

Exploration and Practice of Industrial Robot "1+X" Online Excellent Course Construction

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Abstract

Industrial robot application programming 1 + X course is a key construction course in the national double high professional group. It is also a key course for automation related majors such as industrial robot and electrical automation technology. Guided by the teaching innovation team of national teachers (in the field of industrial robots), the national productive training base of industrial robots is used as the carrier to connect with the national electrical industry cluster, build an online high-quality course of industry education collaboration through industrial robot application programming, simulation and digital technology, cultivate students to serve the regional industries of Zhejiang and Wenzhou, help their digital design development and support the intelligent upgrading of regional industries.

Keywords

1+X Certificate System; Industrial Robot; Digital Technology; Quality Courses.

1. Introduction

In February 2019, the State Council issued the implementation plan of national vocational education reform ("20 articles of vocational education"). In order to implement the plan, the Ministry of education and the Ministry of Finance launched the construction plan of high-level higher vocational schools and majors with Chinese characteristics. Our school was successfully selected into the "double high" school, and the professional group of motor and electrical appliances was selected into the high-level professional group. At the same time, the reconstruction of manufacturing industry foundation and the upgrading of industrial chain, and strengthening the "5 + 5" industrial chain are not only the response measures to ensure economic security and enterprise safety under the current situation, but also the key to accelerate the high-quality development of Wenzhou. In order to promote the construction of double highs, serve the industrial upgrading in Wenzhou and realize the replacement of machines, face the "product intelligence + production intelligence" in the "5+5" industrial chain such as Wenzhou electrical industry cluster and automobile and motorcycle preparation and manufacturing industry, the "double highs plan" will build a high-quality online open course group of "intelligent electrical technology", build a national high-quality online open course, and build a digital classroom with all time, space and audience, Serve the cultivation of high-quality technical and skilled talents and further improve the technical skills of industrial workers. [1-3]

The construction idea of industrial robot application programming 1 + X course is to build an online open course sharing platform based on the first batch of National Teachers' teaching innovation team in the field of industrial robot, the national productive training base as the carrier, the industrial robot 1+X training base as the support, and relying on the national advanced manufacturing cluster production and Education Alliance. Combining digital and virtual simulation technology to build a "ubiquitous" teaching ecology of industry education

collaboration, school teachers and enterprise tutors can participate in teaching. [4-5]At the same time, during the post epidemic period, students and enterprise students can learn courses without time and space constraints, cultivate students and enterprise personnel to serve the robot application industry, help its digital design development and support the intelligent upgrading of Wenzhou regional industry.

2. Construction Idea of Industrial Robot Application Programming1+X Online Excellent Course

2.1. Under the Guidance of Craftsman Spirit, Schools and Enterprises Cooperate to Build Online Open Courses

Guided by the craftsman spirit, following the main line of learning and doing, organically infiltrate ideological and political elements, and organically integrate the values of "accurate control, pragmatism and efficiency creation" into the online course teaching task according to the characteristics of industrial robot 1 + X teaching links and tasks. Taking the application programming of industrial robots under the digital twin as an example, the preliminary study before class takes the online "platform data", the "evaluation of teachers and students, students and benchmarking industry standards" in the class, and the online "platform advancement and labor effectiveness evaluation" after class as the starting point to form the craftsman comparison and evaluation scoreboard, so as to urge students to pay attention to the improvement of Ideological and political literacy and internalize industry values.

To meet the requirements of the National Association of robotics and industry, we will jointly design and upgrade the courses of all kinds of mechanical and electrical industry, and cooperate with the National Association of robotics and industry to meet the needs of the industry. We will also design and upgrade the courses of all kinds of robotics and industry, and meet the requirements of the National Association of robotics and industry. The design of teaching activities includes learning task design, real-time problem design, practice test design, interactive discussion design and expansion homework design. Combined with the students' cognitive law, the course is reconstructed into a scene and progressive project. The principle of "effective, applicable and sufficient" is adopted in the selection of course content. The training project selects the technology widely used by regional enterprises, and focuses on the knowledge points related to the training task in the arrangement of theoretical content, to avoid wide and comprehensive content.

2.2. School Enterprise "Dual" Collaborative Education, Online and Offline Implementation of Hybrid Precision Teaching

Combine "dual" teaching with "Internet +" modern education technology, build a new learning system, and rely on the big data network platform to form a "three mutual layered" hybrid precision teaching mode of "school and enterprise integration", "online and offline interconnection" and "teacher student interaction". Among them, a diversified and hierarchical teaching resource database is built through the big data platform; With the help of online learning platform, learning data feedback, accurate teaching process organization; Through precise teaching, we can recognize the learning situation, integrate the teaching content and reconstruct the teaching process of "before class, during class and after class". Each stage uses the network platform data analysis to reflect the characteristics of precision teaching. Before class, teachers log in to the online learning platform, push learning resources, assign learning tasks, and conduct online counseling and learning situation analysis; Students accept the task, make full use of network resources for online learning and online testing, and feedback the confusion in learning to teachers through online communication. In class, teachers adjust teaching methods by analyzing students' learning behavior data, and accurately design

classroom teaching contents, including key and difficult explanations, task orientation and personalized guidance; Students conduct inquiry and autonomous learning through group discussion and strengthening key and difficult learning, division of work and cooperation, programming simulation training and personalized learning. After class, teachers assign development tasks, carry out independent learning according to the learning data, and complete online review, online test and corresponding development tasks.

2.3. Virtual Simulation + Twin Technology Integrates Digital Teaching Resources to Create an Unlimited Space-time Teaching Platform

Using virtual simulation + Digital twin technology to build the same digital training platform as the real training platform, and connect with online course platform video, animation and other digital teaching resources. Students can conduct independent exploration, cooperative communication and online training through loose leaf textbook task guidance and QR code link. In the post epidemic remote teaching, teachers can demonstrate the operation of real and digital dual training platforms. Online students use the real-time teaching tracking system composed of "monitoring camera + mobile camera monitoring PTZ + remote server" to integrate into the offline classroom, carry out follow-up training on the digital platform, interact and evaluate with offline team members in real time, and teachers and industry mentors in real time.

2.4. Systematic Construction of Multiple Collaborative Evaluation System

Build an all-round evaluation system of multiple coordination. Apply multiple digital technology means to support the whole teaching process, which is intuitive, evaluable and measurable. Master the self-study and self-test data of students' teaching resources through the online course platform, visually check the students' control scheme through the virtual simulation + Digital twin training platform, and track the students' actual operation in real time through the digital monitoring platform. The production and teaching personnel participate in the evaluation in a collaborative manner. The industrial tutor's evaluation is pragmatic and standardized, the teacher's evaluation target effect, and the student's evaluation process are involved. The evaluation is relatively connected with the demands of "stakeholders", to promote students' independent learning and innovative practice in continuous cooperative exploration and solving practical problems.

2.5. Integrate Online Course Resources and Build a New Form of Loose Leaf Teaching Materials in the Form of Project

Integrate online course animation, simulation and video resources to build a project-oriented loose-leaf textbook with a new form of integrated media. Guided by the project orientation in the new form leaflet, the links such as project demand, implementation planning, project division of labor, project implementation and project reflection are combined with classroom teaching links. By scanning the QR code, we can obtain granular teaching resources such as teaching video, animation, simulation, pictures and online tests of online courses, so as to better promote students' "autonomous learning", "music learning" and "cooperative learning".

3. Conclusion

Industrial robot application programming 1 + X course closely follows the forefront of industrial robot technology. Under the guidance of "cultivating people by virtue and educating people by three aspects", docking with the "1 + X" certificate standard of industrial robots, and combined with the digital transformation and upgrading of industries in Zhejiang and Wenzhou, typical application projects such as welding, laser cutting, palletizing, assembly and visual sorting in the application of industrial robot technology are introduced into the classroom. The

establishment of this course helps to cultivate high-quality skilled talents with solid basic skills, high professional quality and strong professional ability of industrial robots.

The construction of high-quality online open courses of this course aims to broaden the audience. On the one hand, higher vocational college students, teachers and social students who are willing to learn industrial robot application programming can learn independently and flexibly through the high-quality online open course platform; On the other hand, teachers can use the online open curriculum platform curriculum resources to assist curriculum teaching and implementation, to realize hybrid teaching and classroom turnover.

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