

The Practice of Linear Algebra Teaching Reform under the Curriculum Ideological and Political Perspective

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Abstract: The teaching effectiveness of linear algebra, as a core undergraduate course at Wuhan Donghu University, directly impacts students' abilities and levels. In line with our university's focus on practical application in undergraduate education, the curriculum team has implemented a series of effective teaching reforms. During the teaching process, teachers seamlessly integrate knowledge impartation and value guidance while aligning with other courses to achieve comprehensive, holistic education. This paper presents the blended teaching design, instructional methods, curriculum evaluation, mathematics experiments, etc., aiming to provide valuable insights for mathematics educators.

1. Introduction

Curriculum ideological and political education is a new educational concept in universities under the fundamental task of "cultivating morality and educating people", aiming to integrate ideological and political education into the discipline education of universities by digging ideological and political elements in professional curriculum resources [1]. The comprehensive and effective implementation of curriculum ideological and political construction has become a consensus in China's educational circle. Linear algebra has a very far-reaching application in engineering technology, biotechnology, computer, multimedia network and other fields, is an important cornerstone of the development of science and technology, and plays a crucial role in the entire professional talent training system. How to cleverly integrate ideological and political elements into classroom teaching to achieve the goal of moral education is the focus of attention of linear algebra teaching workers. The majority of experts and scholars pool their wisdom and share a lot of experience combined with their own teaching practice. For example, Li Zhiqun [2] discusses the concrete design and practical thinking of mixed teaching under the background of curriculum ideological and political education from three aspects: cultural self-confidence, patriotic feelings,

materialistic philosophy and application consciousness; Fan Lixia [3] points out that the goal of cultivating morality and educating people is achieved through the implementation of teaching by combining the history of mathematics and mathematician stories, the application of linear algebra course knowledge in related fields, mathematical culture, mathematical ideas and mathematical methodology contained in the course. Jin Guiyan [4] shared the teaching implementation scheme of "blended" teaching method by using BOPPPS teaching mode and Superstar Learning Platform. While improving the ideological and political effectiveness of "Linear Algebra" course, the teaching implementation scheme also improved students' ability of independent learning, problem analysis and practical problem solving by using mathematical knowledge.

2. The Significance of Linear Algebra Curriculum Ideological and Political Implementation

Integrating ideological and political education into the teaching process of linear algebra can maximize the educational function of mathematics courses, and form a synergistic educational effect with other courses to promote the all-round development of students. Integrating ideological and political education into mathematics courses can effectively combine mathematics professional knowledge and value, improve students' professional ability and comprehensive quality, take effective ways to integrate ideological and political ideas, and promote the teaching reform of mathematics courses, which is of great significance.

Li Zihui [5] pointed out that linear substitution has strong applicability, and his ideas have penetrated into various disciplines, with a strong background and requirements for curriculum ideological and political research. From the perspective of ideological and political background, both Marxist worldview and dialectical materialism are reflected in university mathematics. If accidental and inevitable, contradictions and oppositions, phenomena and essence, etc., have an important impact on the formation of students' "three views". The concept of "learning from practice and using data to speak" contained in university mathematics is of great significance in cultivating students' socialist core values of seeking truth from facts.

3. Ideological and Political Teaching Practice of Integrating Linear Algebra into Wuhan Donghu University

3.1 Optimizing Blended Learning Design

Linear has replaced the curriculum team's design of a comprehensive integration path of ideological and political education in four dimensions and three orders. The "four dimensions" refer to the integration of patriotism, scientific spirit and ideological qualities, and mathematical culture into teaching content, while the three-stage three-dimensional and all-round teaching process refers to the "guiding and entering style on the front line of the class", "interactive style on the middle line of the class", and "three-dimensional communication style after class". Before class, online teaching platforms were used to publish online resources, providing students with opportunities to practice in advance and understanding the basic content of course teaching. Through pre class testing, bring questions to the classroom for learning and improve learning efficiency; Exploratory learning in class, encouraging students to participate in discussions during classroom activities, improving their learning enthusiasm, inspiring positive thinking in the community, leveraging their strengths, breaking the silence in the classroom, and revitalizing the vitality of the classroom; After the assessment, use online platforms to carry out teaching activities such as reading, quality development, and answering questions after class, providing opportunities for communication and interaction between teachers and students, increasing group presentations and other group activities, and improving students' language expression and problem-solving abilities.

3.2 Complementary Advantages between Traditional Teaching Methods and New Teaching Methods

Introducing new teaching methods such as hierarchical teaching, online courses, and flipped classrooms to optimize traditional teaching methods. Layered teaching adheres to the principle of equality for all students. Based on the knowledge level, acceptance ability, and professional needs of students, different levels of teaching content are designed, and different teaching methods are adopted. Through "layer" teaching, the curriculum teaching can maximize the satisfaction of each student's requirements. Building online courses through the Super Star Learning and Communication Platform, uploading content such as frequent microprocessing, lesson plans, courseware, professional applications, and postgraduate entrance exam information, providing students with learning opportunities outside of the classroom. Choose appropriate knowledge points to implement a flipped classroom, where students can learn knowledge through watching micro videos. When encountering complex problems, they can adopt methods such as pausing and repeatedly watching to slowly absorb them. Under the guidance of the teacher, they can consult relevant materials to expand their knowledge and understand cutting-edge knowledge in the subject. In the classroom, they can consolidate their understanding through group discussions, teacher Q&A, group presentations, and teacher-student feedback. The introduction of layered teaching, online courses, and flipped classrooms injects new vitality into course teaching, and the classroom is revitalized.

3.3 Building a Scientific and Reasonable Curriculum Evaluation System

Wuhan Donghu University has established a comprehensive evaluation method, including leadership evaluation, supervision and promotion, peer evaluation, teacher evaluation, teacher self-evaluation, student evaluation and questionnaire survey, which changes the final evaluation into formative evaluation; the subject of evaluation expands from administrative personnel and expert organizations to teachers, students and other stakeholders of the course, and the multi-dimensional evaluation means promotes the healthy and benign development of the course.

On the basis of traditional assessment methods, we should increase the process assessment and pay attention to students' participation in daily learning. The online average score is given based on learning data such as pre-class review, Posting discussion, homework, browsing resource library, unit test, etc. The offline average score is given based on questions answered, group presentation, class performance, etc. At the end of the term, a unified final exam is given. The final online normal score accounts for 25%, offline normal score accounts for 15% and paper score accounts for 60% of the given student's course score.

3.4 Offer Math Experiment Courses

The traditional course teaching is that the teacher speaks and the students listen. In the teaching process, the teacher is in the dominant position, while the students passively accept the knowledge, which is not conducive to the formation of students' innovative thinking. Therefore, the course team chooses computer science and technology, software engineering, data science and big Data majors to carry out mathematical experiment courses. This course is a beneficial supplement to college mathematics courses, which can strengthen the cultivation of college students' scientific quality and innovation consciousness, and improve their comprehensive ability to apply mathematical knowledge to solve practical application problems.

In the mathematics experiment course, the teacher designed experiments to let students summarize concepts by themselves in the process of observation, discovery and exploration, so that

students can form an intuitive understanding of concepts combined with their own experience. The teacher also designed some open experiments with a higher difficulty coefficient for students to complete freely in groups, which can not only exercise students' interpersonal skills but also cultivate their teamwork ability.

The course team has established a mathematical modeling salon in Wuhan Donghu College to encourage students to actively participate in various discipline competitions, and gradually formed a number of disciplinary competition brands that have exemplary roles in the school and the province, such as "mathematical modeling" and "mathematical competition", to stimulate students' interest in active learning and enhance students' innovative ability.

4. Conclusions

In summary, the Linear Algebra course team follows the pace of teaching reform and carries out continuous and effective reform and construction of the course. Gradually formed the teaching concept of "adhering to moral education, student-centered, ability training as the core", constructed the implementation path of "three-stage four-dimensional comprehensive stereo integration" ideological and political teaching of the course, and committed to cultivating innovative talents "suitable for social development, able to apply mathematical tools to solve practical problems". At present, this course is a quality course, a blended first-class course, a demonstration course of ideological and political teaching of the course and a blended first-class course in Hubei Province. However, the course construction has a long way to go, the linear algebra course team will continue to explore, deepen and improve, implement the fundamental task of moral education, and deliver more high-quality applied talents with all-round development of moral, intellectual, physical, aesthetic and labor for the society.

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