

# Research and Practice on the Reform of "High Integration of Professional Literacy and Professional Ability" Action Classroom Teaching

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## Abstract

With the transformation and upgrading of the economy and the optimization and adjustment of enterprise structure, the original talent cultivation goals have been derailed from the enterprise. Following the principle of organically integrating new processes, technologies, and concepts into the curriculum system, we actively connect with local industrial chains and clusters, optimize and adjust the talent cultivation mechanism, and highly integrate professional literacy and abilities. Based on extensive research, we have formed a set of effective talent cultivation experiences and practices. To solve the contradiction between the backwardness of talent cultivation in schools and the demand for professional talents in enterprises. Therefore, this article is of great significance in terms of professionalism, practicality, innovation, and demonstration, and is a topic worthy of in-depth research. At the same time, our school is located in the Suzhou High tech Zone, which focuses on the development of the medical device industry. We have established the Jiangsu Medical Device Technology Industrial Park and settled in dozens of enterprises. These convenient conditions provide natural regional advantages for this study, and the research can also be carried out in depth.

## Keywords

Professional literacy, Professional ability, Integration, Action classroom, Teaching reform.

## 1. Introduction

With the deepening reform of China's education system, the development of vocational education has received social attention. From the proposal of "accelerating the development of modern vocational education" in the report of the 18th National Congress of the Communist Party of China in 2012 to the issuance of the "Notice of the State Council on Issuing the Implementation Plan for National Vocational Education Reform" in 2019, vocational education has increasingly become an important component of modern education. In the "Plan", it is explicitly stated that "vocational education and general education are two different types of education, with equal importance." Developed countries around the world also recognize the important role of developing vocational and technical education in promoting social and economic development and employment growth. How to create first-class vocational education and improve the quality of vocational education has become a hot topic.

As a strong province in vocational education, Jiangsu Province leads the development of vocational education in the country. With the transformation of Jiangsu Province's economy, the structure of talent demand is constantly being optimized and upgraded. With the arrival of the era of big data and artificial intelligence, the medical device industry is developing rapidly. In 2020, Suzhou issued the "Implementation Plan for Building Biopharmaceutical and Health Industry Landmarks with All Efforts (2020 2030)", which pointed out that the city should make efforts, Build the biopharmaceutical industry as the "number one industry".

According to the 2021 list of key industries in Suzhou that are in short supply of professional talents, the highest proportion of biopharmaceutical and new medical device positions in advanced manufacturing is 28.8%. In order to adapt to local economic development and in accordance with the professional teaching standards of the Ministry of Education, our school's Intelligent Medical Equipment Technology major focuses on the field of medical electronic products, serving the "Jiangsu Medical Device Industrial Park, Suzhou Industrial Park Biological Nano Park, Wuzhong Biomedical Industrial Base, and Zhangjiagang Handicraft Equipment Base", and providing talent support for the "production assembly, maintenance, and quality inspection" job group in the medical device industry.

Through in-depth research on enterprises such as Jiangsu Medical Device Industrial Park, Suzhou Hitachi Instruments Co., Ltd., Suzhou Fuji Film Co., Ltd., and Suzhou Yuyue Medical Co., Ltd., the results of the talent demand survey show that core competencies such as being able to adapt to the needs of the new era, adapt to technological updates and changes, and possess teamwork spirit are equally important as professional technology. With the rapid development of the medical device industry, higher requirements have been put forward for applied and technical talents in the field of medical devices. The challenges faced by vocational education development are becoming increasingly significant. How to improve the professional skills of students majoring in medical devices, cultivate their innovative and practical abilities, and achieve a high integration of professional literacy and professional abilities is particularly crucial. Therefore, teaching reform is imperative.

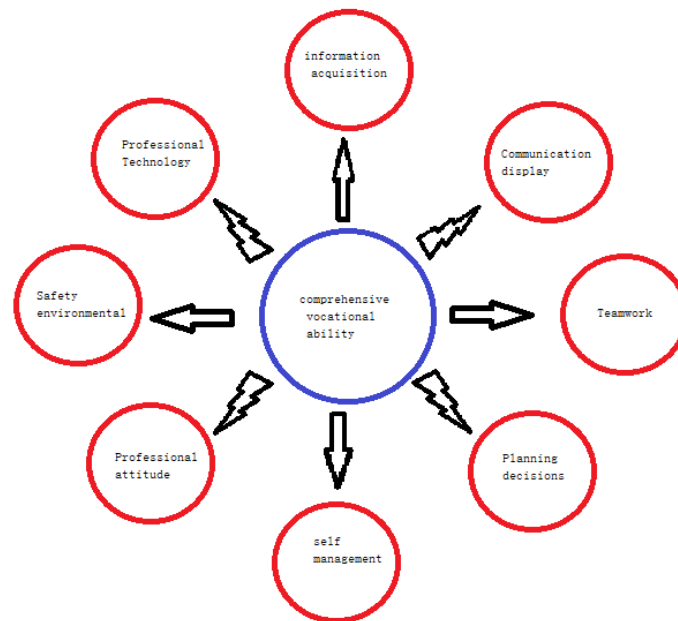
## **2. Establishing Future oriented Vocational Education Talent Training Goals**

### **2.1. The research team conducted in-depth research on enterprises such as Jiangsu Medical Device**

Industrial Park, Suzhou Yuyue Medical Co., Ltd., Suzhou Fuji Film Co., Ltd., Suzhou Kohl Co., Ltd., and Suzhou Hitachi Instrument Co., Ltd., held various forms of research activities such as discussions with enterprise personnel and technical supervisors, and conducted a survey questionnaire survey on the demand for professional talents. After careful analysis and summary, the research team conducted a detailed analysis and summary, Develop a market research report on intelligent medical equipment technology.

### **2.2. The research results of enterprise talent demand show that the ability to adapt to the needs of the new era, adapt to technological updates and changes, and possess core competencies such as teamwork spirit are equally important as professional technology.**

Therefore, the goal of future oriented vocational education talent cultivation is not only to cultivate professional skills, but also to cultivate the key abilities required for students' self growth, specifically manifested as the ability to obtain information, communication skills, plan judgment and decision-making skills, standardization in professional operations, safety and environmental protection awareness, team division of labor and cooperation ability, professional attitude, self-management ability, etc., as shown in Figure 1.



**Figure 1:** The cultivation goal of integrating skills and literacy

### 3. Constructing a "frontline dual element, three stage, and four progressive" talent training model

The major adheres to the concept of "cultivating morality and cultivating talents, combining morality and technology, and integrating industry and education", draws on and absorbs advanced ideas from domestic benchmark universities in the construction of similar majors, and actively constructs a "frontline dual element, three stage, and four progressive" talent training model that combines engineering and learning. With "cultivating morality and talents" as the main line, the school and enterprise jointly build, cultivate, and share, and carry out "experimental verification", "practical training operation", and "job practice" three stage learning. To achieve the progressive development of students' "professional cognitive ability," "professional general ability," "professional core ability," and "professional comprehensive ability."

### 4. Curriculum system reform, reconstruction of teaching standards, and development of professional teaching resources

#### 4.1. Improve the curriculum system

Reform the current curriculum system, restructure the integration of professional skills and professional literacy in the field of intelligent medical equipment technology, and integrate the curriculum system and teaching content. The goal is to integrate the cultivation of non professional abilities with professional abilities, and integrate humanistic, scientific, professional, and professional skills with professional skills.

Combining with national professional teaching standards and referring to professional talent training goals and specifications, integrating professional job standards for medical device production, assembly, maintenance, and quality inspection, professional competition standards for medical electronic instrument maintenance technology, household electronic product maintenance certificates, and assessment standards for medical electrical maintenance workers, Build a professional curriculum system that includes job literacy modules including "security, information, profession, humanities, and innovation", job foundation modules built

on professional group platforms, job core modules oriented towards core competency cultivation, and job expansion modules.

#### **4.2. Reconstruct course teaching standards and content**

According to the training goal of integrating vocational skills and professional literacy, through joint analysis of work tasks by enterprise experts and school professional teachers, a curriculum system of 12 learning fields is formed, typical work tasks are determined, and situational teaching content is developed as a carrier for technical ability and professional literacy training. Based on the determined curriculum standards and teaching scenarios, corresponding school-based textbooks and teaching resources are developed, Adapt to the implementation of action oriented teaching methods. At present, we have completed the development of course standards for 9 core courses, including "Digital Medical Instruments", "Application and Maintenance of Medical Ultrasonic Diagnostic Instruments", "Analysis and Maintenance of Medical Electronic Instruments", and "Assembly and Debugging of Medical Electronic Products". We have collaborated with industry enterprises to develop intelligent digital electrocardiographs and portable EEG training carriers, as well as "Principles and Practice of Portable EEG Instruments" The compilation of two textbooks, "Loose-leaf Tutorial on the Production Process of Electrocardiogram", of which the former has been published by Beijing University of Technology Press and promoted for use in multiple vocational colleges with medical device majors across the country.

#### **4.3. Development of professional teaching resources**

The goal of vocational education is to cultivate high-quality technical talents with practical skills and innovative abilities, and the construction of vocational professional teaching resource banks plays a crucial role in improving teaching quality and cultivating students' comprehensive qualities. The construction of a teaching resource library can provide students with more comprehensive and practical learning resources, helping them better master professional knowledge and skills. The rich and diverse teaching resources in the resource library, such as textbooks, cases, and experimental data, can be provided to students for autonomous learning and practical operations, thereby enhancing their learning interest and effectiveness. The "Intelligent Medical Equipment Technology Professional Teaching Resource Library" follows the integrated principle of "fragmented resources, systematic design, and structured courses", and builds a shared resource library network platform for cross school and cross regional collaboration.

The "Intelligent Medical Equipment Technology Professional Teaching Resource Database" project, as the first hosting unit, has been successfully selected as the 2023 Jiangsu Vocational Education Professional Teaching Resource Database (with only 9 five-year vocational colleges in the province). Currently, it is actively applying for a national level professional teaching resource database and has been invited to give a sharing report on the "Exploration of Building a Shared Professional Teaching Resource Database through School Enterprise Cooperation" at the National Medical Equipment Vocational Education High Quality Development Teacher Training Class.

### **5. Reform the teaching mode to integrate and cultivate students' professional skills and professional literacy**

The reform of teaching models and the application of micro teaching methods are the foothold for the integration of literacy and skills. Through the reform of teaching models and the application of micro teaching methods, we advocate for teacher action oriented teaching and students' self-directed exploration of learning, effectively solving the problems of weak students' self-directed learning ability and difficulty in cultivating comprehensive literacy in

current classroom teaching. At present, teachers have fundamentally changed their teaching concepts, fully realizing that professional learning has gradually transformed into a carrier for cultivating professional abilities and qualities. The focus of classroom teaching is no longer on imparting knowledge and skills, but on cultivating students' professional qualities and abilities; In terms of teaching mode, action oriented teaching is the main form of classroom teaching.

The intelligent medical equipment technology major relies on intelligent digital electrocardiogram machines as a carrier to carry out professional related course teaching, becoming a pilot action classroom teaching. The overall task of product design and development, unit circuit welding and debugging, machine assembly, performance testing, factory packaging, and maintenance is divided around the intelligent digital electrocardiogram machine of typical medical and electrical products, forming a series of coherent processes, allowing students to experience the "five actions" of the action classroom during the work process. At the same time, this plan can effectively achieve the integration of multiple courses such as analog electronic technology, electronic CAD technology, medical electronic product assembly and debugging, medical electronic instrument analysis and maintenance, and digital medical instrument courses, which to some extent meets the needs of enterprise auxiliary development and design positions, equipment installation positions, performance testing positions, and maintenance positions.

## 6. Conclusion

The direction of this research mainly focuses on talent cultivation. In the process of enterprise research, the sample size of the research needs to be further improved. At present, the school of the research group is located in Suzhou High tech Zone, so in-depth research has been carried out mainly on the medical device enterprises in the High tech Zone and the Industrial Park. However, the medical device enterprises in Suzhou have not been investigated, which leads to an incomplete sample size, There may be incomplete research reports, so in the later stage of work, more research should be conducted on enterprises within the Suzhou metropolitan area to obtain the most comprehensive and authentic first-hand data.

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