Analysis on the Construction of Modular Teaching System in Colleges and Universities from the Perspective of Integration between Industry and Education

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Abstract: In China's rapid economic and social development, there are problems, such as economic restructuring and industrial upgrading, the emergence of homogenization of higher vocational development, the difficult employment of students and other issues, the urgent need for high-level applied talent. The social needs-oriented through the integration of production and teaching to train applied talents play a vital role in it. In the process of transformation, we need to further deepen our understanding of transformation, achieve scientific positioning, deepen the means of comprehensive reform, and take service enterprises, service places, docking industries as goals of local higher vocational training. This paper introduces the idea of mathematical modeling, makes modular teaching to higher vocational, trains talents according to the needs of the market industry, imparts knowledge according to the needs of the job, and finally achieves the training goal of graduates' ability to perform the task of actual work.

Keywords: Integration of Production and Education; Modular Teaching; Vocational Talents

1. Introduction

With the development of China's economy and society and the implementation of innovation-driven development strategy, the relationship between talent supply and demand has undergone profound changes, in the face of economic restructuring, industrial upgrading, the pace of industrial upgrading, the structural contradictions of higher education is also more prominent, the problem of graduate employment difficulties has not been alleviated with the increasing number of graduates year by year, production services in the first line of the shortage of applied, composite, innovative personnel training mechanism has not been fully established, talent training structure and quality is not fully adapted to the requirements of economic restructuring and industrial upgrading [1-3]. At the fourth session of the 12th National People's Congress, it was mentioned that the traditional undergraduate colleges and universities with the conditions should be encouraged to shift to applied, and Education Minister Yuan Guiren stressed that local universities should take the lead in the transformation, aiming to train applied technical and skilled personnel to adapt to economic transformation and local economic and social development. In this context, in order to actively adapt to China's economic development into the new normal, actively integrate into industrial transformation and upgrading and innovation-driven development, local engineering colleges and universities need to further transform the idea of running schools to serve local economic and social development, through the integration of school-enterprise cooperation to train applied technology skills, improve the school's ability to serve regional economic and social development and innovation-driven development, the ability to serve the technological progress of industry enterprises, the ability to create value for learners. Then, one of the main problems to be solved in the transformation of higher vocational posts is the deep integration of production and teaching, and the integration of school-enterprise cooperation in production and teaching is the only way to train applied technical skills. Whether from the level of national development strategy, or from the social demand for talents, as the backbone of the

popularization of higher education, the transformation and development of local engineering colleges to applied technology institutions of higher learning has become an inevitable trend and imminent [3-6].

2. Research Based on the Integration of Production and Education

2.1 Technical Characteristics of the Integration of Production and Education

"Production and teaching" can be understood as "production and teaching", in which "production" (including services and management) is an important form of vocational education teaching, focusing on the practical situation of teaching, "teaching" focuses on knowledge content and skills, methods of learning. the integration of production and education is an organic whole formed by the integration of industrial system and education system. Specifically, the integration of production and education is the education sector (mainly institutions) and the industrial sector (industry, enterprises) in the social context, fully rely on their respective advantages and resources and advantages, based on mutual trust and contract, to serve the economic transformation and meet demand as the starting point, with the co-education as the core, with win-win cooperation as the driving force, with school-enterprise cooperation as the main line, project cooperation, technology transfer and joint development as the carrier, with the cultural integration of the industry, the education of the internal and the optimization of the various elements and high integration, the participation of the main body to cooperate with each other as an economic education activities.

2.2 Technical Features of Modular Teaching

The so-called module describes a combination of teaching activities around a particular topic or content, or a module is a content and time-based self-contained, credit- and detectable, limited content of the teaching unit, it can be composed of different teaching activities. the module includes a single course, a combination of several relevant course knowledge points, an experimental course, or internship, a combination of theoretical courses and practices, around a specific topic or content of the teaching module. Modules is designed with application ability as the starting point, and when the student completes a module, he should be able to acquire the ability of the relevant aspects. From "What I'm Going to Teach" to input-oriented (Input-Orientation) to "What students should get through learning" in the knowledge output-oriented philosophy of teaching. There are great differences between traditional teaching and modular teaching in educational concepts, which are the embodiment of the tendency of education to go beyond the tendency of instrumentalization and attach importance to promoting human development. At the same time, the traditional curriculum and the module curriculum in many elements of the curriculum there are great differences, from the perspective of modern education, modular teaching process is undoubtedly more in line with the requirements of modern society. As shown in **Table 1**, a comparison of traditional teaching with modular teaching concepts is shown. A comparison of the elements of traditional and modular teaching is shown in **Table 2**.

Table 1: Comparison of Traditional Teaching and Modular Teaching Concepts

Traditional teaching	Modular teaching
Know what it is.	know what and why
Theory is more important than practice	Theory and practice are equal and important
Focus on education	Comprehensive education
Teacher's Center	Student Center
Passing knowledge	Get knowledge
Education programs	Research Program
Teacher guidance and professor	Teacher assistance, encouragement, assessment

CNKI is currently the most authoritative academic document action database, which not only has a powerful search paper function, but also through keywords can also obtain the attention of scholars to a certain issue in the past period of time. the author typed "modular teaching" in the column of CNKI's key words to obtain a trend chart of research trends in modular teaching from 2000 to 2016.

Table 2: Comparison of elements of Traditional and Modular Teaching

Index	Traditional teaching	Modular teaching
Learning assessment	Subjective evaluation of teachers	Objective evaluation indicators, students can clearly know how and when to achieve the results of learning
Learning process	Teacher-oriented, pay attention to the role of teachers	Student-oriented, pay attention to student's activities
Learning results	Some students are excellent, some students fail	All students have access to their own programs Success
Learning goals	Generally, not announced in advance	Announced before the start of the course
Learning status	Passive	Be proactive
Teaching organizations	Group classes, pre-defined	Highly personalized learning, students can have independent time, location, etc.
The role of teachers	Transfer knowledge	Assess, guide learning, motivate, and provide resources
Course exams	Grade assessment of the entire course of learning	Learning goals to achieve assessment, necessary skills assessment

3. Construction of Modular Teaching System Under the Field of Vision of the Integration of Production and Education

3.1 The idea of Building the Teaching System

"The internal structure of the curriculum is composed of the objectives of the curriculum, the content of the curriculum, the way of learning activities and the evaluation and so on. " the curriculum content is the core element of the curriculum composition, and it is also an integral part of the internal structure of the course. It can be said that there is no curriculum content, the curriculum is also impossible to talk about. the construction idea of modular teaching content mainly draws on the thought mode of mathematical modeling, first of all, determinethe the curriculum objectives and construct the modular teaching content under the guidance of the curriculum objectives. the construction of modular teaching content mainly includes the organization and content system of modular teaching content.

The integration of mathematical modeling thought into classroom teaching is a good reflection of constructivism theory. It embodies the teacher-inspired guide students to use mathematics knowledge, through a series of processes to solve new practical problems. Here, students' mathematics learning is a process of re-creation and re-creation of knowledge. In the mathematics modeling thought into teaching, students no longer passively accept the book ready-made knowledge, but from the reality of life, through observation, thinking, contact and contrast, solution, testing to obtain the experience of active learning. In this process, students have produced effective knowledge migration behavior, make good use of the knowledge learned, and put the new knowledge experience into the existing cognitive structure, completed the process of knowledge construction. At the same time, under the guidance of mathematical modeling thought, students' thinking activities are also fully reflected in the process of learning. Teaching this kind of thought method to students is of great positive significance to the realization of quality education and the all-round development of students. Based on the integration of production and teaching under the field of view, the introduction of mathematical modeling ideas in the modular teaching of higher vocational education, what kind of talents enterprises need, what kind of teaching we carry out, output the talents that enterprises want.

3.2 Establishment of the Goal of Teaching System

The value orientation of "student-oriented" in modular teaching is an echo of the concept of reform of ordinary higher vocational courses. "Make every school successful, make every student successful, this is the basic concept of

this curriculum reform", such a value concept will fully respect the students' diverse development needs in the specific aspects of curriculum design, reflecting a high degree of humane care.

Teaching goal is derived from the two aspects, students and businesses. Students are the central part of the course; the enthusiasm and initiative of student's main body participation is the important guarantee of success. the module curriculum from the perspective of enterprise, enterprise purpose is to benefit maximization of choose and employ persons, therefore, needed to understand the business from the perspective of integration education, determine the course objectives.

3.3 Teaching System Curriculum Content Selection

The concept of goal-led content gives schools and teachers greater freedom to choose their curriculum content. Therefore, how to choose the scientific module teaching content under the guidance of the goal has become an important subject. the content of the course content is mainly as follows: First, not all experience can become the curriculum content, only the educational ally experience that can promote the all-round development of students can generate the curriculum content; the course required by enterprise is a course with strong practicality, and direct experience plays an important role in the course content.

4. Application case of Teaching System

4.1 Introduction to the Actual Case

In the case of Jiaozuo University, in response to the national call, the school has been teaching the "production and education integration" modular teaching since 2006, and the teaching policy of cultivating applied talents. As of June 2016, the school has established six provincial technology demonstration teaching centers, namely, Digital Media Experimental Teaching Center, Automotive Experimental Teaching Center, Digital Art Experimental Teaching Demonstration Center, Civil Engineering Experimental Teaching Center, Fermentation Engineering Experimental Teaching Center, Computer Integrated Practical Training Experimental Center, and 165 large enterprises and research institutions in China have also launched internship and learning cooperation programs.

4.2 The Conclusion of the Experiment

With the continuous advancement and solid development of the school-Enterprise Cooperation Alliance and modular teaching, the achievements of Jiaozuo University in production, learning and research are remarkable. At the same time, the school scientific research team participated in and developed a total of more than 90 national and provincial scientific research projects, for schools and enterprises to obtain government subsidies of about 12 million yuan, and is expected to achieve economic benefits of up to hundreds of millions of yuan, and these funds directly to the production and education integration module teaching system amount has also achieved a year-on-year increase.

Since its promotion in 2004, Jiaozuo University has seized the opportunity of a local economic and industrial transformation and upgrading, focusing on modular teaching. When Jiaozuo University tasted the sweetness of the integration of productive and educational modular teaching in its transformation and development, the school had a good situation of hot enrollment and smooth employment in both enrollment and employment. Take the 2016 undergraduate enrollment and employment situation, for example: the first volunteer admission rate for undergraduates increased from 8% in 2004 to 100%, and the graduate employment rate increased from 79% in 2004 to 98%. It can be seen that Jiaozuo University adhered to the modular teaching system of many years of production and teaching integration mode, explored the transformation and development of local engineering colleges and universities of new ideas, its teaching model to do the characteristics of local engineering colleges, set up their own brand, Walkin in the national local engineering colleges transformation and development of the road to the forefront of the transformation and development of other local engineering institutions played a very good role in the demonstration.

4.3 Strategic Recommendations for Modular Teaching System

Promote modularity within the senior level: Applying a professional ally's isolated modules

in a higher vocational position can lead to problems that are incompatible with other professions. the establishment of a new system should be carried out throughout the school and should be implemented across departments and even across schools in similar professions in other schools.

Uniform module size, in a professional talent training program or in the process of cross-system cooperation module steam, must be module in different majors with compatibility as a prerequisite.

Classify different types of professional modules, and what knowledge and competencies will be imparted will be determined by the professional designers. To do this, modules that are important to a particular discipline from the total "module pool" in a school should be divided into categories.

5. Conclusions

Under the field of view of the integration of production and education, the modular teaching structure can better adapt to the changes of social and economic development and meet the needs of enterprises. For a senior position, facing increasing competitive pressure and being plagued by limited resources, it is necessary to pool its strengths. the flexibility of the teaching arrangement also meets the ever-increasing interdisciplinary and international needs, and modularity also makes it easier to open and hire visiting professors at home and abroad. Based on the background of the integration of production and teaching, this paper analyzes the construction of the modular teaching system of higher vocational education, and finally verifies the validity of the teaching system by example. Therefore, the research of this paper promotes the study of the integration of modular teaching and production and teaching.

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