many vocational colleges are formed or upgraded by the merger of technical secondary schools, so there is inertia in the management mode of scientific research, and most majors fail to build scientific research teams led by well-known scientific researchers in the industry. The proportion of teachers with doctoral degree is relatively low. Although a large number of high-level talents have been introduced into vocational colleges in recent years, they are still in the stage of adaptation and development as a new scientific research force. Also, vocational colleges lack scientific research leaders, not to mention establishing scientific research teams with core competitiveness. [4] So they are weak in technical skills of the service enterprise innovation, product development and process improvement, technology application and technical achievements transformation, which make it difficult to meet the demand of the new technology professional rapid iteration. These constraints cannot improve the ability of vocational education service industry development and academic influence of schools.

3.3 Backward basic conditions of science and technology, and in sufficient consciousness of scientific research

The scientific research in vocational colleges starts late and has a weak foundation, and the investment in personnel, finance and material is insufficient. From the funding perspective, vocational colleges have a big gap compared with undergraduate colleges, which leads to relatively backward hardware equipment and weak ability of teaching and research teams. [5] Due to investment shortage, many high-end scientific research equipment is missing or there is a generation difference with undergraduate colleges. The scientific research performance of vocational colleges is closely related to the evaluation and employment of professional titles. Due to the excessive attention to the assessment of the quantity of scientific research and the neglect of the consideration of the quality and long-term benefits of scientific research, many teachers only pursue short-term completion of ordinary projects and papers to meet the corresponding conditions, which seriously restricts the improvement of scientific and technological innovation ability [6].

4 Strategies and suggestions for improving the technological innovation ability of vocational colleges in Guangdong province

4.1 Innovate the school-enterprise cooperation mechanism and continuously release the innovation ability of the platform

The key for school-enterprise collaborative innovation platform to attract enterprises investment and stimulate the innovation ability of the platform lies in whether the platform can bring benefits to enterprises. To realize the transformation of scientific and technological achievements, the government must reform the traditional administrative procedures and realize the targeted decentralization, including realizing the diversification of scientific research funds. At the same time, market rules and market competition should be involved in vocational colleges to promote their own competitiveness. Vocational colleges should work with government, enterprises and research institutes to innovate school-enterprise cooperation mechanisms, [7] such as strengthening the protection of intellectual property rights and ownership define scientific research achievements, to develop open sharing of innovation team and platform, scientific and technological innovation culture construction, the application of transformation of scientific and technological achievements and production, the integration of collaborative innovation and personnel training and other related mechanisms, thus to make colleges the source and agglomeration of regional scientific and technological innovation services. In this way, it can fully mobilize the enthusiasm of the five parties of "government, administration, academy, enterprise and research institute", attract resources from all parties, jointly carry out activities such as technology development, consultation, promotion and services, continuously release the innovation ability of school-enterprise collaborative innovation platform, and provide strong intellectual support and talent guarantee for regional industrial development.

4.2 Create a favorable environment for scientific research and comprehensively promote the cultivation of scientific and technological talents

Vocational colleges should increase investment in scientific research, accelerate the introduction of doctors and senior professional title talents, attract high-level scientific research backbone and management talents, and optimize the structure of talent team. Key majors should be equipped with professional leaders who have solid theoretical foundation, good application research and technology development ability, and can bring scientific and technological innovation to the actual production of their majors. Also, vocational colleges should create a better environment for scientific research, integrate science and technology service resources, and select teachers with rich practical experience and research ability.

They should focus on the needs of the industry cutting-edge technology and industry enterprise, through project research and development, strengthen cooperation with enterprises and research institutes to carry out the key common technology research, In this way, the industry-university-research collaborative innovation education mechanism can be formed. A high-level scientific research innovation team can be built, providing scientific and technological support for the improvement of local industrial technological innovation ability, and promoting a new pattern formation of scientific research results feeding back teaching.

4.3 Managing multi-party financing investment, and develop scientific and technological innovation work incentive mechanism

Vocational colleges should strengthen the scientific research in terms of money, except from national, provincial and municipal finance capital projects, they should strive for the relevant departments and enterprises to upgrade the scientific research equipment, construct information system and build good science and technology innovation base. A reward mechanism for scientific and technological innovation should be established. For example, preferential policies should be given to the income from scientific research projects undertaken by the introduced high-level talents and the reward for the transformation of scientific and technological achievements, [8] which is mainly not included in the total amount of performance pay. Teachers should be encouraged to explore their potential while completing their teaching work. By setting up their own studios or entities, teachers can provide support for the transformation of scientific and technological achievements, the continuous updating of professional skills and the participation of students in innovation and entrepreneurship activities.

5 Conclusions

In order to improve the ability of scientific and technological innovation, vocational colleges should carry out applied technology research and development, support and serve the product upgrading of small and medium-sized enterprises. Also, the innovation outputs should be translated and put into practice. Those vocational colleges who were selected in the “Double High Plan” are facing both an opportunity and challenge. In coping with challenges, [9] colleges should look for breakthrough point, and mainly focus on the current difficult and important problem. By improving the ability of scientific and technological innovation, promoting the industrialization of innovation achievements and core technologies, focusing on the technological research and development and product upgrading of service enterprises, especially micro, small and medium-sized enterprises, colleges can constantly enhance the ability to serve regional economic development, further expand the social influence of vocational colleges, and enhance the social contribution.

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