

Research on the Reconstruction of Teaching Content System and Specific Measures of Basic Computer Courses from the Perspective of Autonomous Controllable Platform

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Abstract. In order to implement the educational policy in the new era, the paper proposes to reconstruct the teaching content system of basic computer courses. It aims to form an employment ability tree that can benchmark the actual job demands with the guidance of the precise connection between the supply side of talent training and the future demand side of enterprises. Starting from the preset training needs of technical talents on autonomous controllable platforms in China, and faced with the practical problems by the teaching of basic computer courses, the teaching content is reconstructed by the three-step method of "update - feedback - continuous learning". In the process of concrete implementation, the knowledge map of "point, line and plane" is established and the PDCA cycle model of "plan-do-check-action" is adopted to implement teaching; Bring together, build and share high-quality curriculum resources to improve teaching quality. High-quality course resources are gathered, built and shared to improve the teaching quality.

1.Introduction

With the implementation of a series of major power strategies in the new era, emerging technologies represented by cloud computing, big data and artificial intelligence continue to emerge, which puts forward content innovation requirements for the teaching content of basic computer courses in all majors and levels of higher education institutions.

2.The preset training needs of technical talents on autonomous controllable platforms

"Four New" construction is the "Chinese plan" of higher education personnel training and the strategic layout of high quality education development. Among them, the "new engineering" education puts forward new requirements for the competency of positions, and its practical ability, comprehensive ability, innovation ability and adaptability show new characteristics and new standards such as "integration of science and technology, crossover of specialties, and business expansion" [1] [2]. The core competence of the existing positions of engineering professional education is difficult to meet the new needs of new positions in the new era, facing the practical problem of lack of composite technical talents.

In 2013, the incident of Prism Gate broke out, arousing extensive attention to the problem of information security.

The development and design of underlying chip has grown from scratch to CPU. Breakthroughs have been made in the fields of next-generation operating systems and GPU storage. Alternative solutions have emerged for basic software. However, the technical talents training of computer teaching courses cannot meet the preset training requirements of technical talents on the autonomous controllable platform [5]. Therefore, computer courses should be studied from the basic teaching level in terms of curriculum training objectives, teaching content system, course supporting resources and post capacity generation [4], so as to form excellent courses such as knowledge map tree, project-style three-dimensional textbooks, course supporting resources, first-class courses and other excellent teaching results. Only by thoroughly solving teaching pain points and improving teaching quality can we play a positive role in long-term talent reserve for the rapid generation of new quality and new fields in the new era.

3.The problems in the teaching of basic computer courses

First, the existing teaching content is difficult to meet the actual post needs of students. At present, the teaching of computer courses is universal teaching, and the contents of computer courses taught by different majors are the same, without distinguishing and focusing on the different characteristics of majors, which is not conducive to the cultivation of students' working ability. Second,

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curriculum content lags behind the development of emerging technologies. Various emerging technologies are highly integrated with computer technology, and our country is in urgent need of professional compound talents. [9]While the teaching content of computer courses is not updated in time, many new technologies and ideas of computer development are not timely entered the classroom, and the teaching content is outdated and lagging. Third, there is a lack of controllable content in computer courses. The domestic demand for computer autonomy and controllability is more and more intense, and building an autonomous controllable platform is the general trend. However, the current teaching environment of computer hardware and software mainly relies on foreign software and hardware to carry out teaching implementation, leading to the lack and blank of teaching content in the aspect of autonomy and control.

In order to fully implement the Party's educational policy, carry out the fundamental task of cultivating virtues and cultivating people, and cultivate socialist builders and successors with all-round development of morality, intelligence, physique, beauty and labor, we take the precise connection between the supply side of talent training and the future demand side of enterprises as the guideline and theoretical basis. Students' working ability tree is formed according to the actual job demand. Based on the employment ability tree, the teaching objectives are formulated, including knowledge objectives, ability objectives and comprehensive quality. The curriculum group adopts the three-step method of "update - feedback - continuous learning" to reconstruct the teaching content system. Next, it adopts the "plan-do-check-action" cycle mode for teaching organization, and then carries out specific teaching implementation by combining online and offline mixed teaching methods. [10]In terms of reconstructing the teaching content system, according to the characteristics of basic computer courses, the general basic knowledge will remain unchanged, cutting-edge knowledge and independent and controllable ecological environment will be added, and the lack of independent and controllable teaching content of software environment and hardware environment will be made up. See figure 1.

4.Reconstruction of teaching content system in the basic computer courses

4.1.The concrete implementation framework of teaching content system reconstruction

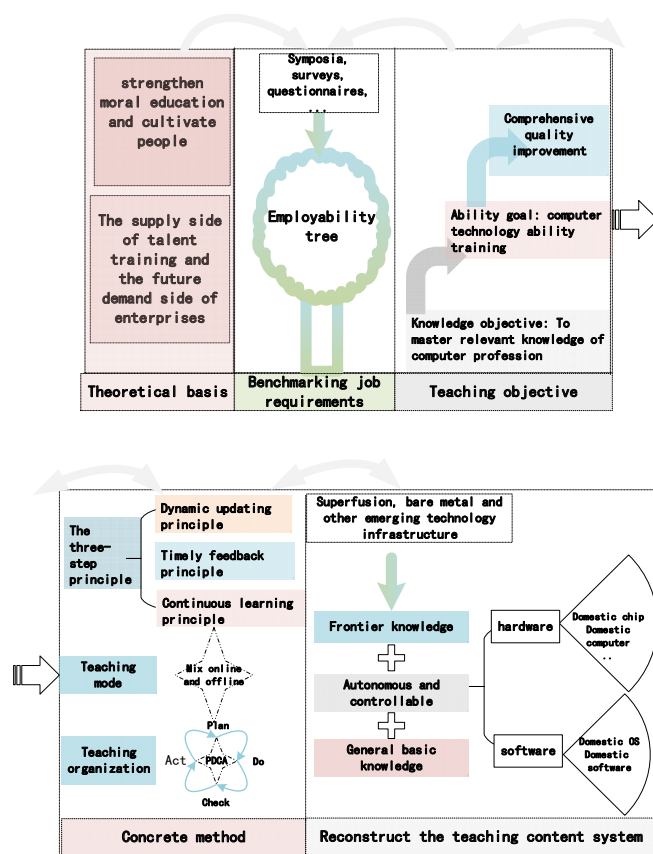


Figure 1 Theoretical basis and main methods for solving the problems

4.2.Forming position competency tree that marks the actual job requirements

Aiming at the demand of students' position, Our course team try to form the position ability tree of the actual position. The course team goes deep into companies,

enterprises and other relevant units and departments in need of technical talents. Through symposiums, questionnaires, surveys and other means, we collect targeted materials, including the new demands for computer technology ability of higher education student after taking office and the expectations of the actual

working units for the talents with computer technologies cultivated by colleges and universities. Finally, we summarized and extracted the ability objectives to be achieved by the course, formed the employment ability tree, and constructed the trinity of "point, line and plane" curriculum knowledge map tree.

4.3.Reconstructing the teaching content system with the three-step method of "updating, feedback-continuous learning" [8]

Step 1: Dynamic update principle. The course content is based on "keeping the basic content basically unchanged", and takes the general basic knowledge of computer courses as the main body to construct the fixed part of the course content.Characterized by "keeping new content and new technology adjustable at any time", supported by emerging technology infrastructure such as hyperfusion and bare metal and the use of autonomous controllable software such as domestic Kirin operating system and Kingsoft WPS office software, relatively independent course content "small manual" is established for different knowledge modules.According to technological development and actual needs, the flexible combination of addition and reduction of this part of teaching content is realized, and the dynamic update and selection mechanism of multi-module course content is realized. Using the methods of "crowd innovation and crowdfunding" and "school-enterprise alliance", and taking the Internet as the communication platform, we will organize and attract technical personnel from colleges and universities, enterprises, research institutes and some companies to complete the content update of the textbook by modules, and form a mature, cutting-edge and flexible textbook for computer courses. [11]On the basis of maintaining the same general basic knowledge, the course content can provide vocational education students of different majors and positions with more targeted training content, and at the same time, it can be more flexible to adapt to the new era of higher education training objectives and requirements and the continuous development of post needs.

Step 2: Timely feedback principle. In teaching, the combination of online and offline teaching mode is adopted. Based on online education platforms such as MOOC platform of China University and MOOC platform of Learning Power, high-quality course resources are pooled, course discussion areas are set up, questions and doubts are answered online, and knowledge level and ability requirements of higher education talents urgently needed by relevant enterprises are collected. Comments and suggestions on curriculum content and teaching methods, so as to update curriculum content and organization and implementation methods in a timely manner. According to the opinions and suggestions of the course content and teaching methods, we timely update the course plan and teaching plan.

Step 3: Continuous learning principle. The course team promotes the construction of a "learning" team model, and makes full use of the discussion of the course team, the guidance of experts and professors, the leading role of

disciplinary pioneers and models, the collective lesson preparation of all members, the concentrated business learning, the collaborative public relations and other methods to establish a continuous and dynamic learning mechanism.We change the concept that teachers attach importance to knowledge imparting, ability cultivation, and light value guidance, and guide all teachers to establish the idea of "curriculum thinking and politics" through various ways [3]. With the goal of ideological guidance and value shaping, we drive teachers to be both "teachers of economics" and "teachers of people", and enhance their professional level of discipline and political theory literacy with both ideas and abilities. In this way, the course contents are constantly optimized .

4.3.1.Adopting PDCA cycle model to organize teaching

According to the personnel training plan and teaching implementation plan, the plan work before teaching is carried out, including the implementation plan, teaching plan, courseware and other five major teaching resources. The "do" stage is the key to carry out the teaching. It follows the purpose of sticking to the reality, laying the foundation, practicing ability and strengthening skills, and achieves the knowledge target of mastering the hardware knowledge and software knowledge of computer courses by means of multi-level project traction. In the ability goal, students can think, analyze and solve problems in the computer way. In the quality goal, students are trained to own computer application ability and certain technical ability. In the check stage, we classify and summarize the feedback opinions collected and sorted in various aspects in the teaching process to form a visual chart, which provides reference and basis for the construction of the next course content system. In the action stage, combined with the development of computer technology and the autonomous and controllable deployment, we constantly adjust the course content system according to the feedback we have collected so as to combine what we teach with what we need more closely.

4.4.Concrete implementation framework

In order to fully implement the Party's educational policy, carry out the fundamental task of cultivating virtues and cultivating people, and cultivate socialist builders and successors with all-round development of morality, intelligence, physique, beauty and labor, we take the precise connection between the supply side of talent training and the future demand side of enterprises as the guideline and theoretical basis. Students' working ability tree is formed according to the actual job demand. Based on the employment ability tree, the teaching objectives are formulated, including knowledge objectives, ability objectives and comprehensive quality. The curriculum group adopts the three-step method of "update - feedback - continuous learning" to reconstruct the teaching content system. Next, it adopts the "plan-do-check-action" cycle mode for teaching organization, and then carries out specific teaching implementation by combining online

and offline mixed teaching methods. In terms of reconstructing the teaching content system, according to the characteristics of basic computer courses, the general basic knowledge will remain unchanged, cutting-edge knowledge and independent and controllable ecological environment will be added, and the lack of independent and controllable teaching content of software environment and hardware environment will be made up. See Figure 2.

5.The innovation point in the concrete implementation process

5.1.Establishing the trinity knowledge map tree of "point, line and plane"

Mind Map is an organizational thinking tool and note-taking method developed by British scholar Tony Buzan [6]. It is an effective graphic thinking tool to express radioactive thinking and a revolutionary method to tap the infinite potential of the brain. The mind map is applied in the teaching of computer courses, each knowledge unit is fully sorted out, specific knowledge points are extracted, and the logical relationship between the two is summarized, so as to complete the structure setting of computer courses. The key and difficult contents of teaching are more prominent in the refining process. The mind map can also be used in the design of the blackboard during the lecture, so that the teaching content is more intuitive and easy to understand.

Using mind map to sort out the course content system can form three kinds of hierarchical tree structure chart. They are respectively knowledge points, knowledge units and knowledge fields (courses), and they build a three-in-one course content system of "points" (knowledge points), "lines" (knowledge units) and "planes". Among them, knowledge is subdivided into three levels: foundation, improvement and expansion, and the level is more targeted.

5.2.Adopting PDCA cycle model of "planning- implement-feedback-adjustment" to organize teaching

5.2.1 PDCA cycle model

"PDCA" refers to the PDCA cycle, also known as the Daiming cycle, which is a general model in management science and a set of "inspiring" classical framework structure mode to promote students to complete learning tasks "efficiently" [7]. The purpose of introducing P (Plan) "plan", D (Do) "implementation", C (Check) "verification", and A (Act) "adjustment" efficient working techniques, namely "PDCA", is to draw knowledge points out by tasks and design teaching contents around knowledge points. Each task is a PDCA cycle, which is composed of four parts. See Figure 2.



Figure 2 PDCA cycle model

5.2.2 Adopting PDCA cycle model to organize teaching

According to the personnel training plan and teaching implementation plan, the plan work before teaching is carried out, including the implementation plan, teaching plan, courseware and other five major teaching resources. The "do" stage is the key to carry out the teaching. It follows the purpose of sticking to the reality, laying the foundation, practicing ability and strengthening skills, and achieves the knowledge target of mastering the hardware knowledge and software knowledge of computer courses by means of multi-level project traction. In the ability goal, students can think, analyze and solve problems in the computer way. In the quality goal, students are trained to own solid theoretical foundation and computer application ability. In the ideological and political goal, students are trained to love our country by science and technology and develop the spirit of exploration. In the check stage, we classify and summarize the feedback opinions collected and sorted in various aspects in the teaching process to form a visual chart, which provides reference and basis for the construction of the next course content system. In the action stage, combined with the development of computer technology and the autonomous and controllable deployment, we constantly adjust the course content system according to the feedback we have collected so as to combine what we teach with what we need more closely.

5.2.3 Gathering, building and sharing high-quality course resources

The construction of high-quality curriculum resources is an important task for the continuous advancement of teaching reform in higher education institutions, and is the focus and difficulty of the in-depth promotion of "Internet +" education. Relying on the national public service platform of education resources, we will build and gather curricular resources to support blended teaching and learning, focusing on the replacement and transformation ability of computing platform, the operation and use ability of office information system, the operation and maintenance support ability of computing platform, the use skills of common tools and software, and the expansion of information service and information system development ability.

High-quality course resources are composed of "micro-teaching materials" and "synchronous courses". "Micro teaching materials" (that is, relatively stable, relatively complete, relatively independent and

indivisible teaching units of core competence in post employment activities) is a new form of teaching materials corresponding to the basic teaching points, integrating information technology, and effectively supporting VR, AR, APP and other new media and technologies by scanning the QR code of paper teaching materials to link relevant resources."Micro teaching materials" can be used independently or in conjunction with online "video classes".

"Synchronous course" is a course resource composed of other media teaching resources with innovative video course as the main line, which supports teachers' daily teaching and blended teaching mode." Synchronous Course" is composed of "innovative video course" and "resource pack" supporting curriculums." Innovative video course" defines the innovative form in the regular video course, and intelligently links video course with learning interactive software to form a video course that conforms to the characteristics of higher education and meets the students' learning habit.The supporting curricular "resource package" includes instructional design instructions, multimedia teaching courseware, online test assignments,online tutoring question answering programs, online teaching management programs,etc.

6.Conclusion

New technologies, new forms, new models and new industries have put forward new requirements for the core competence of higher education, and the new engineering education concept has pointed out the direction for the development of core competence of higher education.The domestic demand for computer autonomous controllable platform is becoming more and more intense, and the establishment of autonomous controllable platform is the trend of the times. The pre-training of technical talents on autonomous and controllable platform is the starting point and destination of the reconstruction of the teaching content system of basic computer courses, which needs constant adjustment and optimization in the concrete implementation process.

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