Research on Talents Training of Productive Service Outsourcing under Intelligent Manufacturing

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Abstract: Based on the analysis of the new technology, format, Productive Service Outsourcing and its typical post capacity requirements of Intelligent Manufacturing, this paper discusses the training scheme of Productive Service Outsourcing talents under Intelligent Manufacturing, including the establishment of Specialty Groups and their dynamic adjustment mechanism, the reform of traditional talent training mode, the construction of multi-purpose Specialty Group curriculum system, the building of school-enterprise expert teaching team, the establishment a digital teaching and practice resource base, and a practical workshops training environment in and out of school, and a modern apprenticeship teaching mode. The training mode can provide a reference for the reform of Service Outsourcing specialty in Higher Vocational Education in China under the new situation.

1. Introduction

1.1 Service Outsourcing Industry Faces Transformation and Upgrading

Driven by new digital technologies such as Big Data, Cloud Computing, Mobile Internet, Block Chains, Artificial Intelligence and so on, new modes and new formats are constantly emerging. Service Outsourcing is rapidly moving towards the era of multiplying with the characteristics of cooperation and competition from the era of subtracting with the characteristics of cost reduction. [1]

“Made in China 2025” specifically pointed out that "to speed up the coordinated development of manufacturing and services, promote business model innovation and business form innovation, and promote the transformation of production-oriented manufacturing to service-oriented manufacturing", China will take the development of service-oriented manufacturing as a task of manufacturing development. In the “Guiding Opinions on Accelerating the Development of Productive Services and Promoting the Adjustment and Upgrading of Industrial Structure” promulgated by the China State Council in 2015, it pointed out that Productive Services is a service industry for producers to provide service products and labor. The development of Productive Services mainly depends on the outsourcing of manufacturing services, that is, manufacturing enterprises will purchase from the market or contracted by specialized Productive Service enterprises instead of originally being provided by their own productive departments. It is a form of Service Outsourcing in manufacturing industry [2]. As the second largest economy and the largest manufacturing country in the world, China has undoubtedly provided an opportunity for domestic Service Outsourcing industry to upgrade and focus on the manufacturing industry.

1.2 Demand for Outsourcing Talents of Productive Services in Intelligent Manufacturing

According to the data of China Institute of Vocational and Technical Education in 2016 and based on the overall plan of "Made in China 2025", the talent gap in China may reach 29 million by 2025, of which 9.5 million will be in the new generation of IT industry.

Productive Service posts under Intelligent Manufacturing involve almost all new generation IT

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technologies, such as Artificial Intelligence, Cloud Computing, VR/AR, Mobile Internet, Block Chain technology and so on. According to the classification of Service Outsourcing, typical positions of Productive Service can be classified into ITO (such as information system operation and maintenance, industrial software development and testing), BPO (such as supply chain management, logistics and warehouse management, market and sales, patent and qualification declaration, insurance, quality management, H.R. management, and legal consultation), and KPO (such as brand design and promotion, product outline design, etc.). These Productive Service posts are suitable for the training objectives of high-skilled applied talents at higher vocational level, and also provide a reform opportunity for the Service Outsourcing Specialty and talent training orientation of Higher Vocational Colleges in the new wave of Intelligent Manufacturing. [3]

2. Ability Characteristics of Outsourcing Talents for Productive Services

2.1 Need to Have the Ability of New Generation IT Technology

Studying the definition of Productive Service can make it clear that Productive Service industry is a kind of high-end service industry with high knowledge content, which runs through all aspects of production and is conducive to improving the efficiency of production and operation. Take the training of traditional Software Outsourcing talents as an example, it is mainly aimed at the pure technical development engineer positions of software suppliers. The skills considered are mainly development technology, professional accomplishment and foreign language. While for the same position of software development engineer in the Productive Service Outsourcing under Intelligent Manufacturing, besides the above requirements, it needs to have the industry business ability and knowledge of manufacturing enterprise management, the ability to recognize and operate new IT-based resources, tools and platforms, etc. [4]

2.2 Interdisciplinary and Cross-industry Comprehensive Knowledge is Required

Productive Service talents should not only have the relevant knowledge and business process of manufacturing industry, but also know how to improve work efficiency, reduce costs, reduce and avoid the loss caused by overstock of goods between various links of production and stoppage of work and so on. At the same time, the Productive Service talents should carry out innovative Productive Service activities according to the characteristics of the corresponding posts and the development needs of different industries. Therefore, the Productive Service talents should have not only the general knowledge and ability of the Productive Service activities, but also the specialized knowledge and service ability of the sub-sectors within the Productive Service industry. [5]

3. Talents Training Scheme of Productive Service Outsourcing under Intelligent Manufacturing

Based on the knowledge correlation among Productive Service posts and the corresponding with ITO, BPO and KPO, the training of talents should first establish a Specialty Group based on existing specialties. Then, according to the ability characteristics of each Specialty Group and the specialty itself, the corresponding training mode is established, including the establishment of a large number of digital teaching environment and programs, the development and implementation of cross-specialty curriculum system, the integration of teachers across departments and schools and enterprises, and the breaking of the traditional university's organizational structure, the thinking and teaching mode of traditional curriculum development.

3.1 Constructing Specialty Groups of Productive Service Posts

Specialty Group refers to a group composed of one or more specialties with strong school-running strength and high employment rate as the leading or core specialty, supported by a group of related specialties with the same engineering objects, similar technical fields or professional disciplines and common foundations, which can realize the sharing and optimization of teaching resources among specialties. The Specialty Group of Productive Service posts can be

corresponded to the ITO, BPO and KPO Specialty Groups of Service Outsourcing. For example, we can build the Specialty Group of Industrial Information System Development and Maintenance by taking the Mobile Application Development Specialty as the leader, and jointly the specialty of Testing Technology, Network Technology and Information System Management. [6]

Setting up a steering committee for the construction of Productive Service Specialty Group, which is composed of the backbone enterprises and universities, and experts of joint enterprises, so that we can work out a Talent Training Plan. According to the industrial development and market demand, the connotation of courses should be continuously updated, new technologies, technologies and standards of industrial enterprises should be incorporated into the curriculum system and teaching contents in time, and the Talent Training Program should be revised regularly every year. 。

3.2 Constructing Multidimensional Course System of Specialty Groups

Because the target position group of the Productive Service Specialty Group has quite a lot of commonalities on the knowledge, quality and skill requirements of the talents, there must be cross-study areas in the various specialties of the Productive Service Specialty Group. According to the cross-learning field, we should build a shared professional technology platform course and core module course for each post in the group. According to the shared resources and common courses of various related majors, the platform is set up as the basic link in the course construction system of Specialty Groups. Each module curriculum requires independence, but also integrity and systematisms. The curriculum system of Specialty Group should embody multi-angle and multi-dimension. Students can choose courses freely according to their actual situation or future employment orientation, so as to have the adaptability to social development and realize the diversion of talents training in different occupations and directions. [7]

3.3 Construction of Digital Teaching and Training Resource Base

The skills and professional qualities of enterprises are integrated into the practice of digital teaching, and the precise description of enterprises ‘working scenes is the starting point of the design of digital teaching and training resource base. Through four steps of resource analysis, needs assessment, task analysis and student analysis, the integration of curriculum knowledge and post skills in digital teaching and training resource base is coordinated. Based on the new generation of IT technology, a high-quality digital teaching resource base for Specialty Groups, including enterprise job scene description set, job-oriented micro-course resource set and job-oriented course practical training resource set is constructed to serve professional teaching, vocational training and vocational skill appraisal. [8]

3.4 Constructing the Team of Professional Teaching in School-Enterprise Cooperation and Exploring the Modern Apprenticeship Teaching Model

Employing leading figures and front-line engineers in the Productive Service industry to serve as leaders and professional teachers in the development planning of Specialty Groups in vocational colleges, a team of high-quality professional double leaders can be built by visiting engineers and undertaking teaching research and teaching reform projects.

Making full use of all kinds of resources of school-enterprise cooperative enterprises, taking specific projects and actual typical work tasks as carriers, and on the basis of the existing information-based teaching mode, the "modern apprenticeship" teaching mode will be further improved and innovated. Under the leadership of enterprise front-line engineers, on-site teaching, simulation teaching, project-oriented task-driven teaching and other teaching modes can be implemented.

3.5 Building Conditions of Practice and Training for Direct Workshop

To formulate the construction scheme of training room, adjust and optimize the training conditions of Productive Service Specialty Group, the sharing of practical teaching resources of Specialty Group will be realized. In particular, we should strengthen the establishment of off-campus "Teaching Workshops" which complement the functions of in-school training bases.

Through "Teaching Workshop" outside school, teachers can enter workshop, students can enter reality and teaching can enter the scene, students can participate in the actual operation and management process of enterprises. And it will also cultivate good professional quality, train skilled professional skills and acquire practical technical knowledge, make professional teaching closer to the needs of enterprises' posts, and realize zero-distance docking between the practical teaching process and the production process of enterprises. Ultimately, zero kilometers of employment for students will be realized. [9]

4. Summary

The cultivation of outsourcing talents for Intelligent Manufacturing and Productive Services is urgently needed in China now. In the environment of rapid development of Intelligent Manufacturing and new generation IT technology, the next development focus of Service Outsourcing is Productive Service Outsourcing. In view of the ability characteristics of the Productive Service Outsourcing post under Intelligent Manufacturing, we should base on the implementation of Intelligent Manufacturing in China and the current situation of Higher Vocational education, and establish a training mode for the Productive Service Outsourcing talents under the condition of Made in China 2025. The key point is to establish a new digital teaching scheme, train students 'digital skills and train the production front-line ability of vocational teachers. And enterprises participate in the construction of digital learning network platform. The talent training program can provide a reference direction for the reform of Service Outsourcing specialty in domestic higher vocational education.

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