Exploration of AI Empowered Curriculum Ideology and Politics Teaching: A Case Study of "Basic Aviation Electricity"

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Abstract. This paper explores innovative approaches to AI empowerment of curriculum ideology and politics teaching, using the "Basic Aviation Electricity" course as an example. The article first analyzes the teaching challenges of this course, which include the high theoretical difficulty, insufficient practical application, and low relevance of ideological and political cases. It then elaborates on the necessity of AI Technology in enhancing the richness of ideological and political content, the precision of teaching, and the learning experience. The feasibility of policy, data, and technological support is also discussed. Subsequently, this article systematically proposes four specific implementation paths: developing a modular ideological and political case library for Bilingual Courses, driving visualized teaching and virtual experiment, innovating multi-dimensional teaching methods, and extending the evaluation dimensions of ideological and political education. The research indicates that AI Technology can effectively integrate the professional knowledge and ideological and political education, providing strong support for cultivating high-quality aviation maintenance technology talents in the new era. This offers a reference for the teaching of Curriculum Ideology and Politics in electrical Bilingual Courses.

Keywords: Artificial Intelligence; Bilingual Teaching; Curriculum Ideology and Politics

1 Introduction

In 2020, the Ministry of Education of China issued the Guidelines for the Construction of Curriculum Ideology and Politics in Higher Education, which clearly pointed out that ideological and political education should be integrated into the talent training system of universities[1]. It also stated each course should give a full play in ideological and political education. As research progresses, this reform is gradually shifting from the exploratory stage to the stage of deep integration.

Basic Aviation Electricity, as a core foundational bilingual course for aviation maintenance majors, is characterized by strong theoretical underpinnings and wide-ranging applications. Its theoretical knowledge provides indispensable technical sup-

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port for power transmission, information processing, sensors, and other fields in aviation. Against the background of a transportation powerhouse, this course not only undertakes the mission of cultivating internationalized, high-quality aviation maintenance talents, but also needs to convey China's craftsman spirit and cultural values during globalization.

With the vigorous development of technology such as Big Data, Artificial Intelligence, and Virtual Reality, the Educational Field is undergoing profound and multi-dimensional changes, reshaping traditional education models.

This paper focuses on the students' virtue through education, integrates industry and professional characteristics, actively promotes the teaching reform of Curriculum Ideology and Politics in Electrical Courses, and systematically constructs an innovative path for AI Empowerment teaching. It aims to cultivate high-quality aviation maintenance technical talents in the new era based on the Basic Aviation Electricity course.

2 Necessity and Feasibility of AI Empowerment of Curriculum Ideology and Politics Teaching in Electrical Courses

2.1 Course Characteristics and Pain Points of Basic Aviation Electricity

This course involves many abstract physical concepts, such as material structure, energy conversion, and circuit equivalent transformation. It requires students to have a good foundation in physics and mathematics, as well as strong logical thinking skills.

The knowledge points of this course are closely related to technologies in cutting-edge fields such as semiconductors and sensors. For example, the thermoelectric effect is the theoretical basis for thermocouples used in aviation to detect high temperatures. However, students often find it difficult to connect theoretical knowledge with practical applications during the learning process.

The ideological and political case matching degree is low, the value guidance is insufficient, and the assessment system is weak. An analysis of the existing case library indicates that, out of the 36 curriculum ideology and political education cases, only 8 (22.2%) were closely aligned with the specific knowledge points of the course. Furthermore, the content of these cases reveals a thematic concentration on two primary areas: the biographical accounts of electrical scientists and the retrospective analysis of aviation accidents. The bilingual nature of the course brings cross-cultural challenges to the teaching, which should not only conform to the science and engineering logic, but also take into account the expression of local values. There is a lack of an ideological and political case library that is compatible with the course teaching content. The traditional assessment focuses on the degree of knowledge mastery, lacks quantitative indicators and comprehensive evaluation for the effect of ideological and political education.

2.2 Necessity of AI Empowerment in Curriculum Ideology and Politics Teaching

Intrinsic Requirement to Enhance the Richness of Content. With its ability to accurately analyze course content, teaching needs, and massive data, AI Technology can efficiently capture social hot spots, industry trends, and cutting-edge technology trends. This capability injects fresh and rich cases and materials into Curriculum Ideology and Politics. It helps to link ideological and political education with professional knowledge, achieving a deep integration of the two. Students can internalize the Socialist Core Values while mastering professional skills, comprehensively improving their ideological and moral quality and professional quality.

Inevitable Choice to Improve the Accuracy of Teaching. Traditional Curriculum Ideology and Politics education often adopts a uniform teaching method, which struggles to meet the individualized learning needs of students. With AI technology, we can collect and record data generated by each student during the learning process in an all-round and all-weather manner. Based on the data, it can deeply analyze students' ideological status, cognitive level, personal interests and preferences, learning ability, and behavior habits. Relying on the analysis results, it can push personalized learning resources and teaching plans containing different elements, which can improve the accuracy and effectiveness of Curriculum Ideology and Politics.

The Fundamental Need to Enhance the Learning Experience. AI tools have the characteristics of timely feedback and easy access. They can quickly obtain multimodal data such as images, texts, audios, and videos. They can efficiently assist teachers in constructing virtual simulation teaching scenarios. Through vivid and intuitive situations, they can evoke students' emotional resonance and strengthen their awareness, which helps to improve learning interest while achieving implicit ideological and political education.

2.3 Feasibility of AI Empowerment in Curriculum Ideology and Politics Teaching

Support from National Policies and Guarantee of Digital Campus. In December 2025, the Expert Steering Committee for Teacher Development of the Ministry of Education officially released the Guidelines for the Application of Generative AI by Teachers (Version 1.0). This document clarifies the guiding ideology, basic principles, scenario guidelines, normative guidelines, and organizational guarantees for the application of generative AI by teachers. It provides policy support and guarantees for AI empowerment in Curriculum Ideology and Politics teaching. Based on the school's continuous Digital Campus construction, infrastructure such as campus networks, information resources such as digital libraries, and information platforms such as blended teaching provide a good software and hardware environment for AI empowerment in Curriculum Ideology and Politics. For example, our institute has established an online "Digital Museum of Chinese Civil Aviation for 70 Years" based on the national teaching resource library.

Support of Massive Resources and Iteration of Generative AI Technology. Massive data resources provide abundant materials for AI tools[2]. Continuously iterative Large Language Models and Natural Language Processing, among other AI Technologies, provide a robust technical foundation for Curriculum Ideology and Politics teaching. AI Technology can extract students' learning characteristics, grasp the latest data on industry development, and focus on current social topics. This enables the generation of cases and teaching plans that are more adapted to students' actual needs and course requirements. It also allows for the personalized delivery of resources. Continuous interaction with AI tools can also extend the boundaries of Curriculum Ideology and Politics teaching.

3 Innovative Paths of AI Empowerment for Bilingual Courses Curriculum Ideology and Politics Teaching

3.1 AI-Assisted Development of a Modular Bilingual Courses Ideology and Politics Case Library

During the teaching process, we can sort out the teaching content, collect the ideological and political cases related to this course, and develop a supporting ideological and political case library with the assistance of Generative Artificial Intelligence[3]. This library is classified according to modules.

The cases are divided into five modular resources: science and technology ethics, family-country sentiment, great country craftsmen, professional quality, and safety and environmental protection. Based on the specific knowledge points of "Electrical Engineering Fundamentals," these cases are organically integrated into the teaching chapters. For example, in the "Basic Concepts" section, cases from the "science and technology ethics" module are used. Through the stories of scientists in the history of electrical development, students can appreciate the wisdom of human beings in using scientific thinking to change lives, guiding them to pay attention to the needs of scientific and technological development. When explaining electrostatic phenomena, cases from the "family-country sentiment" module are used, citing the ingenuity of ancestors in using electricity by friction to identify genuine and fake amber in ancient books, demonstrating confidence in Chinese culture. When explaining circuit breaker components, cases from the "safety and environmental protection" module are used. For example, air disaster examples are used to cultivate students' safety awareness and aircraft maintenance work style. In the explanation of semiconductor knowledge points, cases from the "great country craftsmen" module are used to introduce the significant achievements of Chinese scientists in fields such as semiconductor materials, using the power of role models to guide the sense of mission of serving the country through aviation.

The case development process involves: (1) clarify the core ideological and political elements and plan the webpage's content modules, information architecture, and navigation flow; (2) generate text and code using prompts via generative AI tools; (3)

integrate materials into the development environment for testing; (4) optimize the interactive experience using prompt engineering; (5) deploy the final resources online.

3.2 Curriculum Ideology and Politics Integration of AI-Driven Visualized Teaching and Virtual Experiment

The degree of visualization of traditional electrical courses teaching method is low. By using AI Technology to create visualized teaching resources and develop a virtual electrical experiment platform integrated with Curriculum Ideology and Politics elements, the implementation of Curriculum Ideology and Politics becomes more vivid and relatable.

The use of AI Technology enables the generation of 3D models and animations, which provides strong support for explaining complex knowledge. For instance, when teaching material structure, the 3D model of the atomic structure can clearly show the positions, quantities, and characteristics of several particles. Additionally, it can help students understand energy conversion through the energy level transition of electrons. Incorporating elements of dialectical thinking into visualized teaching resources can stimulate students' scientific spirit of exploring the world.

Developing a virtual electrical experiment platform using AI Technology provide a safe and reliable immersive learning environment to students[4]. For example, students can adjust the numerical value of the series resistance and observe the measurement data of the ammeter and voltmeter through the virtual experiment platform, so as to intuitively understand the properties of the series circuit. This kind of independent operation is not only safe and reliable but also enables students to deepen their understanding of theoretical knowledge in practice. Through the virtual experiment, the platform can cultivate students' rigorous attitude and awareness of safety and environmental protection through functions such as safety tips, intelligent feedback, and ideological and political cases.

3.3 Innovative Multi-Dimensional Teaching Methods Based on AI Technology

Modern teaching emphasizes student-centered approach, striving to match students' actual situations by reconstructing teaching content and reforming teaching models[5]. Based on the AI Technology online learning platform, we can do some teaching innovations in the following aspects. Relying on the intelligent tutoring system of the teaching platform, based on students' learning progress and knowledge mastery, the system can accurately identify students' learning difficulties and weak links, and personalize the push of Teaching Resources and ideological and political cases. A course agent can be established to achieve real-time Q&A and feedback, allowing students to ask questions through text, voice, pictures, etc., to solve learning problems anytime and anywhere, and provide online feedback on learning suggestions, which can enhance students' exploratory spirit and expand subject dimensions[6]. AI tools can be used to help students with weak English foundations improve their acceptance of

Bilingual Courses, and through bilingual ideological and political resources, students can tell Chinese stories well on the international stage.

3.4 AI Technology Extends the Dimensions of Curriculum Ideology and Politics Education Evaluation

AI Technology can achieve a shift from vague to precise in education evaluation through the organic combination of quantitative and qualitative indicators. For example, in the conduct of electrical experiments, quantitative indicators are judged by the degree of experiment completion and the processing of experimental data. Qualitative assessments are made through safe collaboration and orderly norms during operation. The dimension of curriculum ideology and politics education evaluation is extended through students' experimental report writing and online discussions. AI tools can automatically collect students' process learning behavior data, such as classroom participation, online resource learning progress, and safety operation tests, to combine process evaluation and outcome-based evaluation.

4 Conclusion

Taking the Basic Aviation Electricity course as an example, this paper deeply explores the innovative paths of AI Technology empowering Curriculum Ideology and Politics teaching from four aspects: developing a modular bilingual ideological and political case library, driving visualized teaching and virtual experiment, innovating multi-dimensional teaching methods, and extending the evaluation dimension of ideological and political education. AI Technology not only provides infinite possibilities for the innovation of content but also provides richer teaching methods and efficient multi-dimensional evaluation methods for the Curriculum Ideology and Politics teaching and evaluation. The innovative path proposed in this paper greatly improves students' interest and participation, enriches their ideological and political experience, effectively improves the efficiency, quality, and effect of Curriculum Ideology and Politics teaching, and provides more ideas for AI empowering Curriculum Ideology and Politics.

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