

Analysis of the Connotation and Practice of the Integration of Production and Education under the Background of Intelligent Manufacturing

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[**Abstract**] Intelligent manufacturing is the focus and trend of China's industrial development. In the context of intelligent manufacturing, the amalgamation of industry and education is the only way of vocational education. The integration of production, education and research is no longer a superficial and single school—enterprise cooperation. It's a pattern, a thought and an idea. It is only through the whole process of the reform and development of vocational education that the concept of the integration of industry and education can be carried out. In order to provide more and better professional talents for the fast iterative intelligent manufacturing industry, the essence of the integration of industry and education is under the background of intelligent manufacturing. Relying on the new concept and model of vocational education integration, vocational school students can realize individual freedom and all-round development, and everyone has the opportunity to be brilliant in life.

[**Key words**] intelligent manufacturing; integration of production and education; vocational education

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Introduction

On the basis of adhering to and implementing official documents of the central leadership, all regions should actively explore the valuable experience of innovative reform of the integration of production and education from practice. With increased school – enterprise cooperation, the theoretical research related to schools is still insufficient, and there are still many problems in practice. In this paper, the obstacles of production–education integration are studied in depth, and correct solutions are put forward under the background of relevant theories, indicating the direction for the practice of production–education integration.

1 Connotation

To explore the practice path of production–education integration under the context of intelligent manufacturing in the new era, it is necessary to determine the new connotation of production–education–research integration in the new era. The integration of production and education has always been a hot spot in vocational education research. Since the Party successfully held corresponding conferences, most of the vocational education researchers have developed a new interpretation for the connotation of production–education integration. Some researchers believe that the integration of production–education–research refers to the process in which the education sector and the industrial sector reach a consensus on the starting point and core foundation of the integration. During the process, they can achieve a very high level of integration by virtue of the advantageous platform resources and complementary cooperation.

2 Status analysis of talent co-education under the production–education integration of intelligent manufacturing

Through the survey, it can be found that both vocational colleges and intelligent manufacturing industries

believe that the integration of production and education is an important way of talent education. The focus of vocational education in society has shifted from the number of talents to the cultivation of their core professional competencies.

2.1 The focus of enterprises remains to be the quality of talents

With the employment of “Gen Z” higher vocational graduates, their professional spirits, such as lack of hard working and dedication, are gradually exposed. There even exist practical problems, such as serious utilitarianism. Therefore, the talent cultivation purpose of moral education in higher vocational colleges is the improvement of basic vocational quality. In the survey, higher vocational colleges have opened special courses to guide and plan students’ career, but these courses are usually taught by teachers, which are vastly different from the actual requirements of enterprises.

2.2 There are great changes in intelligent manufacturing enterprises’ requirements for the professional skills of higher vocational talents

Students are not only required to master the basic multi-disciplinary knowledge, but also to have the ability to learn new knowledge continuously, the ability to analyze and solve problems after employment, and the spirit of innovation. Although most of the higher vocational colleges being investigated have adjusted their specific courses and knowledge points, the width of basic knowledge still cannot meet the basic needs of intelligent manufacturing talents.

2.3 The development and application of intelligent manufacturing technologies require a lot of scientific research and innovation

There is a general lack of production – education – research integration, production – education – research cooperation and transformation of scientific and technological achievements between enterprises and higher vocational colleges. Due to their own knowledge structure and policy orientation, teachers of higher vocational colleges are not highly motivated to solve practical technical problems and participate in technological innovation of enterprises.

2.4 The purpose of vocational education group is an important carrier of school – enterprise cooperation, an effective way to deepen production – education integration, and a main process to improve the vocational education system

Higher vocational colleges and intelligent manufacturing enterprises generally provide employment like job internships and pilot talent cultivation of modern apprenticeship. However, there are little in-depth cooperation between intelligent manufacturing enterprises and higher vocational colleges in the formation of vocational education groups and alliances.

3 Realization process of production – education integration between schools and enterprises in the new era

3.1 Government’s support, balancing the relationship in cleaning up the mechanism

In order to improve production – education integration in vocational schools, it’s necessary to address the imbalance between government and market. Only after clarifying government’s power boundaries and role can we realize the coordination between government and market regulatory mechanism, and realize the one-stop industrial mechanism and efficient development for higher vocational colleges. Therefore, education industry can be guaranteed. The power list outlines the power of government departments at all levels and defines the boundaries of government power, which can effectively prevent the government from “overstepping” in its administrative functions. The responsibility list matches with the power list, which specifies the responsibilities of government departments at all levels. Define the duties of government departments can effectively prevent it from “misplacing”

its administrative functions. Negative list is to define the scope of government departments' monitor on market behavior, which can effectively prevent the government administrative functions from "missing" access mechanism.

3.2 Roles of relevant industry associations

Organizations like relevant industry associations play an important role in the governance system of public affairs in modern society. In the process of promoting production-education integration in China's higher vocational education, there is a lack of intermediary organizations represented by industry associations. There are two main reasons for this: first, the laws and regulations governing the participation of industry organizations in vocational education are not perfect. Secondly, the transformation of government functions is not in place yet, and the space for industry organizations to participate in higher vocational education is limited. The central government has issued some policies requiring the industry to play a leading role in the process of vocational education reform, but due to the transformation of government functions, relevant industry associations and other organizations should assume the role of vocational education guidance. However, relevant industry associations and other organizations should actively cooperate with each other in participating space of higher vocational education.

3.3 Resource sharing between schools and enterprises

1. Innovation of school-running system of vocational education. Higher vocational colleges must have the courage to break through the traditional framework and mode of unilateral school-running, sign strategic cooperation agreements with enterprises to form an integrated pattern of interest restraints and common development between schools and enterprises, and realize the "three ins, one out". Extensive and in-depth resources should be shared between schools and enterprises. The status of the lack of mutual trust and strong connection between schools and enterprises should be completely reversed, and the synergistic benefits between them should be functioned.

2. Establish a school-enterprise school-running committee to guide and manage the daily affairs of vocational education group. Participants in vocational education institutions can set up a joint school-enterprise management team to guide schools and enterprises in the implementation of comprehensive and in-depth school cooperation. Specific talent cultivation methods, formulation of training programs for professional talents, and daily school affairs of vocational education management and industry indeed provide organization guarantee for the seamless integration of enterprises.

3. Build a resource sharing platform to promote the circulation of resource information between school and enterprise. Through the construction of resource sharing platform, vocational education group play the integration function. It reasonably allocates resources from various disciplines inside the group, establishes various school-enterprise sharing platforms of school resource including practice and training bases, product development bases, and enterprise parks, deepens various resources of higher vocational colleges and industrial enterprises, and significantly improve the utilization efficiency of vocational education resources.

3.4 Establish guarantee system for production-education integration in higher vocational colleges

1. Construction of financial guarantee system. Production-education integration in higher vocational colleges is a huge social system engineering, which cannot rely solely on national financial allocation. Therefore, on the basis of existing fiscal taxation incentives, taxation incentives for higher vocational education should be actively formulated, and integration of finance and taxation, such as land tax and value-added tax, should be implemented in higher vocational colleges.

2. To establish and improve the organization guarantee system of production-education docking. A special organization and coordination mechanism should be set up for overall management. The government should set up a reform and development office for production-education integration, make systematic plans on the development mode of production-education integration in higher vocational colleges, push forward the production-education integration in an overall manner, and set up an industry-integrated organization guarantee system. The principle is

“Guided by government and industries, participated by enterprises”. A scientific assessment and support system for production–education integration should be established, in which a scientific and reasonable assessment mechanism is the key to ensure the expected results of production–education integration. On the one hand, it is necessary to establish a strict and operable assessment process system. Assessment, on–site inspection, report writing, result review and preliminary preparations for other links should be fair and transparent; on the other hand, it is necessary to attach importance to the systematic nature of the assessment, including industry assessment, leadership assessment, enterprise assessment, school assessment, teacher and student assessment, and employee assessment, to ensure the integration of assessment system. Production and education are scientific, rigorous, objective and fair.

3.5 Promote the modernization of the governance of production–education integration

1. Moderate diversification of the main body of governance. To build a new pattern for higher vocational education, it is necessary to build a new and diversified pattern of governance based on the principle of diversified management of higher vocational education, and under the principle of diversified management of higher vocational colleges. Diversified governance emphasizes multi–governance at the governance subjects’ level rather than the quantitative level. In the diversified governance mode, it’s not optimum to have too many or too few governance institutions, and moderate diversification must be realized according to the actual situation of engineering–learning integration.

2. Decentralized system under the governance. Production–education integration is a complex, open and diversified system of higher vocational education. If stakeholders want to play a role in the governance system, they must own the corresponding governance rights. Local governments and education administrations must abide by the laws on the development of vocational education, adequately check and measure resource allocation methods, major governance strengths, and internal and external governance capabilities, and conduct moderate decentralization to achieve organic unity, as well as checks and balances.

Conclusion

Intelligent manufacturing has brought epochal changes to the reform and development of vocational education. Exploring new practice mode of production–education integration under the context of intelligent manufacturing is mainly realized through the establishment and improvement of the system and mechanism of industry–teaching integration, the joint establishment of enterprise schools by schools and enterprises, and the common construction and sharing of practical training bases by industry–academic–research institutes.

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