

# Exploration and Practice of Integrating Innovation and Entrepreneurship Education into the Training Model of Mechanical Talents

Hongchao Wang<sup>1</sup>, Ziyu Wang<sup>2</sup>, Lin Wan<sup>1</sup>, Gang Che<sup>1</sup>, Haichao Bai<sup>1</sup>

1.Engineering College of Heilongjiang Bayi Agricultural Reclamation University Heilongjiang Daqing 163319

2.School of Information and Electrical Engineering, Heilongjiang Bayi Agricultural Reclamation University Heilongjiang Daqing 163319

---

**Abstract:** Implementing innovation and entrepreneurship education is not only a positive response to the needs of economic and social development in higher education, but also a requirement for the reform and development of universities themselves. Innovation and entrepreneurship education is aimed at all students and runs through the entire process of talent cultivation in the field of mechanical engineering. This article mainly analyzes the important significance of innovation and entrepreneurship education for the mechanical profession from the aspects of improving the effectiveness of teaching, enhancing students' comprehensive literacy, and alleviating employment difficulties. It explores and practices the integration of innovation and entrepreneurship education into the talent cultivation mode of the mechanical profession, providing ideas for talent cultivation in the mechanical profession.

**Keywords:** Machinery; Innovation and entrepreneurship; Training mode; Practice

---

## Fund Project:

Heilongjiang Province Higher Education Teaching Reform Research Project (SJGY20210639); The Collaborative Education Program for Industry and Education of the Higher Education Department of the Ministry of Education (231003806252500231003806242221); Key Project of Education Science Planning in Heilongjiang Province (GJB1423046).

## Introduction

In the context of “innovation driven development” and “Made in China 2025”, there is a new demand for talent cultivation models in higher education institutions. With the rise of the new economy, the demand for composite engineering talents is increasing, and there is an urgent need to accelerate the construction and development of new engineering disciplines. Some universities focus on new engineering majors and promote their intersection and penetration through policy guidance and financial support [1-3]. Under the guidance of the new engineering background and guided by the level of engineering education, the talent training mode and curriculum system have been reformed. Innovation and entrepreneurship education plays a crucial role in the cultivation of new engineering talents, therefore, it is necessary to enhance students' deep understanding of innovation ability. Only by cultivating students' comprehensive knowledge application ability, interdisciplinary ability, and independent thinking ability can high-quality innovation and entrepreneurship education be achieved [4-5]. This article focuses on the integration of innovation and entrepreneurship education into the cultivation of mechanical professionals, with the aim of improving students' innovation and entrepreneurship abilities, and conducts research on the talent cultivation mode of mechanical majors.

## 1. The Importance of Innovation and Entrepreneurship Education for Mechanical Engineering Majors

### 1.1 Enhancing the effectiveness of teaching

Innovation and entrepreneurship education plays a crucial role in talent cultivation in universities. If only theoretical knowledge

and repetitive design calculations are learned from textbooks, it will be difficult to carry out innovation research and reduce the effectiveness of classroom teaching. With the high attention paid to innovation and entrepreneurship education in our country, the innovation and entrepreneurship ability of college students has gradually become an essential quality for different professionals. In the process of mechanical drawing, hands-on practice, and course design, students majoring in mechanical engineering should attach importance to cultivating innovative awareness and cultivating research interest in the field of mechanical engineering.

## **1.2 Enhancing Students' Comprehensive Literacy**

At present, enterprises attach great importance to the innovation and entrepreneurship ability of talents in the recruitment process. Having good innovation and entrepreneurship abilities, being able to quickly adapt to work, is the driving force for enterprise development. Schools are the most important learning places for college students, and many students focus their energy on obtaining vocational skills certificates, while neglecting the learning of innovation and entrepreneurship knowledge. Therefore, teachers should arouse students' attention to innovation and entrepreneurship, improve their innovation ability and entrepreneurial spirit, which is also a requirement for improving their comprehensive quality.

## **1.3 Alleviating Employment Challenges**

Currently, the difficulty of employment for college graduates has become a common concern in the whole society. In order to better solve this problem, the government has launched preferential policies for college student entrepreneurship to alleviate the employment pressure on college students and promote the development of China's innovation industry. Innovation and entrepreneurship for students is a very important skill. Teaching innovation and entrepreneurship in universities can enable students to have a comprehensive understanding of the employment situation of their major, the mainstream trend of the current market economy, product research and development, and innovation in production technology, so as to better plan their career and improve their employment rate.

## **2. Exploration and Practice of 2 Talent Training Models**

### **2.1 Integration of Innovation and Entrepreneurship Education into Professional Education and Teaching System**

Innovation and entrepreneurship education itself is a part of professional education. Therefore, in the teaching process of mechanical engineering, innovation and entrepreneurship education should be integrated into it. On this basis, a curriculum system for innovation and entrepreneurship is constructed based on the characteristics of mechanical engineering majors in schools. Based on the theoretical and professional knowledge learned in class, students can use their spare time to design and process some devices, which can cultivate innovative spirit and hands-on ability. In addition, the designed device can also participate in technology competitions, earn credits and scholarships, and make students pay more attention to innovation and entrepreneurship courses.

### **2.2 Based on mentorship and technology associations**

Most students have a vague understanding of their major courses when they enter university, so they do not have clear ideas about their future work. Therefore, it is necessary to adopt a mentor system to provide comprehensive guidance to students in ideological education, learning, and daily life. During their freshman and sophomore years, mentors are responsible for guiding students' thinking, supervising timely learning, complying with school regulations, and enhancing their interest and confidence in learning; In the third and fourth years of college, the main responsibilities are to guide students in their learning and creative abilities, strengthen their professional knowledge, actively participate in subject competitions, and participate in the development and experimentation of actual projects under the guidance of teachers, laying a solid foundation for future scientific research or work. The college needs to establish a technology association with the aim of cultivating practical operational skills for college students and cultivating innovative and entrepreneurial talents. The association introduces a large number of new students, with members with practical work experience as the backbone, and provides technology competition training and guidance to new members in stages. Every year, the college organizes a series of science and technology competitions, with qualified teachers, association backbone, and college leaders as evaluation experts to evaluate the works of students. Every year, a summary and commendation conference will be held to award certificates and prizes to the award-winning members. Experts from the company will also be invited to give detailed comments on the competition, in order to stimulate students' learning enthusiasm and interest, and also to identify key members.

### **2.3 Classroom - Research - Competition to cultivate innovative abilities**

In the teaching of the course, it is mainly taught by the teacher, while students are only in a listening state, which is not conducive to stimulating their interest in learning. Therefore, a flipped classroom approach can be adopted, where the teacher teaches the basic principles. Introduce and explain new principles and technologies in groups of 3-4 people for approximately 10 minutes, followed

by additional explanations from the teacher to enhance students' self-learning and inductive abilities. Based on the research trends in the field of mechanical engineering, select cutting-edge technologies with certain difficulty and interest, and conduct in-depth theoretical analysis to enhance students' interest in scientific research. In addition, during the teaching process, subject competition themes related to the course content can be selected to enable more students to understand the difficulty and participation forms of subject competitions, thereby improving their enthusiasm and actively participating in competitions. Subject competitions are beneficial for improving students' comprehensive hands-on abilities and cultivating their creative thinking. Set up elective courses such as innovative method design and practical project training, and invite relevant teachers and enterprise experts to provide a series of tutoring and training for relevant subject competitions, so that students can not only receive certain elective credits, but also receive more practical research and training, promoting their learning enthusiasm. There are certain requirements for this type of elective course, and students who do not meet the requirements cannot take this type of course, which makes them study harder and forms a good cycle. Most subject competitions have quota restrictions, and to enter the finals, one must go through competition. Therefore, students are generally very hardworking and motivated, and some students even spend their free time in the laboratory, which greatly enhances their autonomy and enthusiasm.

## 2.4 Supported by practical activities

The current talent cultivation model in the field of mechanical engineering has to some extent limited the thinking of students. It should be based on basic professional knowledge and integrated with multiple other disciplines. In order to solve the problem of talent cultivation in new engineering education and promote the cultivation of creative talents among students, it is necessary to start from the practical aspect and continuously improve it. One is open classes. We have reformed the structure of professional knowledge and proposed an interdisciplinary curriculum integration mechanism. Expand professional knowledge in many fields through information technology of the Internet. Breaking through the traditional single major learning, focusing on needs, creating interdisciplinary course groups, and expanding the coverage of minor courses. The second is to implement open courses, especially the exchange between different disciplines, to form a training method of mutual learning and reference. The third is the cultivation of multi-dimensional time and space, which should be considered from multiple aspects. In terms of time, undergraduate teaching plays a supportive role in later graduate education. From a spatial perspective, the university stage is a crucial stage for combining theory with practice, applying theoretical knowledge from the classroom to practice, and engaging in industry academia collaboration and science education integration.

## 3. Conclusion

In summary, innovation and entrepreneurship education meets the needs of social development. Based on the characteristics and industry background of the mechanical profession, this article analyzes the important significance of innovation and entrepreneurship education in cultivating talents in the mechanical profession. The innovation and entrepreneurship education in mechanical engineering majors in universities is a slow accumulation, which requires the joint efforts of schools, teachers, society, and enterprises to build a better platform for college students to master professional skills and innovative inspiration. Innovation and entrepreneurship education should be aimed at all students and run through the entire process of talent cultivation in the field of mechanical engineering.

## References:

- [1] Jia Xinyu, Zhang Jijun, Wang Hongli, et al. Exploration of Reform in Practical Teaching of Mechanism Majors in Applied Agricultural Universities under the Background of Innovation and Entrepreneurship [J]. Southern Agricultural Machinery, 2022, 53 (06): 156-158
- [2] Shi Yuanji, Teng Hongchun, Yang Xinrui. Research on the Training Model of Mechanical Professional Talents Guided by Innovation and Entrepreneurship Education [J]. Modern Vocational Education, 2019 (36): 84-85
- [3] Zhang Weiliang, Li Liang, Wang Wei, etc Reform and Practice of Talent Training Model for Mechanical Engineering Majors in Local Universities under the Background of "Double Innovation" [J]. Neijiang Technology, 2023,44 (03): 39-40+2
- [4]Ren Longjing and Liu Yuanyuan Research on the Application of Innovation and Entrepreneurship Education in the Training of Mechanical Talents under the Background of "New Engineering" [J]. Strait Science and Industry, 2023, (06): 82-85

## About the author:

Hongchao Wang (1994-),Male, born in Suihua, Heilongjiang Province, Doctor, lecturer.Engaged in teaching and research work in the field of machinery.