

Promoting learning through Competition -- curriculum system reform of Internet of Things engineering specialty

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Abstract: This paper studies the professional curriculum system reform of Internet of Things engineering. Firstly, the problems faced by the emerging majors represented by Internet of Things engineering were analyzed. Secondly, targeted countermeasures were put forward. Finally, the new curriculum system was constructed based on the curriculum reclassification starting from the curriculum group. It was integrated with the discipline competition, which shows the effectiveness of students participating in the competition after learning through the new curriculum system. The research results of this paper have practical significance for optimizing and perfecting the curriculum system of Internet of Things engineering.

Keywords: Internet of Things, Reconstruction of the teaching curriculum, Discipline competition

1. Introduction

Internet of Things engineering is an important part of China's "new career", because China has entered a critical development period of a new generation of information technology, and it is also an epitome of the demand for new talents for enterprises and industries in a new development stage. For a long time in the past, traditional engineering majors used professional laboratories to carry out practical training on the basis of theoretical teaching and basic professional courses, which has been a typical way of engineering education in China. It plays a key role in talent training and could also meet the requirements of traditional professional talents. However, the new occupation requires more comprehensive and professional talents, and the model of curriculum + experiment has been difficult to meet to the current talent cultivation needs. Therefore, it is urgent for universities, enterprises and students to cooperate and reconstruct the professional curriculum system.

In recent years, various high-level competitions represented by China College Student's "Internet Plus" Innovation and Entrepreneurship Competition have increasingly taken all-round talent training as the purpose of the competition[1-4], which indeed plays an important role in promoting the development of emerging majors represented by Internet of Things Engineering. "Promoting studying with competition" is deeply affecting the reform of emerging professional curriculum system. This paper takes the Internet of Things Engineering of Beijing Institute of Petrochemical Technology as an example to expound how to carry out discipline competitions and build a practical and professional curriculum system.

2. The problems faced by Internet of Things engineering

The Internet of Things Engineering of Beijing Institute of Petrochemical Technology is formed to meet the actual needs of Beijing's new generation of information technology and related industrial upgrading. It is formed by integrating the advantage courses and teachers team of two national first-class majors of Automation and Computer Science and Technology, taking the construction of "new engineering" as a basis, the development of "new career" as an opportunity, and the traditional professional framework of measurement and control technology and instruments, as shown in Figure.1.

However, the construction of the curriculum system is still based on the traditional professional thinking of engineering, without a deep understanding of the enterprise's employment demand for "new career" positions. The traditional fixed thinking of talent training can't meet the new vocational requirements, especially the new talent training mode integrating "college education", "enterprise employment" and "lifelong learning", which is a common problem faced by emerging majors in China and a major challenge faced by colleges and universities in the new era.

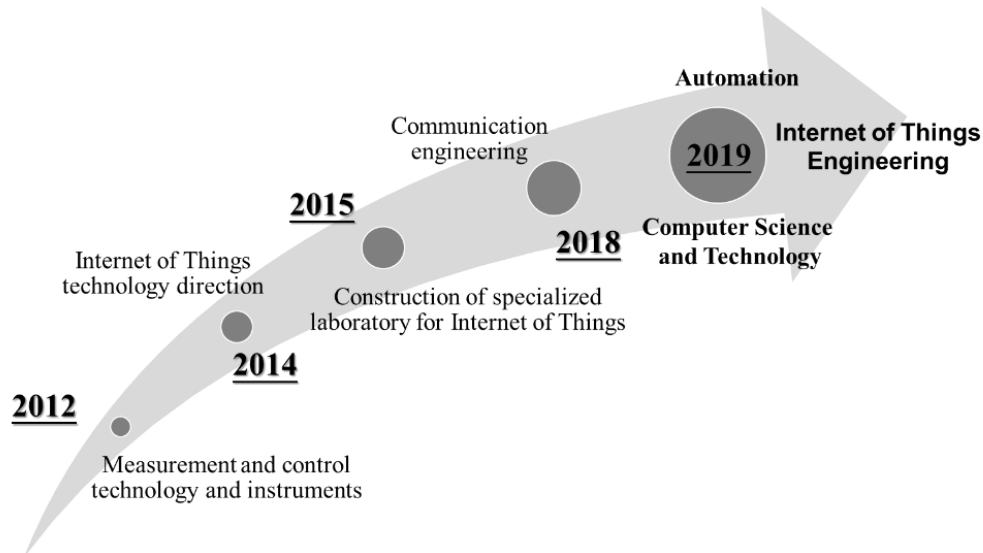


Figure 1: Development history of Internet of Things Engineering major in Beijing Institute of Petrochemical Technology

3. Thoughts on curriculum system reform of Internet of Things Engineering

3.1 New ideas and new thoughts

The curriculum system reform of Internet of Things Engineering is in line with the post skill requirements of "new career", takes the cultivation of high-quality application-oriented talents as the goal, integrates deeply the enterprise employment into all links of college education, and pays attention to the common development of students' theoretical knowledge and engineering practice ability. It aims to create the dual engine drive of "promoting studying through competition" [5] and "innovative practices" [6-7]. The colleges and universities and enterprises jointly build a "double-quality" teachers team to truly realize the "student-centered" new ideas and new thoughts of engineering education personnel training.

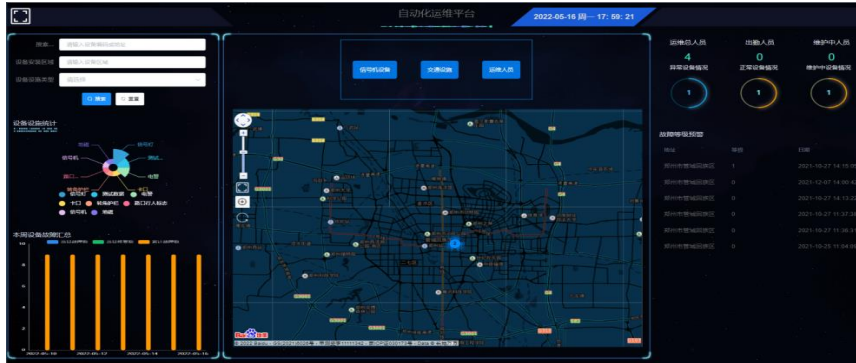
3.2 New goals and new models

The curriculum system reform clearly defines and gradually implements the professional positioning, changing from "Internet of Things" to "Smart Internet of Things". It will promote the construction of multiple disciplines and interdisciplinary integration, and create a new type of engineering platform for cooperation both inside and outside the universities at home and abroad. The reform can effectively adapt to the transformation and upgrading of national and social industrial structure, highlight the cultivation of engineering ability and international vision, and truly provide students with the new goals and new modes of "three-stage integration" of talent cultivation from college education, enterprise employment to personal lifelong learning.

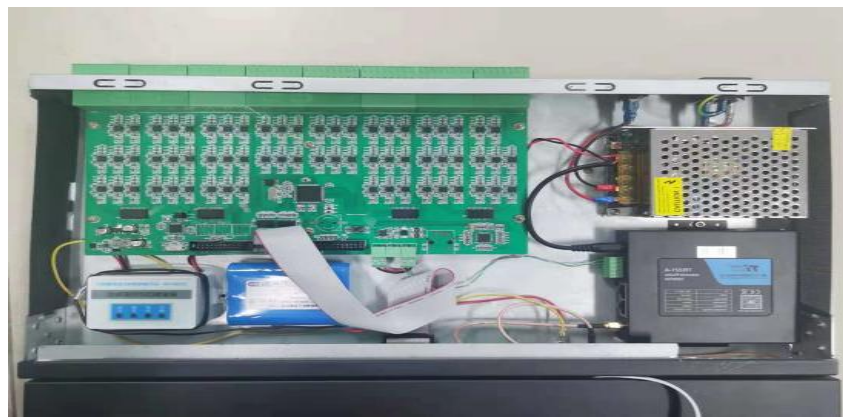
4. The effects of the curriculum system reconstruction of Internet of Things Engineering and integrating "promoting studying with competition"

By fully investigating the core needs of talents' skills in the Internet of Things industry and comprehensively sorting out the teaching objectives and syllabus of Internet of Things Engineering, this paper reorganizes the traditional single curriculum into a curriculum group. On this basis, this paper constructs a new curriculum system that meets the needs of talent cultivation, and forms the

curriculum group classification of “theory curriculum”, “tool curriculum”, “experiment curriculum” and “comprehensive curriculum”. The curriculum system teaching was applied to China College Student’s “Internet Plus” Innovation and Entrepreneurship Competition. Students from different grades could complete the works in the competition with the knowledge they studied, and the teaching effect was very obvious. As shown in Figure 2, the first prize of the school competition is a typical case of “promoting studying through competition”.



(a) Software platform



(b) Hardware devices



(c) smartphone app

Figure 2: Student works of China College Student’s “Internet Plus” Innovation and Entrepreneurship Competition

5. Conclusion

This paper makes an in-depth analysis of the current problems faced by emerging majors represented by Internet of Things Engineering, and studies the curriculum system reform by taking Internet of Things Engineering of Beijing Institute of Petrochemical Technology as an example. Starting from the requirements of enterprise employment, this paper puts forward two strategies: 1) new ideas and new thoughts; 2) new goals, and explore the “three-stage integration model” from college education, enterprise employment to personal lifelong learning. Finally, the curriculum types are reclassified to construct a new curriculum system in line with the needs of talent training, and it is integrated with discipline competitions to achieve the fundamental purpose of “promoting studying through competition”.

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