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Thinking on Practical Teaching of Industrial Robots Based on the Concept of "Interactive Classroom"

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Abstract: This paper aims to explore the practical teaching thinking of industrial robots based on the concept of "interactive classroom". Through the analysis of teaching status and challenges, combined with the core content of interactive classroom concept, we explore the potential of applying interactive classroom in the practical teaching of industrial robots. Firstly, the development and application of industrial robots are discussed in detail, and then the concept of interactive classroom is introduced, which aims to provide a more effective teaching method by combining interactive classroom with practical teaching of industrial robots. Through the research of this paper, we hope to provide new thinking and inspiration for the practical teaching of industrial robots, and promote the innovation and improvement of teaching methods.

Keywords: Interactive classroom; Industrial robots; Teaching thinking

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1. Introduction

Industrial robots have become an indispensable key technology in modern manufacturing industry. With the continuous development and advancement of automated production, industrial robots play an important role in improving production efficiency, ensuring product quality and reducing production costs. However, how to train outstanding talents with practical skills of industrial robots has always been an urgent problem to be solved.

In the past teaching practice, the traditional classroom teaching mode often takes the teacher as the center, and the students passively accept the teaching of knowledge and skills. However, this one-way teaching method cannot meet the needs of practical teaching of modern industrial robots and can not fully stimulate students' learning initiative and creative thinking ^[1]. Considering this problem, we need to explore a more effective teaching method to cultivate students' practical ability in the field of industrial robots.

The idea of interactive classrooms provides us with a solution. Interactive classroom emphasizes the active interaction between teachers and students, students and students and textbooks, and stimulates students' learning interest and motivation through interactive learning environment. In the practical teaching of industrial robots, the application of interactive classroom method can make students participate in practical activities more actively, and fully explore their potential and creative ability.

2. Development and application of industrial robots

2.1 Development history:

(1) In 1961, the world's first industrial robot, UNIMATE, came out to perform repetitive welding work in the automotive industry.

(2) From the 1970s to the 1980s, the scope of application of industrial robots gradually expanded, involving many fields such as material handling, assembly, and handling.

(3) Since the 1990s, industrial robots have made remarkable progress in flexibility, accuracy and intelligence, and are gradually applied to electronics, medical treatment, food processing and other fields.

2.2 Application Fields:

(1) Automobile manufacturing industry: Industrial robots play an important role in automobile manufacturing, such as welding, painting, assembly and other processes.

(2) Electronics and semiconductor industry: Industrial robots are widely used in electronic assembly, printed circuit board manufacturing and chip processing.

(3) Medical industry: Industrial robots play an important role in surgery, pharmaceutical ingredients and medical device production.

(4) Food processing industry: Industrial robots can be used for food sorting, packaging, handling and other work to improve productivity and health standards.

(5) Chemical and pharmaceutical industries: Industrial robots help automate production processes in chemical production and pharmaceutical manufacturing.

(6) Logistics and warehousing industry: Industrial robots can be used for cargo handling, palletizing and warehouse management to improve efficiency and reduce labor costs.

3. Core content of interactive classroom concept

3.1 Student participation and interaction: Interactive classroom emphasizes the active participation and interaction of students. Students are no longer passive recipients of knowledge, but active participants in discussions, questions and problem solving. They build knowledge together by interacting with faculty and fellow students, sharing perspectives and experiences, building collaborative relationships.

3.2 Diverse learning styles: Interactive classrooms encourage diverse learning styles to meet the needs and learning styles of different students. Teachers can stimulate students' learning interest and motivation through group discussion, project cooperation, role play and other activities. Students acquire more comprehensive knowledge and skills through different forms of learning, such as lectures, experiments, practical activities, etc.

3.3 Teacher guidance and support: In an interactive classroom, teachers play the role of facilitator and supporter. Teachers guide students to think, analyze and provide necessary support and feedback based on their needs and learning progress. Teachers are also able to identify students' potential and innovative abilities and guide them to develop and apply these abilities.

3.4 Application of technology and tools: Interactive classroom uses technology and tools, such as electronic whiteboard, online discussion platform, virtual laboratory, etc., to enhance the interaction and cooperation between students, teachers and classmates ^[2]. These technologies and tools can facilitate the sharing and exchange of information and provide more learning resources and learning opportunities.

4. Interactive classroom application in practical teaching of industrial robots

4.1 Group cooperation projects

Teachers can divide students into groups and arrange an industrial robot project in each group, allowing students to co-design, program, and operate the robot to complete the task. The application of such group cooperative projects can promote interaction and cooperation among students and improve their practical skills and teamwork.

In this project, each team can take on specific tasks, such as designing an automated production line, developing a complex robot application, simulating a real production environment, and so on. According to the requirements of the project, students need to cooperate to solve problems, make plans, and cooperate to complete the work of each link. They need to discuss and make decisions together, clarify the responsibilities of each member, and coordinate the workflow of each link.

Through group collaborative projects, students can learn and experience the application of robotics from practice. They need to understand the hardware and software systems of robots, master the relevant programming skills, and apply them to real projects. At the same time, the group cooperation program also encourages knowledge sharing and collaboration among students, and promotes teamwork and communication skills.

In group projects, teachers act as mentors and supporters. Teachers can provide the necessary training and guidance to help students understand the goals and requirements of the project, provide the required knowledge and skills support, and provide feedback and guidance during the project process. Teachers can also organize communication and sharing between groups to help students learn from each other and learn from experiences.

Through the interactive classroom application of group cooperation projects, the practical teaching of industrial robots can be closer to the actual application scenario, and cultivate students' practical ability and team spirit. Students will gain a deeper understanding of the application of robotics while improving their problem-solving, innovation and communication skills. Such interactive classroom application can not only improve students' learning effect, but also cultivate students' comprehensive quality and professional accomplishment.

4.2 Role playing and scenario simulation

In the practical teaching of industrial robots, role playing and scenario simulation is an interactive classroom application that can help students better understand and apply robot technology. By simulating real work scenarios and roles, students can explore all aspects of robotics applications in an immersive way.

In role-playing and scenario simulation, teachers can design specific situations, such as an automated production line, a warehouse logistics system, or a rescue mission in a dangerous environment, and let students play the corresponding roles, such as robot operators, engineers, supervisors, etc. Students need to use robot systems to perform tasks, cooperate and make decisions in simulated situations^[3].

Through role play and scenario simulation, students can actually operate robots, debug programs, observe robot behavior and performance, and interact and collaborate with other characters. They need to think and solve practical problems and understand the applications and challenges of robots in different situations. This hands-on experience can increase students' hands-on skills and develop their problem-solving skills and resilience.

In role play and scenario simulation, teachers play the role of guidance and guidance. Teachers can provide relevant background knowledge, skill training and operational guidance before the scenario simulation to guide students to master robot technology and methods. During the simulation, teachers can observe and evaluate students' performance, and provide timely feedback and guidance to help students improve and improve.

Through interactive classroom application of role playing and scenario simulation, industrial robot practice teaching can deepen students' understanding and application of robot technology. Students can fully apply their knowledge in simulated situations and practice cooperation and coordination with other roles. This hands-on approach to learning helps students better respond to real challenges and problems, improving their engineering thinking, teamwork and problem-solving skills. At the same time, role-playing and scenario simulation can also stimulate students' interest and curiosity, and promote their exploration and further learning of industrial robotics technology.

5. Concluding Remarks

With the theme of "Thinking on practical teaching of industrial robots based on the concept of 'interactive classroom'", this paper proposes a more effective and innovative teaching method by analyzing the current situation and challenges of practical teaching of industrial robots and combining the core content of interactive classroom concept. In this paper, we discuss the development and application of industrial robots, the problems and challenges in teaching, and introduce the application of interactive classroom in practical teaching of industrial robots in detail.

Through the research of this paper, we find that the idea of interactive classroom combined with the practical teaching of industrial robots has great potential. An interactive learning environment can stimulate students' interest and motivation to improve their learning effectiveness and outcomes. Through the application of interactive classroom, students can more actively participate in practical activities, actively think and solve practical problems, and cultivate rich practical experience and innovation ability.

However, we also realize that there are still some challenges and problems in the practical teaching of industrial robots based on the concept of "interactive classroom". For example, teachers need to be equipped with relevant technologies and teaching methods, and schools and educational institutions need to provide support and resources. At the same time, evaluating the effect of interactive classroom in teaching is also a problem that needs in-depth research and exploration.

On the basis of further research, we recommend that education and industry work closely together to explore and promote the development of practical teaching of industrial robots based on the concept of "interactive classroom". Teachers can continuously improve their professional quality and teaching ability, and schools and educational institutions can increase investment and support for teaching resources. In addition, we encourage further research to explore methods and strategies for evaluating the effectiveness of interactive classroom applications.

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