

# Made in China 2025 Leads Innovative Development of Vocational Education

Wang Anfu<sup>1,2</sup>, Chang HongLei<sup>3</sup>

<sup>1</sup>Gansu Forestry Technological College, Tianshui Gansu,741020, China

<sup>2</sup>Tianshui Longyou Environment Conservation Association, Tianshui Gansu,741000, China

<sup>3</sup>Gansu Office, Oxfam Hong Kong, Lanzhou Gansu,730030, China

**Keywords:** Made in China 2025; Vocational education; Innovation and development

**Abstract:** The "Made in China 2025" has led the shift and upgrading of vocational education, promoted the reform of global industry and the promotion of the talent construction standard, and made vocational education transform into multi-dimensional education, interdisciplinary education and lifelong education. In the era of manufacturing 2025, the reorganization and integration of traditional production modes, business modes, learning and lifestyles have upgraded vocational education from traditional teaching to intelligent education, experience education and Maker Education.

## 1. "Made in China 2025"

In May 2015, the Chinese government formally issued "Made in China 2025". "Made in China 2025" is the Chinese government's first 10-year plan of action for implementing the strategy of building a strong nation. It is compatible with the "Industry 4.0" strategy proposed by Germany. "Made in China 2025" puts forward the basic principle of adhering to "innovation-driven, quality first, green development, structural optimization and talent-oriented". At the opening ceremony of the Davoson in 2017, the World Economic Forum Chairman Schwab asserted that "China is showing the world a more powerful ability to lead the fourth industrial revolutions and the secret of success in this new era is 'mass entrepreneurship and innovation'" [1].

On May 17, 2017, Premier Li Keqiang pointed out on "Made in China 2025" that the development of intelligent manufacturing should be the main direction and it should be closely integrated with the "Internet +" and "mass entrepreneurship and innovation" to speed up the construction of an industrial Internet cloud platform and Internet-based Open "double hit" platform [2]. The deep integration of "Made in China 2025" and "Industry 4.0" is leading to far-reaching industrial changes that have profoundly revolutionized the manufacturing industry in the world and further raised the standard of talent building. It also opened up the innovation and development of vocational education.

## 2. The vocational education turn in the era of manufacturing 2025

### 2.1 From "Unitary Education" to "Multidimensional Education"

The traditional unitary education will turn to the multidimensional education in the intelligent era. This shift mainly manifests itself in two aspects: One is the multidimensional nature of teaching: In the era of "service-oriented education," it is hard to come by the power of one school alone. Only by linking and sharing socialized teaching resources, can we combine highly informationalization with deep service, and create multidimensional teaching subjects to enhance students' knowledge and skills. The second is the multidimensional nature of the educational path: Driven by technologies such as cloud computing, virtual reality and 3D printing, vocational education will shift from the traditional teaching system to the intelligent teaching system. It moves from the original static education to the dynamic, from the classroom instruction to the experience, collaborative and productive education under the real working environment. Through the management and analysis of large data, it customizes the learning path and push personalized learning and promotes the

scientific of vocational education.

## 2.2 From "single subject education" to "interdisciplinary education"

Vocational education is a market-oriented training program that explores and creates CPS and takes CPS as the core and produces people who are highly digital, networked, closely linked to non-conventional and systematic complex issues in different sectors of the industry. In the face of multidisciplinary, cross-regional and big data of manufacturing industry, in addition to mastering the manufacturing technology, enterprises also demand staffs to understand interdisciplinary knowledge of information technology, electronics engineering and psychology, to be familiar with the application and maintenance of the equipment that is high-end, precision and intelligent. This requires vocational education to break the barriers of disciplines, to strengthen the cross-integration of multidisciplinary, to focus on specific issues, no longer to concern about the subject boundaries, to cultivate high-quality and creative talents with the ability to cope with complex problems from the perspective of comprehensive application of multidisciplinary knowledge and skills.

## 2.3 From "institutionalized education" to "lifelong education"

In the era of manufacturing 2025, the traditional mode of production, business model, learning and life style will be reorganized and integrated to the greatest extent. In this process, the further application of technologies such as Internet of Things, cloud computing, big data and artificial intelligence will bring forth many new knowledge, new technologies and new problems, which will further shorten the cycle of knowledge and skills turnover and keep a constant breadth and depth strengthen of them. The traditional vocational education is faced with the fact that the supply of knowledge and skills is less and the content of teaching is obsolete, which can not match the iteration speed of knowledge and skills. It is mainly manifested in two aspects: One is the iterative speed of an individual's career path. The second is the extent of the depth and width that the cross-border events lead. This means that institutionalized education can no longer meet the needs of individual career. People have to normalize and dynamic their study, keep learning new knowledge and new skills, speed up the renewal of knowledge and skills, broaden their knowledge and establish the concept of lifelong learning.

## 3. The upgrading of Vocational Education in the era of manufacturing 2025

The era of manufacturing 2025 has put forward new requirements for vocational education, vocational education will be upgraded from the traditional teaching of education to wisdom education, experience education and Maker Education.

### 3.1 Intelligent education

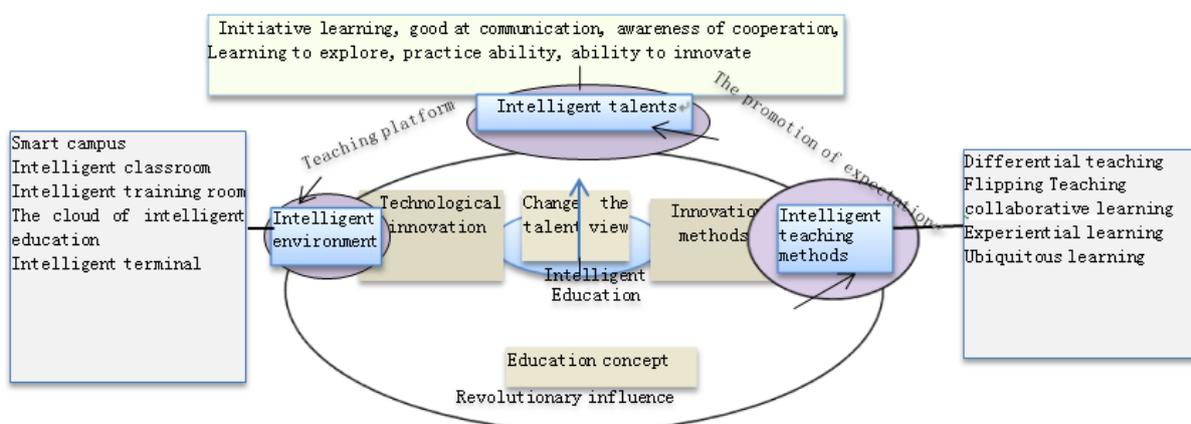


Figure 1 intelligent education model

The era of manufacturing 2025 has produced a series of smart, convenient and efficient lifestyles

such as intelligent transportation, intelligent medical treatment and intelligent tourism. The construction of intelligent campus is being carried out in all directions, and the intelligent education adapted to it is still in its infancy. It is a historic opportunity for the current vocational education to build a new ecological education with a intelligent campus as the core. In terms of the new ecology of school education, the intelligent education mainly includes the intelligent environment, the intelligent teaching method and the intelligent talents. The intelligent education model is shown in Figure 1.

### **3.1.1 Intelligent environment**

The support and leading role of information technology for intelligent education is reflected in all aspects of teaching activities, such as smart campus, intelligent terminal, intelligent learning, intelligent management, etc. The intelligence environment relying on the information system of things has realized the seamless link between teachers, students and teaching managers so that the collection of teaching information, the real-time management of teaching process and the sharing of teaching resources are quick and efficient. The application of big data and cloud computing can manage and analyze the massive data stored in the teaching process. Through the introduction of education cloud, education management, education decision-making and education evaluation tend to be more scientific.

### **3.1.2 Intelligent teaching methods**

In the new ecology of school education with the core of intelligent campus, the connotation of teachers' "teaching" will be changed. When "disabusing", the number of challenging questions from students is on the rise. The original teaching mode and teaching method are unable to meet the needs of intelligent education for high-quality and skilled talents. It is necessary to adopt a new teaching mode, such as flipping teaching, mixed teaching, differential teaching and so on. Introducing collaborative learning, experiential learning and ubiquitous learning into the teaching process so as to cultivate high-quality skilled personnel, continue to accumulate energy for the development of enterprises, to facilitate the innovation and development of education and build an innovation ecosystem of "Internet + Education."

### **3.1.3 Intelligent talents**

Through online, offline, personalized and customized learning and interaction, the initiative of student learning has been aroused, students' interest in learning has been stimulated, and students' self-learning awareness and ability have been enhanced. New talents training mode based on micro lesson, MOOC and flipped classroom has promoted the internalization and migration of knowledge and skills, improved students' ability to solve complex problems, and made it possible to cultivate high-quality skilled talents with innovative passion and entrepreneurial dream.

## **3.2 Experiential education**

The action experiential education based on "learning by doing" is the most basic teaching method of vocational and technical education. This can not only improve students' ability of observation, thinking, problem-solving and innovation, but also help cultivate high-quality skilled personnel with the spirit of "double innovation".

### **3.2.1 Experiential**

Experiential education includes two levels for vocational and technical education. That is, behavior experience and inner experience. Behavioral experience is a kind of practical behavior, which is a dynamic process that provides students with hands-on operation. It is an important way for students to improve their operational skills. The inner experience is the internalization and migration that takes place on the basis of the behavioral experience. The interdependence and interaction between the two play an active role in promoting the overall quality and the creativity development of students.

### **3.2.2 Designability**

Teachers should design and formulate corresponding teaching methods, measures and behaviors in order to improve teaching quality and accomplish teaching goals effectively throughout the teaching process. By constantly designing "teaching activities", using critical thinking and innovative thinking repeatedly to verify the correctness and effectiveness of design in order to strengthen the depth of vocational education learning.

### **3.2.3 Applicability**

Vocational education should be market-oriented and focused on the needs of the global economy and talents. Through the interaction between teachers and students, exploring the interaction between students and students to improve students' abilities of problem-finding, problem-solving, information-obtaining, information-processing, teamwork, innovation and entrepreneurship. It is also important to be of of professionalism in addition to obtaining these abilities and excellent professional skills.

## **3.3 Maker Education**

Driven by the idea of Maker, Maker Education emphasizes creativity, action, cooperation and sharing. It also takes cultivating new materials, mastering new technologies and interdisciplinary solution to complex issues as fundamental task to cultivate innovative talents.

### **3.3.1 Innovative thinking education**

The ultimate goal of Maker Education is to foster students' creative thinking habits. Innovative thinking is the thinking process of the new and unique solutions and methods that are not constrained by the ready-made conventional ideas. For the vocational and technical education, the creative thinking education should be started with teaching content, teaching mode and curriculum evaluation.

### **3.3.2 Innovative technology education**

With the wisdom education, MOOC education and Maker education has gradually entered the classroom. In Vocational and technical education, we should be compatible with online learning, blended learning and collaborative learning. We should make use of the network skills formed by students outside the academic field, and make use of the advantages of online and offline learning to enable students to get more effective learning experience. Using big data technology for learning analysis, providing students with personalized learning styles and transforming students from instructional consumers to creators.

### **3.3.3 Educational Maker spaces**

Educational Maker spaces has a potentially revolutionary impact on the traditional teaching and learning methods of vocational education [3]. Educational Maker spaces is an ideal Maker education environment, and it is an innovative interactive space for makers to exchange ideas in different regions, different cultures, different professional backgrounds and inter-disciplines. The idea is to learn in turn by building things. On this platform, the makers turn the idea into reality by collaborate with each other.

In the era of manufacturing 2025, the trend of world economic integration is even more obvious. Vocational education should deepen the integration of production and education and school-enterprise cooperation, innovate the concept of modern vocational education, strengthen international exchanges and promote the introduction of talents and the construction of "Dual-Teaching Mode Staff". Through the study of new theories and new technologies, students are encouraged to keep lifelong learning enthusiasm and motivation in order to cope with the restructuring of economic structure and the adjustment and integration of enterprise production lines and meet the vocational needs of Internet of Things and big data.

## **Acknowledgements**

This work is supported by the project "Sustainable integrated development of The village of Crouching Tiger, Maiji town, Maiji District, Tianshui City, Gansu Province" cooperated by Oxfam Hong Kong and Longyou Environmental Conservation Association of Tianshui City.

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