

# Research on RFID Experiment Teaching Under the Background of New Science

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**Abstract:** As the core professional course of Internet of things engineering, RFID experimental teaching plays an important role. Aiming at the lack of connection and integration between knowledge points and technology points in the existing experimental teaching, based on the training objectives of curriculum talents, through screening projects and analyzing projects, the RFID knowledge points and technical points are integrated into the case by integrating basic knowledge of experimental teaching, combining with practice related enterprise projects, innovative entrepreneurship projects and collaborative education Internet plus projects, so as to make RFID practice teaching. The effective implementation laid a foundation for the realization of talent training objectives.

**Keywords:** New science; RFID; Experimental teaching; Knowledge convergence; Project integration

## 1. Analysis of Basic Experimental Course Design

The experiment of RFID principle and application course includes such core knowledge points as article coding, barcode, RFID, etc. Through the experiment, students should better master the working principle of RFID system, RFID unit technology, system technology and other basic theories, technologies and application methods. In terms of curriculum experiment, according to the training program, curriculum experiment outline, combined with the needs of professional posts, etc., and taking into account the actual situation of students, the teaching program design of basic experiment is shown in Figure 1. It is not difficult to see from Figure 1 that the design of the experiment is progressive and the learning knowledge is orderly, so that students can have a clear understanding and grasp of knowledge points in the experiment, which is also convenient for operation in actual engineering practice.

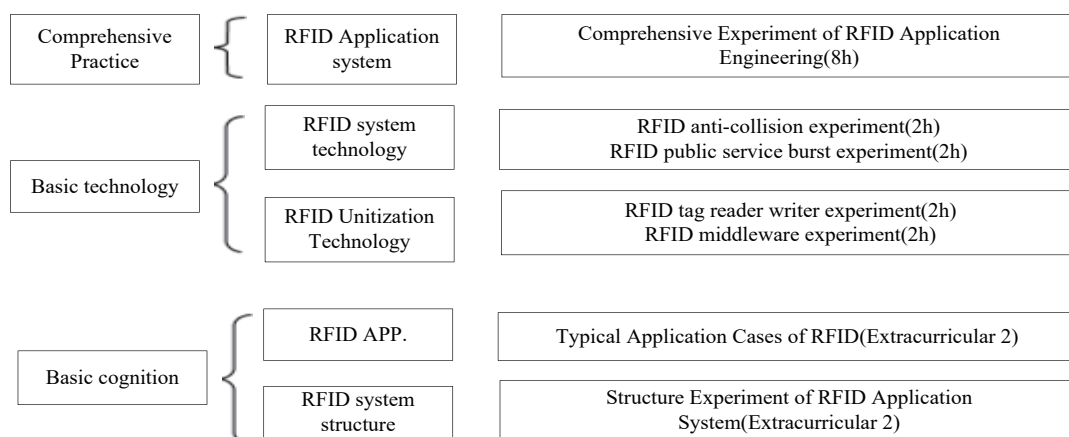


Figure 1 Basic Experimental Teaching Scheme of RFID Principle and Application Course

## 2. Course Design of Project Integration Experiment

The design of project integration experiment should highlight the concept of “building students’ skill structure through practical teaching”. Through the organic combination of case selection, task decomposition and practice, relevant knowledge points are integrated into the project, and the application of professional knowledge is realized through the project, so that students can master RFID

technology. For example, take Chang’antong bus card, campus all-in-one card and other systems, which are the most commonly used technologies in daily life, as an example, the RFID part is broken down into electronic wallet initialization, recharging, fee deduction and other parts to explain, and students can practice, so that they can draw inferences from one example and apply them to ETC, supermarket membership card and other systems. The teaching content is designed based on the front-line project of the enterprise, and the project is reconstructed according to the CDIO concept in combination with the actual situation of students to determine the appropriate project (covering the objectives and abilities in the course experimental syllabus and talent training program), so that students can become familiar with the project from day to day, gradually explore the unknown, and cultivate the interest in exploration and practice.

As the students of the Internet of Things engineering major learn “miscellaneous” and “scattered” knowledge, they can return the scattered and dissociative knowledge points to “units” through the connection of knowledge, and implement various related tasks to the relevant knowledge points, forming a logical connection between “before and after”. Complete project operation tasks in order and according to specifications.

Establish projects for complex engineering problems and complete unit tasks (see Reconstructed Projects and Hierarchical Relationships for details). Cyclic nesting of project-based teaching to achieve the innovation of practical teaching implementation scheme. Introduce the project into the classroom, teaching materials, practice and competition. From courses to knowledge points, from learning to application, from application to innovation, let professional knowledge run through all aspects of experimental teaching in the way of “breaking → kneading → digestion → application”. The project based teaching is easy to understand, and the complex engineering problems can be solved through comprehensive understanding.

The idea of project integration experimental curriculum design is to select projects hierarchically, and the knowledge points between projects are connected with each other. Highlight the professionalism and practicality of the curriculum. In the design of the experimental curriculum, we should focus on the cultivation of professional ability, select the experimental teaching content based on the need to complete the work task, and reconstruct and design the experimental situation with the job demand as the goal and the enterprise front line project as the carrier.

According to the rules of vocational education and the actual situation of students, reconstruct the project, and determine four experimental projects that reflect the level and integrate relevant knowledge points of the curriculum.

### 3. Implementation and effect of project integration experiment

A cooperative and open experimental platform. In order to enable students to learn RFID courses independently and improve the fun of students’ independent learning, the projects developed in cooperation with enterprises are conducive to progressive learning. The case projects developed in cooperation between schools and enterprises are completed on the cooperative open experimental platform. Students cooperate with each other to complete the projects. Problems encountered in the process of completing the projects can be solved through group negotiation, or they can be solved online or offline through enterprise engineers or teachers, Students experience the development process of the project in person, improve their own methods and abilities to analyze and solve problems with their professional knowledge, and lay a foundation for the subsequent graduation design and calmly applying for corresponding jobs. Figure 2 shows the process of independent practice of the open experimental platform.

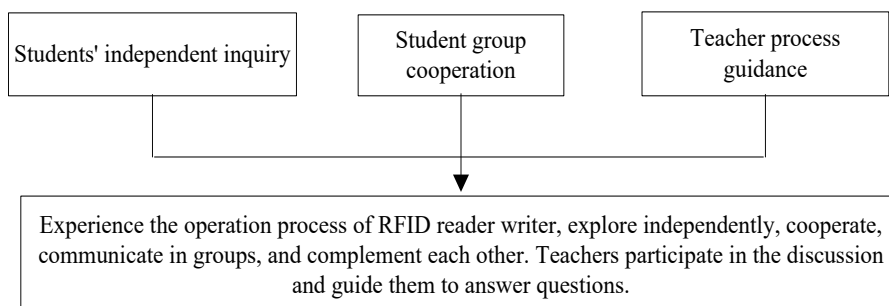


Figure 2 Open experimental platform student independent practice process

RFID courses are good supporting courses for “Internet plus Undergraduate Innovation and Entrepreneurship Competition”, “National Undergraduate Electronic Design Competition”, “National University Biological Networking Innovation and Application Design Competition”, etc., so as to form a competition to promote learning, training, teaching and learning. By substituting competition for practice, competition items, competition cooperation, competition methods and competition ability, a competition education mode of “learning by competition, learning by competition” and “teaching by guidance and guidance by guidance” has been formed. On the

basis of the level training of basic experiments, in order to further improve students' practical ability and train their innovative ability to analyze and solve problems, students can participate in the above discipline competitions.

Through basic experiment, curriculum design, project integration experiment and other practical links, students' hands-on ability has been greatly improved. It is mainly reflected in the following aspects: The results of students' scientific research and innovation experiments are relatively significant in the "Challenge Cup" and various professional competitions; It meets the needs of society, enterprises, talents and schools; In the graduation design of the Internet of Things project, RFID as the completed topic accounts for about 60% of the graduation thesis topics, and the total number of outstanding papers in the graduation design reaches about 45%; Compared with other majors, the employment rate of graduates is higher, and employers have good feedback and greater radiation effect; Achieved the training goal of applied IoT professionals.

#### 4. Conclusion

The practical teaching of RFID principle and application course is an important part of the practical teaching of the entire Internet of Things engineering specialty. The effect of practical teaching determines the extent to which students master RFID technology and basic knowledge. The combination of knowledge points and technology points in the case makes them organically combined, so that students can better master the basic knowledge and skills necessary for employment in related industries. Through the cases selected by the practical course team and enterprise engineers, students can master the knowledge points of RFID courses and post technology quickly and have a good learning effect. Combined with the comprehensive exercise of relevant competitions, the application ability and innovation ability of professional knowledge have also been improved to a certain extent. At the same time, it has also carried out a more in-depth exploration for application-oriented undergraduate talents in the teaching reform of RFID principles and applications.

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