

# Research on the construction of the teaching system of “coordinated development and multiple interaction” between higher vocational education and higher academic continuing education

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**Abstract:** Higher vocational education and higher diploma continuing education are two indispensable components in the modern vocational education system. In order to meet the needs of the society for high-quality talents, it is particularly urgent to construct a cooperative development, multiple interactive teaching system. This study aims to explore the construction of the “collaborative development, multiple interaction” teaching system of higher vocational education and higher academic continuing education, and analyzes it from three aspects: resource combination optimization, factor combination optimization and process combination optimization, providing a good tool and means for the development of higher academic continuing education in higher vocational schools, which can keep up with the needs of social development. Further tap the potential of the school itself, and form a high-quality brand of higher education with its own characteristics.

**Key words:** cloud computing; Data distribution; Load balancing

## 1. Introduction

The development of higher academic continuing education in our country has entered a new era, and a great change has taken place in the mission and task. Higher vocational schools should focus on key areas of manufacturing, modern service industry and the needs of rural revitalization, focusing on front-line employees, and hold academic continuing education to serve “knowledge updating and technology upgrading”. As for computer science and technology majors, the target group is mainly IT employees, most of whom have a large workload and need to focus on their work. In order to provide higher academic continuing education suitable for their professional characteristics, advanced technical means such as “Internet +” and big data analysis should be applied to the teaching, give full play to the supporting and leading role of big data in higher academic continuing education, and provide personalized, differentiated and systematic teaching mode for on-the-job IT personnel, so that they can improve their academic qualifications at the same time. Update their knowledge and improve their business ability.

This paper puts forward an educational model of “collaborative development and multiple interaction” for higher vocational education and higher academic continuing education of computer science and technology. Firstly, through big data analysis of various teaching elements such as school situation, teaching situation and learning situation, a more scientific and reasonable teaching curriculum and teacher arrangement plan and teaching method which are more in line with students’ reality is found; Secondly, big data technology is used to build a cooperation platform for schools and enterprises, schools and industries to jointly train talents, so as to provide knowledge and skill education opportunities for more IT practitioners. Finally, with the support of big data, big data analysis framework is adopted to manage higher education continuing education students and promote the modernization of teaching management.

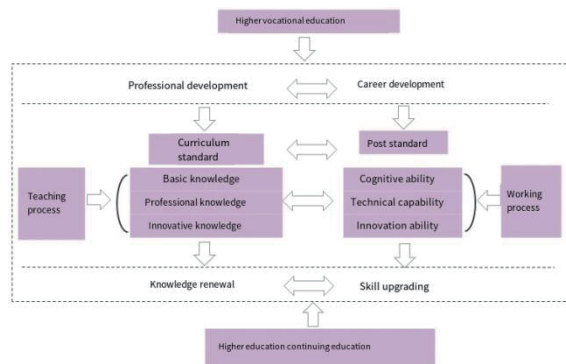
## 2. The construction of “collaborative development, multiple interaction” teaching system between higher vocational education and higher continuing education

### 1. Construction of teaching system

The core concept of the “collaborative development, multiple interaction” teaching system of higher vocational education and higher diploma continuing education is to combine higher vocational education and higher diploma continuing education to form a close synergistic relationship between them. Higher vocational education focuses on cultivating students’ practical skills and professional quality, while higher academic continuing education focuses on improving students’ professional knowledge level and theoretical quality. Through coordinated development, students can gain practical experience and vocational skills in higher vocational education, and then deepen their learning in higher academic continuing education to cultivate higher levels of professional ability and comprehensive quality.

For the major of computer science and technology, we have established a “collaborative development, multiple interaction” teaching system for higher vocational education and higher education. The idea is to conduct big data analysis on the school’s situation, the teaching situation, the situation of on-the-job IT personnel and the social situation they face, etc. On the basis of the major of computer science and technology in our school, To establish a digital and information-based teaching model for computer science and technology major that is suitable for higher education continuing education, as shown in Figure 1.

The construction of the “collaborative development and multiple interaction” teaching system of higher vocational education and higher academic continuing education is based on the combination of professional development and career development. First of all, in the professional development, knowledge update is crucial, we need to constantly update and adjust the curriculum standards to adapt to the changes of the industry and society. This includes the updating of basic knowledge, professional knowledge and innovative knowledge.



**Figure 1: “Collaborative development, multiple interaction” teaching system of higher vocational education and higher continuing education**

(1) Update of basic knowledge: Basic knowledge is the foundation of professional learning and needs to be updated according to the development of the industry and technology. By working with industry experts and businesses to understand the latest industry trends and needs, this information is incorporated into teaching and learning to ensure that students have access to the latest fundamentals.

(2) Updating of professional knowledge: As technology and industry continue to evolve, professional knowledge needs to be constantly updated. By collaborating with professionals and research institutions in related industries, conduct activities such as scientific research projects, industry seminars, etc., in order to gain the latest expertise. At the same time, teachers update their knowledge and constantly enhance their professionalism by participating in training and academic exchange activities.

(3) Innovative knowledge renewal: Innovative knowledge is essential for career development. By encouraging students to carry out innovative research and project practice, students’ innovative thinking and problem-solving ability are cultivated. At the same time, students are encouraged and guided to participate in scientific research and innovation activities, as well as to cooperate with enterprises and social institutions, so as to acquire the latest innovative knowledge.

Secondly, in terms of career development, skill upgrading is of great importance. Post standards need to be developed and integrated into the teaching process to enhance students’ cognitive, technical and innovative abilities.

(1) The formulation of post standards: according to the specification of the abilities and skills required for vocational posts, the post standards should be jointly formulated and incorporated into the teaching plan and curriculum. In this way, it can ensure that students acquire skills and abilities that match the needs of the occupation during the learning process.

(2) Ability improvement in the working process: through practical teaching, internship and training, students can improve their cognitive ability, understanding and application of professional knowledge; Cultivate technical ability and master practical operation skills; And developing the ability to innovate, solve problems and propose innovative solutions.

## 2. Major reforms in the teaching system

Through the updating of knowledge in professional development and the upgrading of skills in career development, the “collaborative development and multiple interaction” teaching system of higher vocational education and higher diploma continuing education can provide students with teaching content and methods that are in line with the needs of the industry and career development. The specific content of the reform is to build a teaching system with combinatorial optimization:

### (1) resource combination optimization

The construction of the teaching system should fully optimize and integrate various resources, rationally allocate and utilize these resources according to the different characteristics and needs of higher vocational education and higher education, and ensure the match between the supply and demand of resources in the teaching process. The professional knowledge and vocational knowledge of computer science and technology majors are combined in an optimized and shared way to provide high-quality teaching resources and digital resources, break through the expansion bottleneck of in-service students’ self-learning resources, and form a more open and dynamic continuing education teaching system.

### (2) Element combination optimization

The construction of the teaching system optimizes the combination of various teaching elements, including teachers, students, courses, etc. Teachers are the core elements in the teaching process and need to possess professional knowledge and teaching ability, as well as the ability to interact and communicate with students. Students are the main body of teaching and need to actively participate in learning, cooperative learning and practical activities. The course design should meet the requirements of higher vocational education and higher educational continuing education, and fully consider the characteristics of on-the-job, part-time and independent learning of on-the-job IT personnel, and can combine practice and theory to provide diversified learning content and ways.

### (3) Process combination optimization

The teaching process is flexible and diverse, able to adapt to different types of students and learning objectives. The combination of face-to-face teaching, practical operation, practice training and other forms can meet the practical needs of higher vocational education; At the same time, it provides online learning, distance education and other ways to meet the flexible needs of higher education.

### 3. Implementation of teaching system

The implementation of the “coordinated development, multiple interaction” teaching system for higher vocational education and higher education continuing education of computer science and technology majors is mainly carried out from four aspects:

#### (1) Developing teaching content through school-enterprise cooperation

Higher degree continuing education of computer science and technology majors is aimed at on-the-job IT personnel, and should highlight the two-way cultivation of knowledge and skills. Therefore, this project not only conducts detailed research on similar vocational colleges, but also engages front-line senior engineers as part-time teachers in cooperation with professional school-enterprise cooperative enterprises to jointly formulate teaching plans and develop course content. To enhance the applicability and practicability of professional teaching and curriculum development, so that on-the-job IT personnel can really improve their education while learning and applying what they have learned.

#### (2) Use big data technology to integrate teaching platforms

Combined with the characteristics of on-the-job, part-time and independent learning of IT practitioners, through the integration of big data technology resources and the special courses built by ourselves according to professional characteristics, diversified courses close to the actual situation of on-the-job IT personnel are set up, and the course content is selected by big data analysis to increase practical and targeted teaching content. Vigorously develop micro-lessons, practice operations, course tests and so on that IT staff are happy to see, so as to solve the problem of contradiction between work and study of IT staff.

### 3. Improve teaching quality through big data analysis

In the teaching process, the learning data collected by big data is used to carry out teaching diagnosis, analyze the variable factors such as the learning status, psychological status and cognitive status of on-the-job IT personnel, and timely find out typical problems, personality problems, common problems and potential problems in course learning, dynamically adjust the teaching progress, improve teaching in a targeted way, and make teaching dynamic. Ensure the quality in the teaching process.

### 4. Construct learner portrait to do teaching support

In the teaching process, big data is used to conduct a comprehensive analysis of the learning status of on-the-job IT staff, construct learner portraits, identify high-risk learners, judge the difficulties they may encounter, and carry out targeted intervention. Not only the data, information and knowledge are presented to the on-the-job IT staff in a visual and intuitive way, but also the learning resources are accurately pushed to them, and the knowledge content and learning partners are supplemented to meet the needs of students’ personalized learning.

### 5. Conclusion

The “collaborative development and multiple interaction” education mode of higher vocational education and higher continuing education of computer science and technology majors promotes the high-quality development of higher continuing education in higher vocational colleges, and solves the problem of improving the quality of higher continuing education in higher vocational schools. On the one hand, further optimize the internal reform, take big data as the underlying structure of the quality monitoring data platform, form a diversified collaborative and comprehensive data governance structure, promote the reform of school-running system and mechanism, and establish a structural and procedural collaborative mechanism of “numerical governance”; On the other hand, to improve the effectiveness of data empowerment, under the support of big data, through the intelligent teaching system, to achieve long-term, all-round tracking analysis of the education object, tracing the learning record of the whole process of learners, and more accurately teaching quality in the education process. The framework results of this paper will provide reference for the reform of higher education continuing education of other majors in higher vocational colleges, and provide research basis for the teaching reform in related aspects.

### References:

- [1] Libin Hu, Di Gao. Research on the transformation and development of Continuing Education in the era of Big Data [J]. Vocational Education Forum, 2018(2):96-101.
- [2] Ning Zhang. Construction of Continuing education System for Professional and technical Talents from the perspective of New Normal [J]. Chinese Adult Education, 2017(11).
- [3] Fengyue Liu, Yue Hua. Research on Training of New Generation Migrant workers based on Collaborative innovation [J]. Vocational Education Forum, 2013 (21) : 56-59.
- [4] Weihua Chen, Guixia Ma. [J]. China Adult Education, 2013 (7) : 153-155.
- [5] Jingtao Sun. Quality Control of Network Training for Civil Servants and professional and technical Personnel [J]. Continuing Education, 2012(4).

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