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Research on the Hierarchical Teaching Method of Internet of Things Professional Courses Under the Background of New Engineering

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ABSTRACT
Based on the professional construction of the IoT, this thesis reforms the teaching mode and talent training mode of "data processing and intelligent decision-making" under the background of "new engineering" and combined with the requirements of IEET engineering education certification, and proposes a layered teaching method in The methods and specific examples used in the course of "Data Processing and Intelligent Decision-making" are divided into different levels according to the students' knowledge and ability level, different teaching goals are determined, appropriate teaching strategies are used, supplemented by different training and guidance The strength of each level promotes the best development of students at each level.

Keywords: *Teaching mode, Training method, Layered teaching method, Internet of Things courses.*

1. INTRODUCTION

In order to proactively respond to the new round of technological revolution and industrial transformation, and support a series of national strategies such as service innovation-driven development, since February 2017, the Ministry of Education has actively promoted the construction of new engineering subjects, issued the "Notice on the Development of New Engineering Research and Practice" and the "Notice on Promoting New Engineering Research and Practice Projects". The new engineering course should focus on the time characteristics such as the Internet revolution, the development of new technologies, and the upgrading of the manufacturing industry to cultivate the core abilities of students. For the Internet of Things major, NBIOT and LoRa represent the latest technological frontiers in the Internet of Things. We must keep up with the latest technology in the industry development, optimize course content, and complete incremental optimization. The experimental content must be consistent with the latest cutting-edge technology. It meets the requirements of new engineering development.

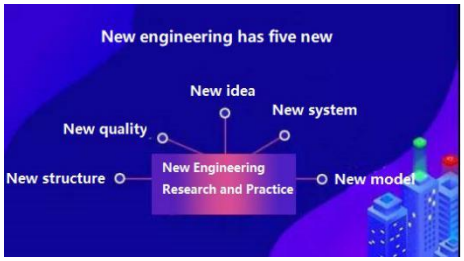

Figure 1 New engineering has five new contents.

It can be seen that "Internet of Things Engineering" is a typical "new engineering" major. The development of all walks of life provides intelligent services. The "Internet of Things Project" can be widely understood as the system engineering of building the "Internet of Things", which mainly includes the construction of the underlying perception system, the intermediate communication system and the high-level intelligent processing system.

2. RESEARCH ON TEACHING METHODS

2.1. Research Objectives

With the guiding ideology of "exploring personalized talent training mode" in the new

engineering discipline, students are encouraged to formulate personalized learning goals and learning methods based on professional interests under the guidance of teachers. Let students discover, research and solve problems autonomously. Students are guided to use knowledge and abilities creatively to discover, research and solve problems autonomously. A new teaching model that accumulates knowledge, cultivates abilities and exercises thinking in research: such as openness, inquiry, practice, autonomy, flexibility, and difference.

In accordance with the school's general idea of "strengthening engineering practice and cultivating innovation ability", with actual engineering as the background, engineering technology as the main line, theoretical teaching and engineering practice ability training as the two main lines, focusing on students' comprehensive utilization of theoretical knowledge to solve engineering problems And carry out the cultivation of engineering research ability. Reform assessment methods, promote the combination of talent training and practice, and vigorously strengthen practical teaching based on the strong practical characteristics of the IoT engineering discipline. In teaching, the curriculum knowledge points are combined with practical questions to cultivate students' ability to analyze and solve problems, while paying attention to the cultivation of students' innovative ability.

2.2. Research Content

2.2.1. Research the problem to be solved

In the context of "new engineering" and the requirements of IEET engineering education certification, the Internet of Things Engineering major has reformed the training goals of professional talents. The major of Internet of Things engineering, adheres to the unity of knowledge and action, and fosters talents. Based on the knowledge system of the Internet of Things system and school-enterprise cooperation, it is characterized by equal emphasis on software and hardware and the intersection of professional fields. High-quality application-oriented innovative talents in Internet of Things engineering required by the country, Guangdong, especially Beijing's economic construction, modern industry, and social development.

2.2.2. Development requirements of new engineering

Engineering changes the world, action creates the future, reform calls for innovation, and new engineering construction is in action. New engineering research and practice are carried out around the new concept, new structure, new model, new quality and new system of engineering education reform.

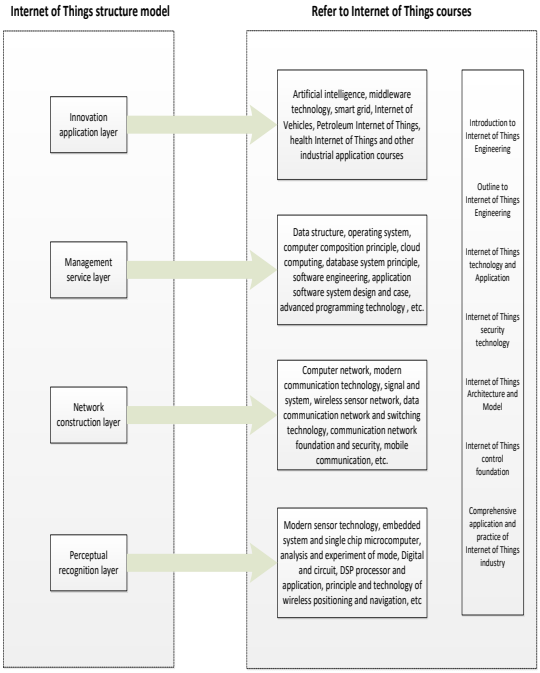

Figure 2 IoT Engineering Course Reference.

2.2.3. The theoretical basis of layered teaching

Confucius, a great educator and thinker in ancient my country, proposed that educating people should be "deep in depth, shallow and superficial, benefit the benefits, and respect the others", that is, "teach students in accordance with their aptitude, and vary from person to person". This is the earliest layered teaching the theoretical explanation. The so-called hierarchical teaching means that in class teaching, starting from the actual situation of students of excellent, medium and poor (generally called ABC three), enhance the pertinence of teaching, and improve "teaching in accordance with their aptitude" to be operable Level, put forward requirements at different levels, conduct different levels of teaching, provide teaching guidance at different levels, organize different levels of testing, and evaluate the learning results and the learning process equally, so that all kinds of students will be in their own "recent developments" during the learning process. The district" has been fully developed.

The theoretical basis of modern hierarchical teaching is Bloom's mastery of learning theory and Vygotsky's theory of recent development zones. The American psychologist and educator Bloom pointed out in the theory of mastering learning this kind of learning conditions and brand new learning opportunities for students of different levels.

Zedong Mao believes that in cultivating students' creativity, attention should be paid to the differences

between students at different levels and grades. Mao Zedong clearly pointed out that "teaching is for learning", only to establish the "student-oriented" thinking, put the goal of teaching reform on the all-round development of students, fully develop students' personalities, and enable students to develop vigorously and autonomously. Development, so as to ensure the quality of teaching reform.

2.2.4. Research content of layered teaching method

(1) Teach students in accordance with their aptitude, focusing on the cultivation of students' innovative consciousness and ability All teaching activities must be based on mobilizing students' enthusiasm, initiative, and creativity, guiding students to explore and think actively, and the "student"-oriented thinking will always run through every process of teaching. Teachers meet the needs of students' personality development to the greatest extent. Carefully design homework to encourage students to acquire knowledge and develop their abilities.

(2) Elaborately design teaching activities, adhere to the "student"-oriented

Incorporate new educational concepts into the entire teaching process, to achieve the purpose of enabling students to master the knowledge training ability and ideological education. In the teaching process, students are encouraged to speak boldly by carefully arranging the timing of questions, and promptly dial and guide them.

2.2.5. Innovative teaching and assessment methods

(1) Concretization of ability training, defense of results of research groups

The Internet of Things major has the training characteristics of strong hands-on ability and should highlight the cultivation of students' innovative and practical abilities. Therefore, we will create an active and free-thinking teaching scenario, cultivate students' active thinking habits and the awareness of exploring problems. In the course, the whole class is divided into 5 groups, each group through self-discussion after class, for the specific technology of interest in the technical topic, determine the clear division of labor within the group, and separately consult materials, reference books, Internet search, etc. Collect information and combine classroom lectures to form an understanding of the specific technical development context, write research reports including the background of the topical technical research, research ideas, main technical methods, main results and development directions, and set aside special time in the classroom for each team to report, the teacher interacts with other students to ask questions. Through speeches, replies and questions. This requires team members to brainstorm, help and learn from each other, raise, analyze, and solve problems comprehensively and effectively, understand and master knowledge and practical skills accurately and deeply, and cultivate team awareness and spirit of cooperation.

(2) Focus on the process, layered evaluation and assessment

As an important means of teaching evaluation, examination has an important guiding role for student learning and teacher teaching. This course will reform the assessment system. Change the practice of setting a "lifetime" examination paper on one examination paper at the end of the term, and increase the proportion of usual examinations. The content of the usual assessment includes a series of content such as classroom interaction, comprehensive problem discussion, special essays, homework quality, etc., which are conducive to guiding students to improve their practical ability and scientific literacy.

(3) Optimizing teaching resources, reconstructing the sharing platform

Take the student as the center, design the teaching process, provide teaching resources, provide learning suggestions, and control the entire learning process. "Course syllabus, course content, teaching courseware, electronic textbooks, exercises and experiments, examination syllabus, online simulation test questions, practical teaching, interactive teaching" and other course resources are shared through the course website, and a communication platform is provided. Greatly promote the promotion of courses and the application of results.

Figure 3 Research results of students in groups (1).

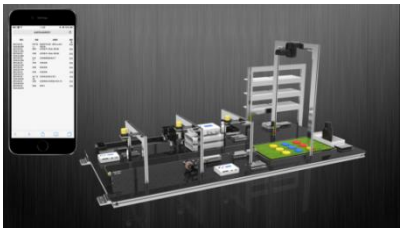

Figure 4 Research results of students in groups (2).

2.3. Main Measures to Optimize Teaching Content and Improve Teaching Methods

Pay attention to the infiltration of research ideas and methods into teaching, and strengthen the cultivation of students' innovative ability. Adopt a variety of teaching methods and teaching methods to strengthen the cultivation of students' comprehensive quality.

(1) Diversified teaching methods: In the course of teaching, a variety of teaching methods such as blackboard writing, multimedia courseware, and simulation programs are embedded and used in conjunction with each other. The process of development and change of things is reproduced in front of students intuitively and relatively intensively, mobilizing students to see, hear, and touch. Various sense organs participate together to stimulate students' interest.

(2) Situational teaching content: students are brought into the society through life display situations or physical demonstration situations, and they are encouraged to explore boldly, and promptly advise and guide. For example, when discussing the use of the specific data processing algorithm K-means, the calculation is performed through the national football rankings, and multiple data comparisons and verifications are provided to stimulate students' interest in learning.

3. CONCLUSION

For the "data processing and intelligent decision-making" course, the method and specific examples of the layered teaching method applied in the "data processing and intelligent decision-making" course are proposed, according to the students' knowledge and ability The level is divided into different levels, different teaching goals are determined, appropriate teaching strategies are used, supplemented by different training and guidance, and the strength of each level is used to promote the best development of students at each level.

Enriching the existing assessment methods, starting with practicality and improving students' ability, adding hierarchical assessment and evaluation, project group case analysis, simulation defense and other links, paying attention to the learning process, strengthening the control of the process, and implementing the teaching process An evaluation system that combines evaluation and teaching objective management, and combines in-class teaching and extracurricular independent learning

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