

## **Research on the Reform of the Teaching System of Automation under the Background of Educational Informatization 2.0**

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**Abstract.** The new field of education in the intelligent period was opened by the Educational Informatization 2.0 Action Plan. Education in the future will be a new education based on information technology. The reform of curriculum organization and teaching mode must keep step with the development of science and technology, so that the intelligent period and educational development can move from integration to innovation. Applied local colleges should make full use of the logical relationship between knowledge system and ability training to develop a dynamic teaching system based on large data technology. Realize the intelligent space of human-machine fusion, virtual reality fusion and remote cooperation, to form an information teaching system with the characteristics of automation and provide new ideas for the construction and application of intelligent education in modern schools.

### **1. Introduction**

The Ministry of education issued the Educational Informatization 2.0 Action Plan on April 13, 2018. It takes big data and intelligent technology as the contact point, emphasizes technological innovation and model innovation, pays attention to the all-round development of the human being, aims to reconstruct the new educational ecology, and forms a Chinese program with international advanced levels in the era of educational informatization. In 2017, the State Council pointed out that the fourth industrial revolution, the smart revolution, is taking place [1]. The core technology is big data and smart information technology. Intelligence is the key to the development of education in this period. The purpose of intelligent education is accelerate the reform of talent training models and teaching methods, and to build a new education system that includes intelligent learning and interactive learning based on intelligent technology [2].

Applied local colleges should make full use of local resources, combine the development history of engineering education, summarize the experience and lessons of engineering education reform at home and

abroad, and analyze the connotation, characteristics and development trends of Educational Informatization 2.0 Action Plan [3]. This paper puts forward the innovative idea of teaching system reform on the basis of the dual orientation of professional education and vocational tendency and the core aim of training ability. Taking the ability deepening as the main line, the course theory teaching, the network open course, the virtual simulation laboratory, the semi-physical simulation platform and the enterprise practice are combined, in order to transform the traditional single evaluation method into the unified evaluation system of ability. In this way, we can realize the integration of human machine fusion, virtual reality fusion, and long-distance cooperation to form a dynamic teaching system based on large data technology, and can provide new ideas for the construction and application of intelligent education in modern schools.

## **2. Necessity of Information Teaching Mode**

### **2.1 Development Strategy of Chinese Educational**

The Chinese education level has entered the middle and upper ranks of the world. The quality of education has obviously improved, and the international influence has been increasing. The rapid development of society has put forward unprecedented new demands on education, and informatization is not only an important driving force for the development of today's society, but also for the reform of higher education. Therefore, the educational concept and teaching mode will be faced with comprehensive reform under the educational informatization [4]. The goal is to make education move from digital and networked to intelligent, and to seek innovation and development on the basis of the high integration of big data and intelligent information.

### **2.2 Demands of the Technological Age**

The accumulation of digital education resources in the construction of Educational Informatization 1.0 provides a large number of foundations for education data. Data transmission technology has also made a historic breakthrough. The rapid development of the 5G era has enabled user terminals to remain online. The devices supported are not only smartphones, but also smart wristbands, smart home devices, and future smart education projects [5]. The widespread application of artificial intelligence will open up a new field of education model.

### **2.3 Demand for Reform of the Teaching Model**

The development of the higher education model is inseparable from the development of social science and technology. Initially, the traditional teaching method was mainly based on teaching, and it developed into a multimedia teaching model assisted by courseware. Then it formed the emergence of online courses such as large-scale online open courses MOOC and small-scale private online courses SPOC. Now the virtual simulation laboratory based on three-dimensional simulation technology and semi-physical simulation platform show that the teaching model is the product of the development of intelligent technology. Therefore, the integration of technology and education is an inevitable trend in the development of modern education.

### 3. Construction of Informatization Teaching System

#### 3.1 A Progressive and Supportive Curriculum Structure

The curriculum should reflect the interface between knowledge structure and enterprise, and emphasize the application and technology of specialty. The structure design of the course should follow the time sequence of the course unit and the logical relationship of the knowledge system, so that the knowledge principle and the timing arrangement can be systematized, which reflects the difficult progress of professional knowledge and the mutual support between courses [6,7]. In this way, students can not only form a complete and profound understanding of the content, but also integrate the ability of training into the curriculum system. According to the logical relationship of the automation course, the cultivation ability is divided into four stages, basic skills, basic professional skills, professional integration capacity and engineering and innovation capabilities. Finally, a logical curriculum structure was formed, refer with Fig.1.

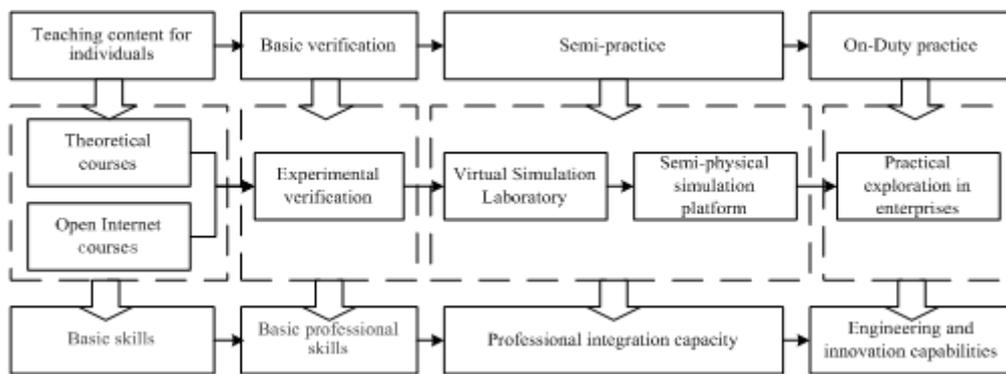


Fig. 1 Logical curriculum structure

#### 3.2 Teaching Model-Human Machine Fusion

In the traditional class, the students lack the deep understanding of knowledge and the cultivation of creative thinking, and the network information in the intelligent age effects on the dominant position of the lesson in the school education. Automation of applied colleges should use modern intelligent technology to construct new teaching modes and methods of interactive learning, and keep the qualitative and quantitative analysis of the original theoretical classroom, the curriculum supporting experiments and project practice teaching, and speed up the construction of open courses on line and other Internet resources. In terms of teaching, we should collect multi-directional data in course management, online video learning, online operations and questions, and assessment management, so as to provide support data for the ability monitoring and evaluation system.

### 4. Laboratory Construction- Virtual Reality Fusion

#### 4.1 Virtual Simulation Laboratory

For students, practice in a business is the best way to upgrade their professional skills. However, students are limited by the teaching schedule, and there are very few opportunities to enter factories and enterprises to

participate in actual production operations. Moreover, because the industrial production line involves the safety of the production process and economic interests, it is impossible for each student to operate it, which has greatly reduced the internship effect.

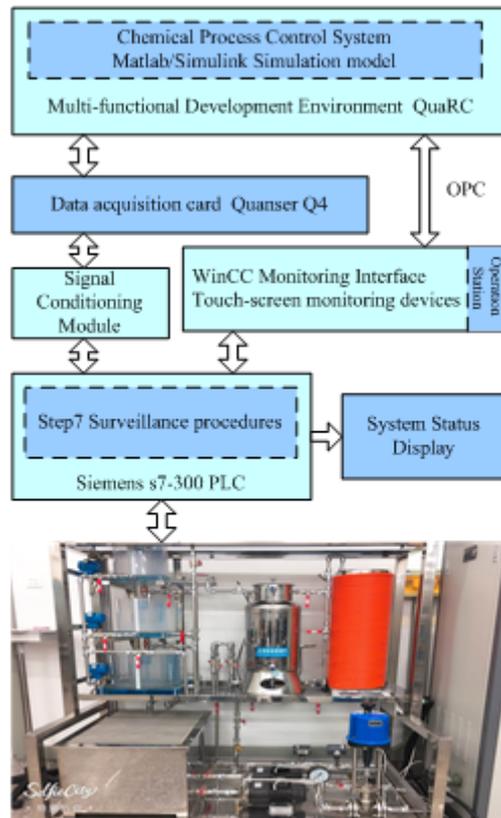
The construction of virtual simulation laboratory is based on three-dimensional simulation technology, which enhances the interest of teaching and the initiative of learning, refer with Fig.2. Students can achieve independent operation and management in the virtual environment. This can provide students immersive experience of human-computer interaction, and students can further understand the theoretical knowledge. On the virtual simulation platform, the student's operation in the scene can be scored in real time, and relevant data can be derived and printed to provide periodic data for the comprehensive evaluation of the course.



**Fig. 2 Three-dimensional simulation system**

## **4.2 Semi-physical Simulation Platform**

The semi-physical simulation platform, also known as hardware simulation in the loop, refers to the real-time simulation of physical objects in the simulation loop. Such as the semi-physical simulation platform of chemical process control system, refer with Fig.3. Real time is a necessary premise for semi-physical simulation, and its experimental results are closer to reality than virtual simulation. The simulation environment tries to give the operator a feeling of full real space position, a feeling of full real operation, and a feeling of time characteristics of the process. Realize the connection between theoretical teaching and practical teaching, and improve the directness of teaching content. Therefore, the semi-physical simulation process is key link to improve the reliability of the system design and ensure the quality of production.



**Fig. 3 Semi-physical simulation platform of chemical process control system**

#### 4.3 Practice and Exploration in Enterprise- Remote Cooperation

The key of cooperative teaching between school and enterprise is to break the disharmony of space and time. The development of information technology has enabled education to form a comprehensive and all-round system on the basis of digitization and networking. Enterprises can upload the evaluation data of 'operational ability directly through the Internet, and provide feedback to the school timely so that teaching can achieve the overall effect of multi-point connectivity, integrated sharing, and cooperation [8,9,10].

Local applied colleges should increase their investment in enterprise internships to expand the area of internship bases, and use local resources and advantages to bring the graduation design process to internships. The graduation thesis should be combined with the production practice, process, technology development and social demand to solve the actual production problem. In this way, the ability of engineering practice can be enhanced to shorten the adaptation period for students to work in enterprises.

#### 4.4 Assurance of Quality Evaluation

In order to ensure the scientific management and teaching effect, it is necessary to formulate teaching quality standards and regulations and carry out multi-dimensional teaching evaluation based on the new technology. The feedback data from offline and online course learning, virtual simulation and semi-physical simulation platforms, and remote evaluation by enterprises form an intelligent space for comprehensive data-based monitoring and evaluation. The space used to replace the traditional evaluation of examination.

Using modernization and informatization to establish a scientific evaluation system, it constitutes a multi-input and single-output performance evaluation system and carries out comprehensive evaluation of each student. It constitutes a completely new form of curriculum expression and realizes the reform of educational models supported by new technologies, smart devices and the Internet.

#### **4.5 Construction of Informatization Teaching System**

The curriculum should be adjusted and the teaching methods should be updated so that digital culture and interactive culture can penetrate into each other. Make the course free, open, shared and interactive with the core features. Teaching should realize the overall effect of multi-point connectivity, one-piece sharing and cooperation. The reform of curriculum organization, teaching model and the development of science and technology are carried out in parallel, so that the era of intelligence and education will move from integration to innovation.

#### **5. Conclusion**

Through this reform, we can achieve a progressive teaching method that focuses on students' needs and aims at improving students' verification and operation capabilities, and form a unified evaluation system based on multi-directional assessment feedback. It not only integrates information technology and education, but also constitutes multi-directional teaching feedback, so that teachers can understand the effect of teaching in real time. This kind of reform has a self-correcting effect on the training of talents. It also promotes the training of teachers in the automation department, the construction of courses and majors, and the development of schools.

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