

Research on Deepening Transformation of Automation Talent Training Mode Based on Engineering Application

Yao Jin, Feng Jing, Yao Xuan, Chen Licheng, Ye Meilin

College of Mechanical and Material Engineering, Wuzhou University, Wuzhou Guangxi, 543000 China

Keyword: engineering application; automation; talent training; transformation

Abstract: At present, the country is vigorously promoting the reform of higher education, emphasizing that the practical application should be gradually taken as the teaching guide in professional teaching. In order to meet the needs of society for talents, especially for the teaching of engineering majors, automation represents the future trend of industrial development, which is very important. Therefore, it is necessary to consciously carry out teaching reform and take engineering application as the teaching direction when teaching automation major. This paper focuses on the topic to be discussed so that the talent training model can meet the needs of the society.

1. Introduction

An important aspect of the reform of higher education is that it must be closely integrated with practical use. On one hand, students will be able to realize the “seamless connection” between the theory and practical application immediately after graduation, so that students can effectively get rid of the problem of “difficult employment for college graduates” in line with the needs of society. It is to enable them to find a professional corresponding satisfied job. On the other hand, it is also conducive to employing but seeking professional quality of qualified personnel. For the automation professional talent training model, it is closely combined with the actual application. The key is to be guided by engineering application, and all teaching activities should be satisfied with the goal of engineering application.

2. The Goal of Training Automation Talents Based on Engineering Application

Combining the theory knowledge of automation specialty with professional practice is for the purpose of engineering technical talents in automation field who have the ability to solve complex engineering problems, which takes students as the center. This is the basic explanation of “the goal of Automation Talent training based on Engineering Application”. Specifically, it is composed of the following aspects.

According to the specific development needs of students, by implementing education and teaching activities that combine professional compulsory courses with specialized elective courses, students can become professional engineers with field expertise, proficient practical operation skills, and strong innovation and entrepreneurship. Teaching reforms include the revision of personnel training programs, the reform of teaching content and teaching methods, and the enhancement of innovative practices.

2.1 General automation professionals

The goal is to cultivate the students to become the talents in the production construction, who can use automation technology skillfully, and realize the transformation from the professional theory to the design plan. The people are expected to become the ones who ultimately make the product research and development come true. And its specialized fields include industry, military, biology, medicine, agriculture, forestry, transportation, environment, economy, finance and so on.

2.2 Top automation professionals with the ability to innovate

The training objective of these students is that they can also make bold breakthroughs and

innovation so as to effectively improve the quality and efficiency of product development.

2.3 Independent entrepreneurial talents

The goal of this section is to cultivate the students into the ones who also have a forward-looking entrepreneurial mind and business vision besides being able to have excellent professional qualities. They also have strong management ability. After graduation, they can rely on automation professional background as the platform to start a business, and eventually become entrepreneurial talent.

2.4 Project management talents

The goal of this group of students is to have not only excellent professional qualities, but also good interpersonal skills and organizational and managerial skills, as well as the ability to coordinate different aspects of relationships. In this way, they are in the background of an automation major, and will become qualified project managers in the future.

See Table 1 on the training objectives of Engineering Application-Oriented Automated talents in all aspects:

Table 1. Training objectives for all aspects of Automation personnel oriented by Engineering applications

Talent category	Ordinary talents	Innovative talents	Independent entrepreneurial talents	Engineering management talents
Train objective	Skillfully use of automation technology in production and construction	Ability to innovate on the basis of mastery of technology	Have the management ability on the basis of mastering the technology	Have engineering management ability on the basis of mastering technology

3. Requirements for professional competence of engineering-oriented automation professionals

For students majoring in automation, the vast majority of them are required to enter industrial production lines or scientific research institutions after graduation to undertake jobs related to automation. According to the nature of their work, the professional competencies they must possess are:

First, the ability to analyze automatic control system and select control scheme is good, and the research and development ability of automation technology and automation system is strong. It is skilled in automatic control and numerical control system, and skilled in operation.

Second, they are expected to be able to test, debug and maintain the operating systems of all aspects of automation.

Based on the above requirements, the engineering application-oriented training model of automation talents must focus on the practical requirements of engineering technology, and the teaching plan. Its teaching must conform to the five-point principle, that is, "thick foundation". We should pay more attention to practice, emphasize application and stimulate innovation. Among them, basic theory, practical ability and innovation ability are indispensable. See Table 2 for the requirements of these five principles:

Table 2 The five point principle of professional competence requirements

Principle	Thick foundation	Wider aperture	Emphasis on application	Stimulate innovation
Requirement	Stress on basic cultivation	Multiple sources of expertise	Stress on practical Teaching	Cultivate students' innovative ability

4. The Common Shortages in the Traditional Automation Talent Training Model

In order to realize the guidance of engineering application in the training mode of automation talents, we should carry out the teaching reform, change the teaching idea, and innovate the teaching mode [3]. It can be said that there are some disadvantages in the traditional automatic talents training mode. These disadvantages seriously hinder the realization of the goal of engineering application.

4.1 Too much theoretical teaching and insufficient practical teaching

This is the "common problem" of many colleges and universities - only paying attention to theoretical teaching but neglecting practical teaching. After the students enter the school, they will be trained in accordance with scientific research talents. This led to a large amount of theoretical teaching taking up most of the class hours in teaching, but not paying enough attention to practical teaching. This is reflected in the fact that there are too few classes in practical teaching. Even if there are, it is often "passing along the way." Teachers do not teach with heart and students do not really realize the importance of practical teaching. In this way, the cultivated talents are likely to be "incomplete" talents with rich theoretical knowledge and lack of practical ability, and it is difficult to meet the needs of the job market. This is one of the reasons why many graduates find it difficult to find employment.

4.2 The teaching of theory and practice cannot meet the specific needs of contemporary engineering application.

Nowadays, with the rapid development of science and technology, we must keep pace with the times in automation teaching to meet the needs of the times. However, at the current stage, the automated teaching system of many colleges and universities is relatively backward, and the teaching content is far from satisfying the needs of contemporary engineering applications both in theory and in practice. For example, today's automated operating system has already entered the digital era, but some teaching content still remains at the traditional technical level. It is difficult for students to come into contact with forward-looking automated knowledge systems during school hours, and it is difficult to access forward-looking automation technology. This results in students having a good grasp of what they have learned during school, and it is difficult to adapt to jobs after graduation.

4.3 Less attention to the students' basic English

A qualified automation personnel must have a good command of English, who are able to read the latest foreign technology English, become familiar with the automation technology English logo. Otherwise it is difficult to meet the needs of current work. However, some automatic professional students has poor English capacity. They only focus only on imparting professional knowledge, but ignore the tamping on their English skills. This leads to their English level is insufficient in the long term. That eventually dragged their professional development on their future employment.

4.4 The insufficient combination of industry, education and research

The production, study and research are a coherent whole. The implementation of the cooperation among the three universities is an inevitable trend in the development of higher education. Through the cooperation between technology demanders and research institutes or institutions of higher education as technology suppliers, companies can promote the effective combination of various factors of production needed for technological innovation. Especially in this era of knowledge-based economy, the cooperation among the industry, universities, and research institutes is even more important. However, at the current stage, many university automation majors still have insufficient cooperation in production, education, and research. The three cannot effectively complement each other, and this has also led to a drag on the teaching of automation majors.

4.5 Lack of a good practice environment.

The project application oriented automation talent training model has higher requirements for

students' internship during the school period, because students can only practice through perfect practice. In order to truly understand how automation is applied in engineering technology, they can effectively exercise their ability to use, operate, and realize the transformation from knowledge to ability in practice. However, at the present stage, many colleges and universities lack a good practice environment. Practice factories cannot cooperate with colleges and universities effectively. Meanwhile, it lacks high quality teachers. All of these have brought some adverse effects to the quality of students' practice.

4.6 The cultivation of students' engineering management ability neglected

As mentioned above, one of the training objectives of the automated personnel training model oriented to engineering applications is to allow some students to become engineering management talents. This requires the timely discovery of talents skilled in project management in teaching, so that they can consciously strengthen the training of project management in peacetime teaching. However, at this stage, many colleges and universities have neglected this point and implemented the same training program for all students "uniformly", ignoring the special personality and expertise of students. This is also unfavorable for talent training.

5. Project Application-oriented Implementation of Automation Personnel Training Model

In the long term professional teaching practice [4], some backward aspects can no longer satisfy the implementation of the automatic talent training model guided by engineering application, which requires us to actively reform the teaching scheme.

5.1 Strengthen practical teaching

The local educational administrative departments, universities and automation professional teachers should take the initiative to recognize the importance of the practice teaching. In teaching arrangement, it is to fully guarantee the proportion of practical teaching, overcome the drawbacks of earlier emphasis on theory and ignore the practice. It should focus on the theory teaching and practice teaching. Combining with each theory the teaching of a stage, we must promptly let students "warm up" in practice. Through the combination between theory and practice, we promote the practice of theory and practice. At the same time, it is also to strengthen the assessment of teaching practice, making practice evaluation rigorous practice for students who fail to meet the requirements.

5.2 Improve the content of the teaching curriculum and consolidate the students' English foundation

In teaching, we must carefully analyze the application of the latest automation technology. According to the trend of the times, we should reasonably arrange theoretical and practical teaching contents, and replace those outdated and backward contents with forward-looking and practical ones. Trying to make the teaching content reflect the times and meet the needs of the latest automation technology.

In addition, for those students who have a poor English foundation, they should pay attention to helping them make up for English after they enter school, and lay a solid foundation for English to suit the professional teaching behind.

5.3 Sign cooperation agreements with solid enterprises and promote close integration of industry, university and research

In order to enable students to have a good internship environment, the institutions must take the initiative to sign cooperation agreements with reliable companies and provide students with a reliable platform for internships. In the process of internship, students should be fully equipped with teachers with professional standards and teaching standards according to the student's internship requirements. In addition, we must establish a comprehensive appraisal system for apprenticeships to carefully assess students' internship status and make full checks.

In addition, colleges and universities must fully promote the close integration of production, education, and research. The three should be fully connected and fully complementary to achieve the effect of 1+1+1>3. Through the cooperation of the three, the quality of professional teaching should be promoted.

5.4 Pay attention to the cultivation of students' engineering management ability

In the process of professional training, colleges and universities and teachers should pay attention to the students who have the talent of engineering management, and pay attention to the cultivation of engineering management. Students can be simulated into several "companies" for group division, and different roles can be assigned to students according to their different specialties. In this way, students can be actually rehearsed in the simulated scene. Make their expertise be further trained and developed, which can lay a good foundation for their further professional development.

Table 3 Implementation Scheme of Talent training Model

Improved method	Strengthen practical teaching	Improve the teaching content and consolidate the English foundation	Improve the Teaching of practice and strengthen the combination of production, Learning and Research	Pay attention to the cultivation of Engineering Management ability
Cultivation content	Ensure the time and quality of practical teaching	The content of the course should keep pace with the times and help the students who are poor at English to strengthen their basic English.	Sign cooperation agreements with reliable enterprises, and effectively promote the integration of production, education and research.	Identify students with a talent for engineering management and rehearse the simulation scenes in the teaching process.

6. Summary

The training mode of automation talents based on engineering application representing the latest trend of automation major teaching at this stage. So how can we effectively promote the teaching of automation specialty to be guided by engineering application in real sense? In order to effectively promote this transformation, we should analyze, integrate and perfect the teaching system from many angles, so that the automatic talent training model can really meet the needs of talent training of the times.

Acknowledgments

Guangxi Vocational Education Reform Project (GXGZJG2015A013); Wuzhou University Education Reform Project (Wyjg2016B012); Wuzhou University Key Research Project (2017B003).

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