

# Curriculum Reform of The Internet of Things Application System Based on Online and Offline Hybrid Mode

Fupeng An<sup>1, \*</sup>, Wei Zhang<sup>1</sup>

Shenyang Institute of Technology, Shenyang, China

---

**Abstract:** According to the characteristics of the Internet of Things application system course, this paper proposes a mixed online and offline teaching mode, the main content includes the characteristics of online and offline mixed teaching mode, online and offline mixed teaching mode online resource construction and the construction of online and offline mixed teaching mode. The construction and implementation of this teaching mode closely integrate offline teaching with online learning, which can dynamically adjust the teaching process and highlight the autonomy and subjectivity of students' learning.

**Keywords:** Internet of Things application system, Online and offline hybrid teaching mode, Curriculum reform.

---

## 1. Introduction

With the rapid development of information technology in recent years and the impact of the epidemic, information technology has deeply affected the development of education and driven the informatization and modernization of education. The traditional teaching methods have been difficult to meet the needs of modern education development. In order to meet the needs of modern education and teaching and promote the reform of education and teaching, the network teaching platform has emerged at the historic moment. A series of policies and documents on the construction of online teaching resources issued in recent years show that the construction of online teaching resources in China has been paid attention and attention at the national level. The national policy and attention also provide great convenience for the development of online teaching resources construction. In recent years Universities are vigorously carrying out the construction of network teaching resources, and the gradually built online teaching resources such as high-quality online open courses and professional teaching resources database have mushroomed like bamboo shoots after a spring rain, showing a good development trend.

The Internet of Things application system is a required course in electronic information engineering, which plays an important role in the electronic industry, especially in the Internet of Things and automatic identification system design. The course content includes the basic concepts of the Internet of Things, the structure of the Internet of Things, the key technologies of the Internet of Things, communication technology, typical application cases, and the design and implementation of the Internet of Things application system. Through the study of this course, students can understand the development status of the Internet of Things, master the key technologies of the Internet of Things, and through its typical application field and case learning and application system design, students can have a clear understanding of the Internet of Things and its application, and make students have a strong The ability to analyze and use practical knowledge of the Internet of Things to solve practical problems lays a certain foundation for the future research and application of the Internet of Things.

Although the current domestic epidemic has been generally under control, there is still the possibility of outbreaks in local areas that has not been completely eliminated, which makes the online teaching still continue for a long time. At the same time, online teaching resources are also an important supplement to offline teaching. Students can use online teaching resources to conduct pre-class preview and get familiar with the course content in advance, which can save a lot of time in class. Using the exercise bank for practice and self-test, can consolidate the learned knowledge. Therefore, it is imperative to build the online resources of the Internet of Things application system curriculum.

## 2. Characteristics of the Online and Offline Hybrid Teaching Mode

The hybrid teaching mode combines the advantages of traditional teaching and network teaching, and integrates various teaching resources. Can give full play to the subjective initiative of teachers. In the whole teaching process, students should be guided, inspired and supervised; and for students, as the main body of learning, mixed teaching can also fully mobilize their learning initiative. The emergence of hybrid teaching provides new ideas and methods for reforming and improving the teaching system of the Internet of Things application system curriculum. Complete the teaching and learning of the theoretical knowledge of the Internet of Things application system by means of "physical classroom+online learning", and improve the practical ability of students through practical links.

Online and offline hybrid teaching mode is applied to the teaching of the Internet of Things application system curriculum, mainly in the following aspects Features.

(1) Hybrid teaching can integrate the teaching material resources, network resources, experimental platforms and practical resources related to the Internet of Things application system curriculum from theory to practice, online to offline, and expand and enrich the teaching resources and content.

(2) Teaching and learning of hybrid teaching, and the offline physical classroom teaching and line of the Internet of Things application system courses. The combination of online network resources, complementary advantages, facilitate

teachers and students online and offline real-time, effective communication, make full use of the advantages of information teaching means.

(3) Mixed teaching can not only use the blackboard writing, courseware and other tools in the brick, and-mortar classroom, but also use online video, GIFs and other materials to learn in various forms of learning, which can deepen the students' understanding of the Internet of Things application system course, and the explanation and learning of the course content has been expanded in an all-round way.

(4) Mixed teaching focuses on the comprehensive evaluation of students' offline classroom learning and online learning process, which will be practical. The questions, attendance, online learning effect and online completion quality of homework are all included in the assessment of ordinary results. The online and offline interaction between teachers and students in teaching is comprehensively assessed, and the practice assessment is combined with the traditional paper results to form the final evaluation results.

### **3. Online and Offline Hybrid Teaching Mode Online Resources Construction**

According to the requirements of the syllabus, to make the course plan, according to the knowledge points, the use of professional recording, recording screen. Video editing software processes and makes teaching videos of the Internet of Things application system, and uploads them to the Superstar Learning Pass platform, so that students can use their trivial time to learn on their mobile phones, and students can repeat their learning if they do not understand it. Reintegrating teaching resources helps teachers to meet students' personalized learning needs according to their different needs. Connect the scattered knowledge points together to form a knowledge system. According to the set knowledge points, the exercise bank is based on objective questions. When each knowledge point is completed, arrange discussion exercises, or conduct online tests online, to facilitate students to meet each other online Flow of communication, in order to master the students' learning status. Teachers grasp the overall learning progress of students. Timely supervise and adjust the requirements and progress of learning, and the specific implementation steps are as follows:

(1) Recording course video resources. The Internet of Things application system course part of the knowledge point is more abstract, students not easy to understand. Video is a favorite and easy to accept way for students. After fully designing the video content to be recorded, professional recording, screen recording and video editing software processing are used to improve the overall quality of the video. High-quality course videos are conducive to improving students' interest in learning and improving the teaching effect.

(2) Establish an exercise bank. Workforms have the function of consolidating and strengthening, through the practice of solving and practice. The combination of international materials can improve the understanding and internalization of concepts and laws from different aspects and from different angles, can prevent the one-sidedness in understanding, and can deepen the understanding of knowledge. Teachers can also test the learning effect of students anytime and anywhere, and can provide more help for students.

(3) Establish courseware, teaching plans and other resource databases. Will teach courseware, teaching plans and other teaching funds related to the course. The material is arranged to facilitate students to preview before class and review after class, and realize the resource sharing among teachers.

### **4. After-class Teaching Evaluation**

With the deepening of curriculum reform, major changes have taken place in the previous teaching concept, the concept of evaluation also has changed, evaluation in addition to the feedback and analysis of teaching situation, timely improve teaching methods, effectively promote a means of students' all-round development, pay more attention to the evaluation of students in each link in a class. First, focus on whether students actively participate in classroom teaching activities, whether they can cooperate with other students to discuss related issues, whether they think independently and propose different opinions from others, and second, choose the appropriate language, timely time, and evaluate students' basic knowledge and basic skills Understanding and mastery, and attitude towards learning; again, this evaluation is a double-edged sword, through the evaluation of students' learning process, teachers can timely adjust their teaching behavior, this itself is the "learning process" of teachers, increase the relationship, improve the students' learning and mastering knowledge interest and ability, and then in the evaluation, promote the comprehensive development of students.

Students are tested and data are analyzed to evaluate the teaching effect of the mixed online and offline teaching mode. Through testing and assessment, the effect of mixed online and offline teaching is timely evaluated according to students' results and understanding of knowledge. A questionnaire survey was used to understand the students' satisfaction and views on the mixed online and offline teaching model. Analyze the problems in the implementation process of online and offline mixed teaching mode, summarize the experience and improve it, constantly optimize the teaching program, and further improve the teaching quality and teaching effect.

The characteristic of this mixed teaching system is that the online and offline teaching process can be flexibly adopted and gradually implemented the way of apply. Students need to take the initiative to participate in online and offline learning and discussion, which can effectively stimulate students' enthusiasm for learning and benefit both teaching and learning. The course of the Internet of Things application system under the online and offline hybrid teaching mode provides a new teaching form for the hybrid teaching system, with certain flexibility. It not only effectively gives full play to the initiative of teachers in offline classroom teaching, but also highlights the subjectivity status of students, and is also an effective method to improve the curriculum teaching practice of the Internet of Things application system.

### **5. Conclusions**

Based on the educational reform project of the school, this study explores the specific application of online and offline mixed teaching in curriculum teaching, which provides theoretical and practical experience for front-line teachers carrying out mixed teaching, and provides reference for the reform and innovation of teaching mode and teaching methods in undergraduate colleges. At the same time, it

attracts teachers' attention and tries to use new ideas and new technologies for teaching reform and practice, and promotes the application and promotion of online and offline hybrid teaching mode in other courses. The two of "online classroom" (online) and "physical classroom" (offline) are deeply integrated to achieve complementary advantages. Combining the "online classroom" and the "physical classroom", The advantages of network teaching and traditional teaching classroom closely together, this hybrid teaching can reasonably and effectively use the existing quality MOOC teaching resources, students can learn anytime and anywhere on the course network learning platform, give full play to the network classroom is not limited by time, change the traditional classroom teaching mode, into the traditional classroom, make up for the freedom and freedom, teachers and students face to face, promote effective tracking and guidance, to help students, improve the ability of students to solve problems. Online learning and classroom The organic combination of teaching constructs the teaching process and optimizes the teaching organization, which can better reduce the teaching cost and improve the teaching quality and efficiency.

This course is applicable to the teaching of the Internet of Things application system course in ordinary institutions of higher learning. The course adopts the OBE teaching concept suitable for the cultivation of applied talents, and uses the teaching mode of integration of science and reality, project teaching, and mixed online and offline teaching to combine the traditional theoretical teaching with practical teaching. Pay attention to pre-class preview, review after class, adopt case guidance method, teaching method, simulation demonstration, discussion and analysis, group confrontation,

summary, report writing, and other teaching methods. Make full use of micro-class, PPT courseware, online teaching resources, simulation software, superstar learning pass, rain classroom and other information technology means. A lot of courses are introduced in the teaching Ideological and political content, adhere to the whole process of all-round education "three complete education" requirements. Pay attention to the cultivation of students' practical ability, problem analysis and problem-solving ability, a more solid grasp of the basic theoretical knowledge in the Internet of Things technology and apply it to practice.

## References

- [1] Zhang Xiuqin. The Current situation, Problems and Countermeasures of Online Course Credit Recognition-Based on the research report of 61 universities [J]. Chinese University Teaching, 2017 (01): 79-83.
- [2] Zhu Ruiling. Application research on online+offline hybrid project-oriented Teaching mode Based on mobile Learning mode [J]. Modernization of Education, 2018,5 (05): 340-341.
- [3] Lu Bo, Meng Jiani, Wang Cunrui. Construction and implementation of online and offline interactive and integrated teaching mode [J]. Journal of Dalian University for Nationalities, 2018 (3).
- [4] Shi Qiuxia. The Application of SPOC Online and Offline Mixed Teaching Model in Higher Vocational Accounting Curriculum [J]. Cultural and educational materials, 2018 (17).
- [5] Wang Li. Discussion on Hybrid Teaching of Model Electronic SPOC Based on Network Teaching Platform [J]. Modern Education Equipment in China, 2018, (295): 15-17.