

Research on Talent Training Mode of Automation Specialty for New Engineering Need

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Abstract. In order to solve the contradiction between the need of talents and the training of talents, a new talent training mode is proposed for automation specialty in College of Electrical and Information Engineering Beihua University. The new mode is researched by referring to the international engineering education accreditation standards of automation specialty and combining with the strategic policies of China manufacturing 2025 and the belt and road initiative and the internet plus and reforming the existing talent training mode. The proposed new mode includes six realization measures and solves three teams of contradiction. This is an innovation of talent training mode for automatic specialty. The new model can match with the economic and social development of national and regional, and match with the school running orientation and school-running characteristics.

Introduction

Automation is a significant symbol of modernization for national industry, agriculture, national defense and science and technology, and is one of the key technologies to promote new technological and industrial revolution [1]. Therefore, the development of automation specialty plays a decisive role in the progress of science and technology and economy in our country.

The Chinese automation specialty originated from the electrification of industry enterprises specialty established in 1952. In order to meet the needs of the national economic construction for the wide caliber talents training and integrate with the international general education, the Ministry of Education of People's Republic of China combined the related specialty and constituted the automation specialty belonged to the electrical information category in 1998. At present, there are 353 colleges and universities opening the automation specialty in China. The specialty has trained a large number of talents for the economic and social development of our country in the past 70 years [2].

Now the economic development of China is coming into the critical period of structural adjustment and transformation and upgrading [3]. The new technology, new product, new business format and new mode are rising up luxuriantly followed by a new round of science and technology and industrial revolution with the internet technology [4]. On the one hand, some new domains are facing with the shortage of talents, such as mobile internet, cloud computing, big data, internet of things, intelligent manufacturing, service manufacturing, e-commerce, mobile medical service, cloud hospital, internet security industry and intelligent security system. On the other hand, some new talent training should be laid out in advance, because the new technology is the basis of the new economy, some possible new technologies, especial the disruptive technologies, should be concerned [5]. President Xi Jinping pointed out that we should develop new engineering specialty in accordance with the logic of science-technology-industry at the international conference on engineering science and technology [6].

The automation specialty in College of Electrical and Information Engineering is a characteristic specialty in Beihua University. It has the long history of running a school and some advantages of specialty construction in the electrical and information specialties of Beihua University[7]. But some prominent problems become the bottleneck of the development of automation specialty. Firstly, the first voluntary rate is not higher than the electrical engineering and automation specialty. Because of the broad caliber talent training model, the professional background is not clear. Secondly, the

professionalism of students is not enough. Because of the comprehensive discipline structure, the academic burden is too heavy. Lastly, the engineering ability of students is not strong. Because of the unreasonable course structure, there are too much theoretical classes [8]. There is an urgent need to research the new engineering talent training mode of automation specialty.

The Key Contradictions to be solved

The purposed talent training mode of automation specialty should meet the needs of the new economic and social development and improve the quality of professional talent, however the advantages should be promoted in the current professional construction. The effective method is to continuously adjust the talent training mode under the leadership of the school and the college. The key contradictions to be solved in this project are:

(1) The new talent training mode and old talent training mode are coordinated and unified.

The new talent training mode is forward-looking, and it can satisfy the economic and social development after a number of years. Meanwhile the existing talent training mode has been accumulated for many years, and it is very familiar to teachers. After the revision, the burden of teachers is heavy. The contradiction is outstanding.

(2) The specialization and professionalism are coordinated and unified.

The systemic specialization is represented by the teacher in the whole teaching process, and it has an important role in the development of career for students. But the professionalism was not embodied in the existing specialty architecture, and it relies on the influence of workplace culture and practice. The contradiction is innovative.

(3) The specialty education and quality education are coordinated and unified

The existing specialty education emphasizes the professional knowledge and technology, and it ignores the quality of students. Meanwhile the quality education separated from the specialty education is like a flower without the root. The demands of economic and social development for the talents are quality and specialty. The contradiction is double-faced.

The Realization Measures

There are six realization measures in the researching process: renew educational idea, reconstruction curriculum system, strengthen school-enterprise cooperation, Opening up professional features, distributary training students and develop the comprehensive ability. Then introduce one by one.

Renew educational idea. The idea is a guide for the action. Now the college entrance examination is reforming. After two years, the first and seconder batches are canceled and matriculation is according to the specialty ranking. So the specialty connotation construction is important. Teachers are not only the imparting of knowledge skills, but also the instructors of students' life. The employment of students is widely concerned. The concepts of "student-centered", "output-oriented" and "job-oriented situation" are carried out the implementation of the researching.

Reconstruction curriculum system. The structure of the existing curriculum system is changed. The humanities and social sciences and natural science are added in the basic courses. The proportion of the basis courses is 20%. The professional competence is added in the specialized courses. The proportion of the specialized courses is 30%. The rest of courses are employment development and professional direction training. The trained talents have the thick foundation and wide caliber employment abilities.

Strengthen school-enterprise cooperation. The deep cooperation is carried out between the school and the enterprise. The school trains the latent according to the needs of the enterprise. There are the platform of practice and training, the platform of professional construction management, the platform of teaching staff management and the platform of field trip management, which are managed both the school and enterprise. There are good for students to adapt to work as soon as possible and conducive to teachers to adapt to technical needs as soon as possible.

Opening up professional features. The existing professional direction is motion control and process control. The motion control usually researches the speed and position control of various types of motors. Now the robots are popularity, and the actuators of the robot are mostly the motors. So the first professional feature is the control of the robots. The process control usually researches the implementation of control process and the application of control system. Now the needs of the process control are diversity, and the advantage control strategy is the intelligent control. So the second professional feature is the intelligent control of the process.

Distributary training students. There are general three kinds of flow after graduation: employment, further study and going abroad. Different flow of students needs different training process. The students determine the directions as soon as possible and develop according to the requirement of the flow. The distributary training can ensure the maximization of the students' goal realization.

Develop the comprehensive ability. The training talents of the new engineering have the ability of quality, ability and knowledge. The quality dimension includes sense of responsibility and dedication spirit, struggle spirit and willpower and interdisciplinary cooperation spirit. The ability dimension includes knowledge acquisition ability, comprehensive application of knowledge ability, engineering practice ability, pioneering and innovation ability, organization coordination ability and cross-cultural communication ability. The knowledge dimension includes wide and generous basic knowledge, profound professional knowledge, and cross domain knowledge reserve.

The New Talent Training Mode

The talent training mode of new engineering automation specialty must carry out the new development concept of innovation, coordination, green, open and sharing, and be innovated by the new concept of engineering education.

The proposed talent training mode is shown in Fig. 1. The added parts are highlighted in gray background shadow. They are the specialized ability training system, student assessment, fraternity assessment and society assessment. The specialized ability training system can make up for the inadequacy of the original training mode. The three assessments can add the feedback loops. The new talent training mode is a multi-objective and multi-loop closed loop control system.

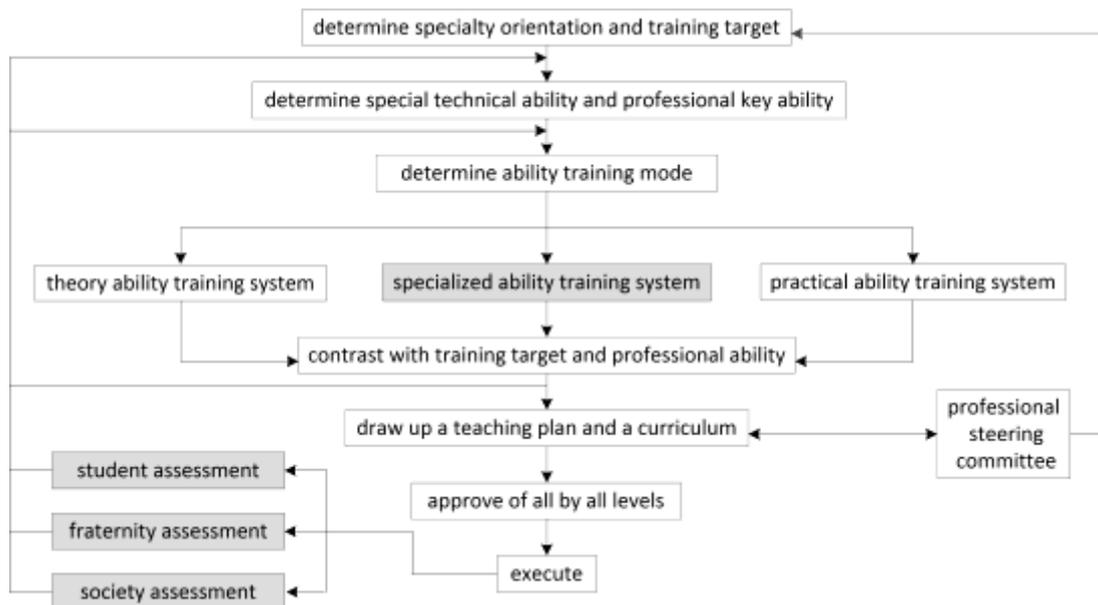


Figure 1. The proposed new engineering talent training mode for automation specialty

Summary

This paper proposed a new talent training mode of automation specialty in College of Electrical and Information Engineering Beihua University. referring to the international engineering education accreditation standards of automation specialty and combining with the strategic policies of China manufacturing 2025 and the belt and road initiative and the internet plus and reforming the existing talent training mode, the new mode includes six realization measures and solves three teams of contradiction. It is a multi-objective and multi-loop closed loop control system and can match with the economic and social development of national and regional, and match with the school running orientation and school-running characteristics.

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