

Exploration and Practice of Industrial Internet Double High Talent Training Mode in Higher Vocational Colleges

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Abstract: In response to many issues in industrial internet talent cultivation, such as the lack of experience to follow, a single training mode, insufficient industry-academia-research collaboration, and lagging quality assurance, Guangdong Light Industry Vocational and Technical College (referred to as Guangqing) Industrial Internet Professional Group focuses on industrial internet technology, covering industries such as artificial intelligence, new generation communication technology, and Internet+. Empowering the transformation and upgrading of light industry manufacturing, Guangqing has developed a „multi-level, multi-dimensional, diversified“ industrial internet talent cultivation model that combines „high skills + high education“ and „skills + technology“ to break through the bottleneck of engineering technology, information technology, and manufacturing technology composite talents in the industrial internet industry. Guangqing has achieved significant results in talent cultivation, professional construction, team building, and social services.

Keywords: Industrial internet; Interdisciplinary talent; Industry-academia integration; Professional group; Talent cultivation model

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1. Introduction:

The Industrial Internet is the product of the deep integration of new-generation information and communication technology with modern industrial technology. It is an important carrier for the digitization, networking, and intelligence of the manufacturing industry and is also the commanding heights of the new round of global industrial competition. Unlike traditional simple manufacturing and repetitive labor, the Industrial Internet requires stricter technical talents.

2. Implementation background

The development of Industrial Internet technology and industry puts forward higher requirements for talents, requiring compound, multi-dimensional, and multi-level talents^[1]. The low standardization of Industrial Internet positions results in a low degree of matching between talent supply and demand. The talent system has not yet formed, and talent cultivation faces many difficulties^[2].

3. Main measures

3.1 Focusing on the characteristics of professional cross-border integration, establishing the core goals of cultivating high-level talents in the industrial internet

Guided by the job demand in the industrial internet industry chain and aimed at serving the industry economy, a new type of vocational education model has been built to establish the goal of cultivating high-level talents in the industrial internet with the concept of „Internet plus advanced manufacturing plus vision plus innovation plus practice plus craftsmanship“. This goal satisfies the changing needs for composite talents in the industrial internet industry that keeps pace with the times. In the context of the cross-

border integration of „Internet plus advanced manufacturing“^[3], students not only need to master ICT professional knowledge but also need to broaden their knowledge dimension, understand engineering technology, manufacturing technology, and other industry-related knowledge. They must flexibly use new-generation information technologies such as artificial intelligence, big data, and the Internet of Things to solve the challenges in the process of empowering manufacturing industry transformation with the industrial internet. This will enable students to have a broad vision, a high degree of innovation consciousness, and a spirit of craftsmanship that strives for excellence.

3.2 Paying attention to multi-level complementarity to achieve the diversification of cultivating high-level talents in the industrial internet

The industrial internet is the product of the integration of new-generation information technology and manufacturing. It not only requires OT and IT composite talents but also requires multidimensional and multilevel talents such as enterprise management talents, industry leaders, professional and technical talents, and industrial workers. Guangdong Light Industry Technical College closely coordinates the urgency and diversity of regional industrial needs and implements a three-year high school and two-year college system, three-year regular high school, and four-year undergraduate programs to cultivate high-quality workers and technical and skilled personnel in the industrial chain (three-year high school and two-year college), high-quality technical and skilled personnel (three-year regular high school), and high-level technical and skilled personnel (four-year undergraduate program) to meet the needs of the industrial internet industry for different levels of skilled personnel and research and development application-oriented technical personnel. On this basis, the college explores the implementation of modern apprenticeship system to cultivate composite technical and skilled personnel; sets up „Watt Workshop“ class to precisely cultivate urgently needed talents; and holds flexible education courses for upgrading the education level of high-skilled personnel to meet the requirement for lifelong learning.

3.3 Paying attention to multidimensional interconnection to achieve the standardization of cultivating high-level talents in the industrial internet

3.3.1 Collaborative development professional group of „Government, School, Industry, Research“

Guangdong Light Industry Technical College relies on the China Vocational Education Association, the Industrial Internet Research Institute, the Guangdong Province IoT Association, the Institute of Computing of the Chinese Academy of Sciences, and leading companies in the industry. It adopts a multi-party cooperation approach of „Government, School, Industry, Research“ to accurately cultivate IT, CT, and OT composite talents and connect with the various levels of the industrial internet industry chain, thus constructing a leading, internationally influential high-level professional group in China.

3.3.2 Co-building and integrating teaching resources with enterprises

Deep cooperation between universities and enterprises in developing scientific and reasonable curriculum systems and three-dimensional teaching resources is crucial for cultivating composite talents in higher vocational education. The Guangdong Industry Internet Specialty Group conducted in-depth talent demand and job group surveys with typical enterprises in the industry, exploring a modular industrial internet application dual-high talent training curriculum system based on job group professional abilities. The industrial internet project-based courses jointly developed by university teachers, enterprise engineers, and scientists are introduced into the classroom to carry out „project-driven, integrated theory and practice“ teaching. The three-dimensional teaching is achieved by integrating modern information technology means, digital educational resources, and teaching content in an organic way.

3.3.3 Co-building dual-teacher mixed teacher teams with universities and enterprises

Under the background of cross-border integration, higher requirements are placed on teachers in terms of education and teaching abilities, innovation abilities, technical service abilities, and social service abilities. Relying on the teaching team of the specialty group, through training and hiring, a mixed training teacher team is formed to achieve the cultivation of industrial internet dual-high talents by combining full-time and part-time teachers.

3.3.4 Co-building a high-level education platform with government, universities, enterprises, and research institutes

Under the guidance of the government, Guangdong Polytechnic of Information Technology cooperates with industry, enterprises, and scientific research institutes to lead the establishment of the „China Industrial Internet Technology Application Research Institute“ and the „Guangdong Province Industrial Internet Industry-Education Alliance“ platform, and promotes the establishment of an industrial internet college to carry out cooperative education in the field of industrial internet and form an ecological environment for deep integration of production, education, and research.

3.4 Focus on diverse interactions and systematize the cultivation of dual-high talents in industrial internet

Cultivating cross-disciplinary and compound talents is a complex system engineering project that cannot be achieved by schools alone. It requires the participation of the government, industry, enterprises, research institutes, and social forces to jointly promote and explore the „government-school-industry-research“ collaborative innovation in order to cultivate high-tech talents with innovative consciousness, meet the needs of industrial development, and have multidisciplinary integration skills. Through multi-party collaboration, complementary advantages, and resource integration, the „government-school-industry-research“ collaborative innovation education model can be explored.

E. Focus on the quality of talent cultivation and build a teaching quality monitoring, evaluation, and continuous improvement system.

Establish a „5-party participation, 4-mechanism, 3-evaluation, and 2-improvement“ quality assurance system, forming a „quality evaluation-timely feedback-continuous improvement“ teaching closed-loop.

4. Experience summary

4.1 Orienting industrial talent development towards industry demand and clarifying the goals of developing dual high-level industrial internet talent^[4-5]

In-depth research should be conducted in the industry and enterprises, and talent development should be based on industry demand and job competency requirements. Deep cooperation with top enterprises in the region should be established to adapt to industry development needs and clarify the goals of talent development.

4.2 Core cultivation through industry-education integration and exploring the diverse collaborative approaches of „government-school-enterprise-research“ in talent development

New models and paths are needed for talent development in industrial internet. Talent development is a problem faced by the government, society, schools, enterprises, and other sectors. No single organization can independently meet the new requirements of talent development.

4.3 Setting dual high-level talent development as the goal and implementing a multi-level talent development path

The development of skill-based talents and research application-based technical talents at different levels of the industrial chain should be implemented, closely linking with the urgency and diversity of regional industrial demand. Dual high-level talent development should be set as the goal to meet the demand for multi-level talents in the industry.

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