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Study and Practice of Ideological and Political Education in the Linear Algebra Course for Vocational Universities

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Abstract: With the country's increasing emphasis on ideological and political education in the curriculum, the teaching reform of vocational universities has gradually integrated ideological and political education into vocational courses. This article takes the linear algebra course as an example to explore how to combine ideological and political education with mathematics teaching, analyses the characteristics of the linear algebra course and the possibility of integrating ideological and political education, and proposes specific implementation ways. Research suggests that linear algebra courses can effectively cultivate students' patriotism, sense of social responsibility, and professional ethics through the design of ideological and political content, innovative teaching methods, the implementation of diversified teaching models, and the transformation of teachers' roles. Through three typical cases of "mathematics in anti-epidemic", "mathematics in ecological protection", and "engineering and mathematics", the application and effectiveness of ideological and political education in practical teaching have been demonstrated. Finally, this article emphasizes the promoting role of curriculum ideology and politics in the comprehensive development of students, and puts forward suggestions for further promoting curriculum ideology and politics, so as to provide useful reference and inspiration for the teaching reform of vocational universities.

1. Introduction

In recent years, the country has attached great importance to integrating ideological and political education into university curricula, and has explicitly proposed to adhere to the fundamental task of "cultivating virtue and educating people", and to achieve the organic unity of knowledge teaching and value guidance through curriculum teaching. Curriculum ideological and political education has become an important direction of education reform in the new era, and all kinds of courses should deeply explore ideological and political education elements to form a cooperative education mechanism. In this context, vocational universities, as important platforms for cultivating technical and professional talents, must effectively integrate ideological and political education into their courses to better meet society's demand for high-quality talents with both moral integrity and technical skills [1-3].

The teaching goals of vocational universities are to cultivate applied talents with a solid theoretical foundation and practical skills. However, in the actual teaching process, there is a common phenomenon of overemphasizing the teaching of knowledge and skills and neglecting the teaching of ideological values, which results in the inadequate cultivation of students' sense of social responsibility and professional ethics. How to organically integrate ideological and political education into the curriculum while maintaining the academic and practical nature of the curriculum and improving students' comprehensive education is an important issue that urgently needs to be addressed in the current curriculum reform.

As one of the important basic courses in vocational universities, linear algebra not only has profound theoretical connotations, but its applications are also widely used in fields such as engineering technology, big data analysis and scientific research, with social practical value. At the same time, the rigorous reasoning, logical thinking and other academic spirits contained in the linear algebra course, as well as ideological and political education elements such as teamwork and technological innovation, provide a good carrier for ideological and political education in the course. Through the reasonable design of teaching contents and methods, the linear algebra course can effectively achieve the unity of knowledge teaching and value guidance.

This study aims to explore how to integrate ideological and political education into the teaching of linear algebra course, and construct a teaching path that combines ideological and political elements with professional content. Through specific practice, the study summarizes the implementation method and effectiveness of the ideological and political education in the curriculum, provides reference for the reform of vocational universities, and provides reference for the ideological and political education in other mathematics courses, so as to further promote the deepening of the practice of “ideological and political education in the curriculum” in the vocational education.

2. Theoretical Basis of Ideological and Political Education in Linear Algebra Courses in Vocational Universities

2.1. The Connotation and Positioning of Course Ideology and Politics

Course ideological and political education is the conscious exploration and integration of elements of ideological and political education into the teaching process of vocational courses, with the aim of guiding students to form correct values, outlook on life and worldview through education, and thus achieving the basic educational goal of "cultivating morality and educating the people". The ideological and political education of the course is not simply to add political theory and ideological education to the curriculum, but to naturally and systematically infiltrate subject knowledge, teaching content, and practical activities into the teaching process, and to help students form correct cognition and thinking about society and individuals while learning knowledge.

The combination of teaching knowledge and teaching values, which is emphasized in ideological and political education, not only aims at improving students' academic level, but also involves forming their ideological level. It requires teachers to use teaching methods and content to guide students to think about social responsibility, life values and moral ethics while teaching professional knowledge and skills. In vocational universities, ideological and political education is of special significance. The core task of vocational education is to cultivate high-quality talents with practical skills and applied technologies, and cultivating students' ideological and moral qualities, professional ethics, innovation consciousness and social responsibility is equally important. Through the effective implementation of ideological and political education, vocational courses can not only help students master theories and skills, but also stimulate their patriotism, professional ethics, innovative spirit and team spirit, thus laying the foundation for their all-round development.

This model of education is particularly important for vocational universities, because traditional vocational education focuses more on cultivating technical skills and neglects the systematic and long-term nature of ideological and political education. The introduction of ideological and political education into the curriculum not only fills this gap, but also provides students with a comprehensive educational platform for development, enabling them not only to adapt to market demands, but also to have the potential to become technical talents with a sense of social responsibility, responsibility and innovative spirit. Through this approach, the curriculum of ideological and political education provides a new way for the educational reform of vocational universities, and promotes the comprehensive upgrading of educational goals.

2.2. The Characteristics of Linear Algebra Courses and the Possibility of Integrating Ideological and Political Education into the Curriculum

Linear algebra, as a basic mathematics course, not only has important application value in various fields such as mathematics, engineering technology and economic management, but its content also contains deep ideological and practical significance. The knowledge system of linear algebra course consists of abstract mathematical theories, rigorous logical reasoning, systematic analysis methods, etc., which can help students to cultivate mathematical thinking and problem-solving ability, while enhancing their scientific spirit, rational thinking and innovation ability [4-6]. Therefore, the integration of linear algebra into ideological and political education courses has important practical significance.

From an instrumental perspective, linear algebra provides a solid theoretical foundation for disciplines in many fields. Whether it is big data analysis, engineering design, financial modelling, resource optimization, etc., core concepts such as matrix operations and vector spaces in linear algebra directly serve to solve practical problems. By studying the theory and application of linear algebra, students can master the basic methods of data analysis and problem solving and have the ability to deal with complex problems. This process itself reflects the goal of emphasizing practice and skill development in vocational education. However, the linear algebra course is not only a utilitarian subject, but also contains deep ideological content. The abstract logical thinking, rigorous reasoning, and systematic problem-solving methods involved in the course embody the scientific spirit and rational thinking. Especially when explaining the solution of linear equation systems, matrix operations, eigenvalues and eigenvectors, students can not only learn mathematical skills, but also cultivate scientific methods for solving complex problems. In these teaching stages, teachers can closely link mathematical knowledge with social development and national construction through specific examples and practical applications, and guide students to realize the important role of mathematics in social development. This combination provides rich resources and platforms for the implementation of ideological and political education in the curriculum.

In addition, the content of linear algebra course has strong practical and social application value, which makes it an ideal carrier for implementing ideological and political education in the curriculum. The concepts of linear programming, eigenvalues and eigenvectors, linear transformations, etc. in the course are widely used in practical scenarios such as resource optimization, data modelling, and engineering design. In the classroom, by introducing content that combines social hot topics and real-life cases, students can further understand the key role of mathematics in solving social problems and enhance their understanding and sense of social responsibility. For example, when explaining linear programming, examples of optimizing medical resource allocation can help students realize the value and importance of mathematics in the national health care industry; when explaining eigenvalues and eigenvectors, socio-economic analysis can be combined to help students understand the application of mathematics in resource

allocation and policy making. This instructional design can not only improve students' mathematical skills, but also help them develop correct values and a sense of social responsibility.

Therefore, the linear algebra has rich potential for integrating ideological and political education into the curriculum. Theoretically, the knowledge system of linear algebra is highly compatible with the goals of ideological and political education, and the combination of the two can effectively promote the sublimation of students' thinking and the formation of their values. In practice, the social application value of the course content provides a wide space for ideological and political education, which can meet students' academic needs and achieve the comprehensive goals of ideological and political education. The linear algebra course is not only a platform for teaching specialized knowledge, but also an important battleground for ideological and political education, which helps cultivate students into composite talents with both moral integrity and talent, social responsibility and innovative spirit.

3. The Way of Implementing Ideological and Political Education in the Linear Algebra Course

3.1. The Ideological and Political Design of Teaching Content

The ideological and political design of linear algebra courses is the foundation and the most important step in realizing ideological and political education in the curriculum. By skilfully incorporating ideological and political elements into the content of teaching, students can acquire correct values and a sense of social responsibility while learning professional knowledge. First of all, teachers need to deeply explore the ideological and political elements in the core concepts of linear algebra, and develop teaching methods based on practical social problems. For example, when explaining matrices and systems of equations, teachers demonstrate the key role of mathematics in solving these real-world problems by combining practical social problem cases such as social resource allocation, urban transportation optimization, and epidemic prediction. When explaining the solution of linear equation systems, the teacher presents cases of how to optimize enterprise production processes and solve logistics problems using linear algebra methods, helping students realize that mathematics is not only a tool in the academic field, but also a powerful weapon for solving social problems. This teaching design can make students realize that as future technology-application-oriented talents, mastering these mathematical tools can contribute to the sustainable development of society.

When explaining eigenvalues and eigenvectors, teachers can combine practical applications in the field of technology, such as image processing, machine learning, structural design, etc., to help students see the fundamental role of mathematics in technological innovation. By demonstrating the application of eigenvalue decomposition in image compression or its importance in machine learning algorithms through examples, we aim to stimulate students' interest and motivation to explore the frontiers of technology. This not only gives students a deeper understanding of mathematics, but also encourages them to pay attention to innovation and progress in science and technology in their future careers.

When explaining vector spaces, the metaphor of teamwork and diverse perspectives can be used to emphasize the connection between the concept of "vector" in mathematics and the spirit of cooperation in real life. For example, in a vector space, each vector can be viewed as an independent element, but their combination and interaction can produce new results. This concept can be compared to the interdependence of team members who work together to achieve common goals. In this process, students can understand the importance of teamwork through mathematics, thereby cultivating their sense of teamwork and collectivist values.

3.2. Innovation in Teaching Methods

The implementation of ideological and political education in the curriculum cannot be separated from innovative teaching methods. Teachers should adopt flexible and diversified teaching methods based on the characteristics of linear algebra to enhance the effectiveness of ideological and political education.

The case study teaching method is a very effective approach to ideological and political education. In the classroom, teachers can conduct case analysis by combining specific social issues. For example, when explaining linear programming, practical cases of enterprise resource allocation optimization can be used to help students understand the important role of mathematical models in modern enterprise management; when explaining matrix operations, traffic flow analysis can help students understand the application of mathematics in urban planning and public transportation management. Through these real-life cases, students can see the application value of mathematics in society and feel the sense of social responsibility as mathematics professionals.

Project-based learning is also an effective teaching method. Teachers can combine course content with hands-on projects, organize students into groups, and have them work together to solve complex mathematical problems. For example, students can participate in a real-world mathematical modelling project and use their knowledge of linear algebra to solve a specific problem. In the process, students can not only consolidate their knowledge, but also deeply appreciate the importance of teamwork and innovative thinking in solving practical problems, thereby enhancing their practical skills and team spirit.

In addition, the application of multimedia technology can effectively enhance the interactivity and intuitiveness of teaching. Teachers can use animation and visualization tools to show the application scenarios of linear algebra, making abstract mathematical concepts vivid and lively. By playing videos discussing social issues related to the course content, teachers can guide students to think about the mathematical essence of these issues, stimulating their attention and sense of responsibility for social development. This teaching method not only enhances students' interest in learning, but also subtly conveys ideological and political elements and strengthens students' social awareness.

3.3. Diversification of Teaching Modes

To improve the effectiveness of ideological and political education in the curriculum, teachers can explore various teaching models and closely integrate them with social needs and students' development. School-enterprise cooperation is an effective way for teachers to invite enterprise experts to participate in curriculum design or organize enterprise visits through cooperation with enterprises. By allowing students to visit the production and management sites of enterprises, they can gain a more intuitive understanding of the close relationship between mathematical knowledge and career development, and also see the practical application of mathematical knowledge in industry. In this way, students not only increase their sense of identification with their major, but also have a deeper understanding of the role that mathematics plays in society.

Interdisciplinary integration is also an important teaching model. Teachers can combine linear algebra with other subjects such as history, philosophy, ethics, etc. to demonstrate the scientific spirit behind mathematics in their teaching. For example, by narrating important figures and events in the history of mathematical development, students can be inspired to have reverence and love for mathematics. By analysing the relationship between mathematics and social ethics, students' sense of social responsibility is cultivated, and they realize that as future mathematicians, they must not only solve technical problems, but also care about the ethical implications of mathematical technology. This interdisciplinary teaching model not only broadens students' horizons, but also

cultivates their multidimensional thinking and critical thinking skills.

3.4. Changing the role of teachers

The change in the role of teachers is crucial to the implementation of ideological and political education in the curriculum. Teachers are no longer just transmitters of knowledge, but have become leaders of values. Teachers need to shift from a single teaching goal to multiple goals that balance the transmission of knowledge and the inculcation of values.

First, teachers must actively change their roles and become guides and role models for students' ideological and political education. In the classroom, teachers should not only help students understand mathematical principles, but also impart positive social values through their own words and deeds. For example, when teaching linear algebra, teachers can combine their practical experience to convey the actual contributions of mathematics to social progress, as well as their sense of responsibility and mission in mathematical research and application. In this way, teachers can stimulate students' interest and enthusiasm for mathematics while guiding them to think about the relationship between mathematics and social development.

Second, teachers should enhance their awareness and practical ability of ideological and political education in the curriculum, actively participate in relevant training and research activities, improve their sensitivity to ideological and political elements, and enhance their creativity in integrating them into the curriculum. Teachers should learn to actively explore ideological and political elements in teaching and effectively integrate them into the curriculum through innovative teaching methods. In this process, teachers should not only focus on students' mastery of knowledge, but also pay attention to the cultivation of students' thoughts and the formation of their values. Through the two-way transmission of knowledge and values, teachers can promote students' all-round development and deepen the implementation of ideological and political education in the classroom.

4. Typical Practical Cases of Ideological and Political Education in Courses

4.1. "Mathematics in the Fight against the Epidemic" Special Topic

The special theme of "Mathematics in Epidemic Control" is an innovative practice of integrating current social issues into the curriculum of ideological and political education. When explaining matrices and linear equation systems, teachers can combine actual cases during the epidemic period to explore in depth the application of mathematical models in epidemic transmission prediction, resource allocation, medical resource planning, and decision support. By describing the distribution of medical resources in different regions in terms of matrices and using linear systems of equations to solve resource scheduling problems, students can see how mathematical tools can provide scientific support for social emergency management.

Specifically, teachers can demonstrate how to solve problems such as hospital resource allocation, traffic flow optimization, and vaccine distribution through matrix operations using real epidemic data. For example, how to use linear algebra to optimize the allocation of medical resources in different cities and predict the future development trend of the epidemic through scientific calculations. This exercise not only helps students understand the application of mathematics to complex social problems, but also enables them to realize that as mathematics professionals, they can contribute to society's crisis response and promote public safety through their expertise.

Through this case, teachers can also guide students to think about the social responsibility of mathematics and emphasize the supporting role of mathematics in important national decisions. By analysing the mathematical model of national epidemic prevention and control, we aim to inspire

students' patriotism and sense of social responsibility, and enable them to deeply understand that as future technical workers, their work is closely related to the well-being of society in the process of solving practical problems.

4.2. "Mathematics in Ecological Protection" Case Study

In the case of "Mathematics in Ecological Protection", teachers can use mathematical tools such as linear programming to explain how to optimize resource allocation. Taking the distribution and development of renewable energy as an example, this article explores how to achieve a balance between environmental protection and economic development under limited resources. This case combines the concepts of green development and sustainable development to help students understand the application value of mathematics in ecological protection.

For example, through mathematical modelling, students can calculate how to allocate limited resources to various renewable energy development projects, such as wind energy, solar energy, etc., while ensuring that the ecological environment is not affected by excessive development. In this process, teachers not only impart mathematical knowledge, but also help students establish correct environmental protection awareness and stimulate their attention to sustainable development.

Through this practice, students can not only master mathematical methods, but also experience how mathematics as a tool can provide solutions to global environmental problems. In addition, teachers can organize social responsibility discussions in the classroom to explore the responsibilities of each individual, country, and enterprise in protecting the ecological environment, thereby cultivating students' awareness of ecological civilization.

4.3. "Engineering and Mathematics" Case Study

The case study of "Engineering and Mathematics" aims to demonstrate the profound connection between mathematics and engineering practice. Teachers can combine practical engineering problems to explain the application of eigenvalues and eigenvectors in engineering vibration analysis. For example, students can understand how to calculate the stability and seismic resistance of engineering structures through eigenvalues and eigenvectors by analysing the vibration characteristics of bridge structures or the vibration situation of mechanical equipment during operation.

Through this case, students can not only enhance their understanding of eigenvalue and eigenvector calculation methods, but also deeply realize the importance of mathematics in the field of engineering. In teaching, teachers can showcase real-life engineering cases, such as earthquake engineering, bridge design, mechanical vibration analysis, etc., to help students combine theory with practice and enhance their ability to solve practical engineering problems.

5. Conclusions

By effectively integrating ideological and political education into the teaching of linear algebra courses in vocational universities, the organic combination of knowledge teaching and value guidance can be achieved, and the educational goal of "cultivating virtue and nurturing talents" can be fully realized. Starting from the connotation of ideological and political education in courses and the characteristics of linear algebra courses, this article explores the implementation path of ideological and political education in courses, including the ideological and political design of teaching content, the innovation of teaching methods, the diversification of teaching modes, and the transformation of teachers' roles.

Specifically, teachers not only impart mathematical knowledge to students through typical

practical cases, such as mathematics in epidemic prevention, mathematics in ecological protection, engineering and mathematics, but also guide students to enhance their sense of social responsibility, environmental awareness, innovation spirit, etc. in solving practical problems. Through these specific case studies, the ideological and political education course not only improves students' professional competence, but also cultivates their sense of social responsibility and practical ability, laying a solid foundation for comprehensively improving students' comprehensive quality and promoting the moral education goals of talent cultivation.

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