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Research on the Establishment of Teaching Standards for Intelligent Technology of Postal Express

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Abstract: By conducting a survey on the development trend of intelligent technology in the express delivery industry and its talent demand, integrating the research results from three dimensions: industry enterprises, colleges and universities, and practitioners in related positions, the professional positioning, employment positions, work standards, and talent demand are clarified. This approach aims to construct a curriculum system for the intelligent technology major in postal express delivery, as well as professional skills and occupational quality requirements for talent cultivation, thereby improving the level of high-quality technical personnel training. The survey mainly used methods such as questionnaires, online research, interviews, field research, and telephone research, completing surveys of 57 enterprises, 31 vocational and undergraduate colleges, and more than 100 practitioners in related positions. It considered the distribution in central, eastern, and western regions, covering the whole country. The survey found issues such as the mismatch between the scale of the major and the scale of the industry, the need to adjust the professional structure of teachers, the need to strengthen the integration of knowledge and practice, and the need for unified professional teaching standards. It is suggested to formulate scientific teaching standards for the intelligent technology major in postal express delivery by constructing an interdisciplinary professional teacher team, reasonably planning the major curriculum, clarifying the professional skills and occupational quality requirements for talent cultivation, and constructing a practice system that integrates knowledge and practice.

Keywords: Intelligent Technology in Postal Express Delivery; Talent Demand; Teaching Standards; Curriculum Design; Talent Cultivation

1. Introduction

In order to complete the postal express intelligent technology professional profile and teaching standards development (revision) work, fully understand the current situation of the express delivery industry and the development trend of intelligent technology, a clear professional positioning, employment positions, job standards and talent needs, research professional settings required for the core curriculum, job requirements for the development of postal express intelligent technology professional profile and professional teaching standards to provide a comprehensive and objective basis[1]. A number of colleges and enterprises jointly participated in the completion of the courier industry, enterprises, colleges and practitioners of the research work.

The research object is divided into three types: industry enterprise research, college professional research and related post practitioner research. Among them, the industry enterprise research is divided into express delivery enterprise research and intelligent express delivery equipment supplier research; institutional research is mainly higher vocational colleges and universities postal professional research; because the postal express intelligent technology professional is a new major in 2021, there is no graduate, so the research object is selected for the relevant positions in the field of three years of practitioners.

The research mainly used questionnaires, network research, interviews, field research, telephone research and other methods. It completed the research of 57 enterprises, 31 higher vocational and undergraduate colleges and universities, and more than 100 practitioners in related positions, considering the distribution of the central, eastern and western regions and covering the whole country.

2. Postal Express Intelligent Technology Specialized Industry Business Research Content

2.1 Research on Industry Enterprises

In 2023, the national express business volume completed 83.36 billion pieces, an increase of 31.2% year-on-year; the annual express business revenue completed 879.54 billion pieces, an increase of 17.3% year-on-year; the average daily express handling volume of express enterprises exceeded 230 million pieces, an increase of 35.3% year-on-year, with the highest daily handling volume of 680 million pieces, an increase of 25.9% year-on-year [2-4].

The rapid development of the express delivery industry, but its development shows a large regional. East, Yangtze River Delta, Pearl River Delta region, the volume of express business and business income continued to run at a high level, the growth rate is slowing down, market saturation, new business, high value-added business, diversified competition has become the strategic development direction of the courier business[5]; Northwest, Northeast express business volume and business income accounted for a relatively small, but the growth rate is relatively fast, with a large market business potential, relying on the characteristics of the product courier, courier rural market sinking Penetration, "One Belt, One Road", express "overseas" and other policies to rapidly enhance the growth space.

In order to adapt to the rapid growth of express delivery business volume, intelligent technology is commonly used in the express delivery industry, mainly in the two aspects of software and hardware. Software is mainly cloud computing, big data, Beidou navigation, 5G network, Internet of Things, intelligent customer service, artificial intelligence assisted decision-making system and other advanced technologies, to promote the digitalization of the whole chain of business information of express delivery and the whole life cycle of business information accurate identification and tracking, to promote the digital transformation of the express delivery business operation, and to realize the whole process of express delivery business with dynamic prediction, accurate image and scientific management.

The hardware mainly focuses on cross-sorting machines, sorting robots, intelligent sorting systems, intelligent stations, unmanned delivery vehicles, drones, AI warehouse security, etc., to achieve a significant increase in the efficiency of express sorting, operation, transit and delivery, reduce the operation error rate and the rate of lost express, and significantly improve the customer experience.

All courier companies in the industry's future outlook, are recognized express in the field of intelligent, automated development of the inevitable trend of the traditional express labor-intensive development model to the technology-intensive development of the change has been the trend.

Take a typical enterprise in the express delivery industry as an example to illustrate the situation. Shunfeng has 60 transit yards put into use fully automatic sorting systems in 2022, with an investment of 934 million yuan in sorting centers, increasing to 121 transit yards put into use fully automatic sorting systems in 2023, with a growth rate of 101.67%.In 2023, Shunfeng invested 4.273 billion yuan in science and technology, an increase of 16% compared with the previous year, and invested in a number of artificial intelligence, big data, robotics, Internet of Things, and other Foreword to the field of forward-looking layout, empowering the industry through science and technology, and becoming an important engine of performance growth. Zhongtong has 265 sets of automatic sorting equipment in 2022, increasing to 339 sets in 2023, upgrading the single-level automatic sorting line in the sorting center to a double-level one, and decreasing the cost of single-ticket sorting by 9.4% from 2022 to RMB0.31, a change that is attributable to the improvement in automation efficiency and the improvement in scale effect. Yuantong has 80 sets of automatic sorting equipment in 2022, increasing to 126 sets in 2023. Moreover, 2023 was the year in which Yuantong invested the largest scale in capacity building since its inception, implementing the renovation and expansion of 13 transit centers, completing the relocation of 14 transit centers and completing the layout of 126 sets of automated sorting equipment in the transit centers, city distribution centers and package building centers, which significantly enhanced the modernization and intelligence of the transit centers. Thanks to the construction of complete infrastructure, automation level improvement, and continuous capacity reserve, the growth rate of business completion of Yuantong in 2023 was the highest in the past four years, and the market

share increased by 0.82 percentage points. Shentong in 2022, 145 sets of automatic sorting equipment, increased to 206 sets in 2023, efforts to build a smart express handling center, hardware-based, technology as the core, comprehensively carry out the replacement of old equipment, to intelligent, automated transformation, technology to make up for the lack of capacity of the site, and efficiency to solve the problem of distribution pressure. Rhymed 2022 automation equipment asset value of 4.611 billion-yuan, accounting for 49% of the company's fixed assets, is committed to the core technology research and development, to improve the degree of automation of the equipment [6-8]. 2023 Rhymed plans to sorting equipment automation upgrading project investment of a total of 3.012 billion yuan, proposed to raise funds of 2.5 billion yuan, mainly for the cross-belt automated sorting equipment procurement and upgrading. At present, YunDa has experienced a single layer automatic sorting line, double layer automatic sorting line, four-layer automatic sorting line of continuous updating, automatic sorting line accuracy rate of more than 99.8%, single layer cross belt automatic sorting line sorting efficiency of 20,000 pieces / hour, sorting error rate of less than one ten thousandth of one per hour, double layer cross belt automatic sorting line sorting capacity of 40,000 pieces / hour.

According to the research, 20% of enterprises said that the next three years' automation, intelligent investment funds will reach 30-50 billion yuan; 45% of enterprises said that the capital investment in 10-30 billion yuan; 25% of enterprises invested in 1-1 billion yuan; 10% of enterprises will be around 100 million yuan.

Postal Express Intelligent Technology can not only provide relevant positions for the express delivery industry, but also highly match the demand for postal express intelligent equipment manufacturing and supply enterprises.

China's courier intelligent equipment market regional distribution and express business volume shows a high positive correlation, with Jiangsu, Zhejiang and Shanghai as the representative of the East China region, as well as Guangdong as the representative of the South China region has a huge market share, courier intelligent equipment market is large, the rapid development of technology. Xinba, Zhongke Micro to, Jinfeng, China Postal Technology, etc. is currently the mainstream third-party cross-belt equipment suppliers in the field of express delivery, of which Xinba and Zhongke Micro to the most comprehensive competitiveness, the head effect is significant; Fengchao technology in the field of intelligent express cabinets have absolute advantage.

2.2 Postal Express Intelligent Technology Talent Demand

In 2022, China's express delivery industry employees reached 4 million people, postal express intelligent technology-related talent demand, although less than 5%, but due to the lack of relevant domestic professional settings, professional talents are scarcer. Postal express intelligent equipment operation and maintenance post, for example, 67% of enterprise feedback in the past three years did not new personnel, the reason is to recruit people, at present, the position is mainly from other positions transferred to the maintenance post, and there is an older age, the problem of talent shortage. China Postal Technology had planned to establish express equipment maintenance platform, but also due to the difficulty of recruiting relevant personnel and suspended [9]. The shortage of professionals has seriously constrained the development of automation and intelligence in the express industry.

2.3 Enterprises' Suggestions on Training Standards for Postal Express Intelligent Technology Professionals

Enterprises generally believe that at present, the outstanding problems existing in the new entry of relevant positions of higher vocational graduates are: insufficient job skills, difficult to work; poor applicability, difficult to communicate; professionalism to be improved, love and respect for the work is more lack of; poor learning ability, lack of professional knowledge. Enterprises hope that institutions in addition to focusing on the cultivation of professional knowledge and technical skills, but also need to strengthen the promotion of students' multifaceted vocational ability. For example: learning ability, communication skills, organizational and coordination skills, hard-working, solidarity and cooperation, innovation, hard work, confidentiality, etc.

3. Postal Express Intelligent Technology Vocational Institutions and Practitioners Research

3.1 Postal Express Intelligent Technology Professional Setting and Enrolment in Higher Vocational Colleges and Universities

Postal Express Intelligent Technology is a new set of higher vocational professional in 2021, the national record of higher vocational colleges and universities 12, 2021 official enrollment institutions 4, four schools with a total enrollment of 288, far from meeting the express delivery enterprises for the professional positions of the demand for talent.

3.2 Postal Express Intelligent Technology Professional Construction in Higher Vocational Colleges and Universities

Postal express intelligent technology professional enrollment institutions in the national dual colleges and universities accounted for 25 per cent, the national postal personnel training base reached 100 per cent, geographically distributed in East China, North China and Central China. All colleges and universities have built independent on-campus express training bases, and 50% of colleges and universities have on-campus express productive training bases in cooperation with express enterprises. The main training equipment are: security check machines, intelligent sorting robots, automatic navigation robots, drones, unmanned vehicles, intelligent express cabinets, AGVs, DWS and so on. 50% of them are post and telecommunications higher vocational colleges and universities, and the professional groups are categorized as: logistics professional group, e-commerce logistics professional group, courier logistics professional group.

According to the personnel training programmer developed by the opening institutions, all institutions have increased the proportion of express information technology, express intelligent equipment, big data analysis, electrical and electronic, basic mechanical design, PLC control programming, database, AUTOCAD engineering drawing and other science and technology courses in the professional curriculum, and increase the proportion of hands-on practical training courses.

3.3 Research on Employees of Related Positions in Enterprises

The Postal Express Intelligent Technology programmer was added in 2021, so there were no graduates, so the research was conducted with practitioners who had been in the relevant positions for three years.

The relevant positions are 99.3% male, with an average age of 34.7 years old, and most of the graduated majors are automation, program-controlled switching technology, optical fiber communication, and electro mechanics. Three years after joining the job promotion situation: equipment (large-scale equipment) maintenance staff, equipment (large-scale equipment) maintenance team leader, processing center supervisor (manager), 6% of the staff from the technical post to the management post [10]. The main automation and intelligent facilities and equipment used most in the work process are: Siemens PLC, various types of frequency converter, transmission belt machine, small parts sorter, security check machine, automatic scanning and sorting, intelligent sorter, Haikang monitoring, etc.

Practitioners said that more professional knowledge used in the work of: circuit principles, communications, electrical control, mechanical, electrical and electronic, PLC programming, computer networks, etc. Need to have non-professional ability outside the professional quality requirements for: unity and cooperation, innovation and pioneering, love and dedication, hard-working, hard-working, technically sound.

All practitioners have said that the postal express intelligent technology professional in the talent training process must pay special attention to practical training practice. Cannot make the courier business training content on the surface, away from the actual production of courier business processes; teaching needs to be closely linked with the actual work, technical production; need to fully understand the actual operation of the courier status quo, the theory and practice closely linked to a large proportion of increase in the proportion of hours of practical training practice.

4. Analysis of Research Results

4.1 Mismatch between Professional Scale and Industrial Scale

Postal express industry in the intelligent technology under the auspices of rapid transformation and upgrading, but the professional settings of vocational colleges and universities are relatively lagging behind, lagging behind the economic and industrial

structure. Even in the Yangtze River Delta region, where economic development and vocational education are better, the adaptability between the professional layout of the postal express class and the industrial pattern is also relatively poor, too small a professional scale, not enough to support the talent needs of the express industry and economy, and the industrial and technical workers do not have a sufficient number of corresponding vocational colleges and universities to open a professional to cultivate.

4.2 The Professional Structure of Teachers Needs to be Adjusted

Higher vocational postal express intelligent technology profession is currently set up in various colleges and universities in logistics, express delivery, commerce, e-commerce, economic management, finance and taxation and other professional groups, but the profession has a strong composite and interdisciplinary characteristics, the professional faculty not only need to have postal express delivery operation, management and other related professional knowledge, but also need to have network technology, automation control, electromechanical, electrical and other related professional capabilities, such as data analysis. At present, the professional structure of the faculty of this profession and the industrial demand match is low, and it is necessary to introduce teachers with computer, electromechanical, industrial robotics and other related professional backgrounds to meet the development trend of the profession's informatization and intellectualization.

4.3 Strength of Knowledge and Practice Needs to be Strengthened

During the research process, no matter the industry enterprises or related positions practitioners, the most mentioned is the lack of integration of theory and practice, the weak ability of the practical power of talent training.

4.4 Professional Teaching Standards Need to be Harmonized

According to the research, at present, in the colleges and universities that offer higher vocational postal express intelligent technology majors, there are problems of ambiguity and inconsistent standards in the professional personnel training objectives, training specifications, and professional curriculum settings. In particular, the curriculum is too different, postal express intelligent technology related courses account for less, and postal express operation management and logistics management and other professional courses have more overlap, there is an urgent need to establish a relatively unified professional teaching standards, the formation of a set of completed professional personnel training course system, so as to make it normative, instructive and implementable.

5. Conclusion

5.1 Expansion of Specialization

Use single enrolment, expansion and other diversified enrolment methods for the first try to broaden the enrolment channels. Form practical professional teaching standards, form a postal express professional vocational education group, share professional development and construction experience, reduce the exploration process, show visible results, eliminate the hesitation and wait-and-see sentiment of institutions to open the profession, and increase the promotion of the postal express intelligent technology profession. Clarify the positioning of the profession and the positioning of students' employment positions, and open related professions at the intermediate and undergraduate levels to facilitate the source of enrolment and the demand for academic upgrading. Set up national and provincial level vocational skills competitions to promote teaching and learning, and stimulate the enthusiasm of higher vocational colleges and universities to set up specialties.

5.2 Constructing Interdisciplinary Specialized Teaching Teams

In the context of Industry 4.0, postal express enterprises not only need to be familiar with the postal express business process, operation and management personnel, but also need to be able to postal express intelligent equipment and systems skilled operation of skilled personnel, equipment and system debugging, maintenance, maintenance, optimization, as well as postal express site intelligent planning and implementation of the maximum integration of

the system, equipment and people, and to achieve the goal of higher time efficiency, endpoints, and lower costs. The goal is to achieve higher time efficiency, more endpoints, higher business standards, and lower costs. The programmer is highly complex and requires a combination of mechanical, electromechanical, networking, information technology, data analysis, management and other expertise. Because it is necessary to bring in teachers with professional backgrounds in electronics, electro mechanics and logistics to build up an open and interdisciplinary professional teaching team oriented to the demand for talents and the competence-based approach.

5.3 Constructing A Practice System of Knowledge and Behavior

Postal Express Intelligent Technology is suitable for adopting the "school-enterprise cooperation - work-learning integration - knowledge and practice" approach to consolidate the foundation, increase school-enterprise cooperation, industry-teaching integration, the construction of on-campus and off-campus productive training bases, increase the proportion of integrated science and practice courses and practical training, practical courses, the development of task-based project courses and modular courses. For example, the modular design of the "Postal Express Intelligent System Planning and Design" course is as follows: measurement of the express transfer center; data collection and analysis of the business level of the express transfer center; express intelligent facilities and equipment performance standards; express business data and equipment performance matching, selection; site layout; site equipment planning; AUTOCAD engineering drawing, etc., a module of a course, a course to solve a One module per course, one course to solve a practical problem, from shallow to deep, from single to comprehensive, to train students' practical and hands-on ability. Taking practice-oriented and ability-based as the value scale, the course realizes the unity of knowledge and practice, and comprehensively improves the skill level and training quality of talents.

5.4 Specialized Curriculum

The core courses are: Postal Express Information Technology Application, Postal Express Intelligent System Planning and Design, Postal Express Big Data Analysis and Application, Postal Express Intelligent Equipment Operation and Maintenance, Postal Express Intelligent Robot Operation and Programming, and Express Practice.

Professional basic courses are: postal express regulations and standards, electrical and electronic technology, basic mechanical design, electrical and PLC control technology, AUTOCAD engineering drawing, computer network technology, database foundation, intelligent robot foundation.

The main professional development courses are: Postal Express Information Security, Postal Express Intelligent Network Point Management and Operation, Drone Assembly and Commissioning, and Configuration Technology.

5.5 Requirements for Professional Skills and Vocational Qualifications for Talent Training

Firstly, vocational skills level certificate or industry enterprise certificate with high social recognition. For example, electrician's certificate, National CAD Skill Level Examination Certificate, Vocational Skill Level Certificate (Intermediate) in Industrial Robot Operation and Operation and Maintenance, Vocational Skill Level Certificate (Intermediate) in Express Operation, Security Inspector, and Drone Pilot License.

Secondly, professional skills requirements. Understanding of the express industry business processes and business characteristics; familiar with express intelligent equipment, technology and related parameters; with a certain degree of electromechanical equipment product debugging, testing, maintenance capabilities, can carry out basic maintenance, as well as operation of simple troubleshooting; skilled in the use of related facilities and equipment, and PLC programming; according to the actual existing site and the use of equipment, and R & D personnel to communicate to achieve upgrading Can carry out planning, design and layout of facilities and equipment according to the needs of express business and the actual situation of the site; can carry out data analysis of express operation; can carry out maintenance of express information system.

Thirdly, talent training professional quality requirements. Have a correct worldview, outlook on life and values. Practice core values, have deep patriotic feelings, national identity, national pride, respect the Constitution, abide by the law,

abide by the rules and discipline, have a sense of social responsibility and sense of participation; respect morality and goodness, honesty and trustworthiness, love for work, respect for labor, love of labor, have a strong practical ability; have a sense of quality awareness, awareness of environmental protection and safety awareness; have a healthy Physical fitness and sound personality, able to master basic sports knowledge and one or two sports skills; good learning methods, good habits of life and behavior, emotional control and self-management ability; good humanistic qualities. Have the ability to feel beauty, express beauty, appreciate beauty, create beauty, have certain aesthetic and humanistic qualities, and be able to develop one or two artistic specialties or hobbies; have a high sense of responsibility, love and dedication to work, bear hardships and stand hard work; have good communication skills and teamwork spirit; have the patience, persistence and perseverance of professionalism focusing on the details; and possess the professional qualities of concentrating, striving for perfection and pursuing the ultimate; Possess the spirit of innovation and creativity to pursue breakthroughs and innovations.

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