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Exploration on Engineering Education Mode of Measurement and Control Technology and Instrument Specialty under New Engineering Background

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Abstract: ***New engineering is based on the national strategic development demand, international competition of the new situation, fostering virtue through education of new requirements and it proposed a new reform direction at engineering education. Measurement and control technology and instrument specialty signed with school of aviation enterprise apart all the way to college students as an opportunity to practice education base to meet the school running orientation, application-oriented personnel training as the instruction, in face-to-face courses, experiment and practice base, teaching staff training resources as the main body, starting from the teaching methods, make full use of the advantage resources, in view of the measurement and control of professional structure and characteristic, optimize the curriculum system and the construction of practice teaching platform sharing type, explore the new mode of engineering education under the new engineering background.***

Keywords: The new Engineering; Engineering Education; Talent Cultivation; Curriculum System

1. Introduction

"New engineering" is a Kind of "Chinese plan" put forward by the reform of higher engineering education in China[1], the core of which is the reform and innovation of talent cultivation mode. Measurement and control technology and instrument major is a traditional major. How to integrate new engineering education concept to transform and upgrade the traditional major and bring new vitality to the major? In this "New engineering" economic form, the major of Measurement and control technology and instrument has recognized that the traditional higher education must adapt to the demand of industrial development, which requires the specialty to further explore can be combined with the concept of "new engineering"[2], further deepening the reform of education practice, promote the talent cultivating innovative research, planning engineering education new development, explore the new mode of engineering education, so as to realize the new requirements of new engineering construction..

2. Highlight the application of characteristics of talent cultivation innovative ideas

In college and enterprises signed the "construction of off-campus practice education center cooperation agreement", after the combination of higher education in the new requirements, new requirements under the new situation, according to the requirements of the provincial first-class professional construction and school training aviation characteristic of the subject of the applied engineering and technical personnel, professional research and control in the demand of the aviation enterprise, found that aviation manufacturing process including design, production, test, test 4 stages, the specific content of the experimental involves the static, dynamic strength, fatigue strength test and test equipment control, etc., covering parts and small machine products, The demand for talents at this stage of the experiment is closely related to the talent training goal of the measurement and control major, and engineering and technical talents who can complete the work at this stage are urgently needed.

Therefore, college and enterprise experts discussion to develop together for aviation enterprises and related units to demand "measurement and control technology and instrument" professional talent training scheme, and determine training "has the strength test technology applied engineering and technology talents" to measure and control the cultivation of the professional features, on the basis of professional setting principle of pertinence and adaptability, to "pay attention to the application, to adapt to the market, develop characteristic" as guidance, innovation culture concept, build the new engineering background of the new mode of talent training synergy between colleges, in the theory of curriculum system and enterprise depth fusion, in the practice guidance teachers teaching system introduced in enterprises, In the construction of the practical teaching platform, it cooperates with the enterprise, ADAPTS to the enterprise's needs in theoretical knowledge learning, and connects with the enterprise in practical ability.

3. Construct a new Talent cultivation mode of campus-enterprise cooperation

After establishing the relations of cooperation with enterprises, with the strength demand testing personnel of the enterprise under the new situation as the foundation, build synergy between colleges under the new requirements of talents cultivation mode, you need to break the traditional mode of university-enterprise cooperation, joint training, to

strengthen enterprise management, the teaching process of control, improve business party, mainly reflects in:

3.1 Establish the measurement and control professional double lead system

In addition to excellent full-time teachers on campus as leaders, senior research fellows of enterprises are employed as adjunct professors and professional leaders of enterprises. The talent training program of the measurement and control major is determined by the two leaders of school-enterprise cooperation based on the change of market demand for talents.

3.2 Pay attention to the cultivation of characteristics

In the talent training scheme introduced in more training content which adapt to the characteristics of training content, 1) in the process of cultivation of talents introduction, associated with the test link by enterprise part-time professors and engineers on the characteristics of curriculum aircraft entire machine static fatigue testing technology, in the course of theory knowledge by aircraft test link test objects, test process, data acquisition and processing and so on teaching content, teaching forms the enterprise teachers team, team teacher everyone bear the tasks related to the teaching content, on the basis of their tasks in the work the knowledge of measurement and control field, respectively, At the same time, enterprise teachers also employ experts for professional guidance. The practical content of this course is a visit to the whole process of a civil aircraft static test. 2) enterprise teachers participate in the graduation design, the guidance of enterprise through teaching and graduation design instruction, early contact with students, understand students' learning ability and professional ability, the students understand the enterprise culture and enterprise workflow, ahead of the two-way choice, employment agreement together, formed in the process of talent training "to promote teaching and effective training, adapt to enterprise production, first guaranteed employment" the favorable situation.

4. Optimize and integrate curriculum system

In the new engineering background, the education idea is to take the student as the center, so the teaching design is focused on the ability of the students, and Outcome-Based Education (OBE) concept illustrates the school location decision professional training objectives, professional training objectives decision student graduation requirements, graduation requirements determine the course system, course system decided to teaching design, teachers and teaching resources. This is a top-down design, supported from the bottom up process. In this process, curriculum requirements are directly related to graduation requirements. Therefore, the construction of curriculum system is the key to determine how to cultivate students and what kind of students to cultivate, and it is also an important link of talent training. To optimize the course system is to go deep into the industry, analyze the job position, and build the course content according to the job position, job task and work process. On this basis, according to the laws of education in colleges and universities teaching, cognitive and school orientation, a line engineers by the enterprise according to the actual demand design task, and then put forward by theory of school teacher curriculum should know should be the theory of knowledge points and teaching, and by a line of engineers and combining the practical application of practice teaching, finally students can apply what they have learned to practical production.

To establish the advanced concept of talent training of "innovative engineering and technical personnel", and the professional teaching system of applied talents training was rebuilt according to the training mode of applied talents for aeronautical measurement and control[4]. The teaching system includes two branches, on and off campus and applied talents need ability of engineering practice can be divided into three levels: the basic skills, professional ability and the comprehensive innovation layers "progressive, step by step a stratified training, reform the traditional knowledge to systematic education as the goal of teaching system, curriculum system and teaching content, establish ability training as the main line of applied talents training teaching system; Starting from the requirement of improving students' innovation ability, the system of cultivating students' knowledge, ability and quality is planned as a whole, and the cultivation of innovation ability runs through all the teaching links. The optimization and integration of professional curriculum framework is shown in Figure 1.

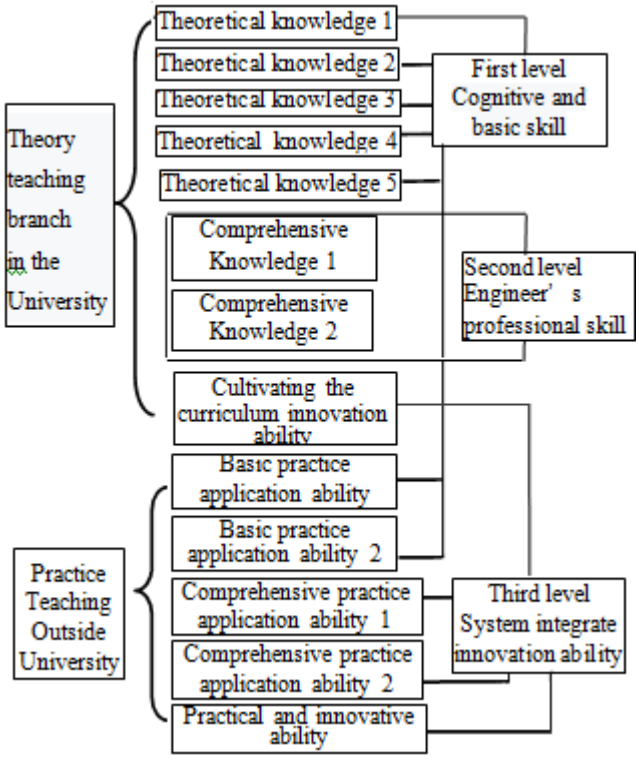

Figure 1: Optimization and integration of professional curriculum framework

In Figure 1, the optimized and integrated curriculum system is divided into two branches, namely, the campus and the off-campus. The knowledge system has three levels, namely, the cognitive and basic skill level, the engineer's professional ability level and the system comprehensive innovation ability level. Among them, according to social needs the theoretical knowledge points classified have five aspects. Together with the two basic practical abilities, they constitute the first layer

of the knowledge system, while the two comprehensive knowledge points constitute the second layer. The cultivation of curriculum innovation ability, comprehensive practical application ability and practical innovation ability are the third layer of knowledge system.

5. Building a Shared practice teaching platform

Under the background of new engineering, talent cultivation is student-centered and enterprise demand-oriented to cultivate students' application ability[5]. Therefore, the measurement and Control Technology and Instrument major takes the aero-engine as the application object, expands and develops the functions of the aero-engine semi-physical simulation parameter test platform, and actively organizes the team of teachers to invest in the construction of the discipline professional platform and the construction of courses. On the basis of the provincial experimental teaching demonstration center of measurement and control technology, two provincial-level demonstrative virtual simulation experimental teaching projects have been developed, namely "aero-engine bench test simulation experiment" and "Aircraft flight attitude control system open virtual simulation experiment Teaching Project". These experimental projects highlight the aviation characteristics of our institute, pay attention to the combination of simulation and practice, and realize the improvement of teaching philosophy. The experimental teaching program not only meets the experimental teaching requirements of this major, but also meets the experimental teaching tasks of other relevant engineering majors. At the same time, it can also provide services for college students' innovative activities and improve the school's ability to cultivate applied talents. Through the Internet, this experimental project is also open to the relevant majors and social personnel of all kinds of colleges and universities in the province (including all kinds of undergraduate, junior college and higher vocational colleges), and plays its due role in promoting the development of higher education in our province.

At the same time, as an important experimental platform for enterprises' high-skill training base, the practical teaching platform jointly developed can accept nearly 30 technical personnel for training every year and attract more relevant enterprises to join the teaching and scientific research practice. To jointly develop experimental equipment with enterprises, it has formed a long-term mechanism combining industry, education and research, established a long-term and stable cooperative relationship between schools and enterprises, better adapted to the needs of engineering education certification, and built a new professional construction mode with practice platform sharing.

6. Conclusion

Under the background of "new engineering" , the measurement and control engineering education professional training mode exploration can boils down to: on the basis of new engineering construction and the development request, upgrade and reconstruct the traditional measurement and control technology specialty, highlight the characteristics of applied talents cultivation idea, depth cooperate with enterprise, adjust the professional structure, results oriented, optimize and integrate professional curriculum system, construct a sharing practice teaching platform, cultivate professional personnel in application and measurement and control technology which meet the demand of engineering education[6]. Under the above concept and construction, the measurement and Control Technology and Instrument major has been awarded as one of the first provincial-level first-class construction majors of our University in 2017, and we are making continuous efforts to obtain the engineering education certification of this major.

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Author Profile

Hong HE received the B.S. and M.S. degrees in Equipment engineering and management and Vehicle Operation Engineering from Northwestern Poly-technical University in 1999 and 2006, respectively. Since 2006, she has been engaged in teaching work in the Measurement and Control Teaching and Research Office of Electronic Engineering College, Xi'an Aeronautical University. At the same time, as the director of the Measurement and control Teaching and Research Office, she is responsible for the teaching management as well as the construction and development of the major. This paper is the research result of the new engineering research and practice project (18XGK2002) of xi 'an aeronautical University .