Research on the Reform and Innovation of Operating System Teaching in the Context of Curriculum Ideology and Politics

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Abstract: *In the context of the Curriculum Ideology and Politics, the current problems of the operating system course are addressed, and the construction plan of combining the construction of the Curriculum Ideology and Politics with the online and offline teaching mode is proposed. The importance of the Curriculum Ideology and Politics in the teaching process of the operating system is explained, and the excavation of Civics elements, the ways and means of teaching reform and innovation, the formulation of teaching reform objectives, and the teaching reform mode are introduced. The reform of the teaching of the operating system course has effectively improved the depth and innovation of the course, enhanced the quality of teaching and students' comprehensive literacy, and achieved better teaching effect and evaluation, hoping to provide reference and reference for other professional courses to carry out the teaching of Civics.*

Keywords: Operating systems; Curriculum Ideology and Politics; Teaching objectives; Teaching mode

1. Introduction

According to the spirit of the National Conference on Ideological and Political Work in Colleges and Universities, the spirit of the National Education Conference and the requirements of the Guideline for the Construction of curriculum ideology and politics in Colleges and Universities of the Ministry of Education (No. 3 [2020] of the Ministry of Education), it is necessary to comprehensively promote the construction of curriculum ideology and politics in colleges and universities, improve the quality of talent cultivation, implement the fundamental task of establishing moral education, and enhance the connotation and level of " Curriculum Ideology and Politics ". The university's curriculum is designed to achieve the organic unity of value shaping, knowledge transmission and ability cultivation. Integrate professional education with ideological and political education, and integrate political identity, national sentiment, cultural literacy, awareness of the constitution and the rule of law, and moral cultivation into the whole process of teaching, so as to improve the quality of talent training.

Guided by the ideology of the new era, we insist on the combination of knowledge transfer and value leadership, using topics and contents that can cultivate students' ideals and beliefs, value orientation, political beliefs and social responsibilities, and comprehensively improving students' ability to analysis facts and reason and distinguish between right and wrong, so that they can become talents with both virtue and talent and develop in an all-round way. All courses need to combine with the characteristics of the curriculum to promote the reform of the curriculum thinking and politics teaching in an orderly manner.

2. Problems in the Teaching Process

Operating System" is a core professional course of Computer Science and Technology, with more theoretical knowledge points and abstract, and very strong practicality, the traditional teaching method can no longer meet the demand of improving students' operation ability and innovation ability. In order to meet the needs of high-speed development, we must break the traditional teaching, take the program as the core, and take Curriculum Ideology and Politics [4] as the grip to stimulate students' interest in learning and improve their innovation ability. It is mainly reflected in the following aspects:

A. the connection between theory and practice is not strong, and students cannot well use the knowledge they have learned to solve practical problems;

B. the Civics element is not fully exploited;

C. the teaching method does not keep up with the development of the times;

D. the assessment form lacks diversity and is not flexible enough.

In view of the current problems of the course "Operating System", we propose the reform and innovation research of the Curriculum Ideology and Politics, pay attention to process assessment, link theory with practice, diversify assessment, dig deeper into the Curriculum Ideology and Politics Science knowledge points of the course, guide students to study consciously and purposefully, and cultivate comprehensive talents who meet the needs of social development.

3. Reform and Innovation of Curriculum Ideology and Politics

Cultivate composite application talents suitable for the development needs of the new era, competent in the technical research, design and development of computer application systems. As the course knowledge points are more, more abstract, not easy to understand, and even some boring, the traditional teaching methods are not conducive to the cultivation of students' comprehensive ability, the urgent need for teaching reform. In the course to find the right integration point of course thinking and politics, digging deep into the course has the course thinking and politics elements and appropriate cases. Adopting a combination of online and offline, in-class and out-of-class, corporate tutors and on-campus tutors, and a "student-centred" teaching philosophy, we cultivate knowledgeable, skilled, cultured, and highly educated composite talents needed in the new era. Make full use of various teaching resources to carry out hybrid teaching reform and innovation.

3.1 Objectives of the Teaching Reform

3.1.1 Knowledge Objectives

To proficiently master important basic principles, basic concepts and basic methods, and to be able to apply mathematical and scientific foundations, engineering foundations, computer expertise and cross-integrated multidisciplinary knowledge to propose systematic solutions for computer application areas.

3.1.2 Skill Point Objectives

To be able to apply the theoretical knowledge, techniques and methods learnt to solve practical problems in reality. Be able to independently design feasible solutions to solve problems by applying operating systems and be able to apply typical methods proficiently.

3.1.3 Vocational Literacy Objectives [3]

To cultivate students' ability to analyze and solve complex engineering problems of operating systems, to cultivate the scientific spirit of being able to think about problems from multiple angles and directions, to be brave to challenges, to be undaunted by difficulties, to innovate and explore, to be rigorous and conscientious, to strive for excellence and to persevere; to cultivate students with good literacy, to abide by engineering ethics and norms, to be able to effectively coordinate and scientifically deal with the impact of computer engineering practice on the environment and the sustainable development of society issues of impact on the environment and sustainable development of society, and be able to adhere to the priority of public interest in engineering practice to establish self-confidence, commitment, craftsmanship, patriotism and professional responsibility, etc.

3.2 Combination of Theory and Practice

The core courses of OS computer science and technology majors, focus on highlighting the practical and innovative cultivation, using enterprises into the classroom, enterprise tutors on the podium, students into the enterprise, so that the course Civic politics elements into the theoretical teaching, concentrated practical teaching, and online teaching process, Curriculum Ideology and Politics into the form can be used course cases, shake, short video, classroom flip interactive, practical teaching and other forms, to achieve The course can be integrated into the course in various forms, such as case studies, short videos, interactive classroom flip, practical teaching, etc. to achieve the appropriate integration of the course's thinking and knowledge.

In order to develop students' ability to develop operating system applications, this course is based

on the Ticketing Management System, General Computer System and Personal Computer System projects.

In the first project students will master the basic concepts of processes, process states and their transitions, process synchronisation and mutual exclusion, deadlock problems, job scheduling and process scheduling algorithms; in the second project students will master job scheduling, process scheduling, scheduling algorithms and real-time system scheduling methods; in the third project students will master storage management functions, partition management functions, page management, segment management and other knowledge points.

This project design has the following characteristics.

A. In terms of project type selection, the projects range from easy to difficult.

B. In terms of content arrangement, the project content ranges from easy to difficult, and after deconstructing and reconstructing the content, the work steps are repeated and the competencies are enhanced.

C. In terms of the assessment of student learning outcomes, the assessment criteria range from low to high.

3.3 Explore the Elements of Curriculum Ideology and Politics Embedded in this Course [2]

In the teaching process, the "Curriculum Ideology and Politics" element of the course is introduced to organically integrate knowledge, ability and quality, cultivate students' comprehensive ability to solve complex problems and abstract thinking, and enhance their sense of responsibility and mission. The Curriculum Ideology and Politics elements is introduced in the teaching process. The main points of the OS curriculum ideology and politics design are shown in Table 1 below.

Table 1: Curriculum Ideology and Politics Building Content in Operating Systems Courses

Serial No.	Knowledge points	Curriculum Ideology and Politics Elements
1	Operating system definition	Technology innovation
2	Synchronization of processes	The universality of contradictions
3	Processor Scheduling Equilibrium	Theory of Thought
4	Memory allocation	Technology innovation
5	Page replacement algorithms	Innovative, exploratory spirit
6	I/O system management	Science and technology is the first productive force
7	Understanding the Linux operating system	Homeland feeling, national self-confidence, responsibility awareness development
8	Linux Common Commands	Footwork, Perseverance, Quantitative Change to Qualitative Change
9	Managing users and groups	System security awareness, legal awareness development
10	Managing and configuring file systems	Optimisation awareness, creative awareness development
11	Disk partitioning	planning, conservation awareness
12	RAID	Data security awareness, energy saving and environmental awareness
13	Network Security Configuration	Network Security Awareness, Professional Ethics
14	Configuring Samba Server	Service Awareness
15	Configuring DHCP servers	Interoperability and orderly service
16	Configuring a DNS server	A sense of reason, responsibility for a strong technology

3.4 Mode of Teaching Reform [5]

3.4.1 Online and Offline Hybrid Teaching

Through the online and offline hybrid teaching mode, the course knowledge system is reconstructed [1]and project-based teaching is carried out; offline meeting classes, classroom flipping is carried out with the objectives of Civics and competencies, and the heavy and difficult issues of the course are solved through a large number of case-based, heuristic, seminar and group confrontation teaching methods to enhance the challenge and high order of the course, which can greatly enhance students' classroom participation. The course adopts case-driven theoretical teaching + scenario-driven practical teaching (using a combination of before, during and after class; online and offline).

3.4.2 Strengthen the Integration of Industry and Education

Enterprise tutors enter the classroom, students enter the enterprise to really learn and practice, the experimental course uses case analysis to lead the principle mechanism, practice instead of lecture, and organic integration with enterprises to strengthen the understanding of industrial industry development requirements and lay a good foundation for future career development.

The Deputy General Manager of the Cloud Computing Division of R&W Software gave a presentation on two main aspects: the current situation of operating systems in China and suggestions for operating system education in universities. He made the following three suggestions.

A. Intensive classroom education in C, data structures and operating systems at the junior level.

B. Combine with open source ecology to guide students to be exposed to or participate in open source practices in the senior year stage.

C. Actively communicate with domestic operating system vendors so that students can be exposed to the engineering practice of operating systems at the social practice stage.

A circular evaluation mechanism has been established to monitor the quality of professional teaching, strengthen continuous quality improvement and ensure teaching quality. He also expressed his hope to combine the current industrial technology needs of the operating system direction, and work with the enterprises present to improve the curriculum objectives of the operating system talent training direction, and reform the relevant curriculum achievement objectives from the lower grades, so as to better cultivate students' comprehensive thinking ability, meet the ability requirements of operating system direction undergraduate graduates, and innovate the integration mechanism of industry and education.

3.4.3 Diversified Assessment Scheme

Table 2: Use of full process assessment (100% of the total)

Serial No.	Assessment content	Appraisal requirements	Assessment methods	Examination Period	Score	Remarks
1	Classroom Attendance	The main focus is on signing in at the cloud classroom, with 5 random attendance checks in the classroom	Roll Call/Blue Ink Cloud Classes	Before Class	10	More than 3 unexcused absences in random attendance checks will result in a failing grade in the overall final assessment
2	Classroom Notes	Summarisation of key knowledge	Checking notes	before class	5	0-5 points depending on the content and quality of the notes
3	Classroom Performance	Be able to actively participate in the classroom interaction	Classroom Mark Grabbing	During class	15	0-3 marks for each session depending on student participation and 3 marks for each knowledge sharing session
4	Classwork	Mastering process synchronisation and mutual exclusion Master the deadlock problem Master job scheduling Master process scheduling	Classwork	During or after class	20	5 points for each assignment, 4 times in total 0-5 marks depending on completion, 2-3 marks for not meeting time requirements
5	Stage Tests	Knowledge tests	Submit class test answer key	In-class test	30	0-30 points based on test results
6	Project Experiments	Knowledge application test	Lab report	After school	20	0-20 points depending on the quality of the report
Total			100			

The whole process assessment method is adopted, consisting of class attendance, class realisation and interaction, assignments, project experiments, stage tests, etc. The course grades can also be exchanged for the results of competitions in the form of credit exchange, for example, winning provincial awards in discipline competitions can be exchanged for the grades of one course; if a national award is won, it can be exchanged for the grades of two courses; it can also be exchanged for the grades of two courses by participating in the Student For example, if you win a provincial award in an academic competition, you can exchange it for one course grade. This will increase students' motivation to study independently. The process assessment mark for this course is 100%, see Table 2 for details.

4. Conclusion

The construction of Curriculum Ideology and Politics is a long-term planning project to encourage more students to train creatively and develop their creative thinking skills. The task requires collaboration between educational and research staff working in various disciplines and social workers to recommend the progress of the project. In the course of the research, some research and practical work was done. Through the study of the OS course, students not only mastered the basic theoretical knowledge of data structures, skills and methods, but also became very skilled in linking theory to practice, and their ability to analysis and solve problems was obviously greatly improved, so that students have a scientific and rigorous attitude, a realistic working style, and a collaborative team spirit. The online and offline hybrid teaching mode is perfectly reflected in the operating system course, and its effect is very good, the reform results provide reference experience for other similar course reform.

Acknowledgements

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