

Cultivation of Innovation Practice and Entrepreneurship Ability in Higher Vocational Students Enabled by Science and Technology Innovation Associations

Zhuolin Xiao¹, Yanzhen Miao², Biaobiao Ge³, Yi Feng⁴

¹Department of Food and Pharmacy, Qingyuan Polytechnic, Qingyuan, China

²Department of Foreign Language and Economics and Trade, Qingyuan Polytechnic, Qingyuan, China

³Department of Electromechanical and Automotive Engineering, Qingyuan Polytechnic, Qingyuan, China

⁴Department of Foreign Language and Economics and Trade, Qingyuan Polytechnic, Qingyuan, China

Email: xiaozhuolin@yeah.net, 495050841@qq.com, 1973545016@qq.com, 1127808420@qq.com

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Abstract

Science and technology innovation associations gather students from different professional and disciplinary backgrounds, which can promote interdisciplinary exchanges and cooperation among students, stimulate students' innovative thinking, and cultivate innovative consciousness and entrepreneurial spirit. At present, there are some problems such as lack of top-level design, homogenization of association activities, lack of fund guarantee, and need to strengthen the construction of instructor team in higher vocational colleges. The ways of enabling higher vocational college students to cultivate their innovation and entrepreneurship ability include improving the top-level design, increasing investment, carrying out the characteristic activities of the association, building a virtuous circle of interaction between competitions and student associations, strengthening the construction of the teaching team of science and technology innovation associations, and setting up a guidance platform for innovation and entrepreneurship.

Keywords

Science and Technology Innovation Associations, Higher Vocational Colleges, Innovation and Entrepreneurship Ability

1. Introduction

Higher vocational colleges shoulder the mission of cultivating high-quality and

innovative technical skill talents for the society, so as to meet the rapid development of science and technology and the social demand for innovative talents. As one of the carriers for higher vocational colleges to cultivate students' innovation and entrepreneurship ability, college students' science and technology innovation association provides a platform for students to show themselves and improve their innovation and entrepreneurship ability.

2. The Significance of Science and Technology Innovation Associations to the Cultivation of Higher Vocational Students' Innovation and Entrepreneurship Ability

Scientific and technological innovation associations play an important role in the process of cultivating the innovation and entrepreneurship ability of students in higher vocational colleges. Scientific and technological innovation associations can not only cultivate the innovative consciousness and entrepreneurial spirit of higher vocational college students, but also improve students' scientific research ability and academic level, thus promoting the transformation of students' innovative achievements.

2.1. Training Higher Vocational Student's Innovative Consciousness and Entrepreneurial Spirit

Science and technology innovation associations gather students from different professional and disciplinary backgrounds, which can promote interdisciplinary exchanges and cooperation among students, stimulate students' innovative thinking, and cultivate innovative consciousness and entrepreneurial spirit. Science and Technology Innovation Association creates a positive team atmosphere, encourages members to support each other and grow together, provides an environment that promotes learning and innovation for students, and encourages students to challenge traditional thinking and explore new fields. Through participating in the projects and practical activities of science and technology innovation associations, vocational students can stimulate their innovation potential, then propose innovative solutions, and actively carry out practice and verification, which is of strategic significance for cultivating high-quality innovative technical skills talents (Peng, 2024). The project practice and case study and other association activities organized by the science and technology innovation association not only provide a platform for higher vocational students to innovate, but also strengthen students' problem-solving ability and enhance their professional ability. By guiding students to analyze problems, formulate plans, implement plans and evaluate effects, the teachers of science and technology innovation associations can comprehensively improve the quality and ability of innovation and entrepreneurship of higher vocational students.

2.2. To Improve the Scientific Research Ability and Academic Level of Higher Vocational Students

In general, teachers from the Science and Technology Innovation Association

have multidisciplinary professional background, which can effectively guide students to participate in innovative entrepreneurship competition, technology project research and development and social practice activities, so as to improve students' scientific research ability and academic level, and breaking the rigid impression that higher vocational college students have low research and innovation abilities and academic levels. These activities are both interesting and challenging, helping students to experience the charm of scientific and technological innovation, stimulate student entrepreneurial enthusiasm and formulate reasonable study plans. For example, instructors of science and technology innovation associations organise students to carry out project-oriented practical training, plan and implement a series of projects with practical application value, combine theory and practice to carry out product development and technology optimisation, and apply for patents on related innovation achievements or write academic papers for publication.

2.3. To Promote the Transformation of Innovation Achievements of Higher Vocational College Students

Science and technology innovation associations can become a bridge for school-enterprise cooperation, promote the effective transformation of students' innovation achievements through industry-university-research cooperation, and cultivate students' innovation and entrepreneurship ability and professional quality. In the association activities, students can learn about the cutting-edge trends related to many disciplines and have a deeper understanding of the development direction of their major, thus form innovative results that meet the development needs of the industry. At the same time, experts are regularly invited to guide and train students, providing strong support for students to carry out innovation and entrepreneurship, and actively promote students' innovation achievements to relevant enterprises, and promote the effective transformation of vocational college students' innovation achievements.

3. The Main Problems Existing in the Science and Technology Innovation Associations in Higher Vocational Colleges

Although many higher vocational colleges have set up scientific and technological innovation associations, there are still problems such as the lack of top-level design of community development planning, the obvious homogenization of community activities, and the weak team of community instructors, which to some extent restrict the role of scientific and technological innovation associations in playing an educational role.

3.1. The Development of Science and Technology Innovation Associations Lacks Top-Level Design

College student associations are mainly student self-management and association federation management. Many college student associations, including science and

technology innovation associations, lack a set of effective operation plan, and the organization and management level of association activities needs to be improved. Some higher vocational colleges have misunderstandings in the understanding of cultivating innovation and entrepreneurship ability of higher vocational students in science and technology innovation associations and lack unified planning and development strategy. The teaching department and the association management department have failed to form an effective cooperative mechanism in cultivating students' innovation and entrepreneurship ability. In the talent training program, the status and role of professional associations are not clearly defined. The development and activities of science and technology innovation associations are not included in the relevant curriculum teaching system of the school, and the construction and professional construction of science and technology innovation associations and innovation and entrepreneurship education lack scientific design. Some higher vocational colleges do not pay enough attention to science and technology innovation associations, which leads to the members of science and technology innovation associations cannot give full play to their strengths through community activities, and it is difficult to effectively improve their innovation and entrepreneurship ability (Wu et al., 2024).

3.2. Association Activities Tend to Be Homogenized and Lack of Financial Security

Some scientific and technological innovation association organizations in higher vocational colleges are obviously homogeneous and fail to organize and carry out scientific and technological innovation activities with association characteristics. After joining the science and technology innovation association, the members of the association cannot deeply participate in the activities related to scientific and technological innovation and lack the platform and opportunities for science and technology innovation and practical testing. Some higher vocational colleges do not fully realize that scientific and technological innovation associations play a role in the process of cultivating college students' innovation and entrepreneurship ability, and the investment funds for the cultivation of scientific and technological innovation associations are insufficient, leading to the activities of science and technology innovation associations are often shelved due to funding problems (Zhang et al., 2022). In the process of activities of science and technology innovation associations, it sometimes needs to use to the special places and colleges and equipment, but due to the association management, experimental equipment management, innovation entrepreneurship education teaching management belonging to different departments, related association activities to layers of approval, science and technology innovation association activities to carry out the lack of guaranteed mechanism. For this reason, the club activities carried out by science and technology innovation associations in higher vocational colleges are obviously homogenized with those of other categories, lack of innovation and creativity, and even have the phenomenon of formal club activities, which strikes the

enthusiasm of students to participate in scientific and technological innovation activities.

3.3. The Construction of the Guidance Teachers of Science and Technology Innovation Associations Need to Be Strengthened

Science and technology innovation associations have high requirements for instructors, which not only need to have rich professional knowledge and experience, but also have good student management ability (Yu et al., 2023). The instructors of science and technology innovation associations selected by some higher vocational colleges only aim to guide students to participate in various competitions and win prizes, and do not participate in and guide the daily activities of the associations. At the same time, some higher vocational colleges have failed to mobilize the enthusiasm of full-time teachers to guide student associations, and the instructors selected for science and technology innovation associations are mainly counsellors and administrative managers. The instructors of science and technology innovation associations lack practical experience in innovation and entrepreneurship, and it is difficult to realize the integration of specialized innovation and innovation, industry and education. At the same time, some higher vocational colleges limit the number of instructors in each student association to no more than two, which leads to the lack of rich professional background, which indirectly affects the quality of activities carried out by science and technology innovation associations.

4. An Effective Way for Science and Technology Innovation Associations to Cultivate Higher Vocational Students' Innovation and Entrepreneurship Ability

In view of some problems existing in science and technology innovation associations, higher vocational colleges can further improve the top-level design and increase the support for science and technology innovation associations. At the same time, scientific and technological innovation associations can carry out activities with community characteristics to create a good atmosphere for innovation and entrepreneurship, guide students to participate in innovation and entrepreneurship competitions, and realize the transformation of students' innovation achievements. In addition, strengthening the construction of teachers in the science and technology innovation associations will help the science and technology innovation associations to cultivate students' innovation and entrepreneurship ability.

4.1. To Improve the Top-Level Design and Increase Investment

Higher vocational colleges should start with top-level design, clarify the status and role of science and technology innovation associations, increase support for science and technology innovation associations, and build a working pattern of teachers and students' participation and school-enterprise cooperation. Higher vocational colleges can make the activities of science and technology innovation

associations curricular, and the professional teachers in the school and the business mentors outside the school participate in the guidance, so that the professional guidance of science and technology innovation associations are more normal, and the activities carried out by science and technology innovation associations are more systematic. Cultivate the soil of innovation culture in science and technology innovation associations, stimulate the internal motivation of teachers and students to innovate, improve students' ability to innovate and practice, build an incubator base for innovation and entrepreneurship, and enhance students' innovation vitality. In terms of capital investment, higher vocational colleges can appropriately tilt towards science and technology innovation associations, because sufficient funding is the guarantee for science and technology innovation associations to carry out innovation and entrepreneurship activities. Higher vocational colleges can provide adequate financial support and platform guarantee for associations through alumni donations, special grants from enterprises and public welfare support (Wang, 2021). Strengthen supervision over the use of funds by science and technology innovation associations to ensure reasonable expenditure of funds (Tan & Wang, 2020).

4.2. To Carry Out Association Characteristic Activities to Build a Good Atmosphere for Innovation and Entrepreneurship

The science and technology innovation association should carry out activities with the characteristics of the association in order to attract and stimulate students' innovation participation. For example, the Innovation Club of Qingyuan Polytechnic has organized and carried out patent application lectures, creative market, entrepreneurship training camp, alumni forum, etc. Through a series of activities such as policy advocacy, setting up entrepreneurship project consulting room, organizing entrepreneurship forum, providing entrepreneurship training, holding innovation achievement display, experience exchange meeting, etc. A comprehensive, multi-angle, three-dimensional display of the community's innovation and entrepreneurship results. At the same time, scientific and technological innovation associations should pay attention to improving the team cooperation and innovation ability of their members, and enhance their comprehensive quality, so as to enhance the competitiveness and influence of the associations. In the process of carrying out the characteristic activities of the community, actively promote the roadshow evaluation of entrepreneurial projects, select a number of high-tech and feasible entrepreneurial projects, and provide "one-to-one" guidance services to implement customized support. Guide entrepreneurial students to tell in-depth stories of innovation and entrepreneurship, actively promote innovation and entrepreneurship culture, and consciously build a good atmosphere for innovation and entrepreneurship.

4.3. The Competition Enables the Association to Expand the Students' Ability of Innovation and Entrepreneurship

Science and technology innovation associations are the key part of science and

technology innovation in higher vocational colleges. Higher vocational colleges should build a virtuous circle of interaction between competition and student associations. Taking the Innovation Club of Qingyuan Polytechnic as an example, the society has always been committed to promoting the improvement of students' scientific and technological innovation ability and comprehensive quality and has organized related community activities around the "Challenge Cup" College Students' Entrepreneurship Competition and China International "Internet+" College Students' Innovation and Entrepreneurship Competition. The Innovation Club of Qingyuan Polytechnic encourages its members to organize teams participating in competitions across colleges, majors and grades, and hold innovation and entrepreneurship achievements exhibition, experience exchange meetings and innovation and entrepreneurship competitions, so as to stimulate students' innovation and entrepreneurial vitality. The development model of Qingyuan Polytechnic Innovation Club guided by competition and supported by associations provides useful reference for the development of science and technology innovation associations in higher vocational colleges. In addition, science and technology innovation associations can widely carry out various forms of labour and skills competitions, so as to give students the ability to change from "work" to "craftsman", to promote learning through competition, and to let students practice skills and strengthen skills in the normal skills competition. For example, the Innovation Club of Qingyuan Polytechnic has established the development concept of "promoting teaching by competition", and actively encourages the members of the society to participate in various practical activities inside and outside the school. Through this kind of association activities, students can not only grasp the latest trend of the development of the industry and enterprises, but also can effectively integrate the resources inside and outside the school, promote the construction of the industry-university-research integration base, and create more practical opportunities for students.

4.4. To Strengthen the Construction of Science and Technology Innovation Organizations to Guide Teachers

As the leading force of science and technology innovation associations to carry out innovation and entrepreneurship activities, the association instructor plays an important role in guiding the association activities. Science and technology innovation associations should implement the double tutor system inside and outside the school and employ industry enterprise personnel with rich industry experience and entrepreneurial practice to serve as the off-campus tutor group of science and technology innovation associations, so that they can regularly guide the innovation and entrepreneurial activities of the associations. The external tutor group is fully involved in the cultivation of innovation and entrepreneurship projects and leads professional associations to carry out high-level innovation and entrepreneurship activities with the help of external resources. At the same time, higher vocational colleges can attract teachers with solid professional practical experience and innovation and entrepreneurship teaching experience to serve as on-

campus guidance teachers of science and technology innovation associations by introducing workload assessment methods for community guidance teachers. For example, the Innovation Club of Qingyuan Polytechnic has hired leading enterprises or successful entrepreneurial teams from the industry to serve as external instructors of the association, and teachers with solid theoretical foundation and rich teaching experience to serve as internal instructors of the association to jointly guide students to carry out innovative and entrepreneurial activities. By participating in social practice activities related to innovation and entrepreneurship, students of the Innovation Association of Qingyuan Polytechnic carry out industry-university-research cooperation, promote the effective transformation of students' innovation achievements, and cultivate students' innovation and entrepreneurship ability. It innovatively establishes the "trinity" open innovation and entrepreneurship platform management mode of teacher guidance, student main body and enterprise participation.

4.5. Science and Technology Innovation Associations Build a Platform for Teachers and Students to Guide Innovation and Entrepreneurship

Science and technology innovation associations should plan innovative projects related to students' majors based on their academic background. By guiding students to participate in scientific research and technology development, they are encouraged to apply their professional knowledge to practical problem solving and improve their professional skills and innovative thinking. At the same time, professional teachers are invited as mentors to provide comprehensive guidance for students to ensure the success of the project and the transformation of results. In addition, to carry out school-enterprise cooperation is a keyway to improve students' entrepreneurial ability. It can not only enable students to contact the real business environment, but also effectively promote the cultivation of students' ability in scientific research and development, organization and management, unity and cooperation. At the same time, enterprises can provide students with internship, financial and technical guidance to help them understand the industry trends and accumulate experience. For example, a student team of the Innovation Club of Qingyuan Polytechnic started from the coffee culture and gradually developed into a team integrating association activities and innovation and entrepreneurship practices. The head of the student team set up a "seed coffee shop" after graduation. Scientific and technological innovation associations should make good use of the practice places with advanced school facilities and perfect technology and organize their members to carry out practical training such as simulated entrepreneurship and market activities, so as to improve students' practice and innovation level.

5. Conclusion

Under the guidance of the in-depth implementation of the strategy of strengthening the country by talents and the national innovation-driven development strategy,

training technical talents with good innovation and entrepreneurship ability has become one of the objectives of personnel training in higher vocational colleges. The high-quality development of science and technology innovation associations will help students combine their professional knowledge with innovation achievements and entrepreneurial literacy, allow students to verify new creative ideas in practice, build a platform for students to practice, and cultivate and improve students' innovation and entrepreneurial ability.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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