

Discussion on the Competition-Oriented Innovative Teaching Model of Higher Vocational Internet of Things Major

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Abstract: In response to the problems and challenges faced by current higher vocational education in the field of Internet of Things, this paper thoroughly explores the necessity of an innovative teaching model that is competition-oriented. This model takes competition as the core teaching method, aiming to stimulate students' enthusiasm and improve their practical operation ability and innovative thinking ability. The article details the design principles and implementation effects of this teaching model, and through rigorous data analysis, it confirms its significant effect in improving students' academic performance, sense of activity quality and effectiveness, as well as their enthusiasm and achievements in participating in Internet of Things skills competitions. In addition, the article also objectively analyzes the advantages and limitations of this model and puts forward corresponding optimization suggestions.

Key words: Skills competition, Internet of Things, innovation, teaching mode

1. Introduction

With the rapid development of Internet of Things (IoT) technology, IoT skills have become a key skill in today's society. The application of IoT technology has penetrated into various fields, and the demand for IoT skilled talents is increasing. Traditional teaching modes often focus on imparting theoretical knowledge while neglecting the cultivation of practical operation abilities, making it difficult for students to truly master the practical application of IoT technology. IoT technology involves multiple fields with numerous and complex knowledge points, making it challenging for students to fully grasp all relevant knowledge. The lack of effective evaluation and feedback mechanisms also hinders teachers from timely understanding students' learning situations and adjusting teaching strategies.

To address the problems and challenges of the current IoT professional skill training mode, we propose an innovative teaching mode that is competition-oriented. By incorporating competition as an important part of teaching, this mode can effectively stimulate students' learning interest and motivation, enhance their practical operation abilities and innovative thinking abilities. At the same time, this teaching mode can also provide a platform for students to showcase their talents, strengthening their self-expression abilities and teamwork capabilities.

2. The design of an innovative teaching mode oriented towards competition

1. The beginning of the semester stage: Team formation and project-based teaching content

In the beginning of the semester stage, a teaching team is formed according to the course requirements. The teaching team members should have rich teaching experience and professional skills, and should have certain practical experience in projects. The team selects projects that match the teaching content from IoT competition cases, and divides and assigns knowledge points and skill points. The focus of this stage is to build a practical teaching system with projects as the core, enhance students' practical operation ability and teamwork spirit. Under the guidance of the teaching team, students need to understand the actual application of IoT technology and the requirements of relevant competitions. Through participating in project practice, students can better understand the principles and applications of IoT technology, and improve their practical operation ability. Students need to play different roles and undertake different tasks in the team to cultivate teamwork spirit.

2. Mid-semester stage: Student learning data collection and personalized recommendation

In the mid-semester stage, student learning data is collected using a teaching interaction platform to form a large student profile database. Data can include students' academic performance, study duration, learning trajectory, etc., comprehensively reflecting students' learning status and effectiveness. Based on the analysis results of the data, personalized learning suggestions and career development plans are provided for students. The focus of this stage is to use big data analysis technology to achieve personalized teaching and precise recommendations, improving students' learning effectiveness and quality of career development.

By analyzing students' learning data, it is possible to better understand their learning characteristics and needs, thus providing them with more personalized learning suggestions and career development plans. Data feedback and analysis can also provide useful teaching feedback for the teaching team, helping them continuously optimize teaching content and methods.

3. End of semester stage: Competition coach training and competition project supplementation

In the end of semester stage, competition coaches are invited to train students in competition-specific skills for their creative works. Competition coaches provide students with practical competition experience and guidance, helping them better understand and apply what they have learned into practical applications. At the same time, half-topic or full-topic projects are provided as supplements, allowing students to exercise their skills and improve their abilities in competition projects, laying a solid foundation for their future career development."

3. Analysis of the implementation effect of the competition-oriented innovative teaching model

1. Improvement in Students' Academic Performance, Perception of Quality of Activities, and Sense of Efficacy

For the evaluation of students' performance in skills related to the Internet of Things major, a method of measuring the number of

correctly applied knowledge points was used. This measurement method directly reflects the mastery and application of knowledge points by practical research students, accurately reflecting their actual level. The results of the student performance test were analyzed using SPSS20.0 software, and the comparative analysis results of academic performance, perception of quality of activities, and sense of efficacy showed that the data of Practice Group 2 were significantly higher than those of Practice Group 1, as shown in Table 1, Table 2, and Table 3. This indicates that the reform of the competition-oriented innovative teaching model is conducive to improving students' learning efficiency and has a significant improvement in students' learning effectiveness. It can also bring better learning experiences to students' learning activities, effectively enhance students' confidence in learning through various learning activities, and thus improve students' learning effectiveness. The classroom teaching of the competition-oriented innovative teaching model can better attract students' attention, and students are more willing to spend time learning courses. Students have a stronger sense of efficacy in learning, they are more confident under this approach, and their satisfaction is higher.

Table 1 Comparative analysis results of academic performance

Group		Practice Group 1	Practice Group 2
Number of people in practice		N=65	N=63
Question 1 (3 knowledge points)	Mean	1.74	2.73
Question 2 (4 knowledge points)	Mean	2.03	2.71
Question 3 (4 knowledge points)	Mean	2.72	3.59
Question 4 (3 knowledge points)	Mean	2.28	3.25
Question 4 (3 knowledge points)	Mean	1.64	2.25
Overall score (17 knowledge points)	Mean	10.41	14.53

Table 2 Comparative analysis results of learning activity quality

Group		Practice Group 1	Practice Group 2
Number of people in practice		N=65	N=63
Reading	Mean	3.59	3.99
Discussion	Mean	3.52	4.02
Practice	Mean	3.45	3.96
Show	Mean	3.56	3.92
Sharing	Mean	3.52	3.96
Evaluation	Mean	3.44	3.97
Reflection	Mean	3.56	3.91
Quality feeling of learning experience	Mean	3.52	3.96

Table 3 Comparative analysis results of learning self-efficacy

Group		Practice Group 1	Practice Group 2
Number of people in practice		N=65	N=63
Concentration	Mean	3.14	3.93
Relevance	Mean	3.25	3.55
Confidence	Mean	3.16	3.53
Satisfaction	Mean	3.53	4.12
learning efficacy	Mean	3.27	3.78

2. The proportion of students participating in the IoT skills competition and the improvement of the award rate

From the comparative analysis results of the participation ratio of students in the IoT skills competition in Table 4 and the winning rate of students in the IoT skills competition in Table 5, the practice group 2 is significantly higher than the practice group 1. This indicates that the competition-oriented innovative teaching model is more effective in cultivating students' ability to participate in IoT skills competitions. More students are willing to participate in the competition and show their learning achievements through competition, resulting in higher winning rates in various IoT skills competitions.

Table 4 Comparative analysis results of the participation rate of students in IoT skills competition

Group		Practice Group 1	Practice Group 2
Number of people in practice		N=65	N=63
Participation rate of students in IoT skills competition		5.24%	12.32%

Table 5 Comparative analysis results of the winning rate of students' IoT skills competition

Group	Practice Group 1	Practice Group 2
Number of people in practice	N=65	N=63
Winning rate of student IoT skills competition	7.26%	14.82%

3. The effect of cultivating students' teamwork awareness, self-expression ability, and IoT skills competition ability

The competition-oriented teaching model not only focuses on the cultivation of individual abilities but also emphasizes the development of teamwork awareness. By completing competition projects through group collaboration, students' teamwork awareness and cooperation ability have been well exercised. At the same time, this model also encourages students to express themselves and showcase their talents through the competition platform. In addition, this model also provides targeted training for students based on the characteristics and requirements of the IoT skills competition, resulting in a significant improvement in their competition ability.

4. Advantages and Disadvantages of the Competition-Oriented Innovative Teaching Model

1. Advantages Analysis

The competition-oriented innovative teaching model demonstrates significant advantages in cultivating professional talents in the field of Internet of Things (IoT). This model not only effectively stimulates students' interest and enhances their learning motivation, but also combines teaching methods with competitions, enabling students to focus more on learning under the drive of competition goals and thus improving learning efficiency. Students apply the knowledge they have learned in competitions to solve problems, which not only exercises their practical operation ability, but also prompts them to discover and solve problems in practice, stimulate innovative thinking, and help cultivate their teamwork and communication skills.

2. Disadvantages Analysis

The competition-oriented teaching model may face resource issues such as insufficient equipment and competition funding, which may limit some students' learning opportunities and affect teaching effectiveness. Due to the strong competitiveness of the competition, some students may pay too much attention to competition results while ignoring other aspects of development, which may affect their comprehensive development and improvement of overall quality. Since competition results are an important indicator for evaluating students' learning effectiveness, it may lead to a single evaluation method that cannot fully reflect students' overall quality and ability.

5. Optimization suggestions for competition-oriented innovative teaching mode

1. Optimization suggestions for advantages

In order to better leverage the advantages of the competition-oriented teaching model, we recommend further deepening the integration of competition content and curriculum teaching. In the early stages of teaching, teachers can design competition-related topics and tasks based on the curriculum content and the actual situation of students, so that students can not only master theoretical knowledge, but also improve their practical abilities and innovative thinking through completing the topics and tasks.

In order to expand the influence of competitive advantages, we suggest improving the incentive mechanism for competitions. Schools can set up a professional IoT competition fund to reward and subsidize outstanding students and teams in competitions, stimulating students' learning enthusiasm and innovation passion. At the same time, the competition results can be included in the comprehensive evaluation system of students as an important basis for evaluation and selection, guiding students to pay more attention to competitions.

2. Optimization suggestions for deficiencies

In response to the possible resource issues, we recommend strengthening the construction of teaching resources. Schools can collaborate with enterprises, industry associations, and other organizations to jointly develop teaching materials and teaching resources suitable for the IoT major in vocational colleges, providing strong support for teaching. At the same time, it is possible to build IoT professional training rooms to provide students with a more complete practical environment.

To solve or alleviate the problem of evaluation system, we suggest improving the evaluation system. Schools should develop a scientific and reasonable evaluation system based on the actual situation, incorporating students' theoretical learning achievements, practical operation abilities, innovative thinking and other aspects into the evaluation system, comprehensively and objectively reflecting students' learning situation and comprehensive quality. At the same time, the supervision and management of the evaluation process should be strengthened to ensure the fairness and effectiveness of the evaluation results.

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