

# Exploration on new ideas of robot teaching reform in Colleges and universities

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**Abstract:** with the proposal of intelligent manufacturing 2025 action program, it points out the development direction for the transformation and upgrading of China's manufacturing industry, and also gives sufficient power to relevant industries. The research on the cultivation of innovative engineering science and technology talents in the Chinese Academy of engineering has shown that China's future modernization and economic development need scientific and technological talents with diversified attributes, which also puts forward new requirements for robot teaching and talent cultivation in relevant colleges and universities. In view of this, in the process of robot teaching, it is necessary for university teachers to innovate their teaching ideas, improve the quality of professional teaching, break through the shackles of traditional teaching, build an efficient talent training system through the integration of modern teaching ideas, complete the reform and innovation of robot teaching, and cultivate more talents with social development. Practical professional talents suitable for the development of the industry. Based on this, this paper analyzes the current situation of robot teaching in Colleges and universities, and puts forward some ideas and suggestions for the teaching reform, in order to add fuel and raise wages for the teaching reform of robot in Colleges and universities.

**Key words:** colleges and universities; Robot teaching; Reform; thinking

With the progress of modern science and technology, robots have been applied in all walks of life. At the same time, robots are the crystallization of wisdom in the development of human science and technology, and a realistic projection of artificial intelligence. Robot is a comprehensive concept and object, which combines machines, software systems, hardware and human wisdom. It is an important milestone achievement in the process of transforming nature. At present, robot science and related technologies have become a must for international competition. In terms of the development of modern robots, we have entered the era of robots, and robots will inevitably become an important part of our lives in the future. However, China's colleges and universities started late in robot teaching and are still in the initial stage. Although they have made some achievements, there are still some problems in teaching. Educators need to analyze them and seriously summarize the countermeasures to promote the reform of robot teaching and promote the quality of robot talent training in Colleges and Universities, It is also used to explore new teaching methods and build a new pattern of robot teaching that points to modernization and efficiency.

## 1 Current situation of robot teaching in Colleges and Universities

### 1. Insufficient integration of theory and Practice

In robot teaching in Colleges and universities, the status of theory and practice should be equal, and even the importance of practice teaching is greater than that of theory teaching. However, in some colleges and universities, there are problems in the time allocation of theory teaching and practice teaching in robot teaching, either emphasizing theory over practice, or specializing in practice and neglecting theory, These two methods can not promote the reform of robot teaching, but also make the training in robot practice teaching lose the original significance of professional ability training. On the one hand, robot teaching and training in Colleges and universities is to consolidate the theoretical basis of students; On the other hand, robot teaching and training in Colleges and universities is to improve students' professional quality. However, influenced by the traditional education concept, some practical courses and theoretical courses are far away from practice, or the class hours between them are improperly arranged, resulting in the students' professional practice ability can not be effectively improved, and can not play an educational role in the overall teaching of robot courses, making the final teaching effect unsatisfactory.

### 2. Teaching philosophy and mode are relatively lagging behind

Undergraduate colleges and traditional colleges generally begin to have courses such as "robotics" and "Introduction to robotics". The specialties offered are relatively wide, involving mechanical engineering, electronic engineering, aerospace, computer science and other specialties, and there are various ways to offer them, such as compulsory, professional elective, school wide elective, etc. It can be seen that the robot course involves many professional fields and diversified teaching forms. It is difficult to improve the quality of its courses and personnel training through teaching reform. From the perspective of development, at this stage, due to the update and iteration of robot technology, the development scale of robot teaching is fast, and even some colleges and universities set up robot courses without adequate preparation, such as teachers' team, school enterprise cooperation, practice base, technical guidance and so on, resulting in unsatisfactory teaching effect and poor talent training quality; Colleges and universities lack sufficient experience in robot teaching and personnel training, and do not fully investigate the market dynamics, resulting in vague professional training objectives, lack of training conditions, mismatch between professional courses and the actual development of enterprises, lack of teachers and other problems. These problems greatly affect the efficiency and quality of personnel training in robot teaching, To a certain extent, it has affected the rapid development of robot course in Colleges and universities, and also affected the quality of personnel training.

## 2 New ideas of robot teaching reform in Colleges and Universities

### 1. Strengthening the reform of practical courses

Robot teaching in Colleges and universities has a strong practicality, so it is necessary for colleges and universities and teachers to pay attention to practical teaching in order to promote the high-level development of robot teaching. Under the background of the rapid development of society and science and technology in the new era, the teaching of robot course in Colleges and universities needs to have strong core competitiveness, which requires professional teachers to fundamentally reform the practice teaching of robot course from the perspective of improving the teaching quality and teaching reform, starting from the personnel training mode. At present, in the practice teaching of robot courses in some colleges and universities, the traditional teaching concepts and modes are still used. "Emphasizing theory and ignoring practice" is a common phenomenon in robot teaching in Colleges and universities. This is because colleges and universities and teachers do not have a correct understanding of the importance of practice teaching, which leads to students' insufficient practical ability and the inability to cultivate robot technicians who are in line with the development of the times and industry. Therefore, it is necessary to break through the traditional practice teaching mode in the teaching of robots in Colleges and universities, and take teaching reform as the core guidance to innovate the practice course, so as to promote the improvement of students' professional practice ability and professional quality.

### 2. Construction of robot teaching and training base

Robot is a typical mechatronics system, which integrates many advanced technologies such as machinery, electronics, sensors, computer hardware and software, control, artificial intelligence and modeling technology. In view of this situation, the construction of robot teaching and training base is of great benefit to the reform of robot teaching. The construction of high-quality robot training room can provide teachers and students with a new comprehensive education platform and robot technology research platform, and guide students to practice in many aspects, such as detection technology and sensors, digital electronics and analog electronics, single-chip computers and microcontrollers, robotics and industrial control. Through the innovation of the training teaching content, students can not only master the internal principles of robots, but also apply professional knowledge according to practice, so as to improve the quality of learning and the professional level of teachers. Therefore, according to the robot teaching content, relying on the characteristics of the robot course to build a high-quality training teaching base is an important way of robot teaching reform in Colleges and universities. During the teaching and training, teachers can match courses such as basic robot production and programming, C51 robot production and C language programming, and robot creativity and production, so that theoretical knowledge can be covered in the practical teaching practice based on robot teaching, so that practice and theory can be highly integrated, and good students' Innovation and creativity can be cultivated. In addition, for robot teaching and training, teachers should establish training objectives, such as through assembly, debugging, primary programming training and so on, so that students can understand the complete and preliminary understanding of typical embedded systems and commonly used sensors, so that students can know it and establish systematic engineering awareness; Integrate course teaching and practice into robot system objects, improve students' interest and enthusiasm in learning, let them know why, and master the working mechanism of the core environment.

### 3. Establish evaluation system and improve talent quality

In the traditional assessment and evaluation mechanism of robot teaching in Colleges and universities, teachers pay more attention to the assessment and evaluation of students' theoretical knowledge and basic ability, but the assessment and evaluation of students' practice is not enough. For the robot course, which is a highly practical professional course, a reasonable evaluation system can effectively promote students' professional ability. Therefore, college teachers should build an effective professional evaluation system with the help of diversified evaluation methods in robot teaching. For example, the way of school enterprise integration can be used for evaluation, that is, after the University and the corresponding enterprises carry out school enterprise cooperation, the two sides' different positions and different functions can be used to carry out a comprehensive evaluation of students. In the specific evaluation process, teachers are mainly responsible for the evaluation of students' theoretical knowledge and basic ability, while enterprises are responsible for the evaluation of students' practical activities. In this "double evaluation" way, students' professional level is improved from many aspects. First of all, in the evaluation of theoretical knowledge and basic ability, teachers should have an understanding of the actual situation of students as a whole, and make a comprehensive evaluation of students in pre-school, during teaching and after teaching, so as to adjust their common advantages and disadvantages. In addition, teachers should also conduct one-to-one evaluation for some students, so that students can accurately understand their own shortcomings and make corrections in time in learning. Secondly, in the evaluation of practical activities, teachers should cooperate with the management of enterprises to comment and grade students' works in time after students' practice, point out the advantages and disadvantages, and give relevant optimization suggestions. Finally, in the process of evaluation and assessment, both teachers and enterprise managers should conduct a comprehensive evaluation of students, so that students can understand the important value of professionalism for enterprise development, deepen the exploration in this aspect in the follow-up cooperation, comprehensively improve their professional quality, and implement teaching reform.

### 4. Strengthening the quality of teaching team

Robots have strong practicality, so from the perspective of teaching, professional teachers' skills and literacy are particularly important, not to mention in the context of modern education, the cultivation of high-end, high-quality and high-level talents cannot be separated from the support of the teaching team. The practice teaching reform based on robot course puts forward new requirements for teachers' teaching level. Therefore, colleges and universities should strengthen the quality of teaching team as one of the main focuses of teaching reform. For example, colleges and universities can hire senior professionals in the industry to participate in the formulation and adjustment of talent

training programs under the robot course teaching system, and implement teaching reform. At the same time, the experienced professionals in relevant industries and enterprises are combined with the teachers in the school to build a diversified teaching team, and help each other through education guidance, class observation and so on, so as to fundamentally improve the teaching ability of teachers' robot courses. Colleges and universities should also provide teachers with more opportunities for further study, go out of the campus to expand cognition and exercise skills, and promote the continuous progress and growth of talents. In short, under the background of modern education, robot teaching in Colleges and universities should tend to be high-end, high-quality and high-level, which also means that colleges and universities should strengthen the quality of teaching team. Only by fundamentally improving the teaching level of the school, can we really improve the level of talent training and the quality of teaching reform. In addition, colleges and universities should follow the modern teaching concept and pay attention to strengthening the comprehensive quality of students in the reform of robot teaching, so as to promote the improvement of students' professional ability, practical ability and professional quality, and realize the comprehensive development and progress of morality, intelligence, physical beauty and labor.

#### 5. Expand vision and actively display the latest achievements of robot technology

As we all know, robot technology has a wide range of applications in all walks of life. It can even be said that the emergence of robots has brought new development opportunities to many industries and fields. Therefore, robot technology has also been developing rapidly, and still maintains the trend of increasing year by year. Therefore, colleges and universities must have a certain lag in robot teaching, so teachers can maintain the sensitivity to the update of robot technology, through the tracking and research of cutting-edge technology, timely display the latest research and application results of robot technology for students in the teaching process, and carry out a detailed display for students through multimedia, We can also conduct professional analysis on these cases, expand students' professional vision, and maintain an interest and love in the study of robot technology. For example, teachers can carry out professional analysis and exploration with students through practical cases such as space exploration robots, blind guiding robots, medical micro robots, etc., and jointly explore how the systems of these robots are designed, so as to continuously deepen from the technical principle level, and show students the application charm of robot technology in practical cases, This teaching method can also promote the reform of robot teaching.

To sum up, in the process of modern social development, robots have an extremely important position, and the demand for robotics talents in corresponding fields is also very large. Therefore, it is necessary for colleges and universities to carry out the reform of robot teaching, complete the teaching reform by strengthening the reform of practice courses, building robot teaching and training base, establishing evaluation system, improving the quality of talents, strengthening the quality of teaching team, and actively displaying the latest achievements of robot technology, so as to improve the teaching level, from theory to practice and then to professional cognition, Improve students' understanding of robot technology in an all-round way, and cultivate a batch of high-quality, high-level and high-quality talents for the development of the national robot field.

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