

# Research on Teaching Methods for Vocational Education and Training of Skill-Based Talent

Chunyan Li\*, Hua Li

Space Engineering University, Beijing, China

\*Corresponding author

**Keywords:** Vocational Education, Skill-Based Talent, Teaching Methods, Theory-Practice Integration

**Abstract:** China has established the world's largest vocational education system, a cornerstone in its pursuit of nurturing highly skilled talent. This study examines the evolution of teaching methods within this system, emphasizing their role in enhancing teaching effectiveness and achieving the goal of producing skilled craftsmen, great national artisans, and technically proficient personnel. It delves into the current state and challenges of China's vocational education, highlighting its importance in the country's journey towards becoming a modern socialist state. The paper proposes an integrated approach to teaching, blending theory with practical application, as a key strategy in vocational education. This approach is crucial for equipping students with the necessary skills to meet the demands of the modern workforce and adapt to technological advancements. The study underscores the significance of vocational education in driving economic and social development, advocating for continuous improvement in teaching methodologies to cultivate a robust and innovative talent pool. Through this, China aims not only to bolster its national competitiveness but also to set a global benchmark in vocational training excellence.

## 1. Introduction

In December 2022, the General Office of the Communist Party of China Central Committee and the General Office of the State Council jointly issued the "Opinions on Promoting the High-Quality Development of Modern Vocational Education," which clearly stated the goal of modern vocational education is to cultivate more high-quality technical and skilled talent, skilled craftsmen, and great national artisans. This is essential for providing strong talent and skill support for the comprehensive construction of a modern socialist country. How to achieve the talent cultivation goal in vocational education and lay a solid foundation for accelerating the construction of a powerful education nation, a powerful science and technology nation, and a powerful talent nation is an issue that every educator should consider.

## 2. Current Situation of Vocational Education in China

Since the 18th National Congress of the Communist Party of China, the development path and model of vocational education with Chinese characteristics have basically taken shape. The attractiveness, influence, and competitiveness of vocational education have been continuously strengthened, undergoing historic and structural changes. In 2023, national universities admitted 9.13 million students, among which vocational colleges enrolled 4.83 million, occupying half of the total. According to the latest data from the Ministry of Human Resources and Social Security, China currently has over 200 million skilled talents, accounting for more than 26% of the employed population. By improving quality and integrating education with industry, China has built the world's largest vocational education system, providing strong support for the promotion of economic and social development and enhancing national competitiveness [1].

However, compared with developed countries and the requirements of building a modern economic system and a strong education nation, China's vocational education still faces issues such

as an imperfect system, a need for stronger vocational skills training bases, incomplete institutional standards, insufficient motivation for enterprise participation in education, policies supporting the growth of technical and skilled talent still needing improvement, and uneven quality of education and talent cultivation.

On July 25, 2023, a leader from the Ministry of Education explained their development approach to vocational education: In the process of building a powerful education nation, vocational education, connecting higher education and basic education, is the waist of the education system. To truly improve quality and achieve high-quality development, vocational education must become the "bronze waist" of the education system, the backbone, the core [2].

### **3. Vocational Education Goals for Skill-Based Talent Cultivation**

Vocational education aims to provide learners with the vocational knowledge, skills, and ethics required for a certain profession or production labor. It is an education type based on, within, and for vocational practice, and its logical starting point for talent cultivation is the vocational competency requirements of work practice. Vocational education should cultivate high-level skill-based talents who can adapt to and serve the higher development needs of the economy and society. The report of the 20th National Congress of the Communist Party of China proposed coordinated innovation of vocational education, higher education, and continuing education, promoting integration of vocational and general education, industry-education integration, and science-education integration, optimizing the positioning of vocational education types. This clarified the goals, paths, and methods of vocational education reform and development, pointing the way forward for building China's vocational technical education system.

In essence, vocational education is practical education that cultivates abilities. In terms of training goals, curriculum systems, and training methods, it must follow the laws of skill-based talent cultivation, prioritizing skill training and capability development. As society progresses, the methods of training skilled talents also change, but the eternal truth is that only through practice can skill levels be improved. Furthermore, modern vocational education should aim at technological innovation and industrial upgrading, focusing on cultivating skill-based talents for research and development and production segments in talent cultivation orientation, integrating school-enterprise cooperation and work-study throughout the training model, and emphasizing enterprise evaluation in assessment methods, focusing on the job capability applicability of the trained talents. By aligning textbooks, courses, and evaluations with market job demands, students can grow their talents and improve their skills through practice [3].

### **4. Teaching Design for Skill-Based Talent Cultivation**

The cultivation of skill-based talent in vocational education requires improvements in many aspects. While solidifying the depth of specializations, it is also necessary to construct a professional curriculum system. The development of courses should start from practice, guided by job tasks, centered on work capabilities, and based on the practical knowledge required by actual positions. The theoretical basis should align with job competence standards, with a focus on establishing and regularly updating curriculum standards. The core goal is to provide assurance and support for the cultivation of applied and technical skill-based talents [4].

In actual teaching design, how to develop course content based on the practical knowledge required by job positions? How to ensure skill-based training is integrated throughout teaching? How to design "real battles" for students, allowing them to "learn to fight on a real battlefield"? These are questions that every vocational education teacher should seriously consider and strive to solve. Only by addressing these issues can the integration of industry and education, and school-enterprise cooperation be optimized.

#### **4.1. Teaching Design**

Teaching design involves arranging teaching elements in an orderly manner according to

curriculum standards and the characteristics of the learners, and determining suitable teaching plans and strategies. It generally includes teaching objectives, key and difficult points, teaching methods, teaching steps, and time allocation (Baidu Encyclopedia).

Professor Reigeluth, a contemporary renowned international teaching design theorist, considers teaching design as instructional science. He points out in "What is Instructional Design and Why Is It Thus?" that "Instructional design is a discipline involving understanding and improving the teaching process. The aim of any design activity is to propose the best approach to achieve intended goals. Therefore, instructional design primarily concerns prescribing optimal teaching methods that result in the desired changes in students' knowledge and skills."

In the actual teaching process, a complete teaching design should start with "why to learn," determining students' learning needs and goals. Then, based on these goals, it determines "what to learn" by selecting teaching content that enhances students' knowledge, skills, processes, methods, emotions, attitudes, and values. Furthermore, teaching design should set clear learning objectives and decide on appropriate methods and strategies to help students master the content, i.e., "how to learn." Finally, a comprehensive evaluation of the teaching outcomes is essential, and based on the results, modifications should be made to the above aspects to ensure effective learning and achieve the intended teaching objectives [5].

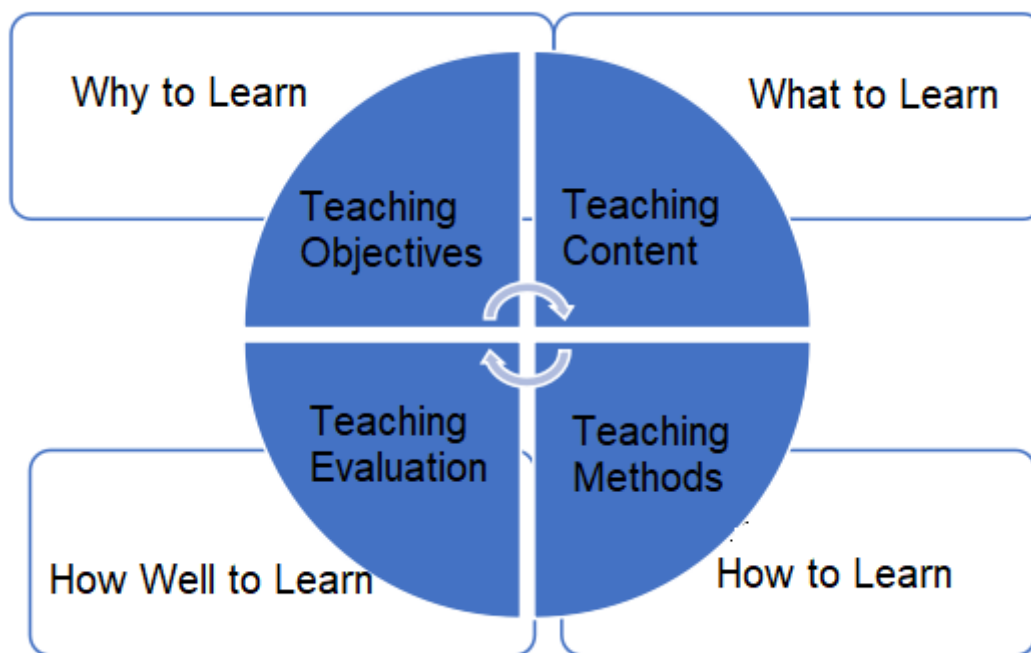


Figure 1: Schematic of the Teaching Process

In the teaching implementation process, appropriate teaching methods are used to help learners master the content and address key and difficult points, thereby achieving the teaching objectives. Therefore, teaching methods are a crucial part of teaching design (See Figure 1).

#### 4.2. Teaching Methods

Teaching methods include both the methods of teaching by the teacher and the methods of learning by the students. In the process of teaching and learning, the teacher designs and implements the teaching content, methods, and pace, while the student is the primary subject of learning. This is the principle of "teaching-led, learning-centered," where the teacher's leading role and the student's primary role are combined and mutually reinforcing, achieving effective teaching outcomes and reaching the expected teaching goals.

There are many types of teaching methods: case teaching method, task-driven teaching method, problem teaching method, theory-practice integrated teaching method, heuristic teaching method, discussion-based teaching method, lecture method, etc. There is no superior or inferior teaching

method; each has its characteristics. The more fully a teacher's leading role is played in the teaching process, the stronger the students' initiative, enthusiasm, and creativity. Conversely, the better the state of students' initiative, enthusiasm, and creativity, the more it stimulates the teacher's leading role. Both complement each other and can achieve excellent teaching results [6].

### 4.3. The Theory-Practice Integrated Teaching Method as an Example

In vocational education, separating theoretical teaching from practical training in course settings and teaching implementations can lead to a low degree of integration between theory and practice, failing to truly enhance students' skill levels. Vocational education students ultimately enter enterprises, so how can they quickly apply the knowledge learned in the classroom to actual job positions? This is a question that vocational education teachers should consider in their teaching designs.

The vocational education approach of prioritizing practical training over theory is correct, but de-emphasizing theory does not mean abandoning it. Unchanging theories are used to analyze ever-changing practical situations, and different practical applications are used to validate eternal theories. In the process of cultivating students' practical skills, it is essential to understand not only what is said but also its meaning, and not only how things are but also why they are that way. This comprehensive approach enhances the ability to solve practical problems, truly achieving the ultimate goal of skill-based talent cultivation.

For instance, in the GNSS-RTK practical operation teaching of the surveying and mapping specialty, there are many brands, models, and types of GNSS-RTK equipment on the market. The operation interfaces of devices from different brands often vary. If practical operation is taught without incorporating theory, it is impossible to cover all bases. This could lead to a situation where a student learns to operate Brand A equipment in school but cannot operate Brand B equipment used in the enterprise after graduation, which is a failure in teaching and does not achieve the ultimate goal of skill-based talent cultivation.

The correct approach should start from theory, leading students to learn the principles first, then analyze key points in the principles, and use these to solve practical problems through extrapolation.

(1) GNSS-RTK Working Principle: RTK technology, also known as carrier phase differential technology, includes two methods: correction method and differential method. The correction method involves sending the carrier phase correction values from the base station to the user, correcting the user's received carrier phase, and then calculating the correct coordinates. The differential method involves sending the carrier phase collected by the base station to the user, and then calculating the coordinates through the difference method.

(2) Key Points of Theory Guiding Practice:

Both receivers (one base station and one rover) are observing satellite data simultaneously;

The base station both receives and transmits: receiving its own satellite signals and transmitting signals (carrier phase or carrier phase differential correction signals) via radio;

The rover receives two types of signals: its own satellite signals and the base station's radio signals;

The rover accurately calculates its own position coordinates.

(3) Extrapolation in Operation:

1) Set up the base station and rover separately, turn them on, and receive satellite signals.

2) Configure the base station mode and radio transmission status;

3) Set the rover mode and radio reception status;

4) Match the radio channels of the base station and rover to ensure they transmit and receive on the same frequency;

5) Check the positioning status and conduct RTK data collection.

Through theoretical explanation -> key point analysis -> extrapolative operation, this method does not focus on a specific model of equipment. As long as students understand and remember this process, they can quickly master the operation of different devices in practice. Additionally, principle analysis not only strengthens understanding but also helps students avoid mistakes and solve problems during operation. For example, in RTK operation, if the equipment is connected correctly but the rover

remains in a single point solution state and cannot achieve a fixed solution, the issue from a theoretical perspective is that the rover is only receiving satellite signals and not the base station's radio signals. A quick check of the radio can resolve the problem.

Therefore, there is no practical training detached from theory, as a leading figure pointed out: "Theory must be unified with practice. Theory that is detached from practice becomes rigid dogma, losing vitality and life. Practice without correct theoretical guidance can also lead to 'a blind man riding a blind horse, approaching a deep pond at midnight'."

With a clear goal of cultivating skill-based talent in vocational education, teachers should strictly design their teaching around this goal. Choosing the right learning methods to complete the teaching content is a key step in achieving the teaching objectives. This article analyzes using the theory-practice integrated teaching method as an example. Other teaching methods also have their strengths. As long as the form of teaching by the teacher is reasonable and feasible, it will engage students' interests, enhance learning effectiveness, and thereby achieve teaching goals and talent cultivation objectives.

In the new journey of comprehensively building a modern socialist country, vocational education has broad prospects and great potential. It is an important foundation for promoting employment, entrepreneurship, innovation, and enhancing the level of Chinese manufacturing and services. Accelerating the development of modern vocational education is the most effective and fastest way to cultivate high-quality skill-based talents, an important support for promoting high-quality development of socialist modernization, and an inevitable requirement for building a modern education powerhouse.

## 5. Conclusions

In today's society, the importance of vocational education is increasingly evident. This article provides an in-depth analysis of the key elements in vocational education for cultivating skill-based talents, particularly the teaching methods that integrate theory with practice. From my perspective, vocational education is not just about imparting knowledge and skills, but also an art of guiding students on how to apply what they learn in the real world. In this rapidly changing era, mere theoretical knowledge is no longer sufficient to meet the needs of businesses and society. Students need to have the ability to apply theory in practice, which is the essence of vocational education. Finally, the development of vocational education is not just a task for the educational sector, but a responsibility of the entire society. We need to cultivate skill-based talents who can adapt to societal development and lead innovation, contributing to the progress and prosperity of society. All this begins with the optimization of our vocational education system to make it more practical and forward-looking.

## References

- [1] Li Xinping. Over 200 Million Skill Laborers in China [J]. People's Daily Online - People's Daily, 2020.12.
- [2] Huang Qi. Showcasing the Style of Skilled Talents in the New Era [J]. People's Daily Online - People's Daily, 2021.1.
- [3] Guo Hua. The Educational Significance of "Student-Centered" Teaching [J]. Educational Research, 2023.1.
- [4] Zhang Jian. Dilemmas and Solutions in Vocational Course Assessment Based on the Goal of Cultivating High-Quality Technical and Skilled Talents [J]. Education and Vocation, 2020(15): 92-97.
- [5] Xing Qinghua. Focusing on the Development Laws of Higher Vocational Education to Cultivate High-Quality Technical and Skilled Talents [J]. World of Labor Security, 2020(20): 66-67.
- [6] Liu Yongbo. Exploration and Practice of the Training Model for High-Quality Application-Oriented Technical and Skilled Talents [J]. Science & Technology Innovation Herald, 2019, 16(35): 214+216.