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Cultivation of Practical Ability of Innovation and Entrepreneurship for Mechanical Students in Universities

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Abstract: In recent years, colleges and universities have carried out a large number of useful attempts in the cultivation of innovative and entrepreneurial talents through various forms, which have provided certain opportunities for the innovation and entrepreneurship practice of college students and have achieved certain results. However, because of the late start, a relatively mature innovation and entrepreneurship education system has not yet been formed. Compared with other developed countries, there is still a large gap between them. The quality of talent training is far from meeting the needs of building innovative countries for high-level talents. And our country is transforming from a manufacturing country to a manufacturing powerhouse, and machinery needs more complex talents. Colleges and universities shoulder the important mission of talent cultivation, and colleges and universities are the main body of higher education. In order to meet the requirements of China's 2025 national strategic era, this article discusses the mechanical entrepreneurial ability to develop new entrepreneurial practices, analyzes the status quo of mechanical innovation and entrepreneurship, proposes a feasible strategy policy, and focuses on curriculum and practice to optimize research. It is hoped that this will help the mechanical innovation and entrepreneurship education in colleges and universities and jointly realize the grand goal of innovation and entrepreneurship education.

1. Introduction

Innovation and entrepreneurship practical ability refers to the ability to systematically process new technologies, new processes, new ideas, and new concepts on the basis of original knowledge and experience to solve problems creatively. It has the potential for engineering practice, technological innovation, and entrepreneurship. In Europe and the United States, there are "European Startup Green Papers" and "American Innovation Law" and other related policy support. Developed countries in Europe and America construct innovative and entrepreneurial society through various means such as development strategy, policy system, environment shaping, and cultural leadership, and regard innovation and entrepreneurship as an important strategy to solve the difficulties of social economic development. Cultivating creative consciousness, creative thinking

and innovative entrepreneurial skills, such as innovation entrepreneurship comprehensive practice ability, has become a regional economic growth and technological change the key to promote the competitiveness of the country. How to implement the country's decision-making and deployment to specific teaching links, integrate innovation and entrepreneurship education into talent cultivation, and train high-quality talents with innovative entrepreneurial spirit and practical ability to serve the regional socio-economic are important issues facing higher education institutions. This article discusses the capabilities of innovation and entrepreneurial talents in mechanical engineering, analyzes the characteristics of innovation and entrepreneurship in aircrafts, and discusses the feasibility and strategic approach. It focuses on the optimization of curriculum and practice. It is hoped that the innovation and entrepreneurship education in mechanical colleges and universities will be helpful to jointly realize the grand goal of innovation and entrepreneurship education.

2. Innovative Talent Characteristics

2.1. Sound Personality and Healthy Body

New entrepreneurial talents usually have active thinking, clear goals, innovative ideas, firm confidence and perseverance, and they can grasp the opportunities given by the times and have a sound personality and healthy body.

2.2. Rich Knowledge Structure

New-entrepreneurial talents are good at learning, have deep professional knowledge and good humanistic qualities, understand the development prospects in the field, can view problems from many different angles, have a wealth of knowledge structure and strong application capabilities, is a kind of new composite talents.

2.3. Advanced Awareness of Innovation and Entrepreneurship

New-entrepreneurial talents should have an advanced sense of innovation and entrepreneurial spirit, as well as novel innovative thinking and a keen business management mind, be good at breaking the boundaries of conventional thinking and discovering innovations.

2.4. Faster Adaptation to Society

New-type entrepreneurial talents must have a strong sense of social responsibility and teamwork spirit. In addition, they should have the ability to learn lifelong and strong psychological adjustment ability. Only in this way can we keep pace with the development of the times and adapt to society more quickly. According to the characteristics of new-type entrepreneurial talents, this paper analyzes the successful experience of education in innovation and entrepreneurship in colleges and universities at home and abroad, and formulates the target of talent training based on the characteristics of machinery major in local colleges and universities.

To new entrepreneurial talents oriented, not only demands students to master the mechanical professional basic knowledge and skills, still need to cultivate students' humanities, law, management, and other aspects of knowledge, so that the students have a multidisciplinary knowledge background, able to skillfully through engineering, science and the humanities and social science, cultivate students' innovative consciousness, the pioneering quality and ability, and

has the strong team communication skills and strong sense of social responsibility and sense of mission.

3. Problems in the Mechanical Curriculum System

3.1. Courses Are Arranged According to the Professional Direction, and Knowledge Is Divided Into Excessive Details

Nowadays, many university courses are based on professional training programs. Some professional courses are narrow in scope, and the courses they study are bound to be limited to narrow knowledge. Therefore, the content of each course is very detailed. The teaching time of each course is limited. In the course of teaching, many important contents will be deleted. While there is a clear distinction between various professions, and interlacing is like every other mountain, it is difficult for the learned knowledge to be integrated and the disciplines are difficult to migrate. Due to the fact that the knowledge segmentation is too detailed and individualized, it lacks overall considerations, causing unnecessary duplication of students' knowledge and certain loopholes. At the same time, students' knowledge structure tends to be one-way, rigid, and incomplete, which is not conducive to the cultivation of their multidimensional, flexible, and creative thinking skills.

3.2. Only Pay Attention to Theoretical Study, and the Practice Is Weak

Many courses only pay attention to the study of basic theories, ignoring the practical aspects, so that students can't flexibly use the theoretical knowledge they learned to solve practical problems. In practice, students are only required to visit because of concerns about various factors, and there is little opportunity for hands-on operation. Just one-sided explanation of the basic theory, making many courses sound boring and empty, resulting in students full of money, but they can only talk on paper, hands-on ability is poor.

4. Discussion on Educational Reform of Mechanical Courses

4.1. Curriculum Resources Construction

We should meet the industry's new professional standards, corporate job requirements for the development of curriculum standards, docking enterprise product development teaching project, docking work process to carry out teaching design; While improving the basic teaching resources for the development of vocational education, in accordance with the standards and requirements for online open courses, we actively explore the curriculum design under the "Internet+" model, and make full use of information technology to develop online and offline mixed teaching to create a good atmosphere for learning at all times and everywhere. In particular, in accordance with the requirements for the cultivation of innovative and entrepreneurial talents, intensify the development of innovation and entrepreneurship curriculum resources, combine the industry innovation and entrepreneurship skills competition, and school scientific research innovation to develop teaching programs, so as to achieve clear teaching goals, powerful resources, and orderly teaching organization.

4.2. Faculty Construction

Through the introduction of talents, team planning, quality engineering, enterprise training, combined with other measures, and vigorously strengthen the construction of teachers. Through the introduction or flexible introduction of scientific research leading talents and skilled craftsmen, we will jointly build "Science and Innovation and Technical Service Team" and "Master Skills Workshop" to attract some outstanding students to participate in horizontal research and technological innovation; At the same time, outstanding students should also be selected to establish the "Innovation and Entrepreneurship Association for College Students", and instructors should be equipped to provide guidance on various innovative and entrepreneurial activities.

4.3. Reform Evaluation Method

In order to achieve the cultivation of new-type entrepreneurial talents, a brand-new quality view of talent cultivation must be established. The evaluation criteria that use student achievement as the sole criterion and the evaluation mechanism that uses universities as the subject of evaluation must be established. We will establish a multivariate evaluation mechanism with universities, employers, and government and relevant social organizations as the main bodies. Reform the traditional evaluation methods and evaluation content, emphasize process evaluation, pay attention to the evaluation of the effectiveness and ability of personnel training, and formulate a diversified, scientific, and development evaluation and evaluation system. The innovation spirit, entrepreneurial awareness, and innovation and entrepreneurship are listed as important indicators for evaluating the quality of personnel training. The evaluation of students' abilities as a main criterion for evaluating the quality of personnel training is one of the main criteria for establishing a quality assurance system for innovation and entrepreneurship education. Lead students to participate in innovation and entrepreneurship practice activities, stimulate students' enthusiasm for learning, and cultivate students' practical and innovative skills.

4.4. Questionnaire Design

In order to understand the current situation of innovation and entrepreneurship practice ability training of mechanical students in Colleges and universities, this paper adopts in-depth interviews, questionnaires and other forms of research. Based on the investigation of College mechanical students' innovation and entrepreneurship practice ability training, this paper aims to comprehensively understand the situation of College Students' innovation and entrepreneurship ability training. In this paper, the field and online and other channels for the distribution and recovery of the questionnaire. On the basis of the effective data, the statistical software SPSS. 19.0 and the questionnaire star platform are used for data statistics, processing and analysis. The statistical methods used in this paper are mainly descriptive statistics and cross analysis

4.5. Reliability Test of the Questionnaire

The so-called half-reliability is to divide the questionnaire into two halves, and then calculate their reliability coefficients separately. When the reliability coefficients of the two halves are the same, the Spearman-Brown formula is often used to obtain the reliability coefficient of the entire questionnaire.

$$r_{SB} = 2r_{SH} / (1 + r_{SH}) \tag{1}$$

When the coefficients of the two halves are not the same, the Lulun formula should be used for calculation.

$$r_{Rulon} = 1 - \frac{S_{a-b}^2}{S_t^2} \tag{2}$$

5. Discussion on the Practice Direction of Mechanical Engineering Students' Innovation and Entrepreneurship

5.1. Survey Results

In the survey of "Content and Forms Contained in IAE Education", "Courses related to Entrepreneurship Practice" ranked first, accounting for 73.3%, followed by "Individualized Entrepreneurship Guidance", "Entrepreneurship Simulation Analysis", and "Courses Related to Entrepreneurship Practice". "Entrepreneur's demonstration", "Entrepreneurship Case Topic Lecture", etc. The details are shown in Figure 1. It can be seen that practice and courses are still an important part of IAE education considered by college students.

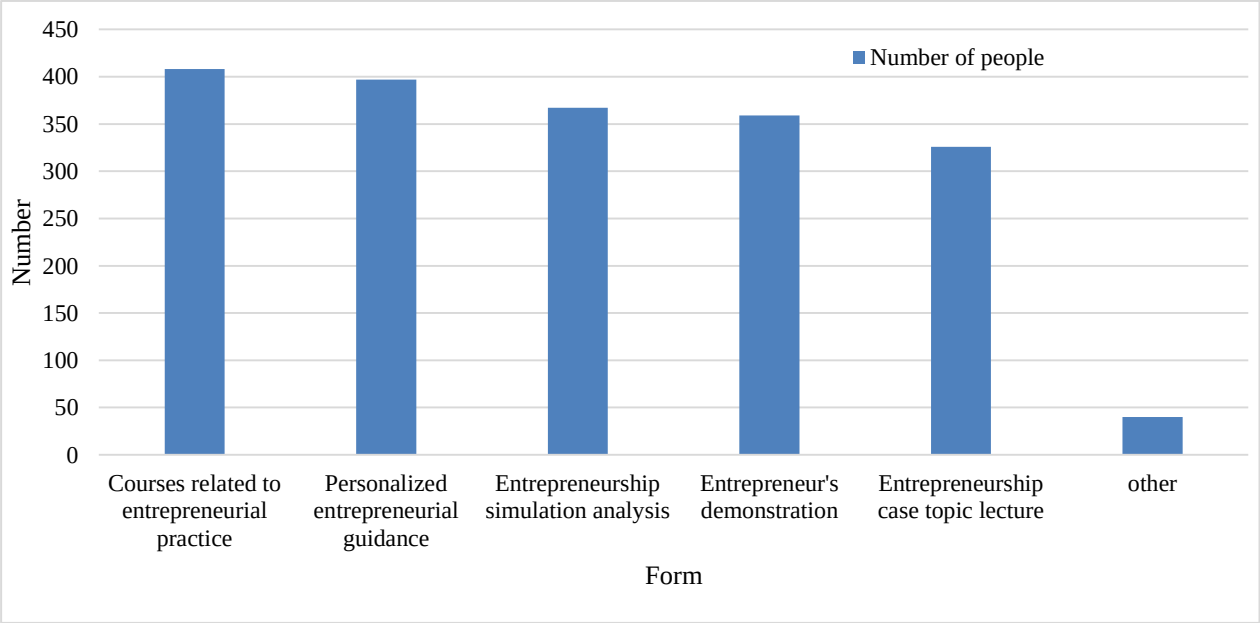

Figure 1. The content form of IAE education

In the understanding of "the specific content of IAE education", "IAE ability" was selected 496 times, "IAE awareness" was selected 467 times, and "IAE spirit" was selected 449 times, so it is generally believed that "Ability + consciousness + spirit" are all indispensable content of IAE education. The details are shown in Figure 2.

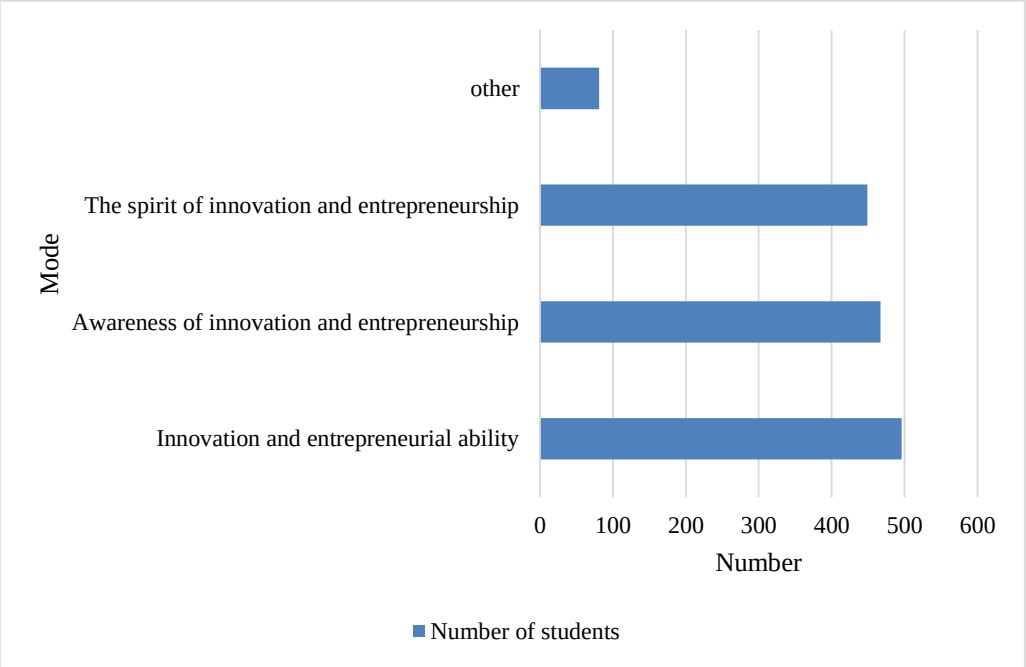

Figure 2. Specific content of IAE education

In the understanding of "more conducive to students' acceptance of IAE education", the most chosen is "participation in entrepreneurship experimental park", accounting for 76.16%, followed by "participation in entrepreneurship competition", "study IAE courses", and " Part-time job, self-study IAE knowledge, etc., as shown in Table 1.

Table 1. Analysis of forms of IAE education that are more conducive to students' acceptance

Options	frequency	proportion
Take the IAE Course	351	62.90%
Participate in the entrepreneurial competition	392	70.25%
Participate in the Entrepreneurship Experimental Park	425	76.16%
Work part-time	271	48.57%
Self-taught IAE knowledge	240	43.01%
others	57	10.22%

5.2. Practical Teaching as a Foundation to Improve Professional Practice Ability

Practice teaching is an important means to connect theoretical knowledge and practical ability, and it is an effective way to cultivate students' innovative ability. The basis of innovation and entrepreneurship practice is practice, and the core is innovation. Entrepreneurship is the sublimation of practice innovation. Through practice teaching, students' practical ability and problem-solving ability are cultivated. Building practical teaching for innovation and entrepreneurship training is in line with modern education and the social needs of human resources. The mechanical professional practice teaching system structure is based on the training of machine tool operation and process establishment, formulating personnel training programs and building a practical teaching system.

5.3. The Competition Promotes the Improvement of the Position Practice Ability

Skill competition is an important assistant to the reform and development of vocational education in the new period. In order to stimulate students' potential, cultivate innovative spirit and improve the ability to practice on the job, the state, provinces and cities have organized a variety of skills competitions. Winners will be recruited preferentially by employers, which greatly increases the enthusiasm of students participating in the competition. To promote the game is to train the competition program in professional learning, and learn professional skills in the process of entry training. Through the organization of targeted skill competitions, the students must acquire the skills that must be mastered in the actual work positions through corresponding skill competitions, learn the corresponding post skills in the skill competition training process, and use the competition as an effective form to promote student development. The completion of the task. Skills competitions involve new technologies and new applications. Skills competition requirements are considered in the development of professional teaching plans.

5.4. Research and development Drives Innovation and Practice

Build a school-enterprise cooperation practice platform with skills master studio, electromechanical R&D center, intelligent manufacturing coordination education platform and robot technology service platform. In this platform, we make full use of the different education environments and educational resources of schools and enterprises, and organically combine school education, which imparts knowledge and skills, with production and R&D practices that directly acquire actual experience and practical ability, to participate in social services. The project development is an entry point to cultivate students' innovative spirit, innovation ability and practical ability.

5.5. Construction of Innovation and Business Practice Platform

Building a platform for innovation and entrepreneurship plays an important role in cultivating the innovative and entrepreneurial ability of college students. The school is based on an electromechanical R&D center, a skills masters studio, a smart manufacturing coordination education platform, and a robot technology service platform to build a passenger space, create innovation and entrepreneurship platforms, establish innovation and entrepreneurship communities, and set up projects to fund and guide innovation and entrepreneurship. The cultivation of innovative consciousness and innovative thinking form the whole process of education and teaching. The school encourages students to carry out innovation and entrepreneurship attempts to guide students to actively participate in innovation and entrepreneurship training programs, innovation and entrepreneurship competitions, and introduces innovation and entrepreneurship projects into talent cultivation programs, combining innovation and entrepreneurship education with school hours, credits, and teacher workload. Through innovation and entrepreneurship to guide the establishment of credits and curriculum reforms, students' innovation ability will be cultivated.

6. Summary

Colleges and universities take "projects as the starting point and platform as the support" and masters of technology-producing, research, and collaboration to create innovative projects. Through practical teaching, innovative project research and development, skill competitions, and innovation

and entrepreneurship practices, the colleges and universities build a sound innovation and entrepreneurship practice training system. Since the implementation of the program, the practical ability and innovative thinking of the mechanical engineering students have been greatly improved. The graduates trained have adapted to the needs of the local economic and social development and become highly skilled personnel with innovative abilities. In recent years, there have been many series of innovation and entrepreneurship competitions such as mechanical professional skill competitions, college student science and technology works design, and "Challenge Cup". The students have achieved fruitful results, and the number of scientific research projects and invention patents that students have approved for approval have increased year by year. Through the establishment of a platform for innovation and entrepreneurship practice, using these solutions, like the practice of teaching as a basis to enhance professional practice, the use of project research and development as a driving force to enhance innovation and practice capabilities, and to promote learning skills by training ,to solve the problem of lack of platforms, lack of grasp, lack of methods, and lack of mechanisms in the cultivation of innovative talents for innovative, entrepreneurial, and innovative talents. It's of great promotion and reference value.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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