Reform and Innovation of Teaching Civics in the Course of "Operating System"

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Abstract: This paper discusses the reform and innovation of Civics teaching in the course of "Operating System". Operating system is a core professional course for computer science majors, and its theoretical and practical nature is strong and abstract, which makes most students not interested in learning the course. It proposes to apply the online and offline hybrid teaching mode in operating system, through network sharing, updating teaching contents, reforming teaching methods, proposing diversified assessment standards, and examining students' knowledge, ability and quality achievement in multiple dimensions. The teaching practice shows that the introduction of the Civics element in the course and the adoption of the online and offline hybrid teaching mode can greatly enhance students' interest in learning and cultivate their patriotism and responsibility. The reform of the OS course has effectively improved the depth and innovation of the course, enhanced the teaching quality and students' comprehensive quality, and achieved better teaching effect and evaluation, which hopefully can provide reference for other professional courses to carry out the teaching of Civics.

Keywords: Operating systems, Curriculum thinking, Teaching reform and innovation

1. Introduction

The Ministry of Education has released the *Guidance Outline of the Construction of Higher Education Curriculum Ideology and Politics*, to comprehensively promote the construction of higher education curriculum ideology and politics. The *Outline* pointed out that comprehensive promotion of the construction of higher education curriculum ideology and politics is the strategic initiatives to thoroughly implement the important discourse on education and the spirit of the National Education Conference, as well as implement the fundamental task of establishing moral education and cultivate people. Colleges and universities should deepen the reform of education and teaching, fully explore the ideological and political resources of various courses, give full play to the nurturing role of each course, and comprehensively improve the quality of talent training.

2. Problems in the Current Teaching of Operating System Course

Operating system is a core professional course of computer science and technology, software engineering, big data analysis and technology and other majors, theoretical and practical are strong, the content is a bit boring and tedious. Therefore, there are some shortcomings in the traditional teaching mode.

2.1. Disconnection between Theory and Practice

The operating system course has a strong practical nature, the original classroom teaching is mostly based on teachers' theoretical lectures, interspersed with relevant experimental content, the curriculum lacks systematization, which is not conducive to students' digestion and absorption, and there is a disconnect between theory and practice, so students cannot well use the knowledge learned to solve real-life problems.

2.2. Lack of Leadership

The course on operating systems is rich in elements of curriculum thinking, for example, the copyright of operating systems, multi-channel programming, synchronisation and mutual exclusion, etc. can be combined with life examples to teach, and it is easy to draw out some nurturing truths. At

present, this course is not fully exploited and does not provide good leadership.

2.3. Outdated Teaching Methods

The teaching methods are outdated and students lack a sense of innovation when programming and do not have the ability to solve complex problems. The original teaching method is aimed at imparting course knowledge, using the indoctrination teaching method, with the teacher's "teaching" as the main teaching activity, without paying attention to the external motivation of students. Therefore, there is an urgent need to explore new teaching methods and means to stimulate students' internal motivation and bring into play their creativity.

2.4. Single Form of Assessment

The current course assessment scheme for operating systems courses lacks challenge. In the current assessment method, there are two parts: the usual grade and the final assessment grade. Regardless of how the percentage is distributed, this assessment method is prone to the situation of "high marks and low ability" and serious Situation. Therefore, In view of the current problems of the Data Structures course in universities, the teaching should strengthen the supervision of the usual learning effectiveness and pay attention to the process assessment. It should link theory with practice, diversify the assessment, tap the Civic and Political elements of the course, guide students' learning enthusiasm, and cultivate comprehensive talents to meet the needs of social development.

3. Reform and Innovation of Civic and Political Science Teaching in OperatingSystem Courses

Operating system theory is strong, abstract algorithms, through effective and rich example materials, the use of reasonable scientific experiments, improve the education program, must fully stimulate the interest of students.

Analysis and research of the current "operating system" course teaching mode status quo, as well as the existing problems, to understand the direction and objectives of the course Civics reform, in response to the existing problems and deficiencies, the "operating system" course Civics reform and innovation research implementation plan, in order to provide students with real projects, to further deepen the cooperation with enterprises in the integration of industry and education model, research "operating system" course online practical training platform, enrich Teaching Resources.

Cultivate high-end composite application talents in the field of computer application suitable for the needs of socialist modernization in the new era, with comprehensive development in moral, intellectual, physical and aesthetic aspects, who can be competent in technical research, design and development and operation and maintenance management of computer application systems, and become the backbone of professional technical research and development or management in the relevant fields of their units. The course has a lot of knowledge, is abstract, not easy to understand and somewhat boring. Teaching reform is needed. With morality as the first priority, we seek a reasonable integration point between the professional knowledge system and the moral knowledge system, and strengthen the integration and penetration of moral education and professional education; with people as the first priority, we build various online and offline teaching resources, and implement the two-way joint drive of online and offline, in-class and out-of-class teaching[1], fully reflecting the "student-centred" teaching concept. To put the emphasis on talent and cultivate the composite talents needed in the new era with knowledge, culture, skills and literacy.

The following are some of the ways in which blended learning and innovation can be achieved through the use of teaching resources.

3.1. Combination of Theory and Practice

The operating system course is based on the teaching content of computer science and technology, focusing on highlighting the practical and innovative cultivation, using diversified thinking and politics to teach and educate people, so that the thinking and politics elements of the course are integrated into the theoretical teaching, concentrated practical teaching, and the online teaching process, the thinking and politics integration shape can be used in the form of course cases, shake, short video, classroom flip interaction, practical teaching and other forms to achieve the course thinking and politics and knowledge points The course can be integrated into the curriculum in various forms, such as case

studies, short videos, classroom flipping interaction and practical teaching, to achieve the appropriate integration of course thinking and knowledge[3].

3.2. Explore the Ideological Elements Contained in This Course

In the teaching process, the "thinking and politics" elements of the course are introduced to organically integrate knowledge[2], ability and quality, to cultivate students' comprehensive ability to solve complex problems and abstract thinking, and to enhance their sense of responsibility and mission. For example, the following chapters could be designed in this way.

3.2.1. Overview Section on Operating Systems

In Chapter 1, the overview section of operating systems: introduce the Huawei incident, the "chip" incident, the Google cut-off and other incidents, thus highlighting the necessity of developing domestic operating systems and the importance and urgency of attaching importance to the software ecology, and understand the development path of domestic operating systems through the chat box on the left side of the screen, so as to stimulate students' sense of responsibility and mission, sense of responsibility and mission.

3.2.2. Process scheduling Algorithm Section

In the content of process scheduling algorithms in Chapter 2: introduce the theory of balance in philosophical thought to show that there is no absolute superiority or inferiority of any algorithm, there is no best algorithm only suitable algorithm. Students are told not to pursue high precision in their future studies and work, but to consider all factors and choose the most suitable solution to achieve the most important overall balance.

3.2.3. Deadlock Problem

In Chapter 4, the operating system deadlock problem: improper competition can cause deadlocks, and coordinated allocation of resources is required for all processes to execute in an orderly manner thereby incorporating the core socialist values of sharing with harmony. Through hot news and movies, we illustrate that mutual stomping and fighting will lead to a total loss and mutual support will lead to a win-win situation. We advocate that we should stay away from the courtly social style and face society with the mentality of mutual benefit and achievement, so as to build a harmonious society together[5]

3.2.4. Memory Management Section

In Chapter 5 Memory Management Knowledge Learning: By analysing the principles of the page replacement algorithm with students, the Analyse the reasons for the emergence of various phenomena to trigger the students' desire to identify problems, analyse them, and trace them back to their roots, to have a spirit of scientific exploration, to find solutions to problems, and to make technical and theoretical innovations and breakthroughs.

3.2.5. File Structure Section

In Chapter 8, the file structure of the operating system: through the comparison of the physical structure of files in Microsoft and Linux, the concept of development in dialectical materialist thinking is introduced. Linux uses developmental thinking to deal with problems, and the file system designed is not outdated until now, while the file system of windows has been upgraded numerous times. In the future era of intelligent Internet, technology is developing rapidly and whatever is done must have a developmental mindset.

3.3. Reforming the Innovative Teaching Model

3.3.1. Methods Used

Practical method: Using students of Grade 21 Computer Science and Technology as a pilot, we explore the integration of course thinking elements in the teaching process of operating systems.

Comparative method: Through comparative analysis of the research results made by some universities in China in the area of course Civics, summarize the experience and provide inspiration and reference for the construction of the Civics reform of the course of Operating System.

Research method: Conduct detailed research on the engineering literacy required by computer-related majors, combine with the relevant work requirements of enterprises, and reform and

select teaching contents.

3.3.2. Contents of Reform

Strengthen top-level design and thought leadership to further align with graduation requirement indicator points and support output-oriented (OBE) professional training objectives.

Knowledge Objectives: To be proficient in important basic principles, fundamental concepts and basic methods; in terms of core technologies, focus on the application of key operating system technologies. This mainly includes process management, storage management, file management and device management.

Competency objectives: the ability to extend the theoretical knowledge, techniques and methods learnt to real-life applications; the ability to independently design feasible solutions to problems with the application of operating systems, strengthen awareness of common algorithms, modularisation, software code analysis and other professional core technologies, and be able to achieve proficiency in the application of typical methods; through independent online learning, making full use of course resources, etc. Possess the ability to be independent and understand the development trend of operating systems and their applications.

Quality objectives: through learning to understand the history and development status of operating systems, guide students to realize how important it is to have their own operating systems and to recognize the importance of autonomous and controllable work, thus stimulating students' sense of responsibility, patriotism, dedication and enthusiasm to promote the development of domestic operating systems as their own responsibility and technological innovation as their mission pursuit. To cultivate students' ability to analyse and solve complex engineering problems of operating systems, to cultivate the spirit of being able to consider problems from multiple perspectives and in all directions, to be unafraid of difficulties, to be brave in challenges and to be innovative; to strengthen the practical experimental training for students, to cultivate the scientific spirit of rigor, excellence, exploration and perseverance, and to continuously build up self-confidence, commitment, craftsmanship, patriotism, professional responsibility, etc.

3.3.3. Adopting a Hybrid Online and Offline Teaching Mode

Through the online and offline hybrid teaching mode[4], the course knowledge system is reconstructed, the teaching process is optimised, and the resources of national high-quality courses are fully utilised to extend the classroom to anytime and anywhere, turning passive learning into active learning. The blended teaching mode not only cultivates students' independent learning ability and enhances their learning motivation, but also helps cultivate students' honest learning attitude and positive innovation consciousness. After self-directed learning by setting online tests, so that students learn with goals, competition and challenges; offline meeting class, break the original knowledge instillation students passively accept type of traditional classroom model, to think political goals and ability goals oriented classroom revolution, through a large number of case-based, heuristic, seminar, group confrontation and other teaching methods to solve the course important and difficult issues, enhance the course challenge and high order, can The course is designed to increase the level of student engagement in the classroom.

The course adopts case-driven theoretical teaching + scenario-driven practical teaching, with the following specific implementation plan using before, during and after class; a combination of online and offline.

3.3.4. Combining Industrial Needs [6]

We should use domestic operating systems as a teaching case to enhance students' sense of mission and to develop their scientific spirit and innovation skills. With the development of the Sentry industry, the introduction of home-made operating systems into the classroom has become an inevitable part of the practical course reform. Through carefully designed teaching cases, including the introduction of core technical features and architectural analysis of Kirin and Hongmeng operating systems, core components and common layout By carefully designing teaching cases, including the introduction of core technical features and architecture analysis, core components and common layouts of Kirin and Hongmeng operating systems, application, local development environment and application development experimental projects, students are able to enhance their practical ability to master the application of mainstream domestic operating systems, and explore the introduction of vocational skills tests in the assessment to help students better understand the operating system knowledge system and support the design of output-oriented (OBE) course objectives. This has greatly stimulated students'

interest and commitment to learning. The experimental course uses case studies to lead the principle mechanism and practice instead of lectures, so that students have a more thorough and adequate grasp of the course and practical ability.

Significantly enhanced, while strengthening the understanding of the development requirements of the industrial sector and laying a good foundation for future career development.

3.4. Process Assessment Diversification

Assessment can be in the form of whole process assessment, which can consist of class attendance, class interaction, class notes, class assignments, class sharing, project experiments, knowledge point tests, essay reports, online tests, competition evaluation, etc., or through credit replacement.

The project process assessment includes the completeness of the project functions, the standardization of the documentation, the teamwork, the effectiveness of the defence and the comprehensive ability of knowledge transfer, etc. The OS course reform practice can stimulate students' intrinsic learning motivation and effectively expand the benefits of the course.

4. Conclusion

The course has been reformed from the concept and form of teaching, practice and theory, to dig deeper into the Civics element of the course, to cultivate students' patriotism and responsibility, and to improve students' overall quality. Through the study of blended teaching , online and offline, in-class and out-of-class integration as one, breaking through the limitations of teaching space, developing traditional teaching and online teaching, making knowledge transfer more rapidly, students can study and research anytime and anywhere, so that it is easy to form a good independent atmosphere, establish the concept of self-learning, automatic progress, lifelong learning, collaborative learning, and easy to form the development of mutual aid independent learning atmosphere. The online and offline hybrid teaching reform and innovation model is perfectly realised in the operating system course, and its effect is very satisfactory.

Acknowledgements

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