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Exploration and Practice of Integrating 1+X Ertificate System into Curriculum Standard

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Abstract: *At the time of comprehensively deepening the education reform, 1+X certificate system is an important institutional innovation and reform of vocational education in China. Integrating 1+X certificate system into professional curriculum standards can achieve the goal of cultivating high-quality compound technical talents, which has put forward new requirements for current vocational education. This paper focuses on the pillar industry of Jilin Province, expounds the selection method of 1+X certificate, and practices the integration of the professional skill level certificate of Automotive IoT's Testing and Operations (intermediate level) into the course of< Intelligent Transportation Technology>, which provides reference for the improvement of talent training quality of automobile intelligent technology major in higher vocational colleges and the "Integration of Course and Certificate".*

Keywords: *Course certificate Integration; 1+X certificate; Making course notes*

1. Introduction

At the time of comprehensively deepening the education reform, The State Council issued <the Implementation Plan for The Reform of National Vocational Education (NDRC [2019] No.4) >in January 2019, which clearly pointed out that vocational education and general education are two different types of education with equal importance. It proposed the implementation of 1+X certificate system for the first time and started relevant pilot work. The purpose is to lay a solid foundation for students' sustainable development and expand their employment skills. In April of the same year, the Ministry of Education in conjunction with the National Development and Reform Commission, Ministry of Finance and State Administration for Market Regulation formulated <the pilot scheme for the system of "Degree certificates + several professional skill level certificates" has been implemented in colleges and universities system of pilot work. Although the country has carried out the top-level design, how to integrate the 1+X certificate system into the professional curriculum standards to achieve the goal of cultivating high-quality compound technical talents has put forward new requirements for the current vocational education[1].

2. The sketch out of 1+X certificate system

The 1+X certificate system is abbreviation of degree certificates + several professional skill level certificates system.It aims to improve students' vocational skill level and is the core measure to implement the spirit of the 19th CPC National Congress and respond to the call of the state to deepen vocational education reform. Based on the educational objectives of vocational colleges, the system carries out certificate training reform by deepening the integration of industry and education and school-enterprise cooperation. Among them, "1" in the 1+X certificate system refers to the degree certificate, which can reflect the students' moral, intellectual, physical, aesthetic and labor education development level through the dissemination of theories and skills and other learning knowledge; "X" refers to the skill level certificate. In accordance with the principle of national and market economic development, vocational skill level certificates in several professional fields are offered to help students expand their vision and enrich the connotation and extension of professional skills. "1" is fundamental, "X" is enabling[2].

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2.1. Connotation analysis of 1+X certificate system

It is the basic requirement for the implementation of 1+X certificate system to integrate 1+X certificate system into the professional talent training program of vocational colleges. At present, vocational colleges still have the problem of uneven quality of talent training, some of which are disjointed between school education and market demand, and fail to keep up with the development of new technologies, new professions and new forms of business. These problems are embodied in the lagging curriculum standards, outdated teachers, and insufficient existing curriculum teaching resources of vocational colleges[3].

1+X certificate system will effectively remedy the above problems. It takes the needs of technical skill training into full consideration, building a platform for social forces, enterprises and other subjects to participate in vocational education. It integrates the market demand into the teaching system of vocational colleges, improving the quality of talent training programs、curriculum standards and evaluation of vocational skills. It also helps to improve vocational colleges innovation personnel training mode , increase the proportion of practice teaching, let the student acquire professional skills and master more new vocational skills and keep up with the professional technology personnel training industry market development. It enhances students' employment competitiveness and potential to achieve the goal of cultivating high quality compound technical talents to meet the market demand.

2.2. Status analysis of 1+X certificate system

In August 2019, the Ministry of Education and other four departments issued <the Implementation Plan for Deepening the Construction and Reform of "Double-Qualified" Vocational Education Teacher Team in the New Era >, which clearly stated: "The workload of teachers' training hours (credits) should be verified as a reference factor for the distribution of performance pay", which fully aroused the enthusiasm of vocational school teachers to participate in 1+X certificate training. As of August 2020, the first 122 national vocational education teacher teaching innovation teams have been selected for the pilot field of 1+X certificate[4]. A number of provinces, including Jilin Province, have set up a special 1+X certificate teacher training program, and the pilot teacher training of 1+X certificate system has been included in the teacher quality improvement plan of vocational colleges. It strongly promoted the implementation of the 1+X certificate system.

In April 2019, the Department of Vocational education and Adult Education of the Ministry of Education launched the first batch of six vocational skill certificates, including those for automobile maintenance and intelligent new energy vehicles, on a pilot basis in colleges and universities. The second batch of 10 vocational skill certificates was launched in September of the same year. By May 2022, 1,235 vocational skill certificates had been put into use nationwide.

3. Path selection of 1+X certificate system into the course standard

With the gradual advance of the pilot work of 1+X certificate system, how to carry out effective teaching reform in the process of talent training, integrate vocational skill certificates into professional courses, and achieve the purpose of expanding students' employment skills is the core issue of the implementation of 1+X certificate system.

3.1. Based on market requirements

The Ministry of Education has issued many vocational skill certificates. Vocational colleges need to closely combine with market demand and enterprise demand when selecting certificates. Enterprises are the final checkpoint to test the learning effect of students, and whether students can be recognized by enterprises is an important part of the learning effect. Most of the employment of vocational college students is to serve the regional economic development. Therefore, vocational school should understand the market demand, especially the local enterprise talent demand, and investigate the professional dock (group) industrial chain based on market demand. Under the premise of talent demand, industrial chain jobs and technical fields, vocational colleges should adhere to the basic principle of integration of industry and education, and timely obtain the information of industrial chain development, industrial core technology, and talent structure change. The reasonable selection of 1+X certificate can be achieved only by combing the professional knowledge, professional skills and professional quality required by the typical position/s based on the actual work、career development needs of enterprises、the job demands

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and professional standards of enterprises[5].

3.2. Infuse 1+X certificates to improve curriculum standards

Through deepening school-enterprise cooperation, the key elements of professional talent cultivation such as career orientation, training objectives and graduation requirements are comprehensively sorted out, and the professional knowledge, vocational skills and professional quality are decomposed step by step to set up a more comprehensive and scientific curriculum system. Break down the knowledge, skills and overall quality requirements of the 1+X certificate and integrate them into the relevant courses. Formulate curriculum standards, clarify teaching methods, assessment methods, improve curriculum standards. The path selection method of integrating 1+X certificate system into curriculum standards is shown in Figure 1.

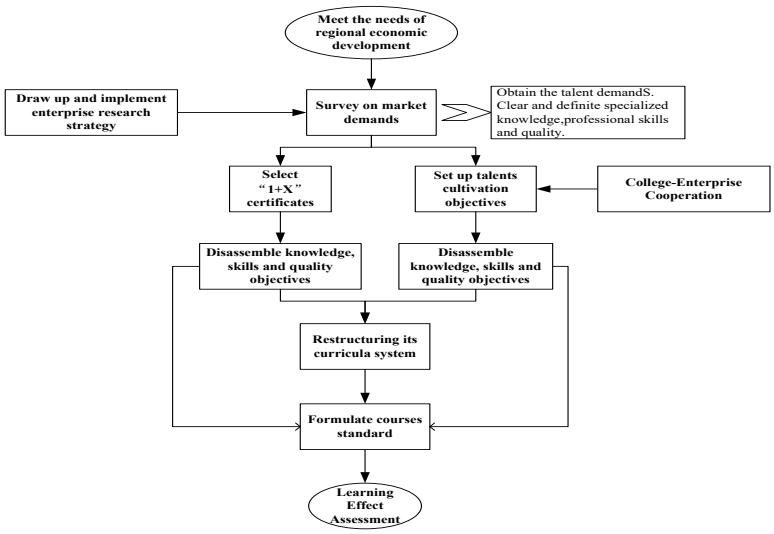

Figure 1: Path selection method of integrating 1+X certificate system into curriculum standards

Vocational colleges need to integrate their own development with regional development, that is, on the premise of fully investigating regional economic development, they should be oriented to high-end industries and industrial high-end, and adjust their professional settings according to the positions and talents needed by regional economic development. Vocational colleges should firmly set up the new concept of development, deepen the cooperation in running schools between colleges mode, follow the development trend of the industrial chain, the core technology updates, talent structure change and so on by making a study plan of the enterprise clear enterprise group structure，realize the dynamic adjustment direction of personnel training to meet the needs of high quality training market and high quality technical skills in a timely manner[6].

According to the post group structure in the industrial chain, the professional knowledge, professional skills and professional quality required by each post are decomposed according to typical work tasks, which are used as the basis for selecting vocational skill level certificates. The school and the enterprise cooperate deeply, and make the goal of talent training together.

Decompose and integrate the professional knowledge, professional skills and professional quality required by the major according to the typical job content. Professional teachers participate in the 1+X certificate training，evaluation and other activities, have an in-depth understanding of the relevant professional certificates, and select the professional skill level certificates suitable for the post. Sort out the professional knowledge, professional skills and professional quality of the vocational skill level certificate.

Vocational colleges should integrate the professional knowledge, professional skills and professional quality required by human training and vocational skill level certificates, reconstruct the curriculum system, decompose the professional knowledge, professional skills and professional quality into specific courses, and ensure that students can achieve the goal of talent cultivation after learning the professional curriculum system.

The curriculum standards are formulated according to the decomposed professional knowledge, professional skills and professional quality points. The curriculum content is reconstructed in

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combination with the job tasks of employment posts. The teaching is carried out according to the typical work content. The evaluation method of teaching effect is reasonably arranged to measure whether students achieve the teaching objectives of the course[7].

4. Practical exploration of integrating 1+X certificate system into curriculum standards

As an important part of the national education system and human resources development, vocational education must shoulder the important responsibility of cultivating diverse talents, passing on technical skills and promoting employment and entrepreneurship. Vocational colleges integrate the 1+X certificate system into the teaching process of professional courses according to market demand and job demand, and achieve "Course certificate Integration", which is one of the important guarantees to cultivate high-quality technical and skilled personnel.

4.1. Analyze and select 1+X certificate according to market demand

In the 2022 Jilin Provincial Government work Report, it is pointed out that "the automobile industry as a pillar industry of Jilin Province continues to develop forward... As an important automotive industry base in China, Jilin Province's development path directly affects the trend of China's automotive industry and its international competitiveness, and the supply of technical and skilled talents in this industry is of vital importance " [8].

Jilin Communications Polytechnic's automotive engineering major matches regional development needs in the process of cultivation of talents, focuses on regional pillar industries to enhance the quality of personnel training. It aims to supports regional development , through enterprise survey and interview, the technical skills needed by enterprises are clearly defined, especially the professional knowledge, skills and professional quality required by the positions. Relying on the FAW group new energy cars and smart car industry development strategy of Jilin province, it deepens teaching fusion, university-enterprise cooperation, and for FAW Group related oems, parts enterprises, sensor enterprises, information technology enterprises, intelligent vehicle 4S shops and maintenance enterprises, jointly revises the talent training program of automobile intelligent technology with enterprises, so as to achieve the purpose of cultivating high-quality technical talents and serving the transformation and upgrading of automobile industry.

On the basis of clarifying the professional knowledge, skills and professional quality of the automotive intelligent technology major to meet the job requirements, selecting the 1+X certificates corresponding to the major from the occupational skill level certificates issued by the state, and through the relevant certificates of professional teachers' participation in learning and assessment. The professional skill level certificate of Automotive IoT's Testing and Operations (intermediate level) , which is suitable for the new energy vehicle technology major, is selected as the main integration certificate of this major.

4.2. Setting curriculum standards with 1+X certificates

Firstly, the training objectives of intelligent automobile professionals are sorted out, classified and summarized, and decomposed into knowledge, skills and quality objectives. Then, the professional skill level certificate of Automotive IoT's Testing and Operations (intermediate level) is decomposed into the requirements of professional knowledge, professional skills and professional quality. Finally, the vocational skills and qualities mentioned above are allocated to each course in the professional course system, and the course standards of each course are optimized and upgraded to achieve the "Course certificate Integration" of training standards, so as to achieve the goal of broadening the employment scope of students and improving the employment quality. The practice of integrating 1+X certificate system into curriculum standards is shown in Figure 2.

Jilin Communications Polytechnic keeps up with the developing situation of Jilin province under the premise of ICP Research of the regional economic development, focusing on Jilin province pillar industry---automobile industry. Through field visits to enterprises, video conferences with enterprises, questionnaire surveys and other forms, the post group structure and talent demand of intelligent automobile industry chain will be clarified, and the automotive intelligent technology major will be set up.

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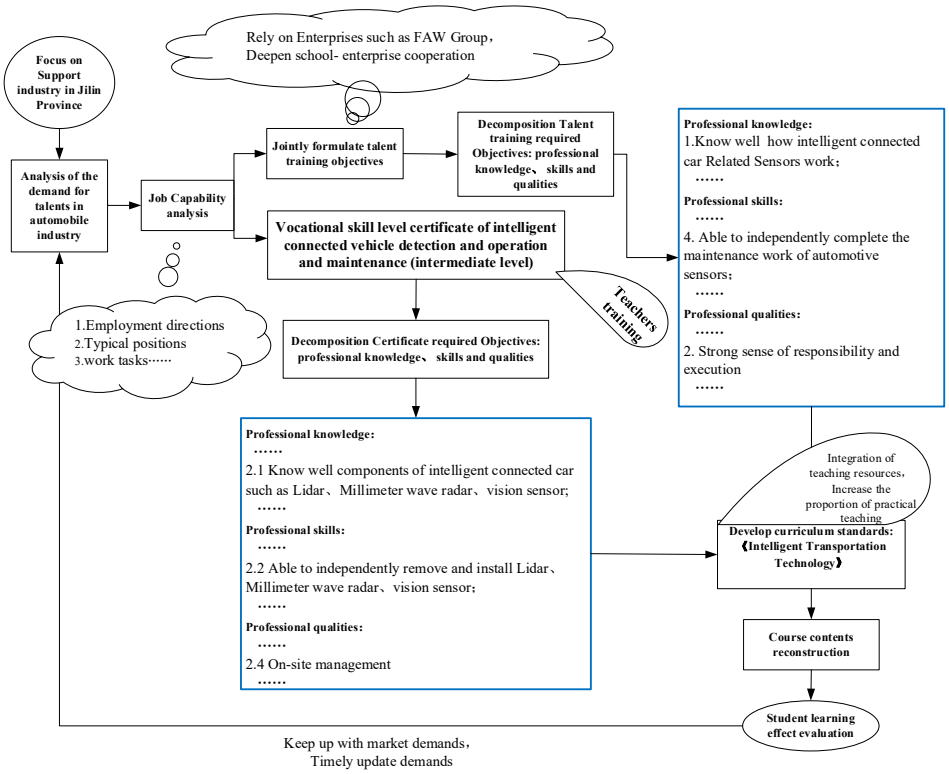

Figure 2: Practice of integrating 1+X certificate system into curriculum standards

Relying on FAW Group new energy vehicles and other enterprises, closely follow the industrial chain development trend, core technology update, talent structure changes and other information, to develop talent training goals that meet market demand. According to the job group task, select the professional skill level certificate suitable for the automotive intelligent technology major. Professional teachers participate in training, evaluation and other activities of the professional skill level certificate of Automotive IoT's Testing and Operations (intermediate level) ,the professional skill level certificate of Automotive IoT's Testing and Adjustment (intermediate level), Diesel vehicle Maintenance and Diagnosis Vocational Skill Level certificate (intermediate), etc. After an in-depth understanding of the above certificates, the professional skill level certificate suitable for the automotive intelligent Technology major -- the professional skill level certificate of Automotive IoT's Testing and Operations (intermediate level) is selected as the main certificate of "Course certificate Integration" of this major.

According to jobs in the industrial chain of structure and typical work tasks, the smart car sensor testing engineer assistant, smart car application software testing engineer assistant, smart car device adapted engineer assistant, intelligent vehicle road testing engineer assistant post, decomposed into the indicators of professional knowledge, professional skills and professional quality to be achieved in personnel training. Sorting out the examination content of the professional skill level certificate of Automotive IoT's Testing and Operations (intermediate level), and decomposing the professional knowledge, professional skills and professional quality of the certificate.

Integrating talent training and the professional skill level certificate need of professional knowledge, professional skills and professional quality and reconstruct the course system. Decomposing professional knowledge, professional skills and professional quality into specific courses in the curriculum system to ensure that students can meet the needs of enterprises after learning the professional curriculum system.

The curriculum standards are formulated according to the professional knowledge, professional skills and professional quality obtained from the decomposition of each course. Taking the course "Intelligent Transportation Technology" as an example, in the course standard formulation, the professional knowledge objective is to master the working principle of intelligent vehicle related sensors, and to understand the structure composition and classification of laser radar, millimeter wave radar and vision sensor components. The goal of the professional skills is to be able to complete the maintenance of automobile sensors independently, especially the disassembly and installation of laser radar, millimeter wave radar and vision sensor components independently. The goal of professional quality is to cultivate students' sense of responsibility and executive ability, which is reflected in the on-site management in the process of work. The course content was reconstructed according to the job tasks of the employment

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position, and the teaching was carried out according to the typical work contents, such as sensor testing related to intelligent vehicles and sensor circuit design.

Reasonable arrangement of teaching effect evaluation methods: through the combination of daily evaluation and final assessment, combined with the actual work content, as well as the examination items in the vocational skill grade certificate, to measure whether students achieve the teaching objectives of the course.

Finally with the introduction of enterprise employees as a form of part-time teachers. Timely access to intelligent vehicle-related development information, industry core technology information, talent structure changes and other information. Continuous improvement of talent training objectives and 1+X certificates, reasonable revision of curriculum standards, to achieve the training of high-quality technical skills to meet the needs of the market.

5. Conclusions

From the perspective of market demand, this paper analyzes the connotation of 1+X certificate system and discusses the path selection method of integrating it into curriculum standards. Focusing on the pillar industry in jilin province and aiming at jilin traffic vocational and technical college professional auto intelligent technology, this paper expounds the method of choosing 1 + X certificate, and practices injecting the professional skill level certificate of Automotive IoT's Testing and Operations (intermediate level) into the "intelligent transportation technology" course.It also improves the quality of talent training for automotive intelligent technology major in higher vocational colleges and provides reference for "Course certificate Integration".

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