Construction of practical teaching system for intelligent manufacturing specialty under the background of double innovation

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Abstract. The innovation and entrepreneurship education in most colleges and universities still stays at the theoretical level, generally lacking practical links, and the practical teaching system of innovation and entrepreneurship education is incomplete. The four-integrated practical teaching system of intelligent manufacturing majors based on the "base six mutual" has improved students' innovation awareness and new abilities, and improved the quality of practical teaching of innovation and entrepreneurship education for college students majoring in intelligent manufacturing.

Keywords: Mass entrepreneurship and innovation; Intelligent manufacturing; Practical teaching base; Competition.

1. Introduction

In September 2014, Premier Li Keqiang proposed at the Davos Forum "Mass Innovation, Mass Entrepreneurship" [1], The call for double entrepreneurship was put forward from this. In April 2015, the General Office of the State Council issued the "Implementation Opinions of the General Office of the State Council on Deepening the Reform of Innovation and Entrepreneurship Education in Colleges and Universities"[2], which requires stimulating the enthusiasm of college students for innovation and entrepreneurship, reflecting the achievements of innovation and entrepreneurship education in colleges and universities, and building college students' innovation and entrepreneurship projects to connect with society. Investment docking platform. In the same year, China's first Internet+ College Students Innovation and Entrepreneurship Competition was held. Premier Li Keqiang gave important instructions to the competition: college students are the new force for implementing the innovation-driven development strategy and promoting mass entrepreneurship and innovation. Engage in innovation and entrepreneurship and improve practical ability. Vice Premier Liu Yandong demanded that the reform of innovation and entrepreneurship education in colleges and universities should be further promoted, the quality of personnel training should be improved in an all-round way, and efforts should be made to create a new force for mass entrepreneurship and innovation. On August 15, 2017, General Secretary Xi Jinping replied to the college students of the "Youth Red Dream Journey" of China's "Internet+" college student innovation and entrepreneurship competition [3], which greatly encouraged the enthusiasm of all college students for innovation and entrepreneurship, and pointed out the direction for the success of the competition, the Vice Premier in charge of the State Council visited the finals of each competition to give guidance. So far, the research on innovation and entrepreneurship education reform under the background of mass entrepreneurship and innovation has reached a new height and has higher requirements.

The purpose of innovation and entrepreneurship education is to cultivate college students' innovative consciousness, exercise their innovative ability, and enhance their professional competitiveness [4]; provide necessary support for students who have entrepreneurial needs, and help stimulate college students' entrepreneurial willingness. At present, the main ways to implement innovation and entrepreneurship education in colleges and universities in my country are through the construction of platforms such as innovation and entrepreneurship education curriculum system [5], industry-education integration practice teaching system [6], college student associations and

competitions, and entrepreneurship and innovation spaces [7]. Through the above platforms, innovation and entrepreneurship work have achieved certain results, and a group of students with innovation and entrepreneurship capabilities have been trained. However, due to the imperfect construction of entrepreneurship and new entrepreneurship course system, the unbalanced quality of teachers, and the unscientific training system for students, at present, the innovation and entrepreneurship education in most colleges and universities is still at the theoretical level, and there is generally a lack of practical links. The incomplete teaching system of educational practice, the lack of teachers with real practical ability, the single guidance method, and the unsound practice system of innovation and entrepreneurship education have restricted the development of innovation and entrepreneurship education to a certain extent. Therefore, the construction of practical teaching system for innovation and entrepreneurship major under the background of double innovation is very important.

2. Process of construction

The major of intelligent manufacturing in Zaozhuang University is developed from the major of mechanical design, manufacturing and automation. The traditional mechanical majors pay attention to the knowledge of mechanical drawing, mechanical principles, electrical automation, etc. After turning to the direction of intelligent manufacturing, the mechanical majors the practical teaching system puts forward new requirements. therefore, built by the School of Mechanical and Electrical Engineering of Zaozhuang University "Four modules, three upgrades, three bases and six interactions "The four-dimensional integrated intelligent manufacturing professional practice teaching system, as shown in Figure 1:

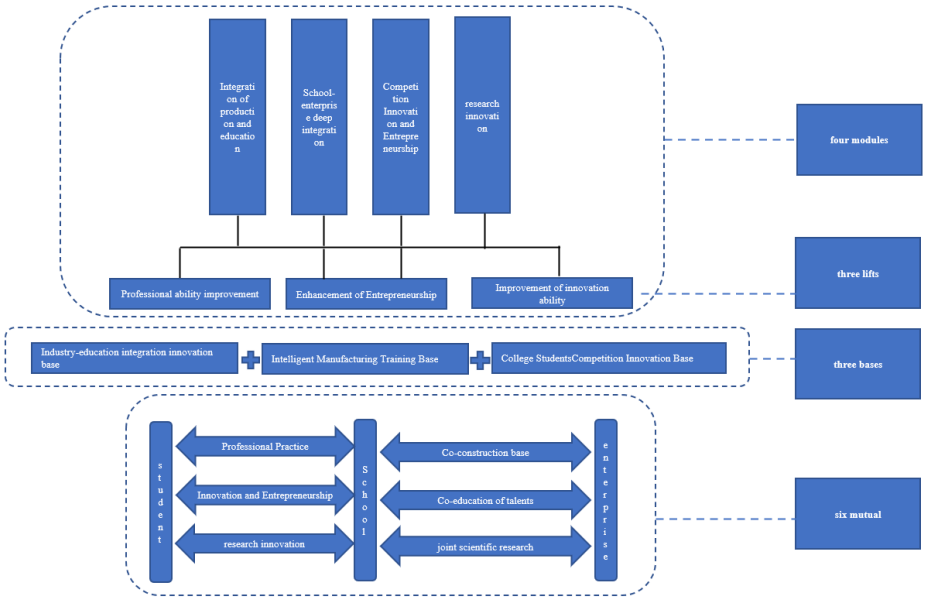


Figure 1. Practical teaching system of intelligent manufacturing specialty

Based on the three platforms of the School of Mechanical and Electrical Engineering, including the Innovation Base for the Integration of Industry and Education land, an intelligent manufacturing training base, and a competition innovation base for college students. The practical teaching system is mainly composed of four modules: integration of production and education, deep integration of schools and enterprises, competition innovation and entrepreneurship, and scientific research innovation. To achieve the six mutual systems of mutual learning, mutual innovation, mutual education, mutual construction of practice bases, mutual scientific research, and mutual exploration among students, schools, and enterprises, and ultimately improve students' professional practice ability, innovation and entrepreneurship ability, and technological innovation ability. The features and highlights of the project are as follows-First, In-depth integration of production and education to

improve students' professional practical ability. The innovation base platform for the integration of production and education has 8 professional laboratory branches, including industrial robot training, industrial robot body design, and industrial data control and acquisition laboratory, with the internationally renowned company ABB industrial robot and GE PAC3i control system as the core. Basic practice links such as in-class experiments, course design, production practice, and graduation design are all carried out in relevant laboratories. second, In-depth school-enterprise cooperation, practical teaching content comes from the needs of enterprises. First of all, through the establishment of laboratories, the appointment of college teachers as vice presidents of science and technology, and students' graduation internships, we will initially establish contacts with relevant companies and form technical cooperation relationships; secondly, send willing students and teachers to target companies to solve technical problems. Carry out order-based training, and be able to take up posts in enterprises when they graduate, and at the same time solve the pain points of teachers' lack of practical experience in enterprises. Finally, by holding a school-enterprise joint application-oriented talent training summit forum, companies are invited to the school to discuss the practical teaching system and train students who meet the needs of the industry and industrial development. third, create a multi-disciplinary integration student competition model to improve students' entrepreneurial ability.

Make full use of the policies and competitions issued by the state to support innovation and entrepreneurship in colleges and universities, such as the "Challenge Cup" extracurricular academic science and technology works competition and business plan competition for college students, the "Internet+" college student innovation and entrepreneurship competition, and the National Mechanical Innovation Design Competition for College Students. Discipline competitions have the characteristics of high requirements, multidisciplinary integration, and integration of theory and practice. During the cultivation of key competition projects, the college forms a multidisciplinary integration team with students from the School of Chemistry, Economics and Management and other related majors. It can not only solve the relevant problems of different majors, but also exercise students' innovative spirit and teamwork ability. fourth, create an intelligent manufacturing training base and improve students' ability to serve the regional social economy. With the innovative thinking of "Internet +", the training base organically connects teachers and students of universities, industrial technology enterprises, and manufacturing customers through the construction of a "big platform + small team" model, forming an inter-university, inter-enterprise, Inter-regional open sharing and collaborative innovation cooperation ensure that the intelligent manufacturing training base exerts the actual effect of educating people and serving the local economy. Encourage teachers to innovate in experimental teaching; cooperate with many companies or organizations to improve the base's ability to serve teaching. fifth, Schools and enterprises provide students with entrepreneurial opportunities and guide students to truly start their own businesses. Encourage students majoring in intelligent manufacturing to carry out entrepreneurial practice learning. By participating in various entrepreneurial competitions and step-by-step drills on each entrepreneurial link, students can choose appropriate entrepreneurial projects to write business plans according to their own conditions, and be guided by corporate mentors. To enable students with entrepreneurial conditions to truly realize their entrepreneurial dreams.

3. Construction of practical teaching system Content and Implementation Path

Taking the 2020-2021 undergraduate class of intelligent manufacturing as an example, the new system of practical teaching is used for practical teaching. Through the integration of production and education, the foundation for students' innovation and entrepreneurship will be consolidated; through the in-depth cooperation between schools and enterprises, 3-5 temporary teachers and 30 students will be dispatched. Teachers work as vice presidents of science and technology or cooperate in the form of project cooperation, and students conduct practical learning in the form of internships. Construct a new system of practical teaching for intelligent manufacturing majors with "four modules, three upgrades, three bases, and six mutuals". Improve the intelligent manufacturing training base by

building an intelligent manufacturing simulation laboratory, train 5-10 teachers, and apply it to 200 students in practical teaching. Through the construction of a practical teaching base for in-depth cooperation between schools and enterprises, teachers and enterprise experts will discuss professional talent training specifications, talent training programs, and curriculum systems, and focus on undertaking some practical teaching work for applied majors, Construct 1-2 practical teaching bases for the deep integration of universities and enterprises. Provide information such as activity reports for participating in relevant innovation and entrepreneurship competitions or plans for innovation and entrepreneurship activities, business plans, etc., unite students in science, engineering, and management disciplines, and use Internet innovation and entrepreneurship, Challenge Cup and other competitions to promote the reform of college students' employment and entrepreneurship education, Create a multi-disciplinary integration student competition model. Through project cooperation and vice president of science and technology, teachers go deep into the front line of enterprises to find technical problems, solve problems, improve teachers' practical teaching ability, and benefit students, Cultivate 3-5 double-qualified teachers.

The above construction contents are respectively elaborated from the construction of a new system of practical teaching for the specialty of intelligent manufacturing, the practical teaching base for school-enterprise cooperation, the multidisciplinary integration student competition mode, and teacher training. Based on the existing foundation of the specialty of intelligent manufacturing, the four modules are summarized. The problem, put forward the corresponding solution, and finally formed the implementation path of the project as follows:

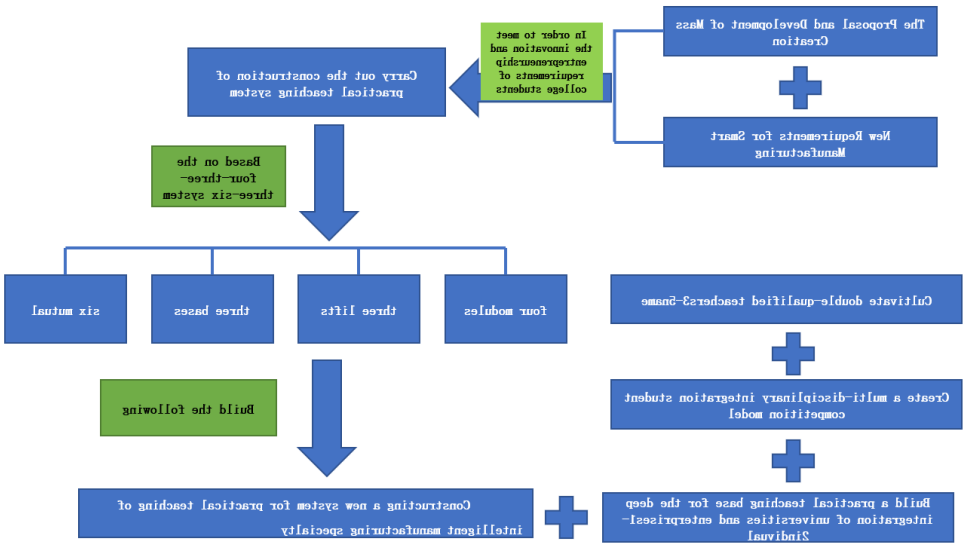


Figure 2. The implementation path of the project

4. Practical teaching system construction achieved the goal

Through the practical education of innovation and entrepreneurship in intelligent manufacturing, make full use of school-enterprise cooperation and practice bases inside and outside the school, and take the opportunity of national policies and innovation and entrepreneurship competitions to allow students to use the professional knowledge they have learned to support innovation and entrepreneurship practice; Targeted counseling to improve students' professional skills and create order-based enterprise talents; through entrepreneurship training, to improve students' real interest in entrepreneurship, Cultivate college students' innovative consciousness and entrepreneurial ability. To cultivate students' innovation and entrepreneurship ability in the practical teaching system of intelligent manufacturing engineering, set up special courses on innovation and entrepreneurship, establish a more complete curriculum system, and promote the reform of innovation and

entrepreneurship education, Improve the talent training program and promote the reform of innovation and entrepreneurship education. Through the industry-education integration innovation fund, the intelligent manufacturing training base, and the intelligent manufacturing professional practice teaching system created by the college student competition innovation base, the integrated model of "industry-education integration, school-enterprise deep integration, competition innovation and entrepreneurship, and scientific research innovation" has been gradually established, forming The practical teaching mode suitable for application-oriented undergraduate colleges and universities can promote the formation and improvement of students' practical ability and innovation ability, and effectively promote students' employment competitiveness, Improve students' practical technical ability to achieve a win-win situation between universities and enterprises.

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