DEVELOPMENT OF SCHOOL-ENTERPRISE COOPERATION CURRICULUM FOR NEW ENERGY VEHICLE PROJECT IN MIDDLE SCHOOL

by

BINBIN LI

AN INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF EDUCATION IN EDUCATIONAL ADMINISTRATION

(INTERNATIONAL PROGRAM)

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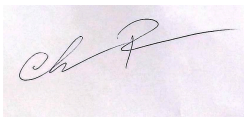

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ABSTRACT

The curriculum development studied in this paper refers to the whole working process of determining curriculum objectives through needs analysis, selecting, and designing teaching contents and arranging related teaching activities according to this objective in order to finally achieve the curriculum objectives. This paper takes school-enterprise cooperation curriculum development in secondary vocational schools as the main research object, and deciphers the process of developing curriculum projects between Hangzhou Technical School and new energy enterprises by means of case studies, so as to investigate and study the school-enterprise cooperation curriculum development by using questionnaires and interviews with teachers, students, school and enterprise leaders in secondary schools, analyze the problems of school-enterprise cooperation curriculum development, and analyze the causes of the problems from the levels of government, enterprises and schools.

Keywords: Middle school, Curriculum development, School-enterprise cooperation

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I listened to my teacher's teachings and learnt about my knowledge and skills and how to behave. I was inspired by my teacher's admonition to keep my feet on the ground, both in my studies and in my work, and I regained my proper attitude and took my studies seriously. During my studies, I never dared to forget my teacher's teachings, overcoming my inner weakness, and taking my studies and research seriously, one step at a time. The professor's rigorous attitude, firm principles, and sincerity towards his students all deeply infected me. In the future, I will remember your teachings, keep my feet on the ground, move forward courageously and strive to become an outstanding educator.

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Binbin Li

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Chapter 1
Introduction

1.1 Statement of the research problem

The connotation and forms of cooperation between secondary schools and enterprises are rich and diverse. The cooperation between schools and enterprises in curriculum development is not only the basis for cultivating talents needed by schools and enterprises, but also the guarantee of long-term cooperation between schools and enterprises, so the cooperation in curriculum development becomes the key to cooperation between both sides. Nowadays, most secondary colleges and universities have conducted curriculum development with enterprises, but in reality, there are many factors that affect the effect of school-enterprise cooperation in curriculum development. However, in reality, there are many factors affecting the effect of school-enterprise curriculum development, such as the low enthusiasm of enterprises to participate in school-enterprise curriculum development, the deviation of school-enterprise curriculum development concept, the resistance of teachers and experts to participate in curriculum development, the lack of resources for school-enterprise curriculum development, and the lack of stable and long-term guarantee mechanism for school-enterprise cooperation. The reason for these problems is that in the field of vocational education, the government lacks strong supervision and monitoring on the development of school-enterprise cooperative courses; without the support and backing of the policy system, enterprises lack the motivation to participate in the development of the courses; the leaders of secondary schools lack an overall understanding of the development of the courses, which leads to the existing school-enterprise cooperation being mostly formal, making the development of school-enterprise cooperative courses still in the Therefore, the development of school-enterprise cooperative courses is still is in the process of exploration. Therefore, there are many issues that need to be discussed and clarified, including the roles and functions of government, enterprises and schools, how to establish a tripartite

cooperation relationship, how to establish the curriculum development concept in response to social reality and students' needs, as well as the professional and vocational construction of the curriculum development faculty, the full co-creation and co-construction of curriculum development resources, the long-term interaction between schools and enterprises and the construction of the cooperation guarantee mechanism, etc.

1.2 Research Objectives

New energy curriculum development requires analysis to determine the curriculum objectives, and then select the teaching content and related teaching activities of a subject according to this objective, and plan, organize, implement, evaluate and revise the whole working process in order to finally achieve the curriculum objectives. Curriculum development includes four parts: curriculum objectives, curriculum content, curriculum implementation and curriculum evaluation, while curriculum design is the design of curriculum objectives and curriculum content. At present, curriculum development is mainly divided into two categories according to their different needs, one is the school-based curriculum development system represented by major universities, and the other is the practical curriculum development system represented by large and medium-sized enterprises. School-based curriculum development system is mainly characterized by systematic, comprehensive, and rigorous teaching knowledge and scientific teaching content. The main feature of the enterprise practice course development system is the operational and practical nature of teaching knowledge, and the teaching content is closely related to the work. According to different development requirements, curriculum development techniques and curriculum design methods are different. The school-based curriculum development system is recognized as a scientific and rigorous academic theory, and the recognized curriculum design theory is Gagne's curriculum design methodology. Practical curriculum development techniques for businesses are relevant and practical due to their pursuit.

As mentioned above, the curriculum development studied in this paper refers to the whole working process of determining curriculum objectives through needs analysis, selecting and designing teaching contents and arranging related

teaching activities according to this objective in order to finally achieve the curriculum objectives.

1.3 Conceptual Framework

Hangzhou Technical School is a full-time technical education school approved by the Department of Human Resources and Social Security of Zhejiang Province. The school adheres to the diversified cooperation modes such as school-school, school-enterprise and Sino-foreign, relying on high-quality resources, and has formed a comprehensive technical school with auto mechanics as the core, social shortage service professions penetration and coordinated development of multiple professions. It has become a comprehensive training base integrating vocational and technical education, skill identification and employment services with perfect school conditions, advanced teaching facilities, strong teaching staff and remarkable school benefits.

The creation of the new energy automobile class is an educational project jointly established by Geely Holding Group and Hangzhou Modern School. 2021, the project was launched in Hangzhou Modern School in Yuhang District, Hangzhou, establishing the goal of joint school-enterprise training of new energy automobile talents. Now, this new energy vehicle class allows the school and the enterprise to solve their respective needs at the same time, and also provides students with the most advanced knowledge of new energy vehicle-related technology to learn and the best employment channel. The modular curriculum for the new energy vehicle class, developed in collaboration with the school and the company, is also a key part of the program's success. The module curriculum has produced excellent students for the school, industry and society, as well as a large number of teachers with professional competence for the partner schools, effectively linking automotive education in secondary schools with the automotive market.

1.4 Research Hypothesis

This paper takes the school-enterprise cooperative curriculum development in secondary vocational schools as the main research object, and deciphers the process of developing curriculum projects between Hangzhou Technical School and new energy enterprises by means of case studies, so as to use the research

methods of questionnaires and interviews to investigate and study the school-enterprise cooperative curriculum development of teachers, students, school and enterprise leaders in secondary schools, and analyze the problems of school-enterprise cooperative curriculum development: enterprises We analyze the problems of school-enterprise cooperative curriculum development: low enthusiasm of enterprises to participate in school-enterprise curriculum development, deviation in the concept of school-enterprise cooperative curriculum development, resistance of teachers and experts to participate in curriculum development, lack of resources for school-enterprise cooperative curriculum development, lack of stable and long-term guarantee mechanism for school-enterprise cooperation, etc. We also analyze the reasons for the problems from the levels of government, enterprises and schools.

1.5 Scope and limitations of the study

The increasing market of new energy vehicles is rapidly expanding the demand for corresponding auto repairers, and the demand for new energy vehicle repairers is also rapidly increasing, and the problems accompanying it are becoming more and more obvious, while the understanding of many colleges and universities of new energy vehicle technology profession only stays at the maintenance level. Although students have a certain understanding of new energy technology, they cannot use the new energy technology they have learned to solve practical problems. This is also because in the teaching of new energy technology, the depth and breadth of teaching contents are not enough to meet the needs of students' learning and the needs of society. At the same time, the education level of automobile maintenance practitioners is not high, and the proportion of those who have received systematic professional knowledge is not high.

After years of development of secondary education, most schools have gradually abandoned the model of subject curriculum system and started to realize that vocational education should get rid of the shackles of general education curriculum development system and model and develop curriculum based on work process. However, some schools hesitate to develop the curriculum due to lack of experience in curriculum development and lack of awareness of the importance of

curriculum development, which makes the curriculum development stagnant. Some schools recognize the importance of enterprise participation in curriculum development and try to conduct curriculum development, but the indifference and skepticism of schools and enterprises towards school-enterprise cooperation prevent enterprises from fully participating in the process of curriculum development, and thus cannot fully determine the work process and job-specific work content based on the actual work context of enterprises. The research in this paper is mainly based on understanding the problems of school-enterprise cooperation curriculum development, exploring the expertise and strategies to solve the problems, designing and improving the curriculum development, proposing feasible solutions to typical problems in the curriculum development process, and providing reference methods for school-enterprise cooperation curriculum development.

1.6 Terminology

Most of the relevant talents in automotive enterprises are recruited from the society, and some of them are also from students of relevant majors in schools. Among the relevant talents recruited from the society, enterprises generally stipulate that they should have worked experience and be able to perform the requirements of the relevant positions. Enterprises require high technical level, i.e., hard conditions, for social recruits, which generally require to reach the level of technician or intermediate worker or above and be able to undertake the work independently. For students recruited by schools, enterprises do not require high technical level of students, but they require high soft qualities such as students' behavior, learning attitude and loyalty to enterprises. Once these students are recognized by enterprises, they will be trained as technical backbone, and the training time is usually more than one year.

1.6.1 Qualities to be possessed

In the survey of Hangzhou Modern School, first, we made preliminary statistics on the total shortage of auto repair workers at all levels in enterprises, and the demand of auto repair enterprises for junior and middle-level auto repair workers is large. During the survey, we found that the enterprises' educational

requirements for auto repair workers are not high, among which 70% are secondary school education, 25% are college education, and 5% are no requirements. In the questionnaire issued by the school to the enterprise leaders, it was found that the 10 vocational qualities required by the auto maintenance workers were reflected in skills, knowledge and innovation, and the enterprise leaders ranked the importance of these qualities (1 being the most important and 10 being the least important), and the results of the survey are as follows.

Table 1.6.1 Auto repair workers should have qualities in order of importance

Evaluation	Level of
Professional ethics	1
Progressiveness	2
The concept of rule	3
Discipline	4
Dedication to work	5
Spirit of cooperation	6
Innovation ability	7
Professional	8
Technical ability	9
Cultural knowledge	10

The above situation shows that there is still a large shortage of junior mechanics and intermediate mechanics in the automotive maintenance industry. From the statistical results, enterprises have lower requirements for employees' skills, knowledge, and innovation ability, and relatively speaking, enterprises attach more importance to employees' professionalism and pay most attention to their professional ethics, spirit and concept. This also reflects from the side that the current professionalism of employees is far below the requirements of enterprises, and the reason is that the proportion of personnel receiving formal education is low and the level of professional ethics is not high.

1.6.2 Analysis of professional settings and vocational positions

The school conducted research and analysis on the background of new energy vehicle industry in Hangzhou and the talent demand in the automobile market and concluded that the industry is in a period of rapid development and enterprises need a large number of skilled personnel for automobile maintenance, while the enterprises need mainly junior technicians and intermediate technicians with high professional ethics and quality, as well as a small number of senior technicians. On the basis of the full investigation of the industry talent demand in Hangzhou and the surrounding areas, the school further analyzed the job settings and structure of new energy vehicle maintenance enterprises, and the school and Greely New Energy Training Course initially determined the auto maintenance profession and its career positions.

Table1.6.2 Table of automotive majors and their career positions

Name of profession	New Energy Vehicle Operation and Maintenance
Occupation name	New Energy Vehicle Mechanic
Occupational position and brief description	Occupational positions: new energy vehicle inspector, new energy vehicle line repairer, new energy vehicle maintenance worker, new energy vehicle service advisor, new energy vehicle sales advisor, auto insurance insured, etc. We investigated the application of new energy vehicle daily inspection, application and maintenance in enterprises, companies, schools and other units, and especially investigated the employment positions of auto repair in Hangzhou, and based on the feedback and investigation, we consolidated and reorganized the existing positions, and combined the new positions arising from the development of modern automobile structure and the application of new technology of maintenance, and organized and summarized the professional positions of new energy vehicle inspection, application and maintenance. In addition, the new jobs arising from the development of modern automobile structure and

	the application of new maintenance technology are organized and summarized, and the more popular jobs are extracted and analyzed as the basis for professional and curriculum construction. The training direction of automobile operation and maintenance majors is determined as composite job talents of automobile maintenance technology, and secondary vocational education should mainly meet the needs of automobile maintenance enterprises, taking into account automobile transportation enterprises and other needs.
Professional training target skilled personnel	Cultivate middle-level technical and skillful talents with good culture and professional ethics who are well-rounded in moral, intellectual, physical and aesthetic development, adapt to the development of new energy vehicle market and social needs, master the knowledge and skills necessary to meet the professional positions of new energy vehicle testing and maintenance, and have strong career development ability and lifelong learning ability.

1.6.3 Analysis of coursework development

The curriculum development of the new energy vehicle class project is built based on the work process. The curriculum starts from the occupational analysis, and after determining the professional occupation and occupational positions, then the curriculum development is based on the work process of the positions. A school-enterprise curriculum development working group was established for the new energy vehicle special class project, and the work tasks of the automobile maintenance profession were analyzed and organized as shown in the table.

Table1.6.3 Job task analysis of new energy vehicle maintenance profession

Occupational position	Job tasks		Occupational skills	Knowledge areas
1、New energy vehicle machine car testing and repair 2.New energy vehicle maintenance business reception 3.New energy vehicle circuit electrical repair	1.1 New energy vehicle rapid inspection	1.1.1 New energy vehicle inspection and maintenance	Able to carry out inspection of electrical circuits, tire removal, mounting, inflation and other	The overall structure of new energy vehicles; the structure and working principle of car battery
		1.1.2 New energy vehicle primary maintenance	Be able to carry out primary maintenance work in the correct order and according to specifications	
	1.2 Repair of electronic equipment and wiring	1.1.3 New energy vehicle secondary maintenance	Be able to carry out secondary maintenance operations in the correct sequence and according to specifications	Knowledge of automobile wiring structure, working principle and electrical management system; basic knowledge of diagnostic instrument

	1.3 Vehicle transmission and drive Maintenance	1.1.4 New energy vehicle special maintenance	Can use a switch to perform brake fluid, power steering fluid, ATF fluid, replacement	Gear transmission and speed change principle; working principle of main reducer and differential; power transmission process
Competency Integration	Industry general ability: Ability to read automobile drawings, ability to standardize the use of common tools for automobile maintenance, and ability to read information on automobile testing instruments, etc. Occupation-specific skills: 1. Ability to test the performance of automobiles, examine and judge faults, diagnose and troubleshoot faults in automobile bus systems, and receive automobile maintenance services Cross-industry vocational ability: Basic ability to adapt to job changes, enterprise management and production site management, and innovation			

1.6.4 Analysis of curriculum structure and base building

Curriculum structure refers to the composition ratio of each type and level of courses and their interrelationship. It solves the main problem of what courses are designed according to the objectives of the curriculum and how to set these courses, etc. The curriculum structure of Hangzhou Modern School mainly consists of four parts: basic platform courses, which mainly set up basic culture courses and career cognition courses to cultivate students' cultural quality and career literacy; professional foundation courses, which are mainly set up as automotive after-sales service foundation, automotive circuit testing, automotive maintenance, automotive vehicle diagnosis and other courses to make students proficient in professional knowledge and skills; professional direction courses, which are divided into

Professional direction courses are divided into four directions. Mechatronics, sheet metal, painting and non-technical, including the WBT network courses and core courses of professional direction. Taking the painting direction as an example, the WBT network courses mainly set up the courses of automobile electromechanical fundamentals, painting fundamentals, primer construction and so on. The core courses of this direction mainly set up primer construction, medium coating construction and other courses, which are fully integrated online and offline, aiming to make students integrate into the culture of new energy vehicle brands, master professional technical skills and have certain vocational survival and development ability; they also include practical courses such as comprehensive practice and on-the-job internship, aiming to further cultivate students' hands-on ability and practical spirit and better integrate with their future positions. Among them, the basic platform courses and professional foundation module courses are not divided into directions and are unified for two academic years; WBT network courses and professional direction courses are divided into electromechanical, sheet metal, painting and non-technical four directions for small class teaching, online and offline courses support each other and are synchronized for one academic year. Its whole curriculum system can be summarized as two modular curriculum systems, i.e. work process and job literacy oriented.

1.6.5 Construction of curriculum resources

Since China advocates that vocational schools in each region should develop unique curriculum resources according to the school's own characteristics. Therefore, with reference to the relevant standards of Geely new energy vehicles, the secondary school absorbed the construction concept and experience of Geely Group, formulated the job requirements of the first line of enterprise maintenance, and developed a series of unique curriculum resources such as teaching materials, student workbooks and teachers' instruction manuals by combining the practical training conditions of the new energy vehicle training base and the number of students.

1.6.6 Teaching resources development

The most important feature of the teaching of the project curriculum of the new energy innovation class is the visualization of teaching design. By visualization of teaching, it means using all possible graphic methods to analyze and process all aspects of teaching. Ordinary instructional design is based on textual descriptions and the ideas are expressed in a linear pattern. Visual teaching uses graphic representations to present the expression of ideas in a multi-dimensional and multi-perspective way. This instructional design presents visualization with the help of visual media, making it easy and enjoyable for students to communicate and share in classroom activities, and creating unlimited opportunities for students to think. For example, posters and posting boards are used as the main information visualization tools in after-sales service courses. Curriculum Packages. The course is presented in the form of a course teaching package, which is a combination of online and offline course content. To facilitate students' pre-learning, New Energy Innovation Class Automotive Training and the school jointly developed e-learning resources. The e-learning content is created based on the learning requirements of each module, and each student is required to complete the corresponding e-learning content before taking the new course. The materials and resources developed for classroom teaching are: the student book is the Technical Training Manual and the Student Workbook; the teacher book is the Teacher's Guide and the PPT.

1.6.7 Construction of Practical Training Base

The practical training base is a place for secondary school students to learn practical skills. The practical training base of secondary school should match with the school's specialty and practical training mode and scale, so as to ensure that students get the practical skills training with strong compatibility and adaptability to the maximum extent. The training base of Jinling Middle School is based on the curriculum developed by the school in cooperation with enterprises, and technical facilities and equipment matching the curriculum are introduced. The vehicles and tools required for the curriculum are always in line with the dealers to ensure the maximum utilization of technical equipment.

The school has built two bases for vehicle inspection and car maintenance according to the direction of the curriculum. The vehicle inspection base contains practical training, technical and non-technical teaching units, one of which is a practical training unit for the integration of science and practice classrooms, which is not only used for teaching and practice, but also functions as a training certification and skills competition for new energy vehicles at all levels. In terms of practical training equipment investment, Geely Group provided the school with a full set of new energy vehicles for teaching, automotive diagnostic equipment and various special maintenance tools, etc., providing sufficient practical training resources for the project students.

The development of the project curriculum of the new energy vehicle class takes market demand research as the logical starting point, adopts the school-enterprise cooperation in the process of constructing the curriculum system, realizes the combination of learning and work through the systematization of the work process, and fully considers the educational environment and teaching conditions of the school, focusing on the feasibility of the implementation of the curriculum system. Its teaching content points to the work tasks of this occupation, which has accumulated valuable experience for the construction of curriculum system and curriculum design of other majors.

1.7 Benefits of the study

1.7.1 School-enterprise cooperation training model

School-enterprise cooperation has become a mainstream channel for secondary school development, but there are some drawbacks in the implementation process. By creating and setting up a school-enterprise cooperation office, an order-taking team is set up to successfully import enterprise cooperation projects and allow students to actively participate in the discussion of project cooperation during school. We can also adopt the practice of hiring entrepreneurs with diplomas as mentors in secondary schools to allow students to participate more effectively in corporate collaborations, and also to introduce collaborative projects with companies into schools. Through effective collaboration between schools and companies, students can experience and learn practical knowledge and

learn more about the real world outside of the campus. By swapping roles through corporate processes and work tasks, students are able to use corporate standardization to be strict with themselves in their future work.

1.7.2 Continuously optimize the curriculum with the actual demand

Curriculum teaching is the most direct way to cultivate students' professional skills, and it is also the content that students are most exposed to in the learning process. Therefore, when carrying out professional skills training activities, secondary colleges and universities should focus on optimizing and improving the quality of the curriculum. By continuously optimizing the curriculum, we can ensure the improvement of the quality and efficiency of classroom teaching, so that students can better learn the latest professional knowledge and skills and thus promote the better development of their abilities. When setting up teaching courses, we should pay attention to the effectiveness of teaching contents and effects to ensure that the course contents are suitable for the actual needs of society and that students can maintain good competitiveness after joining the workforce, which is of great significance to their sustainable development. From another perspective, the teaching content of the courses set by the school needs to be as close as possible to the business project settings of the enterprises in order to better cultivate talents who meet the development needs of the enterprises. In the setting of curriculum projects, secondary schools focus on cultivating talents with professional skills, so they should pay attention to the proportion of practical teaching in the curriculum system, appropriately increase the time for practical teaching and use more practice For those majors with poor ability to adapt to future social development, schools should actively improve them in order to promote the streamlining of teaching courses and the improvement of teaching efficiency. Taking the training of hotel management students as an example, influenced by the rapid development of computer network, schools can add some teaching subjects such as network marketing to the curriculum to promote the improvement of students' comprehensive ability.

1.7.3 Build an effective communication mechanism

To strengthen the cooperation with enterprises in talent training, it is necessary to strengthen the communication and interaction between the two sides. Only in this way can we promote both sides to have a clearer grasp of each other's needs, thus promoting communication and coordination between the two sides, which is a necessary process to realize effective cooperation between the two sides and even improve the quality of talent training cooperation. To better realize the establishment and implementation of cooperative talent training system between secondary colleges and enterprises, both sides need to establish an effective communication system and provide information interaction guarantee, for which both enterprises and schools need to establish an effective communication mechanism. To establish an effective communication mechanism, the following points need to be noted.

First, school and enterprise leaders should pay attention to the establishment of communication mechanism, and both sides should establish a cooperation communication working group composed of their respective leaders so that they can negotiate and solve unexpected problems and situations in the process of cooperation and cultivation in time, which can well provide effective guarantee for the continuation of cooperation. Secondly, in order to help students adapt to the working conditions and environment of enterprises in advance, it is necessary Secondly, in order to help students adapt to the working conditions and environment of enterprises in advance, it is necessary to realize effective docking between schools and enterprises in terms of culture, so that students can adapt to their work quickly, thus helping students to integrate into their work quickly and promoting the effective improvement of work efficiency. Finally, more opportunities should be given to students to carry out work practice, so that they can get better ability training in actual work on the one hand and test the results of cooperative teaching on the other. Once students find problems in the actual work, they can also give feedback in time, which is very important to promote the quality of cooperative teaching mode.

1.7.4 Optimize and improve the evaluation of teaching results

Students at the secondary school level are very different from those at the high school level. Students at the suspension level have relatively poor basic knowledge and low self-confidence in learning. In response to this situation, teachers should improve and optimize the way of evaluation of teaching results, so that secondary school automotive students can put more energy into the learning of new energy vehicle knowledge. Among them, in terms of evaluation frequency, students' learning results should not be examined in the final exam, but their theoretical knowledge mastery should be evaluated weekly or monthly after the end of teaching. In addition, evaluation methods should not only use paper-based exams, but also add more quantitative assessment criteria. For example, students' learning status, their mastery of knowledge, classroom performance, and even their progress can be used as indicators of teaching performance. Such a comprehensive assessment can provide information about students' knowledge learning and motivate more students to participate in subsequent knowledge learning.

1.7.5 Establishing a long-term mechanism

In order to better ensure that students' practical ability is well cultivated in school-enterprise cooperation, our schools and enterprises should ensure that the cooperative talent cultivation model has sufficient stability so that the cultivation of professional and technical talents will not be interrupted. In order to better promote the stability of school-enterprise cooperative teaching mode, we need to establish a long-term mechanism and regulate the behavior of all parties with effective constraints of the system, so as to ensure the standardization and orderliness of school-enterprise cooperative activities, which can well ensure the long-term stability of cooperative teaching mode.

Chapter 2
Theory and Literature Reviews

The data of the papers used in this study were mainly obtained from CNKI periodicals network and Wipu Chinese science and technology database. In the database, the research results from 2009 to May 2019 were searched, and the keywords "curriculum development", "school-enterprise cooperation curriculum development", "secondary school-enterprise cooperation curriculum development" were used as fuzzy search. The keywords "curriculum development", "school-enterprise cooperative curriculum development" and "secondary school-enterprise cooperative curriculum development" were used as fuzzy search. A total of 14,789 papers and 2,115 dissertations on "curriculum development" were searched, 282 papers on "school-enterprise cooperative curriculum development" and only 49 papers on "secondary school-enterprise cooperative curriculum development". There are only 49 papers on "secondary school-enterprise cooperative curriculum development". By screening the research results, excluding the duplicate publications, irrelevant, news reports, call for papers, etc., we got 220 valid papers.

After screening the research results, there were 220 valid papers. In addition, we checked 11 monographs related to "school-enterprise cooperative curriculum development" and conducted related research.In addition, 11 monographs related to "school-enterprise cooperative curriculum development" were reviewed, and the relevant studies were reviewed as follows.

2.1 Research on the existing dilemma of school-enterprise cooperative curriculum development

Scholars have analyzed the current problems of school-enterprise cooperative curriculum development in vocational education from different perspectives. Gao Fan in "The Inspiration of Competence for Curriculum Reform in Vocational Education" points out that in terms of curriculum development, there are various curriculum development models implemented in vocational education in China, but

in actual operation, they do not achieve the desired effect, and the technically skilled talents trained by vocational schools still do not meet the requirements of enterprises. The main problems are the vocational and professional content of vocational education curriculum is weak, the construction of professional teaching standards needs to be improved, and the construction of supporting learning resources is insufficient. Yang Yuying in "Reform and Development of Vocational Education Curriculum in 40 Years of Reform and Opening Up" mentioned that the basic problems of vocational education curriculum can be summarized as ambiguity, disconnection, separation and scarcity, "ambiguity" refers to the ambiguous positioning of curriculum objectives, "disconnection" refers to the disconnection between teaching contents and job requirements, and "disconnection" refers to the disconnection between teaching contents and job requirements. The "ambiguity" refers to the ambiguous orientation of course objectives, "disconnection" refers to the disconnection between teaching contents and job requirements, "separation" refers to the phenomenon of "two skins" between theory and practice, and "scarcity" is manifested in the obsolescence and gaps of teaching materials and related hardware and software resources. Xu Yuanping mentioned in "Exploring the strategy of developing middle-grade market research practical training courses jointly built by schools and enterprises" that "due to the different positions of each other's interests, there are differences in the understanding of the curriculum and such differences directly lead to the differences in the selection of teaching contents, the order and detail of chapters and the grasp of teaching priorities in the course of the construction of the curriculum, and it is also difficult to unify the criteria for delineating the learning areas. It is also difficult to unify the standards of learning areas."

2.2 Research on theoretical and technical approaches to school-enterprise cooperative curriculum development

Among the existing research results, scholars' research on theories and technical paths of curriculum development is still insufficient. The famous Chinese scholar Jiang Dayuan has systematically researched and elaborated the theory of work process systematization with reference to foreign experience. He believes that

the work process systematized curriculum focuses on humanistic teaching and learning disposition of specific work processes, which is more applied, humanistic, and operational. Jiang Dayuan mentions in "The Structural Logic of Work Process Systematization Curriculum" that "the most important feature of the work process systematization curriculum is that it keeps pace with the technological development of the enterprise industry." In order to implement curriculum development based on the systematic work process curriculum theory, three learning scenarios must be divided. For example, Zhu Xinbo believes that the basic process of curriculum development in school-enterprise cooperation is as follows: based on the results of social market research and the qualification requirements for professional positions, the partner school is the main body and organizes curriculum and enterprise experts to extract and summarize the typical work tasks corresponding to the professional curriculum and summarize the action areas based on the typical work tasks; then the curriculum experts develop the techniques to transform them into the corresponding learning area curriculum, and Finally, professional teachers design learning plans according to the work process of professional positions, design learning situations and organize teaching design according to actual professional tasks.

2.3 Talent demand of new energy vehicles

By the end of 2021, the number of new energy vehicles in China will be 7.84 million, accounting for 2.60% of the total number of vehicles. Compared with the end of 2020, the ownership of new energy vehicles has increased by 2.92 million units, an increase of 59.25% year-on-year. Such data fully reflects the increasing level of current research and development and promotion and application of new energy vehicles. In the general environment of increased car usage, it will inevitably lead to an increased demand for talents in the field of new energy vehicle maintenance and repair. The new energy vehicle industry chain includes not only the design and production of vehicles, but also sales and service. After the current new energy vehicles go to market, new energy vehicle enterprises have higher and higher requirements for talents, whether in the whole process of research and development, production or sales and service, the two-way requirements for talents

are put forward. Talents should not only have the corresponding knowledge or skills of new energy vehicles, but also have sufficient understanding of traditional vehicles. Therefore, secondary schools need to cultivate teaching methods and teaching concepts in teaching activities related to new energy vehicles to meet the demand for corresponding talents in the field of new energy vehicles.

2.4 The need to promote the development of secondary schools

Nowadays, under the continuous development of China's education field, secondary schools are facing greater market competition. Many students will have certain considerations when choosing a school, and most of them will choose high school to continue their studies and then continuously improve their theoretical knowledge and skills. Under the background of rapid development of new energy vehicles, if secondary schools can seize this opportunity to cultivate professional and technical talents, they can provide more professional talents for the whole society and field. This can improve the competitiveness of secondary schools, facilitate subsequent enrollment, and enhance the status of secondary schools in the field of education, so that the corresponding enterprises of new energy vehicles will turn their talent supply to secondary schools. Therefore, in the teaching activities of new energy knowledge, the innovation of teaching concept through teaching methods can promote the long-term development of secondary schools.

2.5 Demand for curriculum reform

Entering a new era, our government attaches great importance to vocational education and places it in a prominent position in economic and social development and education reform and innovation. More than 70% of students in vocational schools come from rural areas, and they play an important role in the fight against poverty and the building of a well-off society in all aspects in China. Vocational education shoulders the important task of cultivating diversified talents, passing on technical skills, and promoting employment and entrepreneurship, and has made outstanding contributions to supporting the transformation and upgrading of China's industrial structure, upgrading manufacturing and service industries, and safeguarding people's livelihood.

After a long period of practical exploration, China has formed a unique

paradigm for the development of modern vocational education. Practice has proved that following the needs of economic and social development, serving industrial upgrading and promoting the integration of industry and education and school-enterprise cooperation are the driving force of high-quality development of vocational education; insisting on being rooted in the motherland, based on national conditions and serving regional industrial development is the deep soil for vocational education to enhance its adaptability; implementing the fundamental task of establishing moral education, cultivating high-quality talents with high moral and technical skills, using both hands and brains and developing for life is the key to improving the social contribution rate The key to improve the social contribution rate and employment rate. Implementing the fundamental task of establishing moral education, cultivating high-quality technical and skilled talents with excellent moral and technical skills, using hands and brains, and developing for life, promoting the effective connection of education chain, talent chain, industry chain and innovation chain, and promoting employment and entrepreneurship are the fundamental ways to improve social contribution and recognition.

China's economic and social development has strengthened exchanges and cooperation between industries and enterprises and promoted the accelerated upgrading of domestic industrial structure. The change of industrial structure has brought new jobs and work contents to people, and the demand for all kinds of skilled talents in various industries is expanding. The upgrading of old industries and the emergence of new industries not only raise the requirements of industry enterprises for talents' skills, but also emphasize the innovative spirit of talents and pay more attention to students' literacy and all-round development, which means that vocational education courses face great challenges. At present, in the traditional vocational education curriculum, vocational schools are not yet equipped with the ability to adjust and upgrade their majors in response to industrial upgrading; vocational education curriculum emphasizes theory rather than practice; the curriculum developed by schools is out of touch with the times, and the students trained cannot fully adapt to the needs of industrial development in the new era. In this situation, the first thing vocational schools should do is to

deepen the reform of vocational education curriculum, improve the accuracy and gold content of vocational education curriculum, and deeply integrate with practice in professional settings, curriculum support and talent training programs, to meet the needs of economic and social development for vocational education curriculum reform.

Our government has issued various documents on the integration of industry-education and school-enterprise cooperation to emphasize the importance of the work on the integration of industry-education and school-enterprise cooperation in vocational education. in December 2017, the General Office of the State Council issued "Several Opinions on Deepening the Integration of Industry and Education", which put forward the institutional framework for deepening school-enterprise cooperation at the Chinese level for the first time; in February 2018, the Ministry of Education and six other departments issued "Vocational Education School-Enterprise Measures for Promoting Cooperation In February 2018, six departments, including the Ministry of Education, issued the Measures for Promoting School-Enterprise Cooperation in Vocational Education, providing policy protection for school-enterprise cooperation in vocational education. 2019, the State Council issued the National Implementation Plan for Vocational Education Reform, which mentions that "schools actively provide enterprises with the required curriculum, teachers and other resources, and enterprises should fulfill their obligations to implement vocational education in accordance with the law, using funds, technology, knowledge, facilities, equipment, management and other elements to participate in school-enterprise cooperation and promote human resource development." In 2022, the provinces issued the "Notice on the pilot work of fostering and building enterprises for the integration of production and education in 2022" for China to carry out the pilot work of fostering and building enterprises for the integration of production and education. The specific content and principal requirements of the scope of the pilot enterprises of integration of industry and education, the conditions of pilot enterprises, construction and cultivation, and support measures are clearly defined to provide institutional guarantee for promoting the construction and cultivation of enterprises of integration of industry

and education and comprehensive revitalization. Appropriate education is the best education. Compared with general education, the integration of industry and education and school-enterprise cooperation is an inevitable trend in the development of vocational education and a necessary way to achieve a win-win situation for education and industry. The development trend of vocational education in the new period continues to be good, but there are some urgent problems of vocational education school-enterprise cooperation, which affect and restrict the further development of vocational education school-enterprise cooperation. How to solve the policy implementation dilemma of vocational education school-enterprise cooperation under the framework of the policy system and explore the long-term mechanism of vocational education school-enterprise cooperation requires further deepening the content of school-enterprise cooperation, moving from school-enterprise cooperation to the integration of industry and education, promoting production with learning and bringing learning with production to achieve interaction. The promotion of a series of policies in China has made deepening the integration of industry and education and school-enterprise cooperation a key breakthrough direction for the reform of vocational education in China.

Chapter 3
Research Methodology

3.1 Population

The survey method is a combination of conversation and questionnaire to understand the educational phenomenon in a planned and systematic way, and to analyze, synthesize, compare, and summarize the information collected from the survey to provide regular understanding of the research method. This study intends to conduct a sample survey of secondary vocational schools by means of questionnaires and interviews, and based on scientific processing of the data, to do a systematic investigation and analysis of the current situation of school-enterprise cooperative curriculum development, the main problems, and their causes, and to obtain relevant research information.

According to the process of school-enterprise cooperative curriculum development, the main contents are proposed, and finally the main reasons for the development of school-enterprise cooperative curriculum in this project are analyzed to provide reference for school-enterprise cooperative curriculum development.

The main idea of the curriculum development model is from professional orientation to career description, then to typical work tasks, then the main contents are transformed into action areas and learning areas, and finally multiple learning situations and learning units are set up for implementation. Through the development process of the new energy vehicle project curriculum, we can see that the ideas and steps are based on the theory of work process systematization. Firstly, job research and work task analysis are conducted for the automotive testing and maintenance profession, and the typical work tasks of the new energy vehicle testing and maintenance profession are screened from a large number of work tasks; secondly, the work tasks of the new energy vehicle maintenance profession are integrated to form the knowledge area, vocational skill area and ability area of its maintenance profession, and then according to the laws of the new energy vehicle

testing and maintenance profession and secondary school students' learning style and cognitive characteristics, the knowledge, vocational skill areas and ability areas are integrated. According to the rules of the new energy vehicle testing and maintenance profession and the learning style and cognitive characteristics of secondary school students, the knowledge, skills and ability areas are transformed into the specific curriculum system of the new energy vehicle testing and maintenance profession; finally, other related learning areas are designed under the specific learning areas of the new energy vehicle testing and maintenance profession.

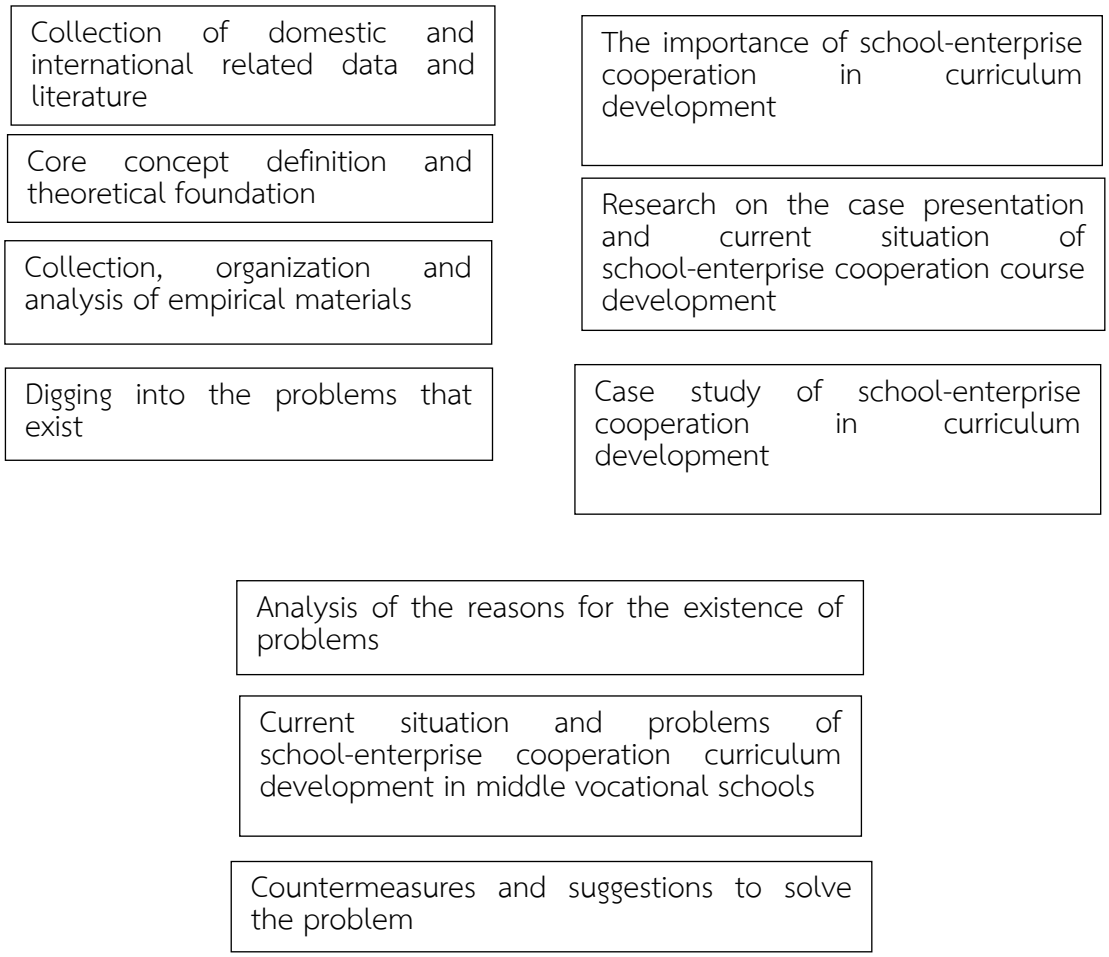
This study takes the school-enterprise cooperation curriculum development topic of Hangzhou Modern School as the research object. Based on the interpretation of typical cases, the research method of questionnaire and interview is used to investigate and study the current situation of school-enterprise cooperation curriculum development in secondary schools and analyze the problems of school-enterprise cooperation curriculum development. Finally, the experience of the cases is combined to propose corresponding countermeasures.

First, through data review. The connotation, characteristics, significance, and theoretical basis of school-enterprise cooperative curriculum development are summarized by means of theoretical basis. Secondly, the current situation of school-enterprise cooperative curriculum development research at home and abroad is sorted out, and the relevant teaching theories are elaborated. Through the actual research of Hangzhou Modern School, the problems in the development of school-enterprise cooperative curriculum were found, and the influencing factors were analyzed for the problems. Finally, the research activities are summarized and effective countermeasures are proposed for the problems in the development of school-enterprise cooperative curriculum in secondary schools to provide referenceable suggestions for subsequent research on school-enterprise cooperative curriculum development in secondary schools.

The research in this paper takes Hangzhou Modern School as a sample, starts from the development system, mechanism and current situation of school-enterprise cooperative curriculum development in Hangzhou Modern School,

investigates, analyzes, organizes and summarizes, and analyzes the problems of school-enterprise cooperative curriculum development in secondary schools today through actual research on the current situation of school-enterprise cooperative curriculum development in Nanjing, analyzes the reasons for the problems, and then proposes targeted and operable specific research ideas are as follows. The specific research ideas are as follows.

Figure 3.1Research ideas



3.2 Data collection

With the development of the economy, Hangzhou's automobile industry is in a period of rapid development, and the number of private cars in Hangzhou is also in a stage of rapid rise, while related large enterprises have been stationed in

Hangzhou, among which China's new energy vehicle dealers have grown from more than 20 at the beginning to more than 700 at the end. The increasing number of dealers has expanded the market share of new energy vehicles and increased the influence of new energy vehicles, but at the same time there are some problems, among which the shortage of auto after-sales service personnel is a pressing problem faced by new energy vehicle dealers. It is difficult for enterprises to employ workers, the demand for graduates of secondary schools in auto mechanics exceeds the supply, auto mechanics are in short supply, and it is difficult to find high-level and high-quality auto mechanics technicians, resulting in an imbalance between supply and demand of auto mechanics. In 2005, there were more than 700 auto repair enterprises in Hangzhou, and in 2009, there were more than 2,000 auto repair enterprises and 4S stores in Hangzhou. According to the survey, there are thousands of auto repair enterprises in Hangzhou, with more than 100,000 employees.

3.3 Research Design

The main research tools for the study of school-enterprise cooperation curriculum development in secondary schools are questionnaires and interviews, which aim to

Investigate the current situation of school-enterprise cooperation courses. The questionnaire mainly includes five parts: basic information, attitude toward school-enterprise cooperative curriculum development, awareness and concept, and knowledge and ability of curriculum development, among which the questions of attitude, concept, knowledge and ability mainly include whether questions, degree questions, multiple choice questions and open-ended questions. The survey targets were selected from secondary teachers and secondary students in Nanjing J school, including teachers and students of automobile maintenance, marketing and tourism management majors. 65 questionnaires were sent to teachers and 62 were collected, with a 95% recovery rate; 242 questionnaires were sent to students and 211 were collected, with a 87% recovery rate. The main purpose of the interviews was to investigate the attitudes and understanding of school leaders and enterprises

towards the development of school-enterprise cooperation courses.

3.4 Statistics and Data Analysis

3.4.1 Analysis of the technical route of curriculum development

Combined with the process of the new energy vehicle project curriculum, the technical route of Geely's new energy vehicle project curriculum development is mainly based on the technical route of work process systematization. The starting point of the new energy vehicle project curriculum development is not the knowledge of the discipline system, but the needs of work and occupation, that is to say, the new energy vehicle project curriculum development is more concerned with the process of doing things, the process of action. Student-centered. Most of the traditional courses are subject systematized courses, which are designed with the subject content in mind. In contrast, the work process systematization curriculum is the opposite, is designed to student-centered curriculum new energy automotive innovation class project curriculum, in the form of direct experience formed by students in the process of completing work tasks, the mastery of knowledge, skills and abilities in a variety of practical actions. It respects the specific needs of each student and focuses on the learning experience and creative expression of students in the course of action. At the same time, curriculum development is a dynamic process. The content and form of the new energy vehicle project curriculum for auto maintenance majors vary at different times or at the same time in different professional directions, so both the school and the enterprise have established a good communication guarantee mechanism for the new energy vehicle project curriculum to ensure timely update and replacement of the project curriculum.

3.4.2 Analysis of the guarantee mechanism of curriculum development

The integration of school and enterprise curriculum concepts is the prerequisite for both parties to cooperate in developing the curriculum. The goal of school-enterprise cooperation curriculum development is to cultivate the professional and technical talents needed by society, and focus on the realization

of school education function while teaching and educating people, while the goal of enterprises participating in school-enterprise cooperation curriculum development is to obtain talents and benefits through production and operation, and they need graduates who can achieve zero distance to jobs, so they tend to focus more on the formation of technical skills of secondary school students and relatively ignore the comprehensive Therefore, they tend to pay more attention to the formation of technical ability of secondary school students and neglect the cultivation and development of comprehensive quality of secondary school students. The cultivation and development of students' comprehensive quality is relatively neglected. From the selection of personnel to the training of teachers, and then the whole process and assessment results of teacher training are jointly completed by the school and the enterprise, both the school and the enterprise become two indispensable subjects of teacher training for the curriculum of the new energy vehicle innovation class project, which becomes one of the guarantees of cooperation between the two sides.

3.4.3 Analysis of the guarantee mechanism of the curriculum concept

The first thing to face in the development of school-enterprise cooperation curriculum is to solve the problem of conflict and contradiction between school and enterprise education philosophy. For Hangzhou Modern School, school-enterprise cooperation is conducive to breaking the situation that education is detached from the society and from the reality, and improving the quality of school teachers through the construction of a dual-teacher team, so as to cultivate talents that meet the needs of social development, and secondary school students can improve their adaptability to jobs and society; it is also conducive to standardizing the secondary school curriculum and strengthening the construction of vocational education disciplines. For Geely Group, school-enterprise cooperation can obtain graduates with zero adaptation period and standardize management with the power of schools, thus reducing enterprise costs. Therefore, Hangzhou Modern School believes that school-enterprise cooperation is necessary for the common development of schools and enterprises, and the school positions the relationship between the two as an equal exchange relationship, so long as the interests of both

parties can be mutually satisfied, the corresponding cooperative relationship can be established. Hangzhou Modern School and Geely Group have reached a consensus on the concept of curriculum development and talent training specifications, and the school develops the curriculum based on the curriculum concept that attaches importance to the needs of enterprises and the development of students. This has become the basic concept of the curriculum development mechanism for the school and the enterprise to reach a win-win cooperation, and the ideological guarantee of the cooperation in developing the curriculum.

3.4.4 Analysis of the guarantee mechanism of course resource sharing

The core feature of the project curriculum of the new energy innovation class is the sharing of resources between the school and the enterprise at several levels of cooperation, such as sharing of faculty, sharing of training bases and sharing of equipment resources. In order to consolidate and strengthen the cooperation with enterprises, the school has formed a curriculum development and teaching implementation team led by schoolteachers, and plans to cooperate with enterprises to train a team of teachers who are compatible with the development and teaching of the auto mechanics curriculum. The secondary school has proposed the principle of building a dual-teacher structure plus quality. In terms of dual-teacher structure, the school curriculum is taught by a combination of part-time teachers from enterprises and professional teachers from the school, who together form the teaching team and optimize the dual-teacher structure of the teaching team. In terms of dual-teacher quality, first, the school introduced senior technicians from Geely New Energy Automobile as part-time teachers. Before teaching, the enterprise experts, as part-time teachers, need to receive training on teaching ability carried out by the school in advance to make up for their teaching ability; secondly, the enterprise regularly trains the school's professional teachers in various technician and trainer courses, so that the schoolteachers are exposed to the latest technology and methods in the automotive industry. At the same time, they cooperate with relevant departments to develop professional training courses to improve the professional skills and practical abilities of schoolteachers.

The sharing of resources between the school and the enterprises is not only

reflected in the sharing of teachers but also in the sharing of material resources. Geely Group has invested a lot of special equipment and new energy vehicles for school teaching, and ensures that the technology, vehicles and equipment resources used in the curriculum are updated in a timely manner. For example, in order to let students feel and adapt to the working mode of Geely New Energy in advance, each practical training unit in the training room is designed according to Geely Group's standards and requirements.

3.4.5 Analysis of Course Assurance Mechanism

In order to create an atmosphere of school-enterprise cooperation in educating people, the curriculum of the new energy innovation class project adopts the mode of joint management by the school and enterprises, which is mainly reflected in the joint development of curriculum resources, the joint formulation of assessment system and the management and assessment of students. The school quotes the management methods and systems of BMW enterprises in the base, specifically including base property management, operation management, automobile and fixed asset management, and catering management. By cooperating with the enterprises, the secondary school has established and improved the management system of the practical training base, so that the personnel structure of the base is reasonable, the job responsibilities are clear, and the operation is standardized and orderly, thus improving the quality of the base. In addition to the practical training bases, the New Energy Innovation Class project also emphasizes the joint management of teachers, which is especially reflected in the certification of teachers for the project courses. Prior to teacher certification, companies and schools jointly negotiate the teacher training process. After teachers learn various knowledge and skills according to the process, they have to attend a unified certification from the company, namely BMW's instructor certification, and learn how to apply it. Instructor certification is assessed by the examining instructor in four areas: presentation ability, media design ability, activity design ability and self-awareness, and the assessment process is based on the instructor's technical ability. In addition, instructors are evaluated annually by the company. The evaluation process includes uploading lecture materials before and after the course,

monthly reports that instructors are required to complete to provide feedback to the company, randomly selected instructors who teach at least one course during the year, feedback forms sent to students, and a year-end competency assessment organized by the company.

The NEP emphasizes a humanistic approach to continuous assessment with a focus on student development. The school has infused the educational philosophy of nurturing people into the management and evaluation of the company, and has developed a unique management system that applies to the student learning and development process, taking into account the characteristics of the program curriculum. The school and the enterprise have jointly discussed and established a series of management systems, i.e. talent selection system, certification assessment system, internship contracting system graduate management system, etc. The school has completed the transformation from goal management to a combination of goal and process management, thus matching the management system with the cultivation of applied talents and improving the scientific, standardized and effective level of student management. Specifically, the management and assessment of students need to be certified by the cooperative enterprises, which should give feedback on the quality of training results. After students enter the new energy innovation class program, a complete personal electronic file should be set up and managed by a dedicated person to track and constantly update students' personal information, as well as training results, internship business information and contracts to ensure understanding of students' dynamics.

3.4.6 Analysis of the guaranteed mechanism of curriculum system

The school-enterprise cooperation model is the current direction of reform and development of vocational education in China. Through cooperation, schools can improve the level of teachers and shorten the gap with social demands; through cooperation, enterprises can ease the labor tension; through cooperation, students can learn more professional knowledge and skills, and both sides of cooperation can benefit from it, which is the basis of school-enterprise cooperation. To carry out long-term, stable and effective school-enterprise cooperation, it is more important to rely on the necessary institutional guarantee, in addition to

strengthening the internal construction of schools.

For example, secondary schools are responsible for providing a professional teaching environment, faculty, teaching implementation and loyal long-term apprentices, while enterprises are responsible for providing advanced resources, equipment and management. Both parties have the right and responsibility to participate in the development of the curriculum and to evaluate the process and results of the curriculum development. In addition to rigid agreements and regulations, both parties communicate and negotiate on specific issues in curriculum development through flexible meetings and other means, and make timely adjustments and improvements to the cooperation system. For example, to ensure smooth and effective communication between the school and the company, the school's Student Work Department and the company's Human Resources Department have established a communication and coordination operation and management center. In order to ensure smooth and effective communication between the school and the enterprise, the Student Work Department of the school and the Human Resources Department of the enterprise have established a third-party intermediary organization, which makes full use of multimedia and information technology to enhance communication between the school and the enterprise through dialogues, annual meetings and symposiums, and exchange opinions in a timely manner to promote smooth communication between the school and the enterprise. The cooperation between Jinling Middle School and Geely Group is doubly guaranteed by rigid systems and agreements and flexible dialogues and meetings, which promote the school-enterprise cooperation courses.

3.4.7 Analysis of the problems of talent cultivation model

The talent cultivation model of school-enterprise cooperation highlights the one-to-one personalized cultivation of employers, schools and students, which is an inevitable trend for the development of secondary schools and is of great significance in the study of education theory. In the future, schools need to continue to explore new concepts, new mechanisms and new ideas of the school-enterprise cooperation talent training model, further improve the model and cultivate high-quality skilled talents with career development for the society. This

paper mainly analyzes the problems in the talent cultivation model of school-enterprise cooperation and proposes corresponding countermeasures.

3.4.8 Analysis of Defects in Curriculum Setting

Curriculum teaching is the most direct way to cultivate students' professional skills, and it is also the content that students are most exposed to. The setting of teaching course content and projects has considerable influence on the actual quality of talent training. From the current teaching situation in secondary schools, there are many problems with the curriculum, which are analyzed as follows.

3.4.9 The curriculum system of secondary schools lacks innovation

Many secondary schools often choose to refer to the practices of colleges and universities when setting up teaching courses, which makes the teaching activities of secondary schools almost no different from those of colleges and universities. This kind of teaching curriculum design, which does not meet the actual teaching situation of our school and the actual development needs of students, leads to low teaching quality and efficiency, and cannot really promote the improvement of students' practical ability.

3.4.10 Analysis of excessive setting of public foundation courses

Facing this situation, many secondary schools include as many public foundation courses as possible in the curriculum in order to better promote the development of students' comprehensive ability. However, too many public foundation courses not only fail to achieve the growth of students' practical ability, but also make students averse to this course, which is counterproductive.

3.4.11 Analysis of the lack of effective communication mechanism

Only in this way can we promote both sides to grasp each other's relevant needs more clearly, so as to promote communication and coordination between the two sides, which is a necessary process to realize effective cooperation between the two sides and even to promote the quality of talent training cooperation, as well as an important way to constantly find out problems and improve in time in the cooperation. It is also an important way to find out problems and improve in time in the cooperation, so as to continuously promote the improvement of

teaching quality. However, as far as the current situation of school-enterprise cooperation in talent training activities is concerned, the communication between schools and enterprises is insufficient. This deficiency is mainly manifested in the failure to timely identify problems in the training mode, the failure to timely identify students' problems, and the tendency for schools and enterprises to disagree in talent training. This lack of communication mechanism tends to lead to serious problems in the cooperative talent cultivation model, which leads to major problems in talent cultivation and ultimately leads to inefficient teaching.

Chapter 4

Data Analysis Result

4.1 Data results and analysis

4.1.1 Current status of curriculum development

The survey data shows that 77% of the schools offer courses developed by school-enterprise cooperation, while 23% of the schools do not offer courses developed by school-enterprise cooperation; 98% of the teachers think the schools attach importance to school-enterprise cooperation course development, and only 2% think the schools do not attach importance to school-enterprise cooperation course development.

Table4.1.1 Current status of curriculum development

Category	Yes	No
Whether to offer courses developed by school-enterprise cooperation	77%	23%
Whether to attach importance to the development of school-enterprise cooperation courses	98%	2%

4.1.2 Purpose of Course Development

According to the survey data, more teachers believe that the development of school-enterprise curriculum helps improve students' employment, promote teachers' professional growth, meet the needs of society, and facilitate the development of schools.

Table4.1.2 Purpose of Course Development

Category	Percentage of
Promote teachers' professional growth	85%
Standardize secondary school curriculum	46%
Improve student employment	92%
Facilitate school development	77%
Meet the needs of society	85%

4.1.3 Awareness of curriculum development

The survey data show that teachers in secondary schools have a basic understanding of the needs of enterprises, schools, and students for curriculum, and they know more about theoretical knowledge such as concepts, connotations and ideas of curriculum development, but they lack practical knowledge about the basic procedures of school-enterprise cooperation in curriculum development, and the data show that 54% of teachers do not know much about the basic procedures.

Table4.1.3 Awareness of curriculum development

Category	Strongly agree	General agreement	Uncertain	Disagree	Strongly disagree
Understand the concept, content and philosophy of curriculum development and concepts of curriculum	23%	38%	38%	0	0
Understanding the needs of companies, schools and students for course needs	23%	62%	15%	0	0
Know the basic procedure of curriculum development in cooperation with school and enterprise Basic procedures of curriculum development	15%	31%	46%	8%	0

4.1.4 Subject of course development

According to the survey data, the proportion of industry and enterprise experts, teachers and curriculum experts is high, with 100% of industry and enterprise experts, 92% of teachers and 85% of curriculum experts, only 46% of teachers think that principals are the main body of school-enterprise cooperative curriculum development, and 38% of teachers think that students and parents are also the main body of school-enterprise cooperative curriculum development.

Table4.1.4 Subject of course development

Category	Percentage of
Curriculum Specialist	85%
Principals	46%
Teachers	92%
Industry and business experts	100%
Students and parents	38%

4.1.5 Approach to curriculum development

The survey data show that 62% of teachers think that the development of school-enterprise cooperation courses should be developed collectively, including school teachers and external experts, etc. 30% of teachers think that the school should develop a staff development team, and 8% of teachers think that inviting experts from external universities is the way to develop school-enterprise cooperation courses, among which no teachers think that it should be developed by teachers themselves. The reason may be due to the fact that most teachers think that curriculum development is not the responsibility of teachers, or they may think that they do not yet have the knowledge, experience and time and energy to fully develop the curriculum.

Table4.1.5 Approach to curriculum development

Category	Percentage of
Teacher-driven development	0
The school develops a staff development team	30%
Invite outside experts to develop personnel	8%
Collective development	62%

4.1.6 Attitude of curriculum development

The survey data show that teachers in secondary schools all think it is meaningful to cooperate with schools and enterprises for curriculum development, which can enhance teachers' business and theoretical level; 92% of them are willing to participate in curriculum development in schools, 8% of them say they do not

want to participate, but only 62% of them think curriculum development is teachers' responsibility, and 38% of them think it is not in teachers' responsibility.

Table4.1.6 Attitude of curriculum development

Category	Yes	No
Does curriculum development make sense	100%	0
Willingness to participate in curriculum development	92%	8%
Whether curriculum development is the responsibility of teachers	62%	38%

4.2 Issues in curriculum development

According to the survey data, 8% of the teachers said they disliked participating in school-enterprise collaborative curriculum development and thought it added to their workload, 77% said it added to their workload but enjoyed the process, and 15% said their workload was reduced and helped them in their teaching work.

Table4.2 Issues in curriculum development

Category	Percentage of
Resentful, adds to the workload	8%
It is heavier, but I enjoy the process	77%
Reduced, helped a lot with teaching	15%
Not much change	0

4.3 Constraints of curriculum development

According to Table 4.3, 92% of teachers said they did not have the time and energy to participate in curriculum development, 77% said their own development level was limited, 92% thought the policy support for school-enterprise cooperative curriculum development was insufficient, 77% thought the school-enterprise cooperative curriculum development lacked support from enterprises, and 54% thought the school-enterprise cooperative curriculum development lacked support

from schools.

Table4.3 Constraints of curriculum development

Category	Percentage of
Teachers do not have the time and energy	92%
Faculty development level limitations	77%
Lack of policy support	92%
Lack of corporate support	77%
Lack of support from schools	54%

4.4 Teaching effectiveness of the course

According to the survey data, 33% of the students believed that the teachers integrated theory and practice very well in their lessons, while 67% of the students believed that the integration of theory and practice varied from teacher to teacher. It is clear that teachers have their own interpretations of the curriculum, have limitations in their understanding, or are unable to consider both in the course of implementing the curriculum due to environmental influences.

Table4.4 Teaching effectiveness of the course

Category	Percentage of
Very tightly integrated	33%
Varies from teacher to teacher	67%
Never linked to reality	0

4.5 Attitude towards learning the course

The survey data show that secondary students feel that they can gain more knowledge and skills in the courses developed by school-enterprise cooperation; 90% of them want to offer more school-enterprise cooperation courses, among which 10% of them say they don't care; 80% of them are willing to participate in the curriculum development of their schools, while 20% of them feel they don't care. Secondary school students uphold a positive attitude toward school-enterprise cooperative courses and their learning, but some of them are not yet aware of their position in their own curriculum development and lack the awareness of

participating in curriculum development, the reasons of which are worth exploring.

Table4.5 Learning attitude of the course

Category	Yes	No	Doesn't matter
More knowledge can be acquired	100%	0	0
More skills can be acquired	100%	0	0
Wants to offer more school-enterprise cooperation courses	90%	0	10%
Willing to participate in curriculum development	80%	0	20%

According to the results of the above survey, it can be concluded that:

Firstly, secondary schools have a positive attitude towards the development of school-enterprise cooperative courses. This is reflected in the fact that secondary schools attach importance to the development and opening of school-enterprise cooperative courses; secondary school teachers have a strong awareness of participating in course development; secondary school teachers think that school-enterprise cooperative course development is meaningful and are willing to participate; secondary school students have a positive attitude towards school-enterprise cooperative courses and express the hope that more school-enterprise cooperative courses will be opened and are willing to participate in course development.

Secondly, teachers and students in secondary schools have corresponding concepts and awareness of school-enterprise cooperative curriculum development. This is reflected in the following aspects: secondary school teachers think that the purpose of school-enterprise cooperative curriculum development is mainly to meet students' employment, social needs and teachers' professional growth; the curriculum development should be mainly collective development, and the participants mainly include enterprise experts, secondary school teachers and curriculum experts, among which enterprise experts and teachers are the main body of curriculum development; secondary school teachers think that school-enterprise cooperative curriculum development is significant to teachers, which can improve teachers' Secondary school teachers think that school-enterprise cooperative curriculum development is significant for teachers, which can improve teachers'

business and theoretical level, increase knowledge about curriculum development and improve their teaching skills; secondary school students think that school-enterprise cooperative curriculum development can promote students and gain more knowledge and skills.

Thirdly, secondary school teachers have certain knowledge and ability of curriculum development. This is reflected in the fact that secondary school teachers say they basically understand the concept, connotation and idea of curriculum development; secondary school teachers also have a certain understanding of the needs of enterprises, schools and students for curriculum.

Through the survey results, it is found that there are certain obstacles to school-enterprise cooperation in curriculum development, and the current situation of school-enterprise cooperation in curriculum development in secondary schools is elaborated in detail with the results of actual survey and interviews. This phenomenon is one of the main problems faced by secondary schools in China in the development of cooperative curriculum. The following figure.

Table4.5.1 Attitudes of both schools and enterprises towards the development of school-enterprise cooperation courses

Participating Subjects	Attitude	Percentage of
School	Strong support and initiative to organize development	52%
	Requirement to develop	31%
	Vague attitude	15%
	No support	2%
Enterprise Enterprise	Strongly support and take the initiative to organize development	15%
	Requirement to develop	20%
	Vague attitude	60%
	Do not support	5%

According to the above data, 52% of the teachers think that the school strongly supports and takes the initiative to develop the curriculum, 31% of the teachers think that the school requires the development, while 60% of the teachers

think that the enterprises have a vague attitude toward collaborative curriculum development, and only 15% of the teachers think that the enterprises strongly support and take the initiative to organize the development. Schools are enthusiastic about school-enterprise cooperation, while most enterprises have a wait-and-see attitude. In the 2018 Measures for Promoting School-Enterprise Cooperation in Vocational Schools, the Ministry of Education pointed out that school-enterprise cooperation is the key to running good vocational education. However, in vocational education in China, the cooperation between schools and enterprises remains on the surface, and most of the cooperating enterprises only provide internship bases for schools, and rarely cooperate with schools in depth such as developing talent training programs and curriculum development. The reasons for this are as follows. On the one hand, enterprises are highly dependent on the economic environment. Due to the fierce competition in the market, most enterprises are more concerned with their own survival and development. Objectively, business leaders do not have time to care about things other than business survival, so the lack of support from business leaders for curriculum development, and the loss of opportunities for cooperation. Subjectively, some business leaders believe that enterprises are only responsible for selecting talents, while training talents is the responsibility of schools. On the other hand, enterprises are profit-making organizations whose fundamental need is to maximize their profits, but in the process of cooperation with schools, enterprises pay a lot of human, material, and financial resources, and it also costs them a long time because curriculum development and talent training is a long-term process. For enterprises pursuing profits, it is difficult for them to get immediate benefits from the cooperation, or even to lose money, which is unfavorable to their economic development and thus reduces their enthusiasm to participate in running schools; and one of the important motivations for enterprises to cooperate with schools is to obtain high-quality technical skill talents matching the requirements of enterprises through cooperation, but due to the problems of school teachers and professional settings, the students trained by schools, compared with the skilled workers in society, are not as good as those trained by schools. However, due to the problems

of school teachers and professional settings, the students trained by schools, compared with the skilled workers in the society, the mastery and operation of students' professional skills do not meet the requirements of enterprises; some secondary school students also lack certain vocational literacy, and the phenomenon of students leaving and jumping from job to job after employment is serious, so the demand of enterprises cannot be guaranteed, which finally destroys the willingness of enterprises to cultivate high-quality skilled talents through schools and frustrates the enthusiasm of enterprises.

4.6 Bias in the concept of developing curriculum

In the process of modern vocational education development, the school-enterprise cooperation of secondary school has become deeper, and the main body of secondary school students The status of secondary students has been emphasized, and the subjects involved in curriculum development tend to be diversified. However, different subjects have different understandings and requirements of curriculum development, so it is crucial to deal with the conflict of ideas among them. In the school-enterprise cooperation, the contradiction and conflict between enterprises and schools in curriculum development are especially prominent. Although the orientation of secondary vocational schools is to cultivate secondary vocational technicians with professional specialties and pay more attention to the cultivation of students' special skills and abilities than traditional education, vocational education is not only technical education, but also includes the transfer of vocational knowledge and technical skills, as well as the development of students' cultural literacy and vocational abilities and literacy. From the enterprise perspective, enterprises seek curricula that are short-term, efficient and fully reflect job standards and specifications, while schools need to train high-quality talents for society. In addition to adhering to the student-oriented philosophy, they need to consider the needs and development of students when developing curricula. In addition, if students' participation is neglected in the process of curriculum development through school-enterprise cooperation, it will be difficult to meet the intrinsic requirements of students. According to the survey of secondary school students, students think that they will gain more knowledge and skills

through learning school-enterprise cooperation courses, but some students still say that the courses "should pay more attention to students' needs" and hope that "more practical and hands-on training courses will be offered". For example, in practical courses such as on-the-job internships, students are often deprived of the right to speak as the main participants and are completely at the mercy of the enterprises and schools, and are reduced to the general sense of labor force. In short, it is because of the inconsistency and imbalance between enterprises and schools in terms of philosophy, values and demands of curriculum development that the two sides are bound to cause certain educational value conflicts to be negotiated and dealt with in the process of collaborative curriculum development.

4.7 Difficulties in getting involved in curriculum development

Teachers in secondary schools are mainly engaged in teaching secondary school students, and they have a deep understanding of students' specific conditions, knowledge and skills of professional courses and requirements, so they are the main body of curriculum development in school-enterprise cooperation, but they have a lot of resistance in the process of curriculum development. According to the survey, school teachers think it is very necessary for school-enterprise cooperation in curriculum development, and they are willing to participate in curriculum development, which shows that teachers' self-awareness of curriculum development has been improved, but some teachers still have weak awareness of participation and think that it is not teachers' task and responsibility to participate in curriculum development. There are other issues that need to be addressed when teachers are involved in curriculum development. First of all, teachers' work is mainly teaching, and it requires a high level of conceptualization and ability to change their role from that of curriculum implementer to that of curriculum developer. Secondly, because secondary teachers usually come from general colleges and universities, they are proficient in professional knowledge, but they lack mastery of curriculum development theories and methods, so they are helpless when they are involved in curriculum development. Although some teachers have mastered some curriculum development knowledge, they are not effective in the actual development because of their lack of development

experience. At the same time, secondary teachers lack practical experience in the operation of professional skills, so they focus more on teaching and understanding professional knowledge when implementing the curriculum, but neglect the cultivation of operational skills. In addition, teachers are the main practitioners of the school curriculum. In addition to teaching the curriculum, they also have the tasks of classroom management, attending meetings, and teacher training, etc. If they devote themselves to curriculum development, they will neglect their daily school work; if they have both, they will not have enough time and energy to balance teaching tasks and curriculum development at the same time. In the long run, it will also reduce teachers' enthusiasm and motivation to participate in curriculum development. At the same time, the cooperation with enterprise experts requires teachers to have the awareness and ability to communicate and cooperate well with them. To sum up, curriculum development puts forward higher requirements for teachers' role change as well as professional knowledge and abilities in various aspects, therefore, it is urgent to study and solve the problem of secondary teachers' willingness and ability to participate in curriculum development.

4.8 Deficiencies in resources for curriculum development

Curriculum resources are important carriers and conditions for implementing school-enterprise cooperative curriculum, showing the characteristics of secondary education, and achieving the training objectives and. In the process of curriculum development, both schools and enterprises need to invest a lot of human and material resources, especially the enterprises need to provide more resources. In the survey of teachers, 89% of them think that enterprises' input is not enough and hope to get relevant resources from enterprises in the future development of school-enterprise cooperative curriculum, which shows that the degree of enterprises' participation in the development of curriculum resources does not reach the school's expectation. On the one hand, the deep involvement of enterprise experts has an irreplaceable role in curriculum development, but the many internal affairs of enterprises make it difficult for enterprise experts to devote more energy and time to curriculum development, and the coordination of human resources becomes a problem. On the other hand, considering the strength of

enterprises, some enterprises can hardly provide the excessive resources that secondary vocational colleges expect to obtain. The construction and sharing of resources such as the science and practical classrooms and training bases need a lot of capital from enterprises, which are important carriers for cultivating technical skills talents, but under the background of fierce competition in the market, enterprises will choose to invest more capital in their own construction and development rather than the development of curriculum resources. In addition, due to the reason of commercial secrets among enterprises, enterprises may have reservations about some production links and materials, the core information cannot be shared, the developed course content cannot be fully matched, and students cannot learn the course that is fully in line with the actual job, and the authenticity of the course is limited.

In recent years, although China vigorously calls for the development of secondary vocational education, the government's investment in education in secondary schools still cannot meet the actual needs, and due to the low social recognition of secondary schools and the limited sources of school funding, it is also difficult for secondary schools to make substantial financial investment in curriculum resources.

4.9 Lack of stable and long-lasting guarantee mechanism

The school-enterprise cooperation mode can promote the smooth and efficient development of secondary school curriculum, but in reality, there are few enterprises cooperating with secondary schools, and there are only a few enterprises that can maintain long-term cooperation relationship with secondary schools. One of the main reasons is the lack of stable and long-term guarantee mechanism for the cooperation between schools and enterprises. Secondary schools have a positive attitude towards the cooperation between schools and enterprises in curriculum development, but they do not have a fully corresponding system and institution. There is no special organization to coordinate with them, so it is difficult for school teachers to communicate with enterprises unilaterally, and there is no way to communicate between school leaders and teachers, and they do not know how to solve the problems and excuse each other. For example, during

the development of the curriculum, enterprises are unable to communicate with the school in a timely manner about their intentions and goals for the curriculum, which may affect the initial intention to cooperate in the development of the curriculum and cause the enterprises to be less motivated to cooperate. The enterprises' willingness to participate in curriculum development itself is not strong, so they will not take the initiative to build the organization and cooperation system. At the same time, curriculum development is a dynamic process, the curriculum of school-enterprise cooperation in the process of implementation, need to be updated, it is not set in stone, once and for all. Due to the rapid development and changes in the market,

the technology of enterprises is also in a state of continuous updating and development, so the cooperative curriculum developed now may not be applicable in a few years, and the skills trained are relatively behind the market and cannot meet the expected needs of enterprises, so the purpose of enterprise participation in the development of cooperative curriculum cannot be realized. Therefore, it is especially important for both schools and enterprises to jointly build a long-term and stable cooperation guarantee mechanism.

Chapter 5
Conclusions and Discussion

5.1 Conclusion

The necessity to carry out innovation in middle-grade automotive new energy teaching is to meet the demand for talents in the field of new energy vehicles, and also to promote the long-term development of middle-grade schools. In the future, when innovating education methods in the teaching of new energy in secondary school, it should enrich the content of automobile professional teaching materials and teaching materials, build intelligent training rooms for new energy vehicles and independent inquiry type knowledge learning classrooms, and moreover, continuously optimize and improve the evaluation of teaching results to stimulate students' interest in knowledge learning and establish students' self-confidence in learning.

Secondary colleges and universities are an important part of China's current talent training system, and the development of educational activities in secondary colleges and universities plays a rather important role in cultivating professional and technical talents. At a time when the demand for professional and technical talents is expanding, secondary colleges and universities are required to shoulder their own responsibilities and promote the quality of talent cultivation through the improvement of their own teaching modes and methods so as to cultivate the talents needed for the development of society. For vocational training institutions such as secondary vocational colleges, they need to strictly track the market development when cultivating relevant professional and technical personnel, effectively grasp the talent needs of each industry, and carry out personnel training activities accordingly, so as to cultivate professional and technical personnel to meet the needs of society.

In conclusion, this thesis focuses on the development of school-enterprise cooperation curriculum in secondary vocational schools. With the method of case study, the current situation, problems and causes of school-enterprise cooperation

curriculum development in secondary vocational schools are investigated and analyzed, and on this basis, suggestions are made with examples, resulting in a more in-depth and practical research result. In terms of theoretical value, it illustrates the credibility of Dewey's theory of pragmatism, vocational education stakeholders and work process systematic curriculum development; in terms of practical value, it helps the development of school-enterprise cooperative curriculum development in secondary schools and lays the foundation for subsequent research. Compared with other studies, this study uses case study as the main method, which is more helpful to expand the influence of school-enterprise cooperative curriculum development. According to the case study, the research results are presented in terms of increasing the enthusiasm of enterprises to participate, establishing the correct concept, building the faculty, developing the curriculum resources and improving the guaranteed mechanism, which help to improve the understanding and attention of secondary schools and enterprises to the development of school-enterprise cooperative curriculum.

However, due to the limitations of some realistic factors and the limited ability of individuals, there are still some limitations and shortcomings in this study. Further exploration is needed on the research of vocational education curriculum concept, curriculum form and how to combine macro and micro of curriculum development.

5.2 Suggestion

5.2.1 S Strengthening ties with companies

The school leadership attaches great importance to the school-enterprise cooperation relationship and sets up a school-enterprise cooperation steering committee composed of leaders from both schools and enterprises. Every year, the school invites leaders of enterprises to the school to hold annual meeting to inform their respective development, understand the development plan of enterprises and get information of labor demand. The near-term employment demand can be contracted, and the long-term employment demand can be ordered to determine the cooperation framework. At the same time, the committee has a liaison officer to maintain regular contact between the school and the enterprise. The school takes

the initiative to provide services to the enterprise, such as providing teachers, classrooms, teaching facilities, venues for cultural and sports activities, and training for the cultural quality of the employees of the enterprise.

5.2.2 Establishing a perfect school-enterprise cooperation system

School-enterprise cooperation is an important way to cultivate skilled talents. Since school-enterprise cooperation has not formed certain mechanism, norms and constraints so far. The school side has the initiative but not the initiative, while the enterprise has the initiative but not the initiative. The two sides of cooperation, which should be equal and mutually beneficial, can hardly achieve reciprocity and coordination in the conflict. Due to the non-reciprocity in the cooperative relationship, once the enterprise side is not driven by interests, the school-enterprise cooperation loses its driving force. If the cooperation is not mutually beneficial and win-win, it is difficult to maintain the partnership for a long time. Therefore, in principle, the school and the enterprise have formulated the "Implementation Measures for School-Enterprise Cooperation" after consultation to ensure the interests of both the school and the enterprise to the maximum extent.

5.2.3 Deepen the teaching reform and improve the teaching level

In order to ensure the smooth implementation of the school-enterprise cooperation model, the school actively invites the partner enterprises to participate in the school's teaching management, so that the teaching plan, curriculum, teaching content, teaching management and teaching materials construction can be more adapted to the requirements of the enterprises' employment. In the teaching plan, we adjust the proportion of theoretical and practical classes according to the requirements of school-enterprise cooperation, and increase the practical class hours to meet the requirements of students going to the cooperative enterprises for on-the-job training on the premise of ensuring that the theory is sufficient; in the course teaching content, more practical things are taught and more theoretical things are taught; in the teaching management, enterprises participate in the formulation of course standards and quality control, and the course evaluation standards unify education standards, enterprise standards and industry standards. In terms of teaching management, enterprises are involved in the development of

course standards and quality control, and course evaluation standards unify education standards, enterprise standards and industry standards; in the selection and writing of teaching materials, scientific and practical teaching materials are chosen to meet the requirements of today's economic development, and enterprises are involved in the preparation of special project courses that combine engineering.

5.2.4 Adhere to the principle of longevity

Adhere to the principle of long-term effectiveness, to put an end to short-term speculative behavior, which is to stand on the strategic height of long-term development, to ensure the stability of cooperation between schools and enterprises, long-term benefits, mutual promotion and improvement; adhere to the principle of target, not blindly in the school-enterprise cooperation, not to distinguish good and bad randomly find an enterprise to cooperate with, but after careful investigation, demonstration, purposeful, targeted selection of those good benefits, good reputation, and professional counterparts or similar, with the development potential of the enterprise as our partners; adhere to the principle of diversity, cooperation with enterprises is not a single, not just focus on the main professional, ignoring non-main professional, but to meet the different professional, training different professional. After careful investigation and demonstration, we will select those enterprises with good efficiency, good reputation and development potential as our school's partners; we will insist on the principle of diversity, and the enterprises we cooperate with are not single, not just focusing on the main majors and ignoring the non-main majors, but meeting the needs of different majors and training different types of talents.

5.2.5 Strengthening the faculty

School-enterprise cooperation requires a team of two teachers. In recent years, the school has to take the way of "going out" and "inviting in" to strengthen the construction of "dual-teacher" teachers to meet the needs of school-enterprise cooperation. At the same time, the school invites enterprise professionals to teach at school, their advanced professional ideas and high skill level is also a strong guarantee for the construction of our "dual-teacher" teacher team.

5.3 Recommendation

the active party of school-enterprise cooperation, secondary schools should clarify and play the main position of the school in curriculum development. Secondary schools must take the initiative and strengthen the cooperation with the government and enterprises. By correctly analyzing the market and students' needs, grasping the right moment and attracting the government's capital investment by virtue of the school's strength and existing resources, the enterprises will take the initiative to cooperate with the school. Secondary schools also need to realize that the cooperation between schools and enterprises is based on mutual benefits, and coordinate the relationship between school teachers, enterprise experts and government at several levels from there to promote the smooth implementation of cooperative curriculum development in secondary schools.

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Appendix

一、 Questionnaire for the study of curriculum development of school-enterprise cooperation (teachers)

Dear Teacher.

I am a graduate student at the University of Southeast Asia in Thailand, and this questionnaire is a survey about school-enterprise cooperative curriculum development. The main purpose of this survey is to find out the views, knowledge and attitude of secondary school teachers towards school-enterprise cooperative courses. Your comments and suggestions will provide important references for this survey. This questionnaire is anonymous, so please answer honestly according to your feelings. Thank you for your support!

University of Southeast Asia, Thailand

September 18, 2022

(I) Basic information

1、 Major taught.

2、 Your teaching experience.

3. Your position: A. School leader B. Grade level director C. General teacher D. Teaching and researcher

(II) Multiple-choice questions (4-9 questions with answers in parentheses; 10-16 questions with a tick in □; 19-27 questions with answers in parentheses)

4、 Does your school offer courses developed by school-enterprise cooperation?

A. Yes B. No ( )

5、 Do you think it is meaningful for schools and enterprises to cooperate in curriculum development?

A.Yes B.No ( )

6、 Do you think your school attaches importance to the development of school-enterprise cooperation courses?

A.Yes B.No ( )

7、 Do you think curriculum development is equal to the development of teaching materials?

A.Yes B.No ( )

8、Do you think it is the duty of teachers to participate in curriculum development?

A.Yes B.No ( )

9、 Are you willing to participate in the development of school-enterprise cooperation courses?

A.Yes B.No ( )

10、 Do you understand the concept, connotation and philosophy of curriculum development?

☐ strongly agree ☐ basically agree ☐ not sure ☐ disagree ☐ strongly disagree

11、 You know the basic procedure of curriculum development

☐ Strongly agree ☐ Basically agree ☐ Uncertain ☐ Disagree ☐ Strongly disagree

12、 You know the needs of enterprises, schools and students for the curriculum

☐ Strongly agree ☐ Basically agree ☐ Uncertain ☐ Disagree ☐ Strongly disagree

13、 You think you can be competent in curriculum development

☐ Strongly agree ☐ Basically agree ☐ Uncertain ☐ Disagree ☐ Strongly disagree

14、 You think teachers need training in curriculum development

☐ Strongly agree ☐ Basically agree ☐ Not sure ☐ Disagree ☐ Strongly disagree

15、 You think it is necessary for schools to cooperate with enterprises in curriculum development

☐ Strongly agree ☐ Basically agree ☐ Not sure ☐ Disagree ☐ Strongly disagree

16、 You are willing to take the initiative to cooperate with enterprise experts

☐ Strongly agree ☐ Basically agree ☐ Uncertain ☐ Disagree ☐ Strongly disagree

17、What do you think is the purpose of cooperation between schools and enterprises in developing curriculum? (Multiple choice) ( )

A. Promote teachers' professional growth B. Standardize the construction of secondary school curriculum

C. Improve students' employment D. Benefit school development E. Meet social needs

18、What do you think should be the main subjects of school-enterprise cooperation in curriculum development? (Multiple choice) ( )

A. curriculum experts B. principals C. teachers D. enterprises, industry experts E. students and parents

19, you are most willing to take which way to develop the curriculum? ( )

A. Teachers develop their own B. School staff development team C. Invite people outside the school to develop (such as universities, experts) D. Collective development

20、Your knowledge of curriculum development mainly comes from ( )

A. participation in training organized by the school B. relevant literature

C. participation in the practice of curriculum development D. other

21、Do you think teachers can get involved in curriculum development? ( )

A. Curriculum development-related knowledge B. Higher teacher business and theoretical level

C. Improvement of teaching skills D. Others

22、What do you think is the workload of teachers in curriculum development? ( )

A. disgusted, increased workload B. aggravated, but enjoy the process C. reduced, a great help to their teaching D. nothing has changed

23、What difficulties do you think the current school in the development of school-enterprise cooperation courses? (Multiple choice) ( ) A. Teachers do not have the time and energy B. Teachers to develop the level of restriction

C. Lack of policy support D. Lack of support from enterprises E. Lack of support from

schools

24、You think the school's attitude toward the development of school-enterprise cooperation courses is ( ) A. Strongly support and take the initiative to organize the development of B. Required to develop

C. vague attitude D. do not support

25、You think that the attitude of enterprises towards the development of school-enterprise cooperation courses is ( ) A. Strongly support and take the initiative to organize the development of B. Required to develop

C. Vague attitude D. Do not support

26、If you are allowed to participate in the development of school-enterprise cooperation courses, what do you think you are missing? (Multiple choice)( )

A. Professional related knowledge and skills B. Curriculum development theory and methods C. Communication and guidance with experts D. Not enough time

27、In the future, what help do you hope to get in the development of school-enterprise cooperation courses? ( )

A. Support and tolerance of the school B. Professional training and guidance

C. Help and understanding from other teachers D. Relevant resources from enterprises

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