Model Design of "Point-Line-Face-Body-Net" Curriculum System for Application Technology

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Abstract. With the official release of the Ministry of Education, the National Development and Reform Commission and the Ministry of Finance in October 2015 on guiding the transformation of some local undergraduate colleges into applied applications, the future application of technical undergraduate colleges will account for the total number of undergraduate universities nationwide. More than 50% of the work is suitable for the construction of professional curriculum system in applied undergraduate colleges. The traditional curriculum architecture is constructed according to the disciplinary system. It focuses on the classification, induction and storage of knowledge, and is more suitable for the cultivation of research-based talents with thick foundation. For the cultivation of applied talents, a curriculum system based on knowledge application is needed. Combining the experience of many years of applied curriculum reform, the author first proposed the "point-line-face-body-network" curriculum system model, and proposed the "four-step method" of curriculum design according to Professor Jiang Dayuan's "systematization of work process". It provides a certain reference for universities that are undergoing transformational development and curriculum reform.

Background of Modern Vocational Education Reform

On February 26, 2014, Premier Li Keqiang presided over the State Council executive meeting, deployed to accelerate the development of modern vocational education, and guided a group of ordinary undergraduate colleges to transform into applied technology universities, opening up the upward channel from secondary vocational, specialist, undergraduate to postgraduate education. With the official release of the Ministry of Education, the National Development and Reform Commission and the Ministry of Finance in October 2015 on guiding the transformation of some local undergraduate colleges into application-oriented, the direction of local university transformation is more clear.

According to the statistics of the Department of Development Planning of the Ministry of Education in 2016, there are 1219 undergraduate colleges in China, including 1106 local undergraduate colleges (including 423 private colleges), accounting for 90.73% of the total number of undergraduate colleges and universities nationwide. With the rapid expansion of the scale of colleges and universities, the shortage of students, the characteristics of running schools are not obvious, the students' practical ability is weak, and the professional skills are low. In this regard, Vice Minister of Education Lu Hao pointed out at the China Development High-level Forum that “more than 600 local undergraduate colleges will shift from applied technology to vocational education.” It can be seen that future applied technology-based undergraduate colleges will it accounts for more than 50% of the total number of undergraduate universities nationwide.

The Key to the Transformation of Applied Technology Universities

The teaching mode of higher education in China has always been based on the elite education of research universities. From the design of curriculum system to the choice of course content to the
method of teaching, all of them are infiltrated into the induction and memory of the knowledge system and the theory of light practice. Education and teaching methods, but with the popularization of higher education from elite education to popular education, most college graduates have migrated from scientific research to applied technology jobs, and work level and work area have undergone major changes. Therefore, the traditional teaching mode has been unable to adapt to the teaching needs of applied technology undergraduate colleges.

Regardless of the major, the path design of the talent training program can be achieved by referring to the six steps of “establishing training objectives – clarifying graduation requirements – designing the curriculum system – designing course content – teaching staff construction – teaching resources support”. System design is the core issue of the whole talent training program. It is not only the training path to achieve the goal of talent training, but also the guiding principle of curriculum content design, and an important reference for teachers and other resources construction.

However, at present, the design of professional personnel training curriculum system in colleges and universities in China is basically a tree structure based on knowledge reserve. It is usually composed of public courses, professional basic courses, professional courses and practical courses. The structure of this course is based on the construction of the disciplinary system focuses on the classification, induction and storage of knowledge, and is more suitable for the cultivation of research-based talents with a thick foundation. For the cultivation of applied talents, a curriculum system based on knowledge application is needed. This kind of curriculum system not only has certain requirements for students' theoretical knowledge, but more importantly, it has a more obvious effect on the cultivation of students' practical ability. There should be an organic connection between the courses. Teachers should be based on social needs, with real projects as the carrier, focusing on the integration of knowledge points in relevant fields. Students should do it in the middle school and gradually internalize knowledge into Skills, and ultimately achieve the purpose of the application of technical talent training.

In view of this, the author puts forward the design idea of the application-oriented "point-line-face-body-network" course system model based on the systematic design of the course structure of Professor Jiang Dayuan's work process. The following is an example of computer network course.

Based on the Work Process Systematic Curriculum Design Steps (Four-step Method)

According to the systematic process of work process, the steps of structural design of the "Computer Network Technology" course are as follows:

Step 1: Restore the work process
Design projects according to the size of the network, with the project (task) as the carrier, according to the order of network scale from small to large, design 4 learning scenarios, namely, dormitory network formation, home network formation, campus network formation, government and enterprise network formation; Guided by the working process of network formation, design six implementation steps, namely network planning and design, communication cable production, switch settings, router configuration, server configuration, network security settings; repeated learning processes in different learning situations It is a step, the content is not repeated, the learning situation is from easy to difficult, the implementation steps are from simple to complex, and the skill is mastered from shallow to deep.

Step 2: Decomposition Capability Unit
According to the four learning scenarios and the six implementation steps designed in the first step, 25 capacity units should be set. The design of the capability unit should fully consider the difficulty of the project, the integrity of the project, the learning and training time, and so on. Designed and developed in accordance with the existing teaching hardware and software conditions of the school, and in the process of teaching implementation, as the learning situation changes from simple to complex, the time spent by the teacher is less and less, and the time spent by the students is becoming
more and more The more skills training progresses, the more demanding requirements are gradually improved.

Step 3: Set the ability goal

Determine the competency goals and assessment styles of the 25 competency units. For a course, students should have certain comprehensive technical skills in addition to a certain theoretical basic knowledge, and have the ability to solve relatively complex problems in engineering. Therefore, the corresponding competency requirements of the 25 competency units must be clear, and the assessment method of each competency unit must also provide necessary explanations to the students in advance, and specific quantitative explanations should be made in the syllabus or curriculum standards and the opening instructions. Students who have mastered 25 sub-capabilities will be able to have the comprehensive technical capabilities of computer network engineering implementation.

Step 4: Inductive "Double-Based Double Skills"

The curriculum structure design based on the systematic process of work process emphasizes the application of knowledge, emphasizes engineering practice, and reflects the cultivation of skills. However, it does not abandon the traditional disciplinary system and has its own way. In the process of “doing and doing middle school”, the course involves the relevant knowledge points have been internalized into the training of skills. Although the traditional disciplinary structure has been broken, the basic theoretical knowledge is still preserved. The double-base and double skills summarized in an applied course can basically cover the knowledge points of traditional courses. This course is based on the ability of 25 competency units to summarize 53 basic concepts and basic theories, 50 general skills and professional skills for 3 different professions.

The Design of the "Point-Line-Face-Body-Net" Course System Model

The fourth part of the above-mentioned curriculum-based design steps (four-step method) based on the work process summarizes 120 knowledge points and skill points. These knowledge points and skill points constitute the smallest unit of the course, knowledge points and skill points. The integration can form a competency unit. The combination of competency units can constitute a learning situation. The combination of learning situations can constitute a curriculum unit. The combination of curriculum units can constitute a curriculum system. Therefore, according to the "Knowledge Skills Point-Capability Unit-Learning Situation-Course Unit The order of the "course system" is combined and visualized in turn, which can form a cubic curriculum knowledge system model.

Then connect the relevant knowledge points in different competency units in different situations in different courses to form a "point-line-face-body-network" course system mode.

1. Incorporate 120 knowledge points and skill points according to the work process;
2. Connect the points into lines to form 25 capacity units (including capability target requirements);
3. Connect the lines into faces to form four learning situations (each situation includes six major implementation steps);
4. Connect the faces into one to form a course unit;
5. Connect the body into a network to form a professional curriculum system;

The structural relationship of the "point-line-face-body-net" course system model is as follows:

1. A curriculum system (network) consists of multiple modules (body);
2. Each course unit (body) consists of 4 different learning situations (faces);
3. Each learning situation (face) consists of multiple competency units (lines);
4. Each competency unit (line) consists of multiple knowledge points and skill points (points);

Based on the above design ideas, the traditional discipline-based curriculum system has been deconstructed, and then systematically and logically designed to reconstruct and form a new structure, namely the “point-line-face-body-network” curriculum system. This new “net-type” structure breaks through the barriers between different categories of traditional “tree-type” curriculum systems, the relative independence of courses, and the lack of organic links. The whole system presents a
“stratification”. - The organic structure of the interweaving, the content integration between the courses is realized, the students' comprehensive ability is more emphasized, and the professional quality of the students is improved.

Conclusion

The transformation of applied technology in undergraduate colleges is a systematic project involving the adjustment of school ideas, the construction of software and hardware resources, the construction of faculty, and the reform of the curriculum. However, the core of the university is the curriculum. The key to the success of the transformation must also lie in the curriculum. Therefore, the application-oriented curriculum reform is the top priority of the transformation and development work, and the application-oriented curriculum construction is the connotation of transformation and development. The construction of the application-based curriculum system is the top-level design of curriculum construction, and is the cornerstone of the design of all curriculum content in the system. Therefore, laying the foundation, doing the top-level design, deconstructing and reconstructing the curriculum system are prerequisites for the implementation of the application-based curriculum reform. One. Combining the experience of many years of applied curriculum reform, the author first proposed the "point-line-face-body-network" curriculum system model, and proposed the curriculum design "four-step method" according to Professor Jiang Dayuan's "system of work process" theory.

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