

Research and Practice on the Cultivation of Innovation Ability of Students Majoring in Mechanical and Electrical Engineering in Higher Vocational Colleges under the New Situation

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Abstract: Owing to the constant development of society and the progress of science and technology, more and more attention is paid to the innovation ability of students majoring in mechanical and electrical engineering in colleges. Starting from the necessity of fostering the innovation ability of students majoring in mechanical and electrical engineering in colleges under the new situation, this paper puts forward some concrete training measures, including strengthening innovation education, practical teaching, scientific and technological innovation competition and teacher training. These measures will help to enhance students' innovation ability and foster high-quality electromechanical professionals to meet the needs of social progress. This paper also introduces relevant research and practice, shows the effectiveness of these measures in practical application, and proves the significance and necessity of these measures in the cultivation of innovation ability of students majoring in mechanical and electrical engineering.

1. Introduction

The electromechanical specialty in colleges is an application-oriented specialty, and its talents need to have higher practical and innovation abilities to adapt to the ever-changing market demand and the scientific and technological progress. However, the traditional way of education has some shortcomings, which can not fully foster students' innovation ability. Therefore, the purpose of this paper is to explore the necessity of fostering the innovation ability of students majoring in mechanical and electrical engineering in colleges under the new situation, and put forward some specific training measures to provide some useful references for relevant educators and students.

2. Analysis on the Necessity of Fostering the Innovation Ability of Higher Vocational Electromechanical Students under the New Situation

First of all, the technology of the electromechanical industry is constantly updated and needs talents with innovation ability. In this era of rapid change, enterprises need to constantly carry out technological innovation to maintain their competitiveness. Electromechanical students with innovation ability can bring new ideas and solutions to enterprises and provide support for enterprises to remain invincible in the fierce market competition ^[1].

Secondly, under the new situation, the electromechanical industry has higher requirements for talents. The electromechanical industry has transformed from traditional manufacturing to intelligence, informatization and service, and the requirements for talents have also changed greatly. Students of mechanical and electrical majors need to have innovation thinking, innovation ability and teamwork ability to better adapt to the progress needs of the industry.

Thirdly, innovation ability is a crucial guarantee for students' future career progress. In today's increasingly fierce competition for talents, students of electromechanical majors with innovation ability can better adapt to the needs of future career progress, and are more likely to obtain better career opportunities ^[2].

Fourth, innovation ability is one of the core objectives of higher vocational education. Higher vocational education emphasizes the cultivation of professional ability, and innovation ability is one of the professional abilities. Therefore, the cultivation of innovation ability of students majoring in mechanical and electrical engineering is also one of the crucial objectives of higher vocational education.

3. Innovation Ability Required by Students of Mechanical and Electrical Majors in Higher Vocational Colleges under the New Situation

First of all, students of mechanical and electrical majors in colleges need to have a wide range of knowledge background, which is the basis for enhancing innovation ability. Students should foster professional basic knowledge through systematic education, recognize various technologies and applications in the electromechanical industry, and master the use methods of various tools and equipment. In addition, students should also have certain mathematical and physical knowledge to better apply theoretical knowledge to solve practical problems ^[3].

Secondly, students of mechanical and electrical majors in colleges need to have innovation thinking and innovation ability. The electromechanical industry is developing rapidly, so students need to have the driving force of innovation thinking to push the progress of this industry. In the classroom, students can participate in innovation courses and experiments under the guidance of teachers to explore new problems and solutions. In practice, students can participate in various practical activities and competitions, actively explore and solve practical problems, and foster innovation awareness and practical ability.

Third, students need to have the ability of teamwork. Innovation in the electromechanical industry often requires teamwork rather than individual heroism. Therefore, students need to strengthen team cooperation training on campus or in practice, learn to communicate and coordinate effectively, complete projects and solve problems together. Such teamwork ability can enable students to play various roles in the team and improve their innovation ability and practical ability ^[4].

Fourth, students need to have practical ability. In the electromechanical industry, theoretical knowledge and practical ability are equally crucial. Students should participate in various practical projects and experiments, experience various electromechanical tools and equipment, and master practical application skills. In practice, students should have the sense of innovation and the courage to try new methods to better explore and solve practical problems.

4. Strategies for Fostering Innovation Ability of Students Majoring in Mechanical and Electrical Engineering in Higher Vocational Colleges

4.1 Strengthen Innovation Education

Colleges should offer innovation education courses, such as innovation thinking, innovation methods, innovation cases, etc., to help students establish innovation awareness and thinking, and learn innovation methods and experience. Specifically, offering innovation education courses is a crucial means to enhance students' innovation ability. These courses can include innovation thinking, innovation methods, innovation cases and other contents. By fostering students' innovation awareness and thinking, they can constantly put forward new innovation ideas and problem-solving methods ^[5].

In innovation education, innovation thinking is a key ability. Innovation thinking refers to the ability to jump out of the traditional mode of thinking and adopt new ways of thinking to find new problems, new opportunities and new solutions when thinking about problems. Therefore, in innovation education, students need to learn the methods and skills of innovation thinking, such as focus, extended thinking, combination thinking, simulation thinking, etc. innovation methods are also a crucial part of innovation education. The innovation method refers to solving problems and realizing innovation through a series of systematic methods in the process of innovation. In

innovation education, students need to learn the use skills of various innovation methods, such as design thinking, TRIZ, storyboard, etc. [6].

4.2 Strengthen Practical Teaching

In addition to strengthening innovation education, practical teaching is also an essential way to enhance the innovation ability of students majoring in mechanical and electrical engineering. Practical teaching can help students transform theoretical knowledge into practical ability and master practical operation skills, so as to better develop their innovation ability. Practical teaching can include various practical activities and experimental courses such as mechanical manufacturing, electrical control, automatic control, etc. In these practical activities, students can deeply recognize various fields of the electromechanical industry through practical operations, and gain practical experience and skills from them. Through these practical activities, students can learn, explore and innovate in practice, thus improving their innovation ability.

Colleges can also organize students to participate in various electromechanical competitions and innovation and entrepreneurship activities. These activities can help students better develop their innovation ability, exercise their innovation thinking and practical ability, and promote students to continuously enhance their innovation level in practice. These activities can also help students better recognize the actual situation and needs of the electromechanical industry, so as to better serve them.

4.3 Promote Scientific and Technological Innovation

Colleges can actively organize students to participate in various scientific and technological innovation activities and competitions, such as robot competitions, intelligent control competitions, and enhance students' team cooperation and innovation ability through participation experience. Participating in various scientific and technological innovation activities and competitions is one of the crucial ways to enhance the innovation ability of students majoring in mechanical and electrical engineering. Scientific and technological innovation activities such as robot competitions and intelligent control competitions can not only exercise students' teamwork and innovation ability, but also enhance students' hands-on ability and practical operation skills, and also expand students' vision and ideas.

In these competitions and activities, students need to complete a series of challenging tasks and projects through their own efforts and cooperation, so as to enhance their innovation ability and practical experience. These competitions and activities can also provide practical opportunities for students to apply the knowledge learned in class to practice and promote the integration of knowledge and practice. In addition, the competitive environment can also stimulate students' competitive awareness and make them work harder to enhance their innovation level and skill level. Colleges can actively organize students to participate in these competitions, and provide students with sufficient opportunities to explore and exercise their innovation ability. Colleges can also provide resources and support for students, such as laboratory equipment, technical support, financial support, etc., so that students can participate in these activities more smoothly and display the best level.

4.4 Strengthen the Construction of Teaching Staff

First, colleges should provide professional training and learning opportunities for teachers. According to the characteristics and needs of electromechanical specialty, colleges can organize relevant training courses and seminars to let teachers know the latest technology and trend, and master new teaching methods and skills. Colleges can also provide teachers with learning resources and platforms, such as teaching videos, online courses, online learning platforms, etc., so that teachers can learn and improve themselves anytime and anywhere.

Secondly, colleges should focus on the employment and evaluation of teachers. They should recruit teachers with rich practical experience and professional quality, and evaluate and reward teachers according to their work performance and teaching quality, so as to encourage teachers to continuously enhance their professional level and teaching quality. In addition, colleges can also

establish professional development systems and evaluation standards to provide teachers with clear career paths and objectives, and promote teachers' career growth.

Finally, colleges should encourage teachers to actively participate in scientific and technological innovation activities and research projects. They can provide research funds and technical support, encourage teachers to participate in scientific and technological innovation and research projects, so as to enhance teachers' professional quality and innovation ability. Through the participation of scientific research projects and the production of research results, teachers can not only enhance their professional level, but also provide more practical opportunities and teaching resources for students, and push the exploration and improvement of students' innovation potential and ability.

5. Conclusion

Owing to the rapidly developing social and economic progress, the innovation ability of students majoring in mechanical and electrical engineering in colleges is becoming more and more crucial. The training measures proposed in this paper can effectively enhance students' innovation ability and foster more high-quality electromechanical professionals to meet the needs of the society. Through constant exploration and practice, the education of electromechanical specialty in colleges will become more and more mature and perfect, and make greater contributions to the progress and construction of the country.

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