

Ideological and political construction and practice of Matab simulation and application course

Jie Chen, Na Yao, Haifang Lv

Tarim University, Alar, Xinjiang, 843300, China

Abstract: *With the emergence of the concept of cultivating new engineering talents, the teaching of electrical engineering and automation majors in universities is facing new challenges and opportunities. Against this backdrop, this paper takes the goal of cultivating high-quality innovative and application-oriented talents guided by the core socialist values. It integrates ideological and political education into the "Matab Simulation and Application" course to foster high-quality innovative and application-oriented talents. Addressing the current problems in digital electronic technology experimental courses and in line with the requirements of new engineering disciplines, this paper, guided by teaching objectives, optimizes experimental content, fully integrates ideological and political elements, adopts a combination of open teaching and classroom teaching, introduces Multisim simulation, updates assessment methods, and encourages students to actively participate in engineering practice projects. Through these measures, the paper aims to achieve an organic unity of "knowledge transmission, ability cultivation, and value shaping," laying the foundation for the cultivation of new engineering talents in electrical engineering and automation majors at universities.*

Keywords: *Matab simulation technology, ideological and political education in curriculum, practical teaching, cultivation of new engineering talents, electrical engineering and automation major*

1. Introduction

In 2019, the Ministry of Education issued the "Notice on Carrying out the Identification Work of National Virtual Simulation Experiment Teaching Projects in 2019," which for the first time combined virtual simulation teaching projects with Marxist disciplines and established virtual simulation experiment teaching projects in the category of Marxist theory. At the same time, the General Office of the CPC Central Committee and the General Office of the State Council jointly issued the "Several Opinions on Deepening the Reform and Innovation of Ideological and Political Theory Courses in the New Era," proposing the establishment of national-level virtual simulation ideological and political course experience teaching centers as an important measure. In this context, the ideological and political education in the "Matab Simulation and Application" course has emerged. This paper aims to explore how to promote ideological and political education among students majoring in electrical engineering and automation through Matab simulation technology, cultivate their ideological and moral character and sense of social responsibility, and lay the foundation for the cultivation of new engineering talents.

2. Overview of the Application of MATLAB Simulation Technology in Electrical Engineering Majors

2.1 Overview of Simulation Technology in Electrical Engineering Majors

In electrical engineering majors, simulation technology is an important tool used to simulate the behavior and performance of circuits, systems, or signals. Through simulation technology, circuit models can be established on computers, and circuit analysis, design verification, and system optimization can be conducted. Electrical engineering majors cover a wide range of fields, including circuit design, control systems, signal processing, etc., hence simulation technology plays a crucial role in these areas.

2.2 Position and Role of MATLAB in Electrical Engineering Majors

MATLAB, as a powerful simulation tool, occupies a significant position in electrical engineering majors. Its strong mathematical computation and simulation capabilities make it an indispensable tool for electrical engineers and automation engineers. MATLAB provides a rich library of functions and toolboxes covering circuit analysis, system modeling, control design, signal processing, etc., meeting the simulation needs of various fields in electrical engineering majors. Additionally, MATLAB also has excellent visualization capabilities, allowing intuitive presentation of simulation results, aiding in understanding and analyzing the behavior of circuits or systems.^[1]

2.3 Application Cases of MATLAB Simulation Technology in Circuit Design, Control Systems, Signal Processing, etc.

2.3.1 Circuit Design Field

MATLAB is widely used in circuit design. For example, in analog circuit design, MATLAB can be used for circuit analysis, parameter optimization, and performance evaluation. In digital circuit design, MATLAB can be used for logic simulation, timing analysis, etc. Additionally, MATLAB provides powerful optimization algorithms for optimizing circuit parameters.

2.3.2 Control Systems Field

MATLAB plays an important role in control system design and analysis. For instance, MATLAB can be used for system modeling, root locus analysis, frequency domain analysis, etc., for designing various controllers such as PID controllers, state feedback controllers, etc. Additionally, MATLAB provides the Simulink tool for dynamic system simulation, used for verifying and debugging the performance of control systems.

2.3.3 Signal Processing Field

In the field of signal processing, MATLAB is widely used for signal analysis, filter design, spectrum analysis, etc. Utilizing MATLAB's Signal Processing Toolbox, various signal processing algorithms can be quickly developed and verified, such as Fourier transform, wavelet transform, digital filtering, etc.^[2]

Through the above examples, it can be seen that MATLAB is widely used in electrical engineering majors, providing powerful simulation tools for electrical engineers and automation engineers, assisting them in circuit design, control system design, signal processing, etc.

3. Theoretical Basis of Ideological and Political Education in the Course "MATLAB Simulation and Application"

3.1 Importance of Ideological and Political Education in Higher Education

Ideological and political education plays a crucial role in higher education, with its significance being undeniable. It is not merely a subject but also a unique form of education aimed at guiding students to establish correct worldviews, life philosophies, and values, fostering their moral character and sense of social responsibility. In electrical engineering majors, the significance of ideological and political education is even more prominent. The development of the electronics field requires not only professional skills but also electronics engineers with correct ethical concepts and a sense of social responsibility. Therefore, ideological and political education is not only about imparting knowledge but also about shaping students into well-rounded individuals with both moral integrity and professional competence.^[3]

Through ideological and political education, students can better understand themselves and society, enhancing their sense of social responsibility and accountability. Especially in today's society, facing increasingly complex social realities and diverse ideological cultures, ideological and political education becomes particularly urgent and important. Only through ideological and political education can students establish correct worldviews and life philosophies, enhance their adaptability to society, and become innovative young people with social responsibility, particularly in an era of rapid change.

Therefore, universities should attach great importance to the importance of ideological and political education, strengthen the construction of ideological and political education courses, innovate teaching

methods, and integrate ideological and political education into students' learning and life. Only in this way can we cultivate a new generation of young people with both moral integrity and social responsibility, contributing to the development of the country and society.

3.2 The Inherent Connection between MATLAB Simulation Technology and Ideological and Political Education

MATLAB simulation technology is closely connected with ideological and political education, demonstrating profound inherent connections. Firstly, as an advanced technical tool, MATLAB's application not only helps students master professional knowledge and skills but, more importantly, cultivates their innovative consciousness and practical abilities. Through MATLAB simulation technology, students can conduct experiments and designs in virtual environments, thereby fostering problem-solving abilities and innovative thinking. Secondly, the application of MATLAB simulation technology can also stimulate students' interest in learning, deepen their sense of identification and responsibility towards electrical engineering majors, and promote comprehensive improvement in their ideological and moral qualities. Additionally, MATLAB simulation technology provides students with a broader perspective, enabling them to explore and practice in virtual environments, better understand and grasp the pulse of social development, and cultivate their sense of social responsibility and innovative spirit.

The introduction of MATLAB simulation technology is not only a technical means but also a manifestation of educational philosophy. By allowing students to conduct simulated experiments and designs in virtual environments, it not only enhances their professional competence but also cultivates their critical thinking and innovative consciousness. At the same time, the application of MATLAB simulation technology can also enhance students' interest and enthusiasm for electronics-related majors, promoting their in-depth understanding and exploration of the discipline. This form of ideological and political education based on MATLAB simulation technology can not only meet students' learning needs in terms of professional knowledge but also guide them to establish correct worldviews and life philosophies, cultivate their sense of social responsibility and innovation, and promote their comprehensive development and growth.

3.3 Theoretical Framework and Methodology for Constructing the "Matab Simulation and Application" Course in Moral and Political Education

Building the Theoretical Framework and Methodology of Ideological and Political Education in the Course "MATLAB Simulation and Application" is a complex and important task that requires comprehensive consideration of multiple factors. Firstly, we need to clarify the ideological and political education objectives of the course and determine that cultivating students' moral character and sense of social responsibility is the main goal. This means that we should not only focus on students' professional knowledge and skills but also pay attention to their moral literacy and social responsibility.^[4]

Secondly, based on the characteristics of the course and the needs of students, we need to design appropriate teaching content and methods, making full use of MATLAB simulation technology. This can be achieved by introducing specific case studies and simulation experiments. For example, we can design simulation experiments related to social development, technological innovation, and other fields, allowing students to gain in-depth understanding and critical thinking skills in virtual environments.

Furthermore, we can also incorporate relevant discussion and debate sessions into the course content, guiding students to engage in ideological exchange and collision, promoting their independent thinking and value identification. Through this approach, students can not only acquire professional knowledge but also enhance their moral character and sense of social responsibility.

Finally, we need to establish a scientific evaluation system to comprehensively assess and provide feedback on students' moral character and social responsibility. This includes regular academic assessments, comprehensive evaluations, personalized guidance, and other methods to ensure that students can develop comprehensively and grow during the course.

In summary, building the theoretical framework and methodology of ideological and political education in the course "MATLAB Simulation and Application" requires comprehensive consideration of factors such as teaching objectives, content, methods, and evaluation systems to promote the comprehensive development of students' moral character and social responsibility. This requires not

only the efforts and innovation of teachers but also the support and cooperation of schools and various sectors of society to jointly advance ideological and political education to a higher level.

4. Exploration of Moral and Political Education in the Construction of the "Matab Simulation and Application" Course

4.1 Course Objectives and Design Philosophy

In the ideological and political education construction of the "MATLAB Simulation and Application" course, our aim is to comprehensively cultivate students' moral character, sense of social responsibility, and innovative ability through learning and application of MATLAB simulation technology, thereby enabling them to become well-rounded and internationally competitive professionals in the field of electrical engineering. To achieve this goal, we have formulated the following design philosophy:

4.1.1 Student-Centered Teaching Philosophy

We place students at the core of teaching and encourage their autonomous learning and exploration. In the classroom, we adopt interactive teaching methods to stimulate students' interest in learning and cultivate their ability for independent thinking and problem-solving. By guiding students to participate in discussions, case analyses, and project practices, we aim to stimulate their motivation for learning and creativity, making the learning process more targeted and participatory.

4.1.2 Integration of Theory and Practice

We emphasize the integration of theoretical knowledge with practical application, enabling students to gain a deep understanding and mastery of MATLAB simulation technology through practical cases and engineering projects. The course curriculum covers comprehensive content from basic theory to practical applications. By combining theoretical explanations with practical exercises, we help students establish a systematic knowledge structure and skill system. This design not only deepens students' understanding of theoretical knowledge but also cultivates their practical operation skills and problem-solving abilities.^[5]

4.1.3 Systematic and Practical Orientation

We stress the systematic and practical orientation of the course, aiming to provide students with comprehensive professional knowledge and skills to lay a solid foundation for their future work and research. The course curriculum covers various aspects of MATLAB simulation technology, ranging from basic to advanced applications, enabling students to fully grasp the technology and apply it flexibly to real engineering projects. Moreover, we also focus on cultivating students' teamwork awareness and innovative thinking. Through project practices and case analyses, we foster students' practical operation skills and problem-solving abilities, laying a solid foundation for their future career development.

In summary, our course design philosophy aims to comprehensively cultivate students' moral character, sense of social responsibility, and innovative ability through student-centered teaching methods, the integration of theory and practice, and a systematic and practical curriculum setting, equipping them with the capabilities and competitiveness to face future challenges.

4.2 Innovation in Teaching Content and Methods

In terms of teaching content, we divide the course content into sections including fundamental theories and technical knowledge, principles and applications of MATLAB simulation technology, and case studies and engineering practices. Firstly, the section on fundamental theories and technical knowledge will cover the basic concepts, principles, and methods of MATLAB simulation technology, including the establishment of simulation models, design, and analysis of simulation experiments, among other topics. Through systematic teaching arrangements, students will develop a comprehensive understanding of MATLAB simulation technology. Secondly, the section on principles and applications of MATLAB simulation technology will delve into the various functions and application scenarios of MATLAB software, including the establishment and solution of simulation models, design, and verification of simulation experiments, among other topics. Through a combination of theoretical explanations and practical exercises, students will master the specific application methods and skills of MATLAB simulation technology. Finally, the section on case studies and engineering practices will

combine real engineering projects and cases to guide students in analyzing and solving practical problems, thereby cultivating their practical operation skills and problem-solving abilities.

In terms of teaching methods, we employ various teaching techniques and approaches, such as lectures, case studies, laboratory demonstrations, group discussions, etc. Specifically, we emphasize guiding students to utilize MATLAB simulation tools for practical operations and project design, thereby enhancing their practical operation skills and innovative awareness through hands-on practice. Additionally, we will organize students to participate in laboratory demonstrations and case studies, where they can observe and analyze real cases to cultivate their problem analysis and problem-solving abilities. Moreover, we will encourage students to engage in group discussions and teamwork to promote communication and collaboration among students, fostering their teamwork spirit and communication skills. Through these diverse teaching methods, our aim is to stimulate students' interest in learning, improve their learning efficiency, and cultivate their comprehensive development abilities, laying a solid foundation for their future learning and work.^[6]

In summary, our teaching content and methods aim to guide students in in-depth learning and application of MATLAB simulation technology through a combination of theory and practice, cultivating their practical operation skills, problem-solving abilities, and innovative awareness, providing strong support for their future development.

4.3 Evaluation and Reflection on the Effectiveness of Student Ideological and Political Qualities Cultivation

When evaluating the effectiveness of cultivating students' ideological and political qualities, we will utilize various assessment methods and tools, including classroom performance evaluation, laboratory report review, project outcome assessment, etc. Through these comprehensive evaluations, we can gain a holistic understanding of students' development in terms of ideological and political qualities, including their moral character, sense of social responsibility, and innovative abilities. Classroom performance evaluation focuses on students' participation in discussions, depth of problem thinking, and ability to cooperate in teams during class. Laboratory report review emphasizes evaluating students' abilities in experiment design, data analysis, and their ability to provide reasonable explanations and summaries of experimental results. Project outcome assessment involves a comprehensive evaluation of students' achievements in project design and implementation, including the project's innovation, practicality, and presentation of outcomes. By employing these assessment methods, we can objectively evaluate students' actual levels of ideological and political qualities cultivation, identify problems in a timely manner, and continuously improve the teaching quality and effectiveness of the course.

During the practical implementation process, we will also engage in continuous reflection and summarization. We will regularly organize teacher team meetings for teaching reflection, conduct comprehensive analysis and evaluation of the course's teaching effectiveness, thoroughly discuss existing problems and deficiencies, and propose improvement measures and suggestions. Additionally, we will actively collect feedback from students through questionnaire surveys, individual interviews, etc., to understand students' opinions and suggestions regarding the course, and adjust and improve the course's teaching content and methods accordingly, aiming to enhance the effectiveness of the course's ideological and political qualities cultivation. Through continuous reflection and improvement, we believe we can better achieve the goal of cultivating students' ideological and political qualities and make greater contributions to the cultivation of talents in the electrical engineering field.

5. Future Development and Prospects of Ideological and Political Construction in the "Matab Simulation and Application" Course

5.1 Course Improvement and Enhancement for the Future

With the continuous development of technology and the evolving nature of electrical engineering, we will continuously improve and enhance the "Matab Simulation and Application" course for the future. Firstly, we will keep track of the latest developments in Matab simulation technology, updating the course content promptly and introducing the latest simulation tools and case studies to maintain the course's cutting-edge nature and practicality. Secondly, we will strengthen the integration of the course with engineering practice projects. By collaborating with enterprises or conducting school-enterprise cooperation projects, students will be able to apply theoretical knowledge to practical engineering

projects, enhancing their practical abilities and innovative awareness.

5.2 Teaching Team Construction and Faculty Development

To advance the ideological and political construction in the "Matab Simulation and Application" course, we will enhance the construction of the teaching team and faculty development. We will establish a regular mechanism for teaching team communication and training, inviting industry experts and senior teachers to share teaching experiences and provide guidance on teaching methods, thereby improving the teaching level and professional competence of the faculty. Additionally, we will encourage teachers to actively participate in scientific research projects and engineering practice projects, continuously enhancing their research capabilities and practical experience, providing solid support for the improvement and development of the course.

5.3 Innovative Paths and Strategies for Ideological and Political Education in Electrical Engineering Based on Matab Simulation Technology

In the future, we will further explore innovative paths and strategies for ideological and political education in electrical engineering based on Matab simulation technology. We will strengthen the design of ideological and political education content and practical teaching activities in the course, focusing on cultivating students' sense of social responsibility and innovative spirit. Moreover, we will actively introduce interdisciplinary ideological and political education resources, combined with the characteristics of electrical engineering, to conduct diversified ideological and political education activities, such as special lectures, social practices, and voluntary services, expanding students' thinking space, stimulating their patriotism and sense of social responsibility, and cultivating outstanding electrical engineering talents with comprehensive development.

Through the implementation of these measures, we are confident that we can elevate the ideological and political construction in the "Matab Simulation and Application" course to a new level, making greater contributions to the education and teaching of electrical engineering.

6. Conclusion

Virtual simulation technology plays a crucial role in enhancing the effectiveness of ideological and political education through practical teaching. However, to fully leverage its benefits, it is essential to objectively recognize its strengths and weaknesses and strike a balance with the teaching of ideological and political courses to avoid blind usage. Particularly in the context of China's education reform process, universities should emphasize the value of virtual simulation technology in improving the effectiveness of practical teaching in ideological and political education. This can be achieved through resource allocation and faculty development, laying a solid foundation for its application. Furthermore, there is a need to intensify training for ideological and political education teachers, guiding them to embrace new educational tools and promoting the renewal of teaching concepts and methods in ideological and political education. This will enable comprehensive utilization of virtual simulation technology in ideological and political education, further enhancing the effectiveness of practical teaching. Ultimately, this will contribute to the cultivation of students' ideological and moral character and sense of social responsibility, laying a solid foundation for the comprehensive development and growth of talents in electrical engineering disciplines.

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