

Research of the Integration of Professional Courses and Discipline Competition under the Background of Engineering Education Accreditation

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ACKNOWLEDGMENT: This work has been supported by 2018 Hubei Province Education and Research Projects [No. 2018452], thanks for the funding provided.

Abstract: In the context of engineering education Accreditation, the integration of discipline competitions and professional courses has also been widely adopted. It can fully improve the quality of teaching and promote educational reform under the engineering education accreditation system. The purpose is to reform the traditional teaching model to train professional talents. This article takes the Mechatronics major as an example to discuss how to strengthen the teaching of professional courses in the context of engineering education Accreditation, and promote its integration with discipline competitions to cultivate the innovative ability of students.

Keywords: Engineering Education Certification; Professional Teaching; Discipline Competition

In order to improve the quality of talent training in colleges and universities and ensure the professional level of engineering, China established the "Engineering Accreditation Standards" in 2012, which aims to improve students' professional abilities through reasonable education which focuses on employment orientation and the instruction work to comprehensively carry out the engineering certification standards in terms of educational methods, curriculum goals, and qualified teachers, etc. Most colleges and universities in China have carried out engineering professional teaching reform in regard to the "Engineering Accreditation Standard". what's more, Mechatronics is a very promising profession with the progress of science and technology and increasing demand for Mechatronics talents in China. The traditional teaching model of Mechatronics has turned to be unable to explore a teaching model of the integration of discipline competitions and professional teaching.

1. An overview of Mechatronics

Mechatronics is a comprehensive technology that includes various mechanical and electrical resources and requirements related to the function and theory of the Mechatronics system. It requires the practitioner to apply various methods to effectively achieve the best result. Under the premise of continuous development of computer technology, Mechatronics has been more widely applied in industries due to its advantages of low energy consumption, high accuracy, and strong functions. Moreover, after years of development and research, Mechatronics has been integrated with artificial intelligence and automation and got greatly developed^[1]. The Mechatronics discipline mainly studies the technology and principles of Mechatronics and cultivates Mechatronics theoretical researchers, professionals, and engineers. With the widespread application of Mechatronics, most of the universities in China are offering the Mechatronics major.

2. Measures of teaching reform to integrate discipline competitions and professional courses in the context of engineering education accreditation

2.1 Establishing teaching system and content

In the practical teaching of Mechatronics, the educator are responsible for accelerating the reform to rationally and scientifically organize the content to give effective introductions on the graduation project, internship, and teaching modules for students, so that to realize the reform of overall teaching system. When designing the teaching system and content, the teacher should penetrate teaching throughout the whole learning structure to improve students' comprehensive skills, professional skills, and practical skills so as to build up their application and problem-solving abilities. Similarly, in the teaching of Mechatronics professional courses, the three modules should be reasonably arranged to promote the development of professional course teaching^[2].

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doi: 10.18686/ahe.v4i5.2278

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when explaining to students, teachers should set the teaching content reasonably according to the actual needs for talents, social development, etc., to promote student development and improve their professional abilities.

2.2 Constructing the professional teaching team

The teaching model focus on implementing discipline competitions in the teaching process to improve students' abilities so that it is necessary for universities to build up a professional faculty and establish a practical evaluation system for the competitions. To perfect the faculty, colleges and universities should encourage teachers to go to enterprises and participate in practices, strengthen communication with other colleges and universities, and share teaching materials to make the best use of the advantages and bypass the disadvantages and continuously optimize the teaching process^[3]. When establishing the evaluation system, it is necessary to conduct the assessment from a comprehensive perspective, and give feedback to students in a timely manner so that they can make appropriate adjustments by reviewing the results. The process can greatly improve the students' ability. In the actual evaluation system for discipline competitions, it is necessary to take scores as the basis for evaluation and pay attention to the improvements in students' practical abilities and thinking patterns.

2.3 Including competitions in the teaching content to improve students' capabilities

In the traditional teaching process of Mechatronics, although the class is student-centered, the teaching model needs an effective reformation to combine professional education and discipline competitions. Teachers should take the competition as the main part of teaching content to allow students to explore the subject through research projects, contests, and competitions, etc., to enhance their professional abilities. The class should enable students to practice skills needed in the competition project so that after class they can further develop their abilities. Teachers can organize various Mechatronics activities to encourage students to experience discipline competitions and develop their professional abilities^[4]. For example, the teacher can organize a small scale competition of "Mechatronics Equipment Assembly" to improve students' hands-on skills, an "Equipment Inspection" competition to enhance the students' operational ability, a "Gas Installation" competition to develop students' basic application ability, an "Equipment Debugging and Assembly Record Filling" competition to cultivate students' good work habits, an "Electrical Control Circuit Installation" competition to improve students' circuit assembly ability; a "PLC Control Program Coding" competition to cultivate students' programming ability or an "Installation of Touch Screen" competition to improve students' organization ability, etc.

2.4 Benchmark the standard against competition to promote teaching reform

In the actual teaching process of Mechatronics major, the inserting of professional technology in the discipline competition can effectively accelerate the teaching reform of the Mechatronics major. The projects selected in the discipline competition are all representative items of the engineering industry and are no doubt beneficial for the comprehensive development of the future engineering industry in China which represents the forward-looking and instructive nature of discipline competition^[5]. Unusually the scholars responsible for assigning the competition topics are technical scholars in engineering companies who clearly understand the requirements of enterprises. Therefore, the competition projects become highly-related to the actual demands of engineering companies, representing the technology and professional needs of enterprises^[6]. Mechatronics competition projects include interrelated multiple modules. and multiple modules will also be integrated. In the actual teaching process, teachers should explain the procedure and each module carefully to integrate the explanations into professional courses. This kind of teaching reform will improve the learning experience of students and promote their progress of professional abilities.

3. Conclusion

In the context of engineering education, cultivating professional talents, and improving the quality of teaching are the main tasks of teaching reform. It is highly advisable to utilize the excellent resource of discipline competition and fully integrate it with the teaching of professional courses in the process of continuous improvement of Mechatronics major. Thereby, it will contribute to the comprehensive development of students to prepare future professional talents for society.

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