

# Analysis of Countermeasures for the Construction of the Integration of Posts, Courses, Competitions and Certifications System for the Internet of Things Major from the Perspective of Vocational Undergraduate Education

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**Abstract:** With the proposal of new-quality productive forces, higher education has ushered in new opportunities for reform. In this context, how to more effectively cultivate students' professional literacy and comprehensive abilities, and train them into high-quality talents meeting the needs of industrial and social development, has become one of the dilemmas perplexing university teachers. In this regard, from the perspective of vocational undergraduate education, universities should keep up with the trend of the times, actively construct the integration of posts, courses, competitions and certifications curriculum system, so as to improve the teaching effect and talent training quality of the Internet of Things major, and provide solid talent support for promoting industrial and social development. Therefore, this paper conducts in-depth research on the construction of the integration of posts, courses, competitions and certifications curriculum system for the Internet of Things major from the perspective of vocational undergraduate education, aiming to provide valuable references for improving professional teaching effects and promoting the reform of university professional teaching.

**Keywords:** Vocational undergraduate perspective; Internet of Things major; integration of posts, courses, competitions and certifications; curriculum system construction

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## 1. Introduction

In 2019, the State Council issued the National Vocational Education Reform Implementation Plan, which clearly proposed to actively promote vocational education reform, carry out pilot projects of undergraduate-level vocational education, promote the development of vocational education towards typification and high quality, and better meet the needs of enterprise development<sup>[1]</sup>. Vocational undergraduate education is another breakthrough in the modernization of China's higher education. Its core goal is to cultivate high-level technical and skilled talents, which is different from the academic talents cultivated by general undergraduate universities and the technical and skilled talents cultivated by higher vocational

colleges. Vocational undergraduate education emphasizes the close connection between education and teaching and industrial needs.

As an emerging industry, the Internet of Things industry has rapid technological iteration, with new products and concepts emerging one after another, which puts forward higher requirements for the literacy and abilities of Internet of Things professionals cultivated by universities<sup>[2]</sup>. Actively promoting the construction of the integration of posts, courses, competitions and certifications curriculum system can effectively break through the limitations of traditional disciplines, integrate educational resources, reconstruct the talent training system, ensure the close connection between professional teaching and post needs, and at the same time, the process of curriculum learning and the process of vocational ability improvement promote each other, and the achievements of skill competitions and vocational qualification certifications complement each other, ultimately realizing the precise adaptation between professional teaching and industrial development.

## **2. Value implication of constructing the integration of posts, courses, competitions and certifications curriculum system for the internet of things major**

From the perspective of vocational undergraduate education, constructing the integration of posts, courses, competitions and certifications curriculum system for the Internet of Things major has important practical significance. In this regard, this paper conducts in-depth analysis from the following aspects.

### **2.1. Posts closely connect with post needs and improve students' core competitiveness**

The post in the integration of posts, courses, competitions and certifications represents post needs, emphasizing post-demand orientation and closely connecting the curriculum content of the Internet of Things major with the actual needs of jobs<sup>[3]</sup>. By in-depth analysis of the needs of the talent market and jobs, optimize professional teaching content to ensure that the professional knowledge and skills learned by students can be directly applied to practical work. Actively constructing the integration of posts, courses, competitions and certifications curriculum system can improve students' core competitiveness and lay a solid foundation for their smooth employment and good career development.

### **2.2. Courses optimize the curriculum system and improve professional teaching effects**

The course in the integration of posts, courses, competitions and certifications refers to professional courses<sup>[4]</sup>. To better meet post needs, this model emphasizes reconstructing the curriculum system to ensure that the curriculum content is always advanced and practical. Specifically, it is necessary to break traditional disciplinary barriers, timely reform curriculum content, integrate the latest technologies, processes and specifications of the Internet of Things industry into the curriculum teaching content, so that students can understand the cutting-edge knowledge and development trends of the Internet of Things industry in the process of curriculum learning, avoid the disconnection between the learned knowledge and skills and the actual needs of enterprises, thereby further improving professional teaching effects and transporting a large number of high-level technical and skilled talents for industrial development.

### **2.3. Competitions stimulate learning interest and cultivate students' practical abilities**

The competition in the integration of posts, courses, competitions and certifications refers to vocational skill competitions<sup>[5]</sup>. By organizing and carrying out various vocational skill competition activities, setting rich prizes to guide students to participate, it can effectively stimulate their learning interest, mobilize their enthusiasm and initiative, and cultivate students' practical abilities and innovative abilities. At the same time, skill competitions can also provide a platform for students to show themselves, help them learn professional knowledge more in-depth and temper their skills, thus laying a foundation for their faster adaptation to the enterprise working environment in the future.

## **2.4. Certifications strengthen vocational certifications and cultivate students' professional literacy**

The certification in the integration of posts, courses, competitions and certifications refers to industry certificates<sup>[6]</sup>. This model emphasizes integrating industry certificates into all links of professional teaching, so that students can obtain relevant vocational grade certificates while learning professional knowledge and skills. These certificates are not only an effective reflection of students' comprehensive abilities but also important credentials for their future job hunting. By obtaining relevant vocational skill grade certificates, students' professional literacy is effectively improved, laying a foundation for their smooth employment in the future.

# **3. Dilemmas faced in the construction of the integration of posts, courses, competitions and certifications system for the internet of things major from the perspective of vocational undergraduate education**

## **3.1. Low degree of integration among various elements of posts, courses, competitions and certifications**

In the process of constructing the integration of posts, courses, competitions and certifications curriculum system for the Internet of Things major in universities, there is a lack of in-depth integration among elements such as posts, courses, competitions and certifications, and there is a phenomenon of each fighting on their own, which seriously affects the improvement of the teaching effect of the Internet of Things major<sup>[7]</sup>. Specifically, the teaching content lacks in-depth integration with the real post needs of enterprises, skill competition projects, vocational certificates, etc., leading to the difficulty of the integration of posts, courses, competitions and certifications curriculum system to give full play to its own role, thus affecting the improvement of students' professional literacy and comprehensive abilities.

## **3.2. Uneven teacher literacy**

Teachers are not only important organizers and participants of classroom teaching activities but also the core driving force for the reform of university education and teaching<sup>[8]</sup>. Teachers' literacy and abilities will have a direct impact on the construction of the integration of posts, courses, competitions and certifications curriculum system for the Internet of Things major. However, some university teachers lack practical experience and have a lack of in-depth understanding of the development of the Internet of Things industry, post needs and the latest standards, leading to difficulties in integrating elements such as posts, competitions and certifications into curriculum teaching, thus affecting the cultivation of students' professional literacy and comprehensive abilities.

## **3.3. Lack of perfect guarantee mechanisms and evaluation systems**

Perfect guarantee mechanisms and evaluation systems are important prerequisites for the construction of the integration of posts, courses, competitions and certifications curriculum system<sup>[9]</sup>. However, at present, some universities lack perfect guarantee mechanisms, and lack necessary financial support in the construction of practice bases, teacher training, activity organization, etc., making it difficult to provide necessary support for the construction of the integration of posts, courses, competitions and certifications curriculum system. School-enterprise cooperation is not in-depth, enterprises lack enthusiasm and initiative, and have not deeply participated in all links of professional teaching, thus affecting the improvement of curriculum teaching effects. At the same time, in terms of the evaluation system, the traditional evaluation method is still adopted, with students' mastery of theoretical knowledge as the main assessment content, lacking evaluation of students' practical abilities, innovative abilities and problem-solving abilities, leading to the lack of authenticity and comprehensiveness of evaluation results, which is difficult to fully reflect students' comprehensive abilities.

## **4. Countermeasures for the construction of the integration of posts, courses, competitions and certifications system for the internet of things major from the perspective of vocational undergraduate education**

### **4.1. Construct a modular curriculum system to achieve in-depth connection between posts and courses**

Guided by the post ability needs of the Internet of Things industry, construct a three-level modular curriculum system of basic-core-expansion to gradually cultivate students' literacy and abilities, making them high-quality talents meeting the development needs of the Internet of Things industry<sup>[10]</sup>. Among them, the basic module mainly covers general knowledge and basic professional skills, such as sensor network configuration and embedded system development. The core module is oriented to enterprise post needs, including a lot of core post knowledge and skills, such as intelligent warehouse management system design, industrial Internet data collection and processing; the expansion module should integrate the latest development trends, new technologies and new standards of the Internet of Things industry, such as edge computing, big data models, 5G Internet of Things applications, etc. At the same time, real enterprise projects can be introduced as practical teaching content to more effectively cultivate students' practical abilities and innovative abilities, laying a foundation for their all-round development in the future.

### **4.2. Build a high-quality teaching team to improve practical teaching levels**

First, improve the teacher training system. Regularly organize teachers to participate in various training and academic activities to reform teachers' concepts, help them establish an educational concept oriented to market needs and centered on cultivating students' professional literacy, enable teachers to have a more in-depth understanding of the connotation and significance of the integration of posts, courses, competitions and certifications, enhance their awareness and ability to integrate post practice, vocational qualification certification, skill competitions, etc. into professional teaching, improve their teaching levels, and thus provide higher-quality teaching services for students<sup>[11]</sup>. At the same time, colleges and universities should also actively build a double-qualified teacher team, and regularly arrange professional teachers to carry out on-the-job training in enterprises to enrich their practical experience and strengthen their comprehensive abilities. Second, do a good job in talent introduction. Invite outstanding enterprise employees and technical experts to work as teachers in the university to improve the overall teaching level of the university's teachers and reform the structure of the teacher team. Finally, improve the teacher evaluation mechanism. In this way, teachers' teaching effectiveness can be evaluated more comprehensively and scientifically. And link the evaluation results with teachers' awards and commendations, professional title evaluation, performance assessment, etc., so as to fully mobilize their enthusiasm and initiative, thereby improving professional teaching effects and talent training quality.

### **4.3. Innovate the integration of competitions and courses mechanism to strengthen practical ability cultivation**

From the perspective of vocational undergraduate education, to promote the construction of the integration of posts, courses, competitions and certifications curriculum system, it is also necessary for universities to build a stepped competition system of school-level competitions - provincial competitions - national competitions, and deeply integrate competition content and standards with the teaching content of the Internet of Things major, so as to help students obtain vocational skill grade certificates while imparting professional knowledge and skills<sup>[12]</sup>. For example, the Internet of Things technology application competition items in national skill competitions can be split and used as professional teaching content, enabling students to have an in-depth understanding of the content and standards of national vocational competitions and realizing promoting teaching through competitions. At the same time, competition links can be simulated in curriculum teaching, and various types of competition activities can be organized for students to implement promoting learning through competitions, so as to stimulate students' learning interest, improve classroom participation, and more effectively cultivate students' professional literacy and comprehensive abilities<sup>[13]</sup>.

#### **4.4. Implement the dual certificate system and construct a vocational ability certification system**

To improve students' core competitiveness, universities should also actively construct a dual certificate system of academic certificate + vocational skill grade certificate, so as to provide a solid foundation for students' smooth employment in the future<sup>[14]</sup>. Specifically, the content of authoritative industry certificates such as Internet of Things Engineer and Industrial Internet Implementation and Operation and Maintenance Certificate can be integrated into professional teaching, and the assessment points and assessment methods of certificates can be embedded in curriculum design. At the same time, certificate assessment can be simulated in practical teaching links, and practical content in certificate assessment can be introduced to require students to carry out practical training. In this way, students' professional knowledge and skills are cultivated to help them obtain vocational skill grade certificates. In addition, universities should also construct a credit exchange mechanism. After students obtain relevant certificates, they can convert them into credits, thereby effectively reducing their academic burden and more effectively stimulating students' enthusiasm for obtaining skill grade certificates.

#### **4.5. Improve guarantee mechanisms and evaluation systems to construct a long-term development ecosystem**

To construct the integration of posts, courses, competitions and certifications curriculum system, universities should also improve guarantee mechanisms and evaluation systems<sup>[15]</sup>. On the one hand, a multi-party collaborative guarantee mechanism should be constructed to obtain support from multiple parties, such as the government, industry, and enterprises. For example, we can actively strive for support from the regional government in terms of taxation, special funds, and policies; we can obtain guidance from the Internet of Things industry; we can get support from enterprises, etc. By constructing a multi-party collaborative guarantee mechanism, a solid foundation is laid for the construction of the curriculum system. On the other hand, the evaluation system should be improved, the evaluation content should be enriched, and a multi-evaluation method should be adopted, so as to improve the accuracy and comprehensiveness of evaluation results, and thus lay a solid foundation for promoting students' all-round development.

In short, from the perspective of vocational undergraduate education, universities should fully recognize the importance of constructing the integration of posts, courses, competitions and certifications curriculum system, and promote the construction of the curriculum system through various ways and means, so as to more effectively cultivate students' professional literacy and comprehensive abilities and lay a solid foundation for their all-round development in the future.

#### **Disclosure statement**

The author declares no conflict of interest.

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