

# ***Research on the Innovation of Collaborative Talents Cultivation Mode in the Major of Computer Application Technology Based on "Production- Teaching Integration and School-Enterprise Cooperation"***

—A Case Study of Applied Technology College

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**Abstract**—"Production-teaching integration and school-enterprise cooperation" is the orientation for higher vocational colleges as well as scientific positioning of talents cultivation mode. Through the project construction centered on the talents cultivation mode characterized by "school-enterprise cooperation and collaborative innovation", the teaching reform is deepened, which is oriented by the need of information industry, driven by reform and innovation and focuses on the reform of talents cultivation mode. The research aims to solve the practical problems of teaching so as to improve the quality of talents cultivation and boost teaching results, thus improving the overall school-running level in a comprehensive manner.

**Keywords**—*computer application, production-teaching integration, talents cultivation mode*

## I. RESEARCH CONTENTS AND THE PROSPECT OF APPLICATION

### A. Research contents

The main purpose of the construction of school-enterprise collaborative education platform featuring "production-education integration and school-enterprise cooperation" is to improve the quality of talents cultivation, form the collaborative education concept of production-teaching-research and promote collaborative education culture, thus forming new thought on the construction of computer major jointly driven by colleges and enterprises. In the meantime, the system of collaborative education will be set up, collaborative education platform of production-teaching-research will be built and implementation approach of collaborative education will be created by targeting at the improvement of the quality of talents cultivation and focusing on the reform of talents cultivation mechanism. In addition, collaborative education culture is promoted and new mode characterized by school-enterprise interaction is developed in full-dimension [1]. To be specific, the details are as follows:

1) *Exploring brand-new and meaningful mode of school-enterprise cooperation education for computer majors*

It should center on "deep cooperation and production-teaching integration", break the limitation of practical mode of traditional education and create the atmosphere where students, professors, lecturers, engineers, enterprise managers and others at different levels can interact and exchange in the same environment. Additionally, it should break through traditional teaching methods, make knowledge be complementary with each other in teaching in an efficient way, share resources in school-enterprise cooperation in a better way to advance together and build newer teaching mode. Meanwhile, it should vigorously promote the team construction of "double-certificated teachers" and the practice of students' innovation and entrepreneurship.

2) *Building school-enterprise collaborative educational platform featuring innovative and interactive "trinity"*

It should maximize its inner potential after the integration of colleges' professional development, enterprises' demand for talents and students' study interest, which means that it should combine the computer resources with the advantages of software and hardware so as to meet the need of market and enterprises' demand for talents. They want to expand their market and improve products' advantages [2]. It should motivate teachers to teach and stimulate students to study. Moreover, it should build "trinity" platform and establish innovative platform where the attention is paid to market need, talents quality, knowledge and skills differences, curriculum setup, the adjusted teaching contents and performance and evaluation.

3) *Making full use of resources to promote the sustainable development of "school-enterprise cooperation"*

It should strengthen the cooperation between institutions of higher learning and enterprises in order to be more competitive and better improve social reputation. We will make full use of

software and hardware of the college and guarantee the sustainable development of useful resources through standardized management system.

In order to improve the quality of talents in higher vocational colleges, it must make talents cultivation and professional construction orient toward market and make the way of running school adapt to market. Furthermore, it must strive for the support of enterprises and actively serve the needs of enterprises through deepening the cooperation between colleges and enterprises for collaborative education, which is the basic approach for cultivating high quality technical talents and achieving healthy and rapid development of vocational education. Driven by the needs of enterprises, we adopt open school-running model, unswervingly follow the path of production-teaching-research integration and cooperate with enterprises to complement each other's advantages and share interests, thus further strengthening the momentum and vitality of school development.

### *B. The prospect of application*

The major of computer application technology follows the orientation of the college which focuses on engineering and has coordinated development with technology, economics, management and humanities. In addition, based on the service for local economy, it will promote professional reform, enhances internal construction and improve the level of running school under the guidance of scientific outlook on development, unceasingly exploring talents cultivation mode featuring "school-enterprise cooperation and production-teaching-research integration". We will strive for creating a high quality and well-built professional "double-certificated" teachers team with both part-time and full-time teaching, deepen practical teaching reform, improve teaching management and continuously enhance the level and quality of this major. What's more, we will actively carry out social service, give full play to the leading and exemplary role of specialty majors, aim to build this major with the characteristics of "orienting toward market needs and joint and collaborative construction by school and enterprise" and make students find jobs as soon as they graduate from the college, thus cultivating large quantities of "applied and engineering" technical talents for economic construction and achieving the seamless connection between school and enterprise in real sense.

Through the project construction centered on the talents cultivation mode characterized by "school-enterprise cooperation and collaborative innovation", the teaching reform is deepened which is oriented by the need of information industry, driven by reform and innovation and focuses on the reform of talents cultivation mode. The research aims to solve the practical problems of teaching so as to improve the quality of talents cultivation and boost teaching results, thus improving the overall school-running level in a comprehensive manner. We endeavor to build a new type of talent cultivation mode featuring "school-enterprise cooperation and collaborative innovation" in which colleges cooperate with enterprises to jointly educate students, construct a curriculum system for training applied creative talents, establish a "double-certificated" teacher team with high teaching and research level

which has strong ability in practice and innovation and set up a provincial-level specialty major with certain influence and status among similar colleges and universities within two years.

## II. RESEARCH BACKGROUND

In the face of the country's unprecedented support for the new generation of information technology industry, Liaoning province takes the opportunity of national development on strategic emerging industries to actively promote the adjustment, transformation and upgrading of industrial construction, hence new generation of information technology industry enjoys rapid development. In addition, the demand for IT talents also provides external development environment for the development of computer application technology and talent cultivation. And higher standards and higher requirements are put forward for the cultivation of talents in this major. The major of computer application technology is one of the earliest engineering majors in our college. After years of construction, we have obtained amount of experience in the reform of talents cultivation mode, construction of teachers' team and teaching resources, teaching reform and management and school-enterprise cooperation for education. Additionally, we have also achieved better results. The quality of talent cultivation is increasing with each passing year. In recent three years, the employment rate has reached over 95% with sound employment quality [3].

However, we are also aware that computer applied technology is one of the most widespread majors in our province. Several different higher vocational colleges have this major. In higher vocational colleges in Shenyang, over 20 colleges have this major. Due to the expansion of college enrollment in recent years, the situation of the enrollment and employment of this major is severe and the competition is intense. Since the increase in the number of graduates, employers have more choices to choose suitable graduates. Thus, the requirement for graduates is getting higher and higher. Graduates not only have professional and comprehensive quality, but also have higher professional core ability, common skills of industry, special skills and innovation ability [4].

Therefore, the current hot issue emphasizes how to closely follow the pace of the development of new generation of information technology industry. We should meet the needs of industrial development and employers, further promote professional reform, continuously enhance the level and quality of this major and improve the competitiveness of graduates. In addition, we should strive for cultivating a great number of high-quality senior technology-oriented innovative talents with "applied and engineering" ability in order to contribute to the development of Liaoning.

## III. RESEARCH BASIS OF THE PROJECT

Sound practical foundation provides platforms for the further research of the project. Relying on scientific and technologic activities held by the college for years such as career planning competition for college students, science and technology festival and software design competition, the project team creates sound academic atmosphere on campus.

By linking colleges with enterprises, practice teaching base is not only the window of enterprises and the second classroom of colleges, but also the front to cultivate college students' practical ability. Additionally, practice base outside campus, the base jointly built by colleges and enterprises and start-up base for college students provide external condition for the implementation and completion of this project.

#### IV. THE ACHIEVEMENTS OF PROJECT RESEARCH

##### A. *Talents cultivation program of "alternation of working and learning" and "school-enterprise cooperation" with the unique "five steps circulation and spiral rising" characteristic*

The cultivation of professional ability runs through the whole program. We follow the sequence of practical teaching: "visit for learning--cognition practice--special week for practice--professional training--replacement teaching practice". And we observe the order of theoretical teaching: "public elementary courses--professional basic courses--professional skills courses--quality expanded courses". Such two paths are interwoven and move forward together. The professional ability rises spirally in the circulation of the alternation of working and learning [5]. In the combination of theory and practice, we carry out teaching in accordance with cognitive rules of "practice-cognition-practice again-re-cognition". We divide six semesters into five learning stages or five learning procedures. Before replacement teaching practice, each stage or procedure starts with practical teaching, accompanied by theoretical teaching. And the earlier theoretical teaching lays foundation for latter practical teaching. Therefore, they are connected and interwoven, thus reflecting the teaching concept of "the alternation of working and learning" and "school-enterprise cooperation" and school-running characteristics of higher vocational colleges. The unique talents cultivation of "five steps circulation and spiral rising" guarantees its implementation in detail.

##### B. *Core curriculum teaching mode with progressive integration of six factors*

According to the basic requirements of the posts of computer application technology, the curriculum system of this major has formed such curriculum teaching system with the integration of six factors: "understanding on practice--theory--practical simulation--replacement practice--exchange and summary--professional skills training and evaluation". The professional and practical characters are emphasized in teaching mode, students' professional skill cultivation is attached great importance and professional skill evaluation is integrated into teaching process. We conduct professional qualification training and evaluation on occupations of six categories. The rate of obtaining professional certificate for students has reached over 90%, which lays a solid foundation for the "immediate employment" after their graduation.

##### C. *"Paid practice and pre-employment integration" reflects the school-running concept of "school-enterprise cooperation and working and learning combination" in higher vocational colleges.*

Our colleges tentatively explore from the following two aspects: one is paid pre-employment and replacement practice mode. All courses of this major will be ended in the tenth week of the fifth semester, followed by graduation practice and replacement practice. The employers are the ones we contact, which usually have the demand for talents. During the practice, employers can decide future post for students in the light of their needs and students' performance and train them individually, thus realizing "zero distance" between colleges and enterprises. The other is paid practice in enterprise in advance as the circumstances may require and the cultivation of students together with enterprises. As for those enterprises which are desperate for IT talents, we can arrange students to work in enterprises in advance. And designated teachers are sent to enterprises for on-site teaching for related courses and guide students to practice, thus students can have targeted study from the very beginning. Such two explorations have obtained sound effect and enterprises are welcome such modes.

#### V. THE PURPOSE AND VALUE OF PROJECT RESEARCH

(1) Through the research of this project, we can build professional construction committee with computer application industry. And according to the changes of applied industry and professional posts, we adjust to the orientation of professional skills in time.

(2) Through the research of this project, we can build integrated cultivation mode among institutions of higher learning, change talents cultivation program for computer application in time, adjust to curriculum setup and better promote teaching reform and curriculum construction.

(3) Through the research of this project, we can train the professional teachers' team and build faculty team with "both the quality and structure of double-certificated teachers".

(4) Through the research of this project, we can cultivate high-end technical talents for society in line with job requirements and solve the contradiction between supply and demand for applied technical talents and applied employment industries.

(5) By carrying out teaching tasks with IT enterprises, we can train professional and practical ability of teachers' team and guarantee the practicability of teaching contents and "zero distance" between students and enterprises.

#### VI. THE MAIN ANTICIPATED INNOVATION

##### A. *Unique talents cultivation mode with "orienting toward market, school-enterprises cooperation, collaborative education, combination of working and learning" characteristic*

Aiming at serving students and orienting toward future employment for students, we start with "orienting toward market, school-enterprises cooperation, collaborative education,

combination of working and learning" to reform talents cultivation mode and attain our goals of jointly formulating teaching plan, sharing resources, building practical bases, editing textbooks and cultivating students, thus driving professional adjustment and construction and guiding the reform on curriculum setup, teaching contents and methods.

*B. Thoroughly implementing the teaching concept of "production and teaching integration" and "school-enterprise cooperation" and reflecting the school-running characteristics of higher vocational colleges*

We carry out such educational concept as "learning by doing, doing by studying and doing while learning", integrate working and learning naturally and meet students' need for practice. Students work in enterprises as students and apprentice, teachers play the role of scholars, masters and employees in enterprises and employees of enterprises impart knowledge as teachers and masters, which can provide sound opportunity for students' future employment.

*C. Unique teaching strategy with "interaction among three parties"*

Based on teaching practice, we adopt unique guideline of "teaching interaction among three parties" and receive feedback from "students-teachers-enterprise". Through communication channels in six aspects, teachers' professional orientation and teaching methods can match for social requirements well and school-running mode and talents cultivation and management can serve for current social technologies, thus, school education can connect with social development well.

*D. Cultivating "applied and engineering" senior technical talents and achieving seamless connection between schools and enterprises in real sense*

Through theoretical study and professional practice, students can obtain basic applied theories and professional knowledge such as the application of big data, the development of software technology, application technology of Internet of Things, Cloud computing, digital media technology and the

application of various technologies. In addition, they can be trained in network design and construction, software development engineering (mobile terminal) and Internet of Things and master the technologies of network, software development, cloud computing and Internet of Things. What's more, they can apply the theories and principles of what they have learnt into the design, organization and construction of network engineering and verify and reconstruct them. They can be proficient in using programming software to develop software and the design of related application software. We strive for cultivating a group of applied and innovative market-oriented talents who have solid basic theories, extensive professional knowledge and strong abilities in engineering thinking and design.

## VII. CONCLUSION

To sum up, through school-enterprise cooperation in computer application technology and the research of educational and training mode in higher vocational colleges, we can optimize teaching process and improve teaching efficiency. In addition, we can effectively promote teachers' educational and teaching level and improve students' comprehensive quality.

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