

# Research on the training path of intelligent manufacturing talents in vocational colleges under the background of intelligent manufacturing in China

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## Abstract

Relying on the regional intelligent manufacturing development plan, optimize the teaching resources, give priority to with regional revitalization of innovation driven engine, intelligent manufacturing as the goal, the implementation of "Internet +" made in "4.0" depth fusion industry pattern, strengthen course and accommodation, prevent education of talent training and the gap between the intelligent manufacturing company demand, promoting and deepening cooperation between schools and enterprises, Jointly promote career construction and the development of intelligent manufacturing companies, introduce talents in intelligent equipment, robotics, automobile manufacturing and other industries, and optimize the curriculum.

## Keywords

**Intelligent manufacturing; Vocational colleges; Personnel training; The path.**

## 1. The background

In 2018, China's industrial structure continued to upgrade: the tertiary industry accounted for 52.2%, and the added value of high-tech manufacturing increased by 1.2 percentage points in the proportion of industries above designated size. For the intelligent Manufacturing industry, in the 1980s, artificial Intelligence technology was applied to the manufacturing industry. Wright and Bourne introduced the theory of intelligent manufacturing for the first time in Manufacturing Intelligence. The principle is to make machines carry out daily production in an automatic state through smart lines, software systems, robot vision and remote control, triggering the cultivation of intelligent technical personnel. In 2010, Germany developed ten years (2011 ~ 2020) automation development plans, manufacturing automation level of ascension as a national policy to perform, to promote electronic electrical engineering, mechanical and electrical integration technology, the production level of technology, computer and IT technology, sensor and transmitter, drive and implement technology, communication technology and the development of comprehensive technical direction. Since the 21st century, the presentation of Cloud computing, Internet of things, Big data, Mobileinternet and other information technologies, We will upgrade manufacturing to a new generation of Smart manufacturing. Made in China 2025 and Guidance on Actively Promoting the "Internet Plus" Initiative are required to promote the integration of mobile Internet, cloud computing, big data and the Internet of things with modern manufacturing. In his government work report on Tuesday, Premier Li Keqiang promoted the combination of advanced manufacturing and modern service industries to accelerate the building of a manufacturing powerhouse. Shape the industrial Internet platform, develop "intelligence plus", for the transformation and upgrading of the manufacturing industry. Adem Kulauzovic, an expert in the automation industry, optimizes the digital ecosystem at the Domino Predictive Intelligent Maintenance platform (Domino Cloud). Li Hongjian and Yu Xingping suggested that, by focusing on the needs of the new generation of information technology talents in the transformation and upgrading of

intelligent manufacturing industry, the cultivation of talents with production and education was studied, and the "five-in-one" technical talents cultivation system of knowledge imparts, skill training, innovative practice, quality cultivation and value accumulation was proposed. Establish a new talent training system based on "platform + direction + project combat" course system and "base + studio" teacher skills to improve the platform. Li Xiaoxi and Shen Jianqiang proposed to explore the cultivation of complex advanced engineering application talents by relying on the new method and convenient conditions of the collaboration of Hamburg University of Applied Science and Technology, and to build an intelligent manufacturing experiment and technology platform combining teaching, scientific research and social services with the direction of establishing a high-level university. It will be built into the experience presentation center of intelligent manufacturing concept, the application experimental teaching center of intelligent manufacturing and the upgrading and innovation practice center of intelligent manufacturing, which will improve the level of international cooperation and discipline establishment of our school in all aspects. What Yun said, according to the technical features of intelligent manufacturing by use of action-oriented school set up form, relying on industry, schools and businesses work together to establish a professional academic standards, build a professional curriculum standard match the professional qualification standards, teaching content and the integration of work tasks, learning process and working process of the accommodation, the concept and practice the integration of school-running system, According to the teachers of the school, places and other realistic situation, the establishment of a modern vocational education system. In the book "An Empirical Study on Students' Vocational Ability Assessment in Integrated Curriculum Teaching Reform", Gu Donglian proposed to use COMET vocational ability assessment method to assess students' vocational action dimension. Shao Yaping put forward the teaching innovation policy of using behavior-oriented teaching to change new thoughts from the perspective of the analysis of the needs of vocational ability, aiming at the goal of education to meet the needs of learning, so as to improve students' professional quality. The content of education meets the needs of the post, and should be carried out by means of production technology, and stick to the integration of teaching, learning and doing.

In foreign perspective, Australia TAFE mode "competency-based", form the ability of classification and the German "dual system" is also divided into same important ability and the ability to specialize in curriculum system with training package as its foundation, training package content is divided into capacity standards, the certificate system, evaluation guidance and individual learning materials. Modules of Employable Skills (MES) emphasize that "students are the core, learning stations are the core and skills are the core", instead of the traditional curriculum that "teachers are the core, classrooms are the core and textbooks are the core". In order to cultivate students' vocational technical ability, MES mode plays a positive role in vocational education training. It from some industry of actual working procedure as the main clue, finished according to job task module, you can call it as "task module", give full consideration to the different needs of labor-intensive industry and technology-intensive industry, combined with China's national conditions and the regional industry, develop their vocational education patterns and curriculum system. The above academic views and models have their own characteristics. Different vocational colleges need to establish their own teaching models according to their own situations to cultivate intelligent technical talents.

## 2. Research significance

### 2.1. Theoretical Significance

At present, the curriculum system of intelligent manufacturing specialty in many vocational schools is taught by experience. Although the content of teaching has increased the proportion

of practical training courses, it is still based on experience teaching in general. This method cannot match the cognitive characteristics of students in current vocational colleges. This topic is based on action-oriented teaching method and outstanding ability and the quality of intelligent manufacturing professional courses to explore, build teaching system of "action", on the relationship between knowledge and expertise emphasizes knowledge from professional skills to the summary of the process, abide by the professional quality of law, to strengthen the teachers, teaching environment and teaching resources optimize, build a combined teaching subject system and action, To establish a curriculum system suitable for the actual situation of vocational colleges, and provide theoretical guidance for the curriculum reform of intelligent manufacturing in vocational colleges.

### 2.2. Practical Significance

To establish an intelligent manufacturing teaching system that meets the action orientation of vocational colleges and realize the concept of practical essence of vocational education curriculum; The change of vocational teachers is mostly experience teaching mode. Smart manufacturing professional measures oriented curriculum innovation, using a variety of means to encourage and attract enterprises (preferably local enterprises) to participate in vocational education training; Taking action as a guide to organize teaching and learning to cultivate the professional action skills of students majoring in intelligent manufacturing. Vocational colleges need to carry out the education reform of action-guided teaching method, keep up with the progress of The Times in the education and teaching methods, cultivate intelligent manufacturing talents with development potential and can promote the development of these vocational abilities, which is of great significance for the whole teaching reform and development of intelligent manufacturing specialty in higher vocational colleges.



Figure 1: Research on the training path of intelligent talents in vocational colleges under the background of intelligent manufacturing in China

### 3. System combing

The path research idea is shown in Figure 1.

- (1) Literature retrieval, theoretical review and review.
- (2) Demand analysis of regional intelligent manufacturing professionals.
- (3) Innovate the training mechanism of intelligent manufacturing talents in vocational colleges.
- (4) Innovate the training mode of intelligent manufacturing talents in vocational colleges.
- (5) Innovative talent training program and curriculum system.

#### **4. Innovate the training mechanism of intelligent manufacturing talents in vocational colleges**

Many years ago, D Mertens expressed the relationship between labor and labor market, put forward important ideas about the idea of "key capabilities", and analyzed a series of statements about labor relations, market value, comprehensive evaluation and so on. Kultusminister Konferenz course design and Settings have been modified to derive the "action domain" education model, simulate the real environment for teaching planning changes, quickly develop teachers and students direct skills requirements.

#### **5. Innovate the training mode of intelligent manufacturing talents in vocational colleges**

Study the German "dual system" vocational education model, learn the German vocational school "framework teaching plan" to organize teaching activities, according to the German enterprise and cross-enterprise training center according to the "Vocational education Regulations" issued by the federal government to carry out practical teaching, improve the action guidance teaching form, using students as guidance. Students take the lead in the whole teaching process as the main body of action, and participate in the design, implementation and evaluation of the teaching process. Teachers act as coordinators and participants. The core of action-oriented school model is to enable students to realize an action product that can be used or further processed or learned in the classroom. To task and project as a carrier, a variety of teaching methods integration of teaching process, namely, task driven as the core, to project a variety of teaching methods of teaching, case teaching is given priority to, supplemented by multimedia teaching means, to achieve with work process as the guidance, the theory and practice combined with each other, as the ultimate goal of the standard in the cultivation of ability. Classroom teaching realizes the integration of "teaching, learning and doing", and the integration of quality training and ability formation.

#### **6. Innovation and establishment of smart factory training center**

Around the intelligence training center for high-end craft factory specialized personnel training and vocational colleges raise "the double teacher" the teacher literacy practice education center, advanced manufacturing technology research and development center, regional manufacturing small and medium-sized enterprises "technical service center" made with combination of function orientation, project planning design and the practical analysis. To integrate the production needs of cooperative enterprises, build the assembly line for intelligent production and installation of product parts and the assembly line for intelligent installation and inspection of electric equipment, and study the closely related teaching and training, scientific and technological services, innovation and entrepreneurship, and social training function modules

#### **7. Action-oriented "task-driven" teaching model**

A variety of teaching methods with task-driven as the core, project teaching and case teaching as the main teaching method, supplemented by multimedia teaching means, realize the ultimate

goal of using work flow as the guidance, combining theory with practice, and ability training as the standard. Classroom teaching realizes the integration of "teaching, learning and doing", and the integration of quality training and ability formation. With "action orientation drive" as the main mode, play a role of the students in the process of teaching, teachers' leading role, attaches great importance to analyze the problems of students, ability to deal with the problem of cultivation, from complete a stage of "task", through the guides the student to continue to complete the "task", so as to learn new knowledge, to realize the teaching goal. The real work scene is set up so that students can feel their future work environment before entering the society, know and find the problems in advance, and then solve the problems in time under the guidance of teachers, effectively avoiding the disconnection between the future learning content and the post.

## **8. Specific research methods and protocols.**

### **8.1. Literature research method**

This project uses the information resources of CNKI, Wanfang, VIP and other databases to retrieve the materials related to the research of this project, and makes use of library books and periodical materials to collect, analyze and sort out a large amount of information to strive for the detailed and reliable theory of this project research. Through the analysis and collation of the collected data, the cultivation mode of intelligent manufacturing talents at home and abroad is studied, and the connotation, talent training framework and technical data of intelligent manufacturing are deeply grasped. According to the research purpose, research progress and research prospect of this project, suggestions on talent training are made to innovate the breakthrough point of this project.

### **8.2. Inductive analysis and deductive analysis**

According to the literature research, the collected intelligent manufacturing data are summarized, and the general conclusion about this project is obtained through the subdivided information and data, and then the cultivation path of intelligent manufacturing talents in vocational colleges is deduced based on the deductive method.

### **8.3. Comprehensive analysis method**

By analyzing the vocational colleges all of intelligent manufacturing personnel training path mechanism, mode and problems in the process of integrated comprehensive analysis, according to the analysis, extraction, conclude that scientific vocational colleges intelligent manufacturing personnel training path, improve vocational colleges intelligent manufacturing talents cultivating way exploration results and effectiveness.

## **9. Conclusion**

In creating a new type of intelligent manufacturing center, want to consider the needs of the enterprises and the needs of the latest technology, increase the existing apprenticeships, studio system, etc., break original to cool, problem sets, add some more advanced system center is in the nature of the mixed ownership, government, enterprise and different stakeholders, such as vocational colleges can integrate various resources, realize the resource sharing, Relying on the government's intelligent manufacturing industry planning, the information and intelligent manufacturing production management equipment of advanced manufacturing enterprises are used to develop vocational education, achieve the integration of practical training equipment and intelligent manufacturing, the integration of vocational education and production practice, and the integration of vocational education and AI application, and innovate the training mechanism and mode of intelligent manufacturing personnel. The training center is the training

center of vocational colleges, the probation base of teachers and the intelligent manufacturing center of enterprises. Through the macro planning of the local government and the full participation of enterprises, the intelligent manufacturing training center of "co-construction, sharing, co-management and opening" not only integrates resources, but also achieves a win-win situation.

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