

Exploration and Reflection on the Integration of Innovation and Entrepreneurship Education into Professional Construction in Technical Colleges

-- Taking Photoelectric Technology Application Major as an Example

Lixia Mou

Department of Electronic Engineering, Huizhou Technician Insititute, Huizhou, Guangdong
516003, China

Abstract

Due to the needs of social development, innovation has become the soul of a country's development. The government has put forward the slogan of "mass entrepreneurship and innovation" and launched a series of measures to encourage innovative and entrepreneurial talents. Technical colleges must keep pace with the times and explore a development path that integrates professional construction with innovative and entrepreneurial models. Taking the photoelectric technology application major as an example, this paper analyzes the current situation of innovation and entrepreneurship in technical colleges, identifies ways to encourage teachers and students to participate in innovation and entrepreneurship education together, explores the talent cultivation mode of integrating innovation and entrepreneurship education into professional education through precise market research, and builds an inter-disciplinary resource-sharing innovation and entrepreneurship platform. In addition, it provides students with learning resources through elective courses and online learning platforms, ultimately achieving the goal of school-enterprise cooperation and stimulating the potential of teachers and students in innovation and entrepreneurship.

Keywords

Innovation and Entrepreneurship; Photoelectric Technology; Professional Integration; Talent Cultivation Mode.

1. The Significance of Promoting Mass Entrepreneurship and Innovation in Technical Colleges

The "Opinions of the State Council on Several Policy Measures to Vigorously Promote Mass Entrepreneurship and Innovation" points out that promoting mass entrepreneurship and innovation is an inevitable choice for fostering and generating new drivers of economic and social development, a fundamental measure for expanding employment and realizing the path of enriching the people, and an effective way to stimulate the innovative potential and entrepreneurial vitality of the whole society [1]. In 2024, the number of students enrolled in technical colleges nationwide reached 1.601 million, and the number of graduates reached 1.014 million. Technical colleges take the cultivation of high-tech applied and practical talents who meet the needs of the front line of production as their fundamental task [2]. For technical colleges, innovation and entrepreneurship education can not only solve the pressure of employment and improve students' overall quality, but also start from the level of education and teaching reform, driving the education and teaching of technical colleges into a new stage of development and achieving more brilliant results. Innovation and entrepreneurship

education has attracted the attention of technical colleges and has made important contributions to providing skilled talents for enterprises, but there is still much room for improvement in terms of creativity. Taking the photoelectric technology application major as an example, this paper explores and ponders the integration of innovation and entrepreneurship education into the professional construction model.

2. Analysis of the Current Situation of Innovation and Entrepreneurship Education in Technical Colleges

2.1. Analysis of the Basic Situation of Students, Teachers, and Parents

Most students in technical colleges have experienced failures in high school entrance exams or college entrance exams and have lost confidence in traditional education. They are not very good at coping with traditional exams, but they have keen observation abilities towards social development and changes, and they are mentally agile. Most of them come to learn a skill to solve survival problems, and they are eager to cultivate their skills and earning capabilities. Professional knowledge is relatively boring and tedious for them. Due to factors such as weak theoretical foundations and unclear learning goals, many people hold a "muddling along" mentality in school, but they also desire a decent job or their own business after graduation. Teachers in technical colleges must not only have strong professional theoretical knowledge, but also strong practical operation capabilities and skill levels. Most majors also require experience in enterprise production practices. Busy class management and teaching work have caused most teachers not to delve deeply into the teaching goals of innovation and entrepreneurship education, believing that imparting students with a survival skill is the most important thing. It is considered a success if students can find a stable and well-paid job after graduation. However, innovation and entrepreneurship education encourages students to understand and explore methods of self-employment, which may make students restless and affect the quality of teaching. As for the parents of technical school students, most of them have limited academic qualifications and experiences, and their family economic level is also limited. They believe that innovation and entrepreneurship require a lot of money, investment, and resource channels, and the risk of entrepreneurship is greater than seeking a stable job. They are afraid of wasting time and money, and prefer to honestly attend traditional skill classes.

2.2. Survey on students' Willingness to Innovate and Start a Business in Technical Colleges

Currently, a questionnaire survey on innovation and entrepreneurship has been conducted among 174 students from three five-year senior classes majoring in Photoelectric Technology Application in our department, and 170 valid questionnaires have been collected. The data analysis of the valid questionnaires is shown in Figure 1. Among them, 63% of the students have ideas for innovation and entrepreneurship but no direction, 9% of the students have ideas and also have certain channels and directions for innovation and entrepreneurship because their families are self-employed or they have already exercised during winter and summer vacations, 20% of the students said that no one has instilled this idea in them, and they usually have no access to this kind of knowledge, so they do not have a good understanding of innovation and entrepreneurship, and 8% of the students said that they just want to find a stable job after graduation or go home to help their families, and they are not interested in innovation and entrepreneurship. From the data, it can be seen that most students want to learn about innovation and entrepreneurship knowledge through study, and if there is an opportunity, they also want to try to start their own businesses or companies.

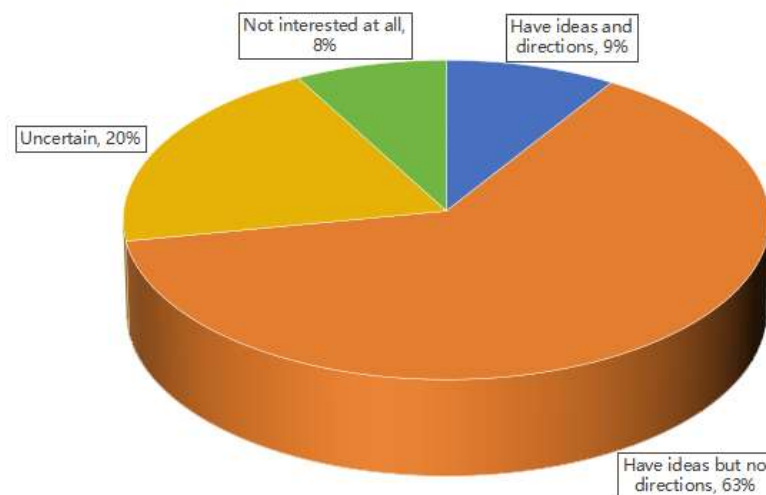


Figure 1. Questionnaire survey on willingness to innovate and start a business among two classes in our school

2.3. Students in Technical Colleges Hope to Receive Support Related to Innovation and Entrepreneurship

Then we continued to distribute questionnaires to 122 students who have entrepreneurial intentions. The purpose was to investigate what kind of support related to innovation and entrepreneurship these students hope to receive. The survey results are shown in Figure 2. Students with entrepreneurial intentions generally hope to receive support in the following areas: learning relevant knowledge of innovation and entrepreneurship, attending lectures given by outstanding alumni or local entrepreneurs, participating in regular sharing of innovation and entrepreneurship cases by the school, receiving targeted guidance from experienced teachers in innovation and entrepreneurship, joining relevant clubs and organizations, learning professional knowledge from interdisciplinary studies, obtaining venture capital and venue support, etc. Among them, students are particularly fond of receiving guidance from experienced teachers in innovation and entrepreneurship to clarify the direction, as well as obtaining corresponding venture capital and venue support.

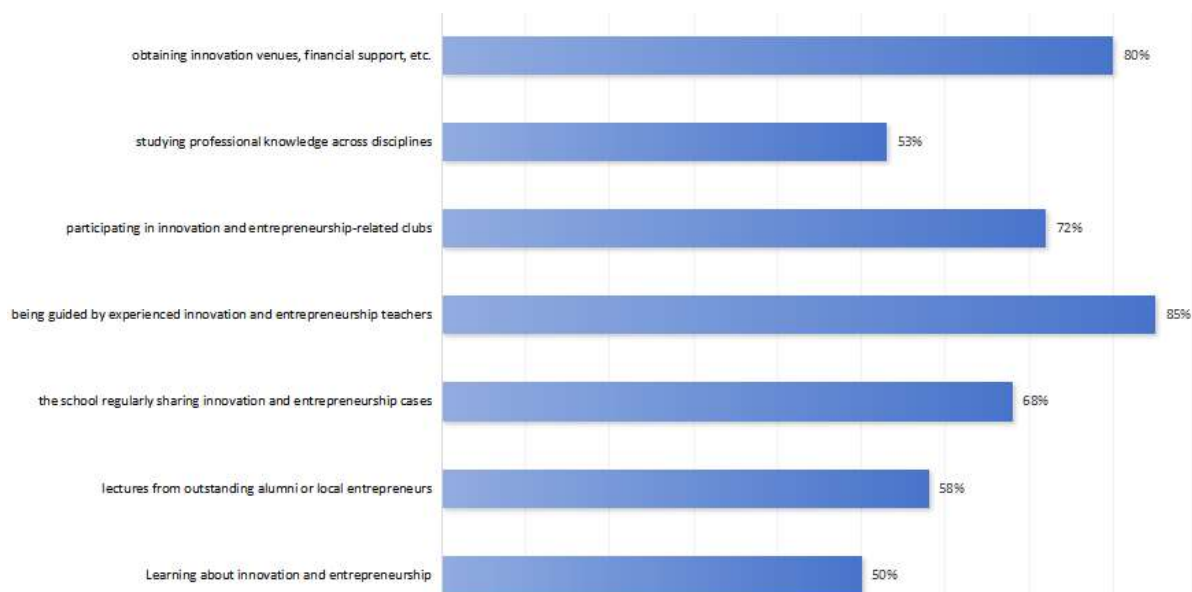


Figure 2. Questionnaire survey on "What kind of support do students with entrepreneurial intentions hope to receive?"

3. Exploration of Integrating Innovation and Entrepreneurship Education into Professional Education in Technical Colleges

3.1. Change Our Mindset and Make Innovation and Entrepreneurship Education No Longer a Mental Burden

Innovation and entrepreneurship education is to let students understand the significance of innovation and the process of entrepreneurship, rather than simply teaching students to invent and create, or start their own companies. Instead, it aims to shape and cultivate students' innovative and entrepreneurial thinking and methods, enabling them to master knowledge in management, investment, economics, finance, law, and other fields, optimizing their cognitive structure, cultivating good professional qualities, stimulating their innovative thinking, reflecting on the meaning of learning skills, and mobilizing their enthusiasm for independently researching the latest market technologies [3]. To change mindset, education should start from the lower grades. For example, in the first semester, some locally experienced business founders or outstanding alumni can be invited to give keynote lectures, take students to visit and learn cutting-edge technologies and methods in school-enterprise cooperation enterprises, and carry out simulated enterprise operation methods. Professional teachers are encouraged to participate in innovation and entrepreneurship-related exchange activities, actively participate in social practice activities in local well-known enterprises during summer and winter vacations, discuss ways and methods to integrate innovation and entrepreneurship education into professional education, change their mindset towards innovation and entrepreneurship, and improve their professional quality and skill level. At the same time, the class teachers should do a good job in the ideological work of students and parents. They can use WeChat and other online platforms to push messages such as the experience of outstanding students in technical colleges starting businesses, articles about students participating in skills competitions and being highly recognized by enterprises, and national policies encouraging innovation and entrepreneurship, so as to change the negative perception of students and parents towards innovation and entrepreneurship.

3.2. Building an Excellent Innovation and Entrepreneurship Teacher Team to Provide Educational Guarantee for Innovation and Entrepreneurship Education

Whether the teaching staff has a sense of innovation, whether the teaching staff has the ability of innovation and entrepreneurship, and whether the teaching staff continuously improves the level of innovation and entrepreneurship education play a very critical role in students' innovation and entrepreneurship education [4]. The innovation and entrepreneurship ability of the whole school's teaching staff can be improved through the methods of "going out" and "bringing in". "Going out" refers to teachers going to enterprises for practice, exchanging and learning with other institutions that have done well in innovation and entrepreneurship, visiting some advanced technology and product expositions, and broadening their thinking, drawing on models, and improving the level of innovation and entrepreneurship education through online learning and other methods. "Bringing in" refers to the school's ability to introduce teachers with experience in innovation and entrepreneurship through recruitment, or to introduce outstanding business operators or outstanding alumni through school-enterprise cooperation to carry out teaching activities, exchange lectures, competition guidance, etc., and to discuss with the full-time teaching staff to spark innovative and entrepreneurial thinking.

3.3. Starting from Market Demand, Explore the Training Mode of Innovation and Entrepreneurship for Professional Talents

According to the "Development Outline of the Electronic Information Industry in the Guangdong-Hong Kong-Macao Greater Bay Area", the electronic information industry is the primary industry in Huizhou with strong vitality, and optoelectronic technology also falls within the scope of electronic information. Firstly, it is necessary to conduct a demand analysis based on market demand. Huizhou boasts a large number of high-tech optoelectronic information enterprises such as TCL Optoelectronics, NVC Lighting, Cree Semiconductor, XD Lighting, Everlight Electronics, Jufei Optoelectronics, and Absen Optoelectronics. Optoelectronic technology is advancing rapidly, and professional demand analysis should be updated annually through the analysis of corporate employment needs and market demands to formulate training programs for optoelectronic technology talents and explore new methods for students' innovation and entrepreneurship education. Secondly, starting from the majors, it is necessary to analyze job requirements and understand which jobs are easier for students to find employment after graduation, which have ideal early-stage development, and have the potential for innovation and entrepreneurship [5]. Thirdly, courses should be determined based on job positions, including basic courses, professional courses, professional expansion courses, and innovation and entrepreneurship training courses. Innovation and entrepreneurship courses are not limited to designing brand-new products, but optimizing and transforming existing products is also a way of innovation, such as cost savings, function improvement, etc., which can also be regarded as an aspect of innovation and entrepreneurship education ideas. Finally, on the basis of clear courses and skills, it is necessary to optimize and transform the training rooms, which can be divided into three categories: basic training rooms, professional training rooms, and innovation and entrepreneurship training rooms (including on-campus factories, competition bases, and off-campus cooperative enterprises). First-year students can cultivate basic operational skills in basic training rooms, second-year students can improve operational skills in professional training rooms, and third- and fourth-year students can receive skills training integrated with innovation and entrepreneurship and participate in various innovation and entrepreneurship competitions in innovation and entrepreneurship training rooms.

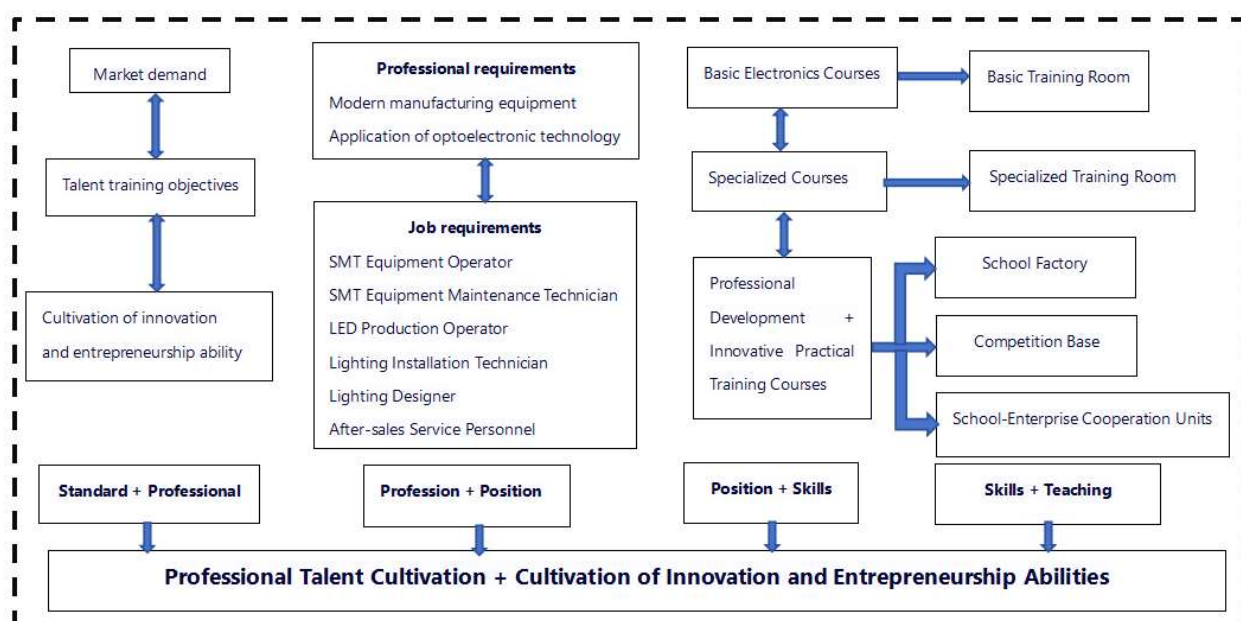


Figure 3. Training Mode for Cultivating Innovation and Entrepreneurship Abilities of Optoelectronic Technology Professionals

3.4. Build Interdisciplinary Studios and Set up an Innovation and Entrepreneurship Platform for Resource Sharing

An innovation and entrepreneurship platform is not merely about financial and policy support; it is also about enabling students to find a group of like-minded partners who can collaborate and generate innovative and entrepreneurial sparks based on the unique characteristics and strengths of their respective majors. Our college boasts strong engineering departments and a rich liberal arts curriculum. For instance, students from the Electronic Engineering Department can leverage their expertise in optoelectronics and smart home technology to design the core of a product. Students from the Manufacturing Engineering Department can use their knowledge of industrial design to create the product's exterior. Those from the Information Engineering Department can ensure the product's application through their proficiency in interior design. Meanwhile, students from the Finance, Economics, and Business Administration Department can leverage their e-commerce expertise to promote and market the product, utilizing live streaming, Douyin, RED, and Toutiao, among other social media platforms, to achieve a seamless service chain from design, manufacturing, application, to promotion. This is the essence of building the platform.

Currently, there is limited communication between departments, and some students struggle to turn their ideas into reality. To address this, we can foster collaboration among departments through clubs and establish interdisciplinary studios, as depicted in Figure 4, to build a resource-sharing innovation and entrepreneurship platform. Once the platform is established, we can invite experienced innovation and entrepreneurship mentors to conduct professional training, such as the popular SYB training, three-stage training, and remote entrepreneurship training.

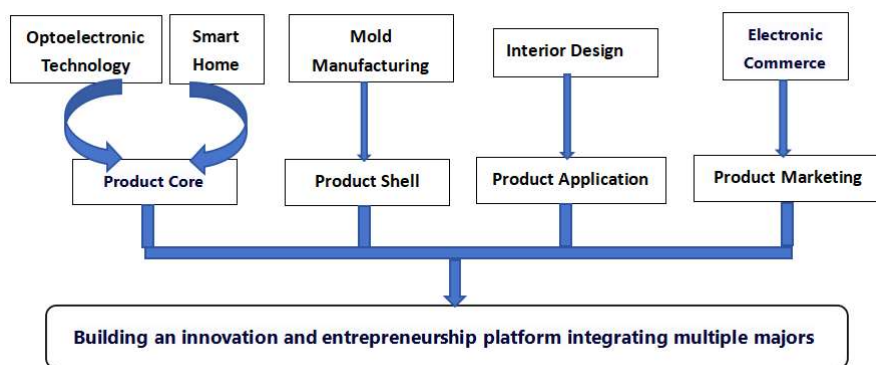


Figure 4. Establishment of an Interdisciplinary Innovation and Entrepreneurship Platform

3.5. Provide Innovative and Entrepreneurial Learning Resources through Elective Courses and Online Learning Platforms.

Firstly, elective courses can satisfy students' strong curiosity about courses in other majors. Universities generally offer elective courses, but technical schools rarely do so. Technical schools should respect students' interests and characteristics by offering elective courses during second-class sessions and evening study times. It is suggested that each department can offer 1-2 easy-to-understand professional courses as a trial. For example, the Electronic Engineering Department can offer electives on electrical safety and basic lighting knowledge; the Finance, Economics, and Business Administration Department can offer electives on e-commerce and finance; the Basic Education Department can offer courses on photography and copywriting; the Information Engineering Department can offer courses on software usage and networking; the Automotive Engineering Department can offer courses on general automotive knowledge; and the Manufacturing Engineering Department can offer courses on intelligent

manufacturing. This will allow interested students to cultivate their learning interests, broaden their horizons, make like-minded friends, and stimulate innovation and entrepreneurship vitality.

Secondly, technical school students are very interested in mobile phones and the internet, and most of them are familiar with platforms such as Cloud Class, Learning Tong, and Tencent Classroom. The Innovation and Entrepreneurship Center can introduce some online courses as learning resources for students to utilize during evening study times and spare time.

4. Conclusion

The integration of innovation and entrepreneurship education with professional education is a prevailing trend in current education. It is essential to fully recognize the impact of innovation and entrepreneurship on national economic and social development. Only by transforming mindsets, building an outstanding teaching staff for innovation and entrepreneurship, exploring talent cultivation models for innovation and entrepreneurship, establishing resource-sharing innovation and entrepreneurship platforms, and providing abundant learning resources for innovation and entrepreneurship, can we cultivate highly skilled talents with strong capabilities in innovation and entrepreneurship.

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