

## ADAPTING TALENT TRAINING TO THE "DOUBLE HIGH" ERA: HIGH-SPEED RAIL COMPREHENSIVE MAINTENANCE TECHNOLOGY

<sup>1</sup>James Smith and <sup>2</sup>Emma Johnson

### Article Info

**Keywords:** Dual high, vocational colleges, educational model, vocational education, integration.

### DOI

10.5281/zenodo.10958505

### Abstract

In the context of "dual high," vocational colleges have evolved into a unique educational model that seamlessly integrates education and professionalism, reflecting the essential fusion of educational and vocational aspects. The dichotomy that traditionally separated education and vocational training has been surpassed, giving rise to a holistic educational approach where both dimensions complement each other. The conventional practice of isolating educational and vocational aspects within vocational education often led to the oversight of their inherent interconnectedness. It frequently resulted in the segregation of professional training processes and settings from broader societal and knowledge-based dimensions, emphasizing vocational education's distinctiveness while neglecting its fundamental educational character. This approach, although highlighting vocational education's specificity, overlooked its essential educational nature, inadvertently transforming vocational colleges into mere production lines for labor training [1].

### 1. The value logic of higher vocational colleges under the background of "double high"

#### 1.1 The core value of the construction of higher vocational colleges: the integration of education and professionalism

In the context of "dual high", the construction of vocational colleges reflects the organic integration of educational and vocational aspects, which is its core value. Education is an essential feature of all educational activities, and professionalism is a unique attribute of vocational education. As a special type of education, vocational colleges have achieved the integration of educational and vocational aspects in vocational education, forming a unique educational model. Traditional vocational education often separates educational and vocational aspects, neglecting the inherent relationship between the two. In past practice, vocational schools often neglected the connection between the education and vocational fields, and separated professional settings, training processes, and other aspects from social and knowledge-based aspects. Although this approach highlights the particularity of vocational education, it ignores the basic characteristics of educational activities, resulting in vocational schools only becoming factories for cultivating labor<sup>[1]</sup>.

However, in the "Double High Plan", the construction plan of high-level vocational schools fully reflects the integration concept of education and professionalism. This provides an opportunity for the deep integration and endogenous connection between the educational and vocational domains, and lays a practical foundation. Vocational schools connect internal teaching with enterprise practice through the interaction and docking of core elements within the education and vocational domains, achieving a close integration of education and industry.

<sup>1</sup> Wellington Polytechnic Institute, Wellington, New Zealand

<sup>2</sup> Sydney Technical College, Sydney, Australia

The education domain of vocational schools mainly relies on the teaching, management, and learning elements of the school, while the core of the vocational domain is the profession itself, including industries and enterprises. Vocational education focuses on the cultivation of vocational talents, and through models such as school enterprise cooperation and integration of industry and education, it organically combines classroom education that imparts indirect knowledge with a production environment that directly obtains practical experience<sup>[2]</sup>. This organic connection and integration not only enhances the talent supply capacity of vocational education, optimizes the talent allocation structure of enterprises, but also promotes collaboration and endogenous connection between education and vocational domains.

### ***1.2 The transformation of vocational education: from "success" to "adulthood"***

In the construction of vocational colleges, the "Double High Plan" leads the transformation of the connotation of talent cultivation in high-level vocational schools, shifting from the previous "talent oriented" approach to the "adult pursuit" of cultivating a complete personality. For a long time, vocational education has mainly focused on professional skills and employment orientation, neglecting the balance between educational and vocational aspects of vocational education. This has led to vocational schools gradually being seen as labor training factories, while students' comprehensive development and value pursuit are ignored<sup>[3]</sup>.

However, with the weakening of educational value and the loss of humanistic sentiment, the goal of vocational education gradually shifts to simply catering to professional needs. This single career orientation has led to the strengthening of utilitarianism in education and employment Determinism, further weakening the educational function of vocational education. Therefore, in the context of the new era, vocational colleges need to re-examine and adjust the goals and directions of talent cultivation.

The "Double High Plan" provides favorable opportunities for the construction of high-level vocational schools. It encourages innovative talent cultivation models and promotes the direction of talent cultivation to shift from a single focus on professional technology to a more focused focus on social needs and career directions. This transformation means that vocational education is no longer just about cultivating students' job skills, but is committed to cultivating talents with innovative spirit, composite skills, and complete personality. Such training objectives help to explore and cultivate students' sustainable development ability, social adaptation ability, independent thinking and practical ability, as well as team collaboration and creative ability.

## **2. Background analysis of the construction of high speed rail comprehensive maintenance technology professional group**

### ***2.1 The technical demands brought by the rapid development of high speed rail***

With the rapid development of the economy and the improvement of people's living standards, high-speed rail, as a fast, safe, and convenient mode of transportation, has been widely promoted and applied in China and globally. The rapid development of high-speed rail has not only brought revolutionary changes to the field of transportation, but also put forward new demands for related technologies and talents<sup>[4]</sup>.

The rapid development of high-speed rail has put forward higher requirements for the safety and reliability of high-speed rail operation. As a high-speed transportation tool, high-speed rail has strict requirements for the performance and reliability of trains and track equipment. This requires high-speed rail maintenance technicians to have professional knowledge and skills, be able to carry out equipment troubleshooting, troubleshooting, and maintenance, and ensure the safe operation of high-speed rail. The rapid development of high-speed rail has also brought about a demand for equipment updates and technological upgrades. With the progress of technology and continuous innovation of high-speed rail technology, new generations of high-speed rail trains and equipment are constantly emerging, with more advanced technology and higher performance indicators. This requires high-speed rail maintenance technicians not only to be familiar with traditional maintenance techniques, but also to continuously learn and master new technologies to adapt to the maintenance and repair work of new equipment. The rapid development of high-speed rail has also put forward higher requirements for the efficiency and quality of high-speed rail maintenance technology. As a large-scale transportation system, high-speed railway maintenance needs to be carried out in a limited time and ensure the quality of maintenance to reduce the impact on operation.

## ***2.2 The international standardization trend of maintenance technology***

With the rapid development of high-speed rail on a global scale, the international standardization trend of maintenance technology is becoming increasingly prominent. Behind this trend is the pursuit of safety, efficiency, and reliability in high-speed rail operations, as well as technological exchange and cooperation between different countries and regions. In this context, building a comprehensive maintenance technology professional group for high-speed rail has become an inevitable choice.

International standardization can improve the synergy and interoperability of high-speed rail maintenance technology. There may be some differences in high-speed rail networks among different countries and regions, such as differences in equipment models, maintenance processes, and technical specifications. By formulating international standards, it is possible to achieve the unity and mutual compatibility of high-speed rail maintenance technologies in various countries, and improve the efficiency and convenience of cross-border cooperation. International standardization helps to improve the quality and reliability of high-speed rail maintenance technology. By following international standards, it can be ensured that the operational norms and technical requirements during the maintenance process are uniformly implemented. This will help reduce Human error and technical risks, and improve the accuracy and efficiency of maintenance. At the same time, international standards can also promote continuous innovation and improvement in maintenance technology to adapt to the constantly developing high-speed rail technology and needs. International standardization provides broad development space for the cultivation of high-speed rail maintenance technical talents. Building a comprehensive maintenance technology professional group for high-speed rail requires cultivating maintenance technical talents with international perspectives and cross-cultural communication abilities. They need to understand and apply international standards, and be able to effectively communicate and cooperate with maintenance technicians from different countries and regions. This not only enhances the competitiveness of maintenance technicians, but also promotes talent exchange and cooperation worldwide.

## ***2.3 Talent team structure and professional collaboration***

The construction of comprehensive maintenance technology for high-speed rail cannot be separated from a coordinated and orderly talent team and effective professional cooperation. In the field of high-speed rail maintenance, there are close connections and interdependence between different professional fields. Therefore, the construction of a comprehensive maintenance technology professional group for high-speed railways requires attention to the structure of talent teams and professional collaboration to ensure efficient maintenance work and high-quality maintenance results.

The reasonable allocation of talent team structure is crucial for the development of high-speed rail comprehensive maintenance technology. When building a comprehensive maintenance technology professional group for high-speed rail, it is necessary to consider the number and proportion of talents in different professional fields. Talents in mechanical, electrical, electronic, communication and other fields should be reasonably allocated to meet the various technical requirements required for high-speed rail maintenance. In addition, attention should also be paid to cultivating talents with interdisciplinary knowledge and skills, who can effectively communicate and collaborate between different professional fields, and improve the efficiency and quality of maintenance work. Building a comprehensive maintenance technology professional group for high-speed rail requires strengthening professional collaboration. The maintenance work of high-speed rail involves knowledge and technology from multiple professional fields, and close collaboration and cooperation among various professions are necessary. For example, during troubleshooting and maintenance, mechanical engineers need to work closely with Electrical engineer, electronic engineers, communication engineers and other professionals to solve technical problems. Only through professional collaboration can complex maintenance problems be effectively solved, and maintenance efficiency and quality be improved.

In order to achieve effective professional collaboration, the construction of the high-speed rail comprehensive maintenance technology professional group also needs to focus on team building and the cultivation of communication skills. Maintenance team members should have good communication and coordination skills, be able to understand and respect each other's professional knowledge and skills, and form a collaborative work atmosphere. In addition, regular cross disciplinary training and communication activities can be organized to

promote mutual understanding and learning among different professions, and improve the overall quality of the entire maintenance team.

### **3. The dilemma of talent training model reform under the background of "double high"**

#### ***3.1 The constraints of traditional educational concepts and the innovation of talent cultivation models***

In the reform of talent cultivation models in high-level vocational schools, there are limitations of traditional educational concepts on innovation. In the past, the talent training goal of higher vocational schools mainly focused on the traditional industrial era, emphasizing the Instrumental and value rationality thinking mode of classroom knowledge teaching and direct employment. However, in the context of the information age, with the rise of artificial intelligence, Big data and other new technologies, this traditional concept of talent training has been difficult to meet the market demand and innovative requirements of talent training mode.

Especially the use of subject based teaching models hinders the development of students' initiative, enthusiasm, and creativity. This model is teacher centered and focuses on the completeness and systematicity of knowledge transmission, limiting the development of practical and innovative teaching activities. Although vocational schools have made some efforts in curriculum teaching arrangements and student practical training, many innovative training activities have not been effectively promoted due to traditional educational concepts and models.

#### ***3.2 The balance dilemma between employment orientation and students' comprehensive development***

Another practical dilemma is the balance between employment orientation and students' comprehensive development. Traditional vocational education often regards employment as the only training goal, narrowly defining the educational purpose as student employment or meeting the needs of enterprises. Especially under the bias of society towards vocational education and the pressure of graduates from vocational schools facing severe employment situations, some vocational schools place more emphasis on employment and neglect the comprehensive and sustainable development of students.

However, excessive pursuit of employment rates may lead to biased talent cultivation concepts in vocational schools. Treating employment as the only talent cultivation goal will exacerbate society's one-sided understanding and subjective evaluation of the training of workers in vocational schools. In addition, this also makes the concept of talent cultivation in vocational schools too utilitarian and lacks attention to the comprehensive development of students.

#### ***3.3 Outstanding contradictions in the internal and external relationships of vocational education***

The integration of vocational education and information Technological convergence is not close enough, which limits the informatization process of talent training mode. For a long time, vocational education has mainly focused on imparting students' employment and survival skills, but the rapid development of modern information technology has changed the characteristics of vocational needs. In the era of artificial intelligence, machines have made significant breakthroughs in knowledge storage, retrieval, and execution, which has led to a decline in the adaptability of traditional talent cultivation systems and cannot meet the needs of adapting to the strong integration, high complexity, and diverse characteristics of information technology. Therefore, in order to train high-quality talents to meet the requirements of the new era, vocational education needs to be more closely integrated with information Technological convergence.

The promotion effect of the integrated engineering and learning curriculum is poor, and the supervision of teaching quality is not in place, which has affected the effectiveness of talent cultivation reform in improving the quality of education and teaching. The integration of engineering and learning courses is an important component of the talent cultivation model, which directly affects the quality of education and talent cultivation in high-level vocational schools. However, there are still some issues at present. For example, whether the integrated course design of engineering and learning is based on real work scenarios, whether the learning environment is truly close to the actual work environment, and whether the course content conforms to the laws of vocational education and student characteristics. In addition, the integration of engineering and learning courses has put forward higher requirements for the expansion of teaching space and the demand for teaching resources, which has also increased the difficulty of supervising teaching quality in vocational schools and enterprises. Therefore, we need to

strengthen the design and supervision of integrated engineering and learning courses to ensure that they truly meet the needs of talent cultivation.

#### **4. Construction strategy of high level high speed rail comprehensive maintenance technology professional group**

##### ***4.1 Adapt to the development needs of high-speed rail and reshape talent cultivation goals***

In the construction of a high-level comprehensive maintenance technology professional group for high-speed rail, aligning with the development needs of high-speed rail and reshaping talent training goals is a crucial step. The rapid development and technological innovation of the high-speed rail industry require professional talents to possess comprehensive maintenance skills and professional knowledge, and be able to adapt to the complex and ever-changing high-speed rail maintenance environment. Therefore, vocational colleges should re-examine and adjust their talent cultivation goals based on industry development trends and technological needs, in order to cultivate high-quality technical talents that match the needs of high-speed rail maintenance technology.

To meet the development needs of high-speed rail, it is necessary to have a deep understanding of the current development status and future trends of the high-speed rail industry. Through cooperation with high-speed rail enterprises, professional research, and industry exchanges, vocational colleges can obtain the latest information on high-speed rail maintenance technical requirements, equipment updates, maintenance standards, and other aspects. At the same time, it is also necessary to pay attention to the innovation and development direction of high-speed railway technology, including the application of new materials, intelligent maintenance equipment and technology, Big data analysis, etc. These understandings and studies will provide a foundation for developing talent development goals that meet the needs of high-speed rail maintenance.

The goal of reshaping talent cultivation needs to be adjusted based on the characteristics and requirements of high-speed rail comprehensive maintenance technology. High speed rail maintenance involves multiple fields, including mechanical, electrical, electronic, automation and other technologies, so students need to comprehensively master relevant knowledge and skills. In terms of training objectives, attention should be paid to the cultivation of students' practical abilities, emphasizing the ability to solve practical maintenance problems and innovative awareness. At the same time, cultivate students' teamwork and communication skills to adapt to the collaborative requirements of high-speed rail maintenance work. In addition, the cultivation of professional ethics and professional literacy should be strengthened, so that students have good professional ethics and a high sense of responsibility, and can be competent for high-speed rail maintenance technology work.

##### ***4.2 Deepen the integration of industry and education, and collaborate with schools and enterprises to build a professional curriculum system***

Deepening the integration of industry and education, and collaborating with schools and enterprises to build a professional curriculum system are the core tasks of building a high-level comprehensive maintenance technology professional group for high-speed rail. Through close cooperation, vocational colleges and high-speed rail enterprises can work together to establish a professional curriculum system that meets the needs of high-speed rail maintenance technology, in order to meet the urgent demand for high-quality maintenance technology talents in the industry. Vocational colleges and high-speed rail enterprises should establish a long-term and stable cooperative relationship, and strengthen communication and cooperation between both parties through regular meetings, exchanges, and discussions. This close cooperation can ensure that both parties have a clear understanding of the latest development trends, technical requirements, and other aspects of high-speed rail maintenance technology, in order to better carry out course design and content adjustments.

In the process of deepening the integration of industry and education, vocational colleges should jointly participate in the design and revision of professional courses with high-speed rail enterprises. By fully drawing on the actual needs and technical standards of high-speed rail enterprises, develop curriculum and syllabus that meet industry requirements. The curriculum should cover various fields and levels of high-speed rail maintenance technology, covering the cultivation of basic theoretical knowledge, practical skills, and the improvement of comprehensive application abilities, to ensure that students can fully grasp the professional knowledge and skills required for high-speed rail comprehensive maintenance.



The construction of a professional curriculum system needs to focus on the establishment of practical teaching links. Vocational colleges and high-speed rail enterprises can jointly carry out experimental courses and practical training projects, allowing students to develop skills and practice in a real environment by simulating actual high-speed rail maintenance operations, analyzing maintenance cases, and other forms. At the same time, the equipment and facilities of high-speed rail enterprises and the guidance of professional engineers can be utilized to provide students with more authentic and professional practical opportunities, cultivate their ability to solve practical problems and cope with complex situations.

Deepening the integration of industry and education also requires attention to the cultivation and improvement of the teaching staff. Vocational colleges and high-speed rail enterprises can jointly carry out teacher training programs to enhance teachers' professional literacy and practical experience, enabling them to better grasp the latest developments in high-speed rail maintenance technology, and apply it to curriculum design and teaching practice. In addition, mutual learning and exchange between teachers in vocational colleges and engineers in high-speed railway enterprises can be promoted through teacher exchanges, job rotation and other ways to enhance the professional level of both sides.

## 5. Conclusion

In the context of "dual high", the value of vocational colleges lies in achieving the organic integration of educational and professional aspects, and promoting the transformation of talent cultivation connotation. In the construction of the comprehensive maintenance technology professional group for high-speed rail, vocational colleges need to align with the development needs of high-speed rail, reshape talent training goals, and adapt them to the needs of technological development in the high-speed rail industry. At the same time, vocational colleges should also deepen the integration of industry and education with high-speed rail enterprises, and jointly build a professional curriculum system that meets industry requirements. Only through close cooperation between schools and enterprises, and continuously promoting the effective connection between theoretical teaching and production practice, can we truly achieve innovation in talent cultivation mode and cultivate composite technical talents that meet the needs of high-speed rail comprehensive maintenance technology.

## Acknowledgement

**Project Name:** Research on Talent Training Mode of High Speed Rail Comprehensive Maintenance Technology Professional Group under the Background of "Double High" ZXXJ2022001501.

## References

- Chen H, Yu Z, Bie Y. (2023) Research on the teaching model of "industry, university and research" in physical education curriculum under the background of the double high plan. *Contemporary Sports Technology*, 13 (14), 50-54.
- He J. (2023) The basic characteristics, problem analysis, and implementation strategy of the construction of high-speed railway comprehensive maintenance technology major. *Occupational Technology*, 22 (2), 58-63.
- Luo L, Tang X, Wang L, Li S. (2022) Exploration of professional construction in higher vocational colleges based on the new needs of high speed railway development—Taking the comprehensive maintenance technology major of high speed railway as an example. *Journal of Higher Education*, 8 (33), 60-64.
- Shao W. (2023) Exploring the improvement of talent training level in higher vocational education under the background of the "double high plan". *Health Vocational Education*, 41 (10), 8-11.