

# Reconstruction of the Curriculum System of Internet of Things for Emerging Engineering Education and New Career Development

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**Abstract:** This paper studies the reconstruction of the curriculum system of the Internet of things. According to the requirements of the new talent training mode of "three-stage integration" and the deep integration of university education and enterprise employment, it first analyzes the problems existing in the curriculum system of the Internet of things; secondly, it puts forward targeted countermeasures; finally, it uses the new concept to classify the curriculum types to realize the reconstruction of the curriculum system, and takes the Internet of things major of Beijing Institute of Petrochemical Technology as an example to show the division results. The research results of this paper are practical for optimizing and improving the curriculum system of the Internet of things.

**Keywords:** Internet of Things, emerging engineering education, new career development, reconstruction of the teaching curriculum, three-stage integration

## 1. Introduction

The Internet of things belongs to the "emerging engineering education" <sup>[1-4]</sup> and has entered the latest catalogue of "new career development". It is put forward and promoted from the national level to meet the actual needs of the upgrading of the new generation of information technology and related industries. Its goal is to take the construction of "emerging engineering education" as the support and take the development of "new career development" as an opportunity to train applied technical personnel with basic knowledge and basic skills of physical networking, social responsibility, professional ethics and humanistic accomplishment, and international vision. Strong engineering practice ability, can solve the problems of the Internet of things system engineering.

However, the Internet of things in many colleges and universities in China is developed from the major of measurement and control technology, communication engineering or computer science and technology <sup>[5-7]</sup>.

They follow the training goal, training mode and curriculum system of traditional majors. However, the curriculum system of traditional majors does not take into account the change of "new engineering" education and the change of career development in "new profession". Therefore, it is difficult to adapt to the actual needs of enterprises for skilled personnel <sup>[8]</sup>.

In order to solve this problem, this paper takes the Internet of things of Beijing Institute of Petrochemical Technology as an example to analyze the current problems in detail, and puts forward three countermeasures from the macro level. Through the reclassification of curriculum types from the micro level, a forward-looking and practical new curriculum system is constructed.

## 2. Problems facing the Curriculum system of Internet of Things-A case study of Beijing Institute of Petrochemical Technology

The Internet of Things major of Beijing Institute of Petrochemical Technology has also introduced core courses such as Linux Intelligent Programming, Sensor Technology and Communication Technology, as well as online industrial control experiment platform and smart home experiment platform in the course system construction and laboratory construction in the early stage. Although it has played a great role in teaching COVID-19, it also has obvious shortcomings. The fundamental reason is

that the traditional talent training solidified thinking can not adapt to the new vocational requirements, the impact of new technology and modern enterprises to the new demand for talent. In particular, it can not meet the "three-stage integration" of the new mode of talent training, namely "University Education", "Enterprise Employment" and "Lifelong Learning", as shown in Figure 1. This kind of problem does not exist only in our school, it is a common problem faced by emerging majors and emerging professions in China, it is also a confrontation between traditional and emerging.

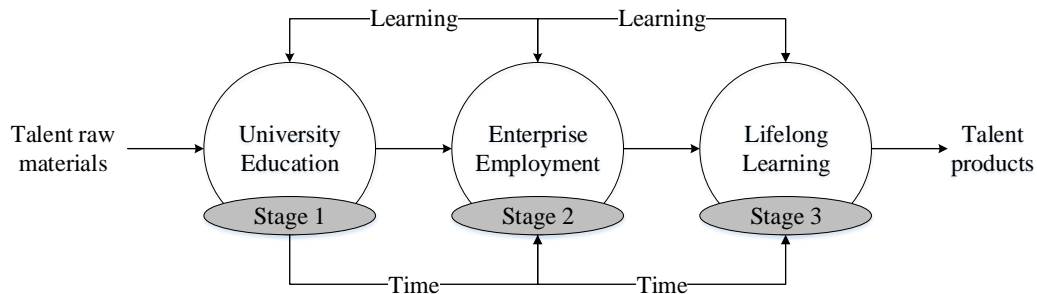


Figure 1: "Three-stage integration" of the new mode of talent training

### 3. Countermeasures for the Construction of Curriculum system of Internet of things Specialty

#### 3.1 Constantly renew ideas and strengthen top-level design

It should focus on the coordinated development of serving the society, take industrial upgrading and social demand as the guidance, cultivate high-quality applied talents as the goal, start with innovative and entrepreneurial education, and take the construction of "double-qualified" teachers as the foundation, take the education and teaching reform as the driving force, take the deep integration of industry, university and research as the support. It should adhere to the principle of coordinated development of the three dimensions of conduct, ability and knowledge, pay attention to the cultivation of engineering practice ability, and comprehensively implement the concept of professional certification of engineering education. and strive to explore and practice the "student-centered" new mode of training talents in engineering education.

#### 3.2 Continuous improvement of professional training goal and orientation

It should meet the needs of the development of "emerging engineering education" and "new career development", integrate "new technology", "new idea" and "new mode", and carry out the construction of "emerging engineering education" in depth. It must clearly define and gradually implement the professional orientation, and change from the "Internet of things" to the "intelligent Internet of things". Effectively adapt to the transformation and upgrading of the industrial structure of the country and society, highlight the cultivation of engineering ability and international vision, so that the teaching content and curriculum system are highly matched with economic and social development, and the ability and quality of graduates are more consistent with the needs of the industry. Take serving the national strategy and industrial development as an opportunity to train engineering applied technical personnel with the abilities of engineering design, system integration, function development, installation and commissioning, operation and maintenance for the new generation of information technology, autopilot, artificial intelligence and other fields.

#### 3.3 Continuously promote the specialty construction and explore the new talent training mode of "three-stage integration"

The educational mode of "emerging engineering education" should be actively explored. We will promote the construction of a new engineering platform for the cross-integration of multi-disciplines, inside and outside the school, and for cooperation at home and abroad. The purpose of this paper is to explore a new talent training mode of "three-stage integration" from the education of colleges and universities, the employment of enterprises to the lifelong learning of individuals. Create a number of full-time online advanced Internet of things laboratories, in-depth refinement of the syllabus and course content. The purpose of this paper is to construct the six-dimensional education mode of "teaching-practice-practice-use-refinement-country" of course teaching, professional experiment, competition

training, project application, intensive employment and international vision, so as to achieve the goal of cultivating talents from colleges and universities to enterprises.

#### 4. The Reconstruction of the Curriculum system of the Internet of things Specialty

The development characteristics of "emerging engineering education" and "new career development" are deeply combined to meet the actual needs of enterprises. It is necessary to comprehensively sort out the teaching objectives and syllabus of Internet of Things major, and reclassify course types based on course group. Construct and form a forward-looking, targeted and practical new curriculum system. In Beijing Institute of Petrochemical Technology in Internet of things as an example, four major core courses are reintegrated and divided. It forms a curriculum system based on "Theory courses", "Tool courses" for proficiency, "Experimental courses" for practice training, and "Comprehensive courses" for comprehensive improvement., as shown in Figure 2.

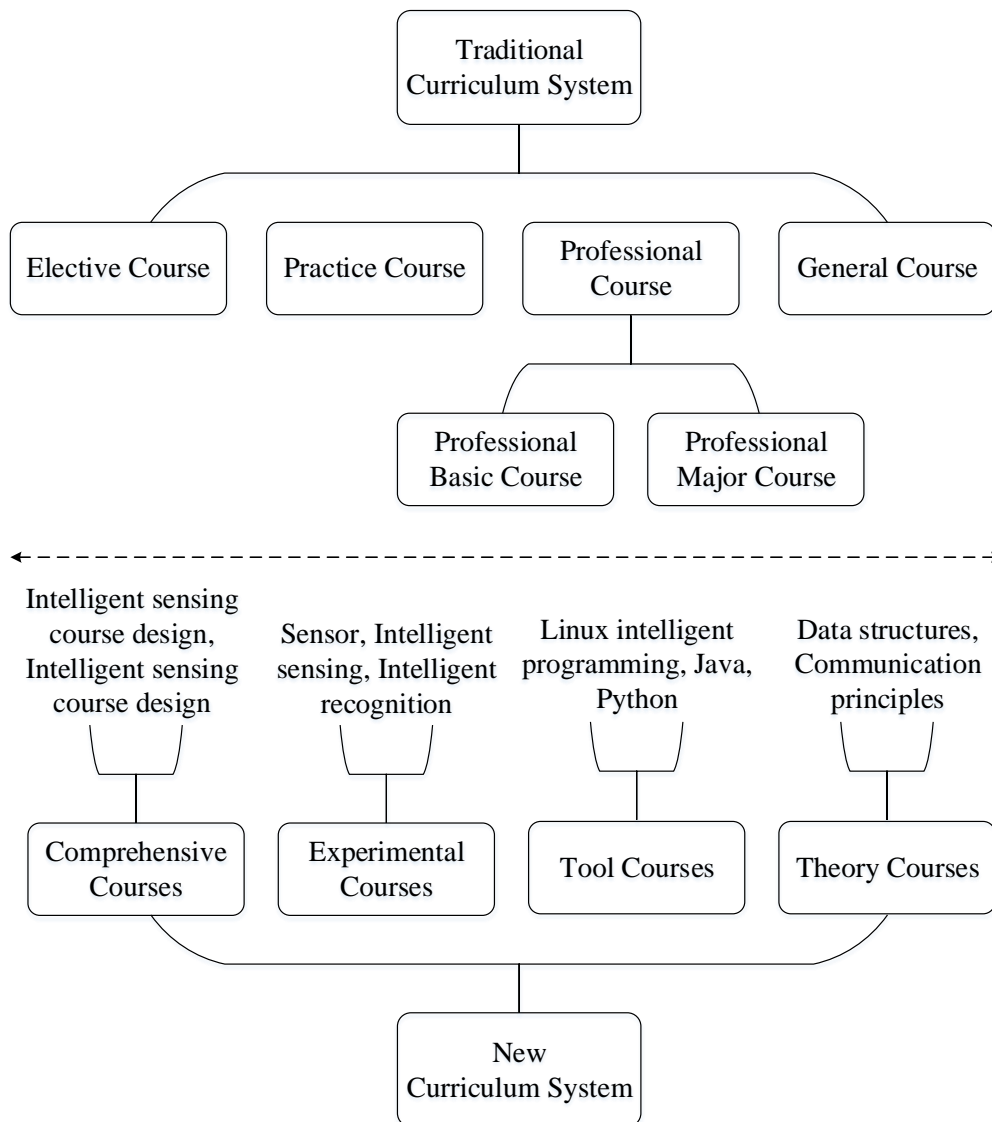


Figure 2: Reconstruct the curriculum system according to the curriculum classification

#### 5. Conclusion

This paper takes the development of "emerging engineering education" and "new career development" as the background to study the reconstruction of the curriculum system of the Internet of things. Starting from the actual needs of enterprise employment, it emphasizes the goals of practical application, precision training and lifelong learning. First of all, the paper makes an in-depth study of the

problems existing in the curriculum system of the Internet of things; secondly, we put forward three strategies: 1) Constantly renew ideas and strengthen top-level design; 2) Continuous improvement of professional training goal and orientation; 3) Continuously promote the specialty construction and explore the new talent training mode of "three-stage integration" Finally, it reclassifies the curriculum types, constructs and forms a new curriculum system with foresight, pertinence and practical application, and takes the Internet of things of Beijing Institute of Petrochemical Technology as an example.

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