

On the Teaching Reform of Mechatronics Professional Courses in Higher Vocational Colleges

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Abstract: Owing to the increasing demand for skilled talents in society, higher vocational education has become a hot topic at present. Mechatronics is a crucial subject in higher vocational education, and its curriculum teaching reform has also become a hot issue. In the current rapidly developing scientific and technological environment, the curriculum teaching reform of mechatronics is not only a change of teaching mode, but also a crucial way to meet the needs of the industry. This paper discusses the feasibility and necessity of the teaching reform of mechatronics technology specialty in colleges, starting with the current situation of the teaching of mechatronics technology specialty and combining with the necessity and realization of the curriculum reform.

1. Introduction

Mechatronics technology is a new technology that emerges at the historic moment in the current rapidly developing scientific and technological environment. However, the rapid progress of mechatronics technology also poses new challenges to the curriculum teaching of mechatronics technology specialty. The traditional course teaching method can no longer meet the needs of mechatronics technology specialty. Therefore, the teaching reform of mechatronics technology specialty in colleges is imperative.

2. Current Teaching Situation of Mechatronics Technology in Higher Vocational Colleges

2.1 Single Teaching Content and Lack of Pertinence

In the teaching of mechatronics technology courses, it is often only around the basic knowledge of machinery, electronics and computer. Although this teaching method can enable students to master basic knowledge, it lacks practical application and pertinence.

2.2 Lack of Practical and Operational Teaching Links

In the teaching of mechatronics technology courses, theory and practice are independent of each other. They often only focus on theoretical teaching and lack practical and operational teaching links. This teaching method makes students' practical application ability unable to be enhanced and can not adapt to the actual work needs.

2.3 Imperfect Curriculum and Lack of a Closely Linked Curriculum System

In the teaching of mechatronics technology courses, there is a lack of closely related curriculum system, and often only separate different courses for teaching. This teaching method makes it difficult for students to connect different knowledge points and lacks comprehensive application ability^[1].

3. Necessity of Teaching Reform of Mechatronics Technology Major in Higher Vocational Education

3.1 Enrich Course Content and Improve Pertinence

According to the characteristics and practical application of mechatronics technology, new contents need to be added to the course, such as intelligent manufacturing, machine vision, automatic control, artificial intelligence, etc. According to the needs of students at different levels and major directions, targeted optional courses should be set up to meet the personalized needs of students.

3.2 Change Teaching Form and Focus on Practice

The change of teaching form should pay attention to the practice link. In the teaching of mechatronics technology, theory and practice complement each other, and teachers should focus on the practice link, improve students' practical ability by adding experiments, simulations and project design, and encourage students to participate in practical courses and practice to enhance their practical operation ability and innovation ability ^[2].

3.3 Optimize Curriculum and Realize a System with Closely Linking Courses

The curriculum setting should be optimized to realize the system with closely linking courses. Curriculum setting needs to be closely connected to form an organic system. For example, courses related to mechatronics technology can be integrated to form a series of organically linked curriculum systems, such as intelligent manufacturing, machine vision, automatic control, etc. The establishment of the curriculum system can strengthen the links between courses, improve the comprehensive quality of students and the ability to solve problems.

4. Teaching Reform of Mechatronics in Higher Vocational Education

4.1 Guide Students to Go Deep into Practice

First, establish laboratories and training bases. Mechatronics technology specialty requires students to have certain practical operation skills, so it is necessary to establish a complete laboratory and training base to let students learn knowledge and skills in practice.

Secondly, strengthen cooperation with enterprises. Through cooperation with enterprises, students can recognize the actual working environment and requirements of enterprises, and improve their practical ability and employment competitiveness.

Finally, design practical courses and projects. In the design of practical courses and projects, it is necessary to consider the interests and needs of students, adopt a variety of practical methods and means, let students solve practical problems through practical activities, and improve their practical and innovative abilities ^[3].

4.2 Promote the Construction of Teaching Staff

First, introduce high-level teachers. High-level teachers can provide students with high-quality teaching resources and practical guidance to improve their practical ability and professional quality.

Secondly, strengthen teacher training and research. Teachers need to constantly improve their teaching level and practical ability. They can improve their teaching level by participating in teacher training and research activities to understand the latest teaching concepts and technologies.

Finally, establish a teacher-evaluation mechanism. The establishment of teacher-evaluation mechanism can promote teachers' teaching reform and innovation, and improve teaching quality and level ^[4].

4.3 Practice Teaching Reform

Strengthen laboratory construction: provide students with better experimental environment and equipment, so that students can have a deeper understanding of the practical application and operation of electromechanical integration technology.

Comprehensively promote practice teaching: practice teaching is applied throughout the whole learning process. Through experiments, practical training, practice and other ways, students can participate in and operate in practice to improve their practical ability.

Deepen industry-university-research cooperation: actively cooperate with enterprises, scientific research institutions, etc., closely combine students with practical work, so that students can better understand the needs of enterprises and the progress of the industry, and enhance students' innovation awareness and practical ability.

Promote innovation and entrepreneurship education: in practical teaching, actively foster students' innovation awareness and entrepreneurship, provide students with opportunities and platforms for innovation and entrepreneurship, guide students to combine theoretical knowledge with practical problems, and foster students' innovation and practical ability^[5].

4.4 Construct Evaluation System

The ultimate goal of the reform is to enhance the quality of education. Therefore, it is necessary to establish a complete evaluation system to effectively evaluate and feedback the teaching reform. The evaluation system should include student evaluation, teacher evaluation, enterprise evaluation and other aspects to comprehensively reflect the effectiveness and problems of teaching reform.

4.5 Strengthen Education and Teaching Management

4.5.1 Optimize Curriculum

Enrich the course content and increase the pertinence: the course content should be adjusted according to the actual needs of students and market needs, and increase the practicality and pertinence, so that students can better grasp and apply the knowledge they have learned.

Strengthen the combination of theory and practice: the curriculum should focus on the combination of theory and practice, increase practical and operational teaching links, so that students can better grasp and apply the knowledge they have learned, and enhance their practical ability and innovation ability.

Optimize the curriculum structure and achieve a closely linked curriculum system: the curriculum should be reasonable, avoid duplication and redundancy, and achieve a closely linked curriculum system, so that students can better understand knowledge and master skills.

Introduce new teaching methods and technologies: teaching methods and technologies are crucial factors of teaching quality. New teaching methods and technologies should be actively introduced, such as network teaching, mobile teaching, experimental teaching, etc., to enhance teaching effect and quality^[6].

4.5.2 Improve the Level of Teachers

Improve teachers' teaching level: schools can enhance teachers' teaching level and ability by holding teaching training courses, organizing teaching seminars, and carrying out teaching observation activities. Schools can introduce excellent teachers at home and abroad and strengthen the construction of the teaching staff.

Strengthen teachers' scientific research ability: teachers' scientific research ability and level can not only enhance their own quality and ability, but also provide better teaching resources and guidance for students. Schools can promote the improvement and progress of teachers' scientific research ability by establishing scientific research platforms and organizing scientific research projects.

Give teachers more teaching autonomy: schools should give teachers more teaching autonomy, let teachers have more decision-making power and control power, and enhance teachers' initiative and creativity. Schools can establish an evaluation mechanism to evaluate, reward and punish teachers' teaching quality, and encourage teachers' enthusiasm and initiative.

4.5.3 Strengthen Student Management

Strengthening student management is very crucial for enhancing teaching quality and students'

quality. Students are the main body of teaching. Only by strengthening student management can students' learning effect and quality be guaranteed. Strengthening student management can also enhance students' awareness of education and responsibility, foster students' self-discipline and self-confidence, prepare students for their career, enhance students' awareness of education and responsibility. In teaching, it is essential to strengthen the education and management of students, foster students' self-discipline and sense of responsibility, and let students consciously abide by the rules, regulations and teaching requirements of the school and college.

4.5.4 Strengthen Practical Teaching

Strengthening practical teaching is very crucial for enhancing students' comprehensive quality and employment competitiveness. Practical teaching can help students gradually master practical work skills and professional qualities in practical operation, and enhance students' self-confidence and employment competitiveness. Practical teaching can also help students better recognize the actual operation and market demand of enterprises and prepare for employment and entrepreneurship.

First of all, the significance of practical teaching should be fully considered in the curriculum design, and practical courses should be included in the curriculum system, such as experimental courses, practice courses, graduation design, etc. In the classroom teaching, we should strengthen the practical teaching link, use case analysis, discussion, simulation and other teaching methods, so that students can understand the actual situation in the work through practical operation, and enhance the ability to solve practical problems. Finally, the establishment of practice base can provide students with practice opportunities, let students participate in real projects and work, and enhance practical ability and professional quality.

5. Conclusion

In short, mechatronics technology is a hot topic in the current industrial field, and the mechatronics technology specialty is also favored. Owing to the progress of industry and technology, the demand for mechatronics technology specialty will also increase. Therefore, it is of crucial significance to reform the teaching of mechatronics technology specialty. By strengthening teacher training, curriculum reform, teaching means update, and strengthening education and teaching management, we can achieve innovation and reform in the teaching of mechatronics technology courses, enhance students' comprehensive quality and employment competitiveness, and better adapt to the future progress trend.

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