

Original Paper

Research on a New Teaching Model of Integrating Ideological and Political Education into Courses under the Background of “AI Education”

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Abstract

“AI education” is a comprehensive concept that refers to deeply integrating artificial intelligence technology into the field of education, using intelligent methods to optimize the educational environment, thereby promoting fundamental changes in traditional education models, teaching methods, and learning experiences—a new type of educational model. In a narrow sense, “artificial intelligence education” means using AI technology to assist in various aspects such as teaching, management, assessment, and feedback, in order to achieve more efficient and personalized educational services. In a broader sense, “artificial intelligence education” is not limited to the technical application level; it also represents an innovation in educational philosophy and models. It emphasizes a student-centered approach, fully utilizing AI technology to meet students’ individual needs and continuously improve their learning outcomes. Curriculum-based ideological and political education integrates the core ideas of ideological and political education into the implementation of diverse professional courses, emphasizing the deep integration of knowledge transmission and value guidance. This allows various elements within the classroom to interact and collaborate, strengthening the effect of ideological conveyance while teaching knowledge. This integration is essentially a creative reorganization of the content dimension in the educational process, combining theoretical compatibility with practical significance. AI demonstrates unique advantages in promoting the realization of curriculum ideological and political education goals. For example, it can introduce abundant teaching resources and innovative teaching methods. Taking a basic course like “Data Structures” as an example, AI-generated ideological and political databases can incorporate rich social practice experiences into professional knowledge teaching, guiding students to perceive the underlying

ideological and political significance through their professional learning. At the same time, AI can innovate and adjust traditional educational models, further enhancing the actual effectiveness of curriculum-based ideological and political education.

Keywords

AI, Ideological and political education in courses, education

1. Introduction

Data Structures is a fundamental compulsory course for undergraduate software majors. Through this course, students will be able to use mathematics, natural sciences, engineering basics, and professional knowledge to define and describe problems, select research approaches according to the requirements of complex engineering problems in application-oriented software systems, design solutions for complex engineering problems in application-oriented software systems, and complete the design of data models. It aims to meet the frontline needs of the software engineering industry, especially in the Guangdong-Hong Kong-Macao Greater Bay Area, particularly Dongguan. The course also focuses on cultivating qualified citizens who love their country, support the Party, abide by the law, and possess good moral character, fostering a talent pool with well-rounded development in morality, intelligence, physical fitness, aesthetics, and labor.

However, traditional “Data Structures” teaching focuses on basic algorithm concepts, algorithm theory, and other fundamental knowledge, while the cultivation of hands-on practical skills is relatively weak, and the time allocated for practical teaching is insufficient. Students need to engage in a large amount of hands-on practice outside of class to master programming proficiently. In the current teaching approach, even if teachers adopt the method of explaining and practicing simultaneously in class, due to the numerous steps involved in operations, many students may grasp the content in class but, due to forgetting some parts after class, experiments may fail, making it difficult to review and reproduce classroom content, which seriously affects learning outcomes. Furthermore, when taking the “Data Structures” course, in order to make up for prerequisite knowledge, the usual approach is for the instructor to briefly review or skip over the content in the first 10 minutes of class; this duration is too short for students to review and digest the material effectively, resulting in minimal effect. Alternatively, instructors may assign tasks for students to preview the material themselves before class, but in this case, students lack supervision, and teachers cannot accurately determine whether the students have genuinely previewed the material, making this approach also ineffective. Poor mastery of prerequisite knowledge results in ineffective connection and progression of the course. Additionally, many current teaching methods are limited to explaining basic knowledge points, without classifying and expanding them, nor linking them with ideological and political education in courses. Therefore, pure classroom teaching cannot meet the learning needs of students, and it is necessary to use the latest teaching models to improve the teaching of such courses.

In the context of “AI education,” teaching design that incorporates curriculum ideological and political

education needs to organically integrate artificial intelligence technology, subject knowledge, and ideological and political education to cultivate students' professional abilities, innovative thinking, and values. In addition, artificial intelligence integrates high-quality global teaching resources, improves teaching efficiency, and helps teachers find materials that meet their goals, thereby enhancing teaching quality. It can easily integrate high-quality courses, teaching videos, and academic materials from around the world, providing teachers with flexible and diverse teaching options.

2. Research Status

The current wave of digitalization is surging, and artificial intelligence technology is profoundly reshaping the landscape of various industries, with the education sector being no exception, ushering in an unprecedented wave of transformation. The emergence of cutting-edge technologies such as natural language processing models represented by ChatGPT and the latest video generation model Sora is deeply revealing the limitless potential and broad prospects of artificial intelligence (AI) in the field of education. The advent of these advanced technologies not only signals an imminent AI-driven revolutionary change in the education sector but also provides strong technological support for achieving higher quality and more personalized education. Against this backdrop, researching and applying new models of "AI education" has become particularly important and urgent.

With the help of AI-generated ideological and political databases, professional knowledge teaching can be integrated with rich social practice experiences, guiding students to perceive the ideological and political significance behind their professional studies. At the same time, AI can also innovate and adjust traditional education models, further enhancing the tangible effectiveness of curriculum-based ideological and political education. An intelligent teaching platform built through AI can achieve personalized learning goals, matching each student with unique learning plans and ideological and political education materials according to their learning progress and mastery of knowledge points. This encourages students to engage in the learning process driven by their interests. At the same time, using AI virtual simulation technology creates an immersive environment, allowing students to deeply engage with ideological and political requirements in practice, improving their ideological and political stance in real business scenarios, further enhancing their spatial grasp of course objectives and core values, and guiding students in this field to acquire judgment and action skills aligned with the socialist orientation.

Given all the above advantages, it is imperative to reform the teaching model to integrate ideological and political education into the curriculum under the context of "AI education." This project intends to start with the "Data Structures" course, introducing AI and ideological and political education into the curriculum, continuously creating a model course of integrating ideological and political education under the context of "AI education". At the same time, a team of competition instructors with practical experience and professional teachers with postgraduate entrance exam expertise will be formed to discover, encourage, and guide student teams to participate in various competitions, laying a solid

foundation for AI empowerment, allowing students to quickly master the skills and qualities required under the context of “AI education”.

3. Specific Measures for a New Teaching Model Integrating Ideological and Political Education into the Curriculum under the Background of “AI Education”

3.1 Specific Reform Content

In the context of “AI education”, teaching design that incorporates curriculum ideological and political education needs to organically integrate artificial intelligence technology, subject knowledge, and ideological and political education to cultivate students’ professional abilities, innovative thinking, and values. In addition, artificial intelligence integrates high-quality global teaching resources, improves teaching efficiency, and helps teachers find materials that meet their goals, thereby enhancing teaching quality. It can easily integrate high-quality courses, instructional videos, and academic materials from around the world, providing teachers with flexible and diverse teaching options.

The “Data Structures” course will adopt a new teaching model that integrates ideological and political education within the context of “AI education” and will be conducted through project-driven instruction. AI technology will be used to provide students with personalized learning paths while incorporating ideological and political elements. By constructing a virtual experimental environment with AI and combining it with ideological and political cases, students’ sense of social responsibility will be enhanced. In the process of organically integrating these elements, emphasis will be placed on cultivating values and cultural confidence, aiming to help students develop correct life perspectives and values, as well as patriotic sentiments, alongside their knowledge acquisition. AI platforms will be used to conduct online ideological discussions, while offline group projects will deepen understanding. Cross-disciplinary ideological teaching modules will be designed by integrating philosophy, ethics, and other disciplines. An intelligent teaching platform will be built with AI to achieve personalized learning goals, matching students with unique learning plans and ideological education materials based on their learning progress and mastery of key concepts, encouraging students to engage in learning driven by interest. AI virtual simulation technology will also create an immersive environment. The classroom will use the BOPPPS model to design the pre-class, in-class, and post-class activities comprehensively. Through AI-selected cases and project tasks that break down postgraduate entrance exam topics and competition knowledge points, students will progress gradually from basic to advanced levels, following the principle of “learning by doing and doing by learning.” The teaching emphasizes the central role of students, strengthens practical training on key exam-related topics, enhances students’ programming skills, and lays a solid foundation for postgraduate exams and competitions.

The specific model is shown in Figure 1:

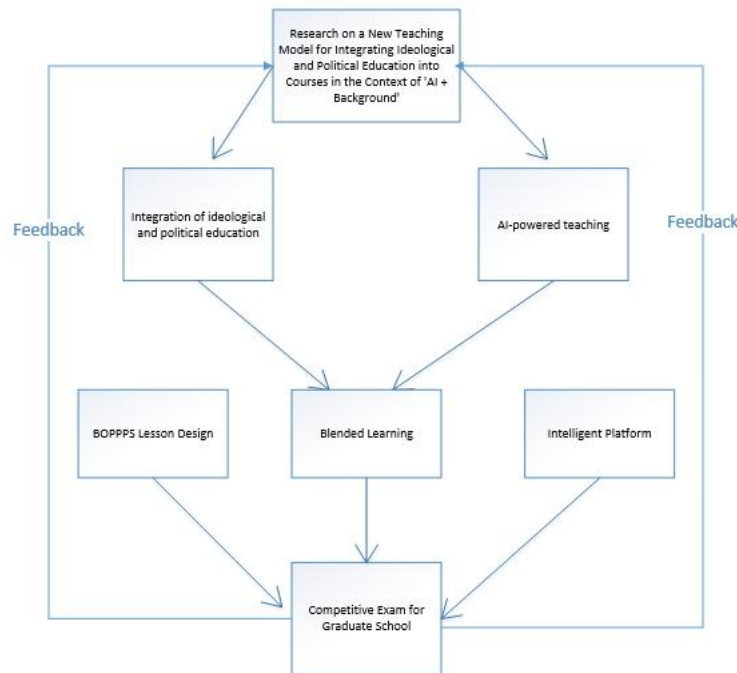


Figure 1. Course Teaching Model

3.2 Overall Course Design

The BOPPPS model is used to design the overall structure before, during, and after the class, as shown in Figure 2:

- 1) Pre-class Preparation (AI-assisted), Intelligent Preview Push: Micro-lesson videos are pushed through the learning platform, containing subject knowledge and ideological and political cases. AI analyzes preview data to identify students' difficulties.
- 2) In-class Implementation (Blended Teaching), Case Introduction (5 minutes): AI selects cases and breaks down real enterprise project tasks, progressing from simple to complex, gradually enhancing understanding. It showcases AI application scenarios and introduces the ethical issues behind the technology, discussing the value of 'technology for good.' Knowledge Explanation & AI Interaction (20 minutes): The teacher explains core theories while performing AI tool demonstrations. Student questions are collected in real time via AI bullet screen tools, allowing for adjustments to teaching focus. Group Tasks (20 minutes): The teacher designs practical sessions based on software engineering characteristics, project-oriented in the experimental phase, and groups design "AI solutions" including societal benefit analysis (points for ideological integration). A collaborative platform (e.g., Tencent Docs) is used to record the process in real time, and AI evaluates participation. Ideological Elevation (10 minutes): A documentary clip showcasing Chinese scientists overcoming challenges is played to guide students in discussing 'innovation and responsibility.'
- 3) Post-class Extension (Personalized Learning), AI Intelligent Homework: The platform pushes differentiated exercises and automatically generates learning reports to provide feedback on the

achievement of ideological goals. Virtual Practice: Social impact scenarios of AI technology are simulated through virtual simulation platforms (e.g., VR labs).

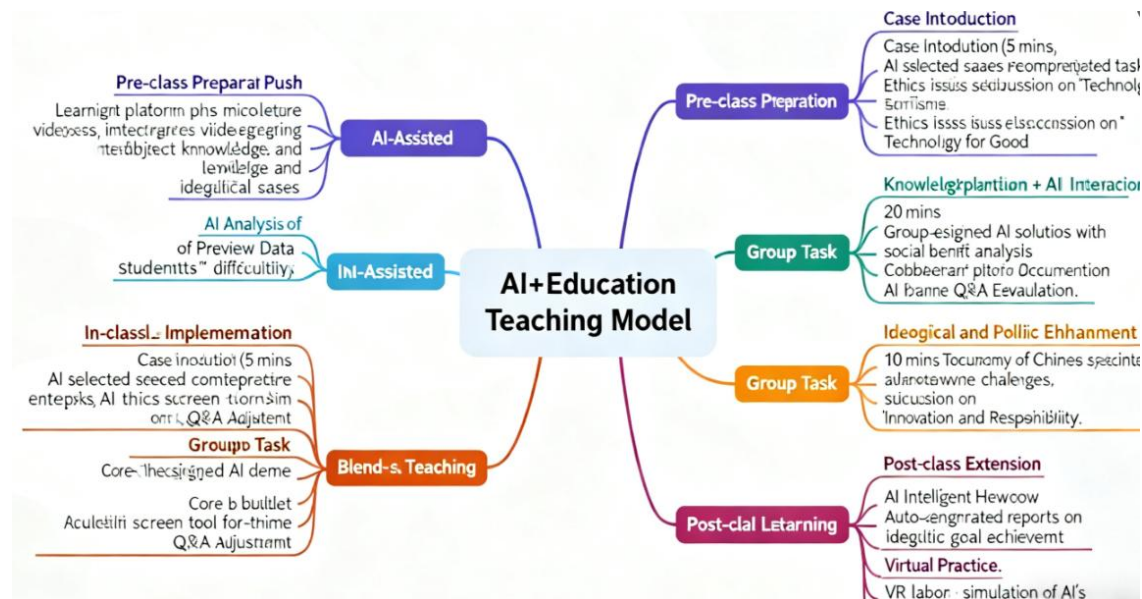


Figure 2. Research on a New Teaching Model of Integrating Ideological and Political Education in Curriculum Design under the Background of AI Education

3.3 Course Teaching Methods

1) AI-powered course instruction. Intelligent assisted teaching: Using AI technologies (such as intelligent recommendation systems and adaptive learning platforms) to provide students with personalized learning paths, while integrating ideological and political education elements. Virtual experiments and case simulations: Building virtual lab environments with AI and combining them with ideological and political case studies to enhance students' sense of social responsibility.

2) Organic integration of ideological and political elements. Value guidance: Emphasizing the balance between "efficiency and fairness" in algorithm teaching, guiding students to consider the social impact of technology. Cultivating cultural confidence: Highlighting contributions of Chinese scholars in the field of data structures (such as Wu Wenjun's algorithms) to boost students' national pride. The goal is for students to develop correct life perspectives and values while learning knowledge, and to foster patriotism.

3) Blended teaching model. Combining online and offline: Using AI platforms for online ideological and political discussions, and deepening understanding through offline group project practice. Interdisciplinary integration: Designing cross-disciplinary ideological and political teaching modules in conjunction with subjects like philosophy and ethics.

4) AI-based intelligent teaching platforms to achieve personalized learning objectives, matching students with unique learning plans and ideological education materials according to their learning

progress and mastery of knowledge points, promoting self-driven engagement through interest, while using AI virtual simulation technology to create an immersive environment.

5) Using the BOPPPS model for overall design before, during, and after class.

6) Actively guide students in competitions and postgraduate entrance exams during the teaching process. AI technology can, through the logic of “data perception—algorithm decision—feedback”, reconstruct the design of competition topics, training paths, and evaluation systems, creating a synergistic effect of “precise demand targeting and dynamic ability iteration”. Competition-driven methods can utilize this logic and provide students with professional guidance for postgraduate entrance exam strategies. Integrate the knowledge points of the postgraduate entrance exams into course teaching, subtly guiding students' learning, strictly managing their study time to strengthen their professional knowledge, actively encourage students to participate in professional competitions to enhance their expertise, and provide students with a good learning atmosphere and environment for exam preparation.

3.4 Course Teaching Evaluation Methods

This course adheres to a “student-centered” teaching evaluation system and has established a comprehensive evaluation system where formative assessment and summative assessment complement and influence each other, forming a comprehensive evaluation of students' learning status. The formative assessment system is introduced, and the final grade will consist of three parts, each with a weighted assessment component. Specifically, the final grade = 30% formative assessment, 30% project experiments and practice, 40% final exam.

Formative assessment (30%) includes 5% class attendance, 5% online learning, 10% homework, and 10% classroom performance. Project experiments and practice (30%) include 10% lab reports and 20% lab presentations.

Lab Assessment: “Data Structures” is a highly practical course, making practical training particularly important. The close integration of practice and theory follows an 'teach-learn-do' integrated teaching approach. Labs are scheduled after each theoretical lecture, with lab content designed based on the lecture material. Labs include mandatory tasks and optional tasks, with optional tasks provided for students who can handle extra work. Students complete the labs on computers and write lab reports in the standard format. The instructor grades each lab by verifying it in class (students run their programs and give a defense) and marking the lab reports.

Regular performance: Composed of homework, classroom interaction, attendance, video learning, chapter quizzes, group tasks, chapter studies, discussions, and exams.

Final Assessment: The final exam is conducted as a major project. First, an exam plan is drafted, the scope of the exam is determined, and after approval by the leadership, the questions are prepared. There are A and B versions of the exam, and the Academic Affairs Office randomly selects one as the main exam paper and the other as the makeup exam paper.

Table 1. Assessment Details for Programming Courses

COURSE ASSESSMENT	Assessment process	Proportion (%)	Assessment Rules
Daily performance	Classroom attendance	5%	Attendance status of each class assigned in class
	E-learning	5%	Record of learning situation of Super Star Learning Pass Weekly video learning and units on the classroom dispatch platform;
	Process assessment	Homework after class	10% Completion status of test questions and assigned assignments
	Classroom performance	10%	Flipped classroom participates in questions, competitive answers and discussions; Comprehensive score with explanation
	Project	Experimental report	10% Check the experimental report status
	Experimental Practice	Experimental defense	20% Explanation of the project and answering of questions during the student defense process
Final grade	Offline centralized Final examination	40%	Final examination score

3.5 Reform Goals

(1) Explore the theoretical basis of a new teaching model that integrates ideological and political education into the curriculum under the background of “AI Education”.

(2) Based on the characteristics of application-oriented undergraduate universities and the actual conditions of schools and students, achieve an efficient combination of “teaching” and “learning” in the teaching process, with an emphasis on the reasonable optimization of the leading roles of teachers and students in the classroom. The main objective is to encourage students to participate more actively in learning. Interest-driven guidance is an effective method to stimulate students' enthusiasm for learning. The explanations should be as clear and accessible as possible, using simple, vivid, and engaging language to convey knowledge points, while also focusing on cultivating students' logical analysis and

hands-on abilities, striving to ensure that every student gains knowledge and improves skills.

(3) Explore methods in teaching practice such as “interest-driven, AI-supported, ideological and political elements” to stimulate students’ interest and enhance teaching effectiveness. In the context of information-based teaching, use AI to build intelligent teaching platforms to achieve personalized learning goals. Match students with unique learning plans and ideological and political education materials based on their learning progress and mastery of knowledge points, promoting self-driven engagement in the learning process through interest. Additionally, leverage AI virtual simulation technology to create an immersive environment.

(4) Explore ways to integrate ideological and political elements, aiming to help students, while acquiring knowledge, improve their patriotism, establish correct core values, and foster a spirit of dedication. With AI support, promote the achievement of curriculum ideological and political goals, demonstrating unique advantages. For example, AI can introduce rich teaching resources and innovative teaching methods into curriculum-based ideological and political education. By utilizing AI’s data processing capabilities, massive ideological and political materials—such as current affairs, model figures’ deeds, and content of red culture—can be integrated and precisely delivered according to teaching needs and student characteristics, thereby making the content system of ideological and political education more comprehensive and abundant.

(5) Integrate competitions and postgraduate entrance exam preparation, using competition to promote learning and research to enhance learning. In traditional teaching, teachers often focus on students’ ability to replicate textbook knowledge without paying attention to their capacity for innovative application. This project’s feature is that an AI-enabled competition model can dynamically extract industry data to select topics, respond in real-time to industry trends, and, using virtual simulation technology and enterprise-level databases, provide rich training resources. Employ process-driven competency profiles for multidimensional assessment and link competition platforms directly with enterprise demand data to achieve closer industry-education integration. Compared to traditional competition models, the AI-enabled approach not only improves timeliness and resource richness but also enhances the scientific validity of assessments and industry alignment, offering participants a more valuable learning and practical experience.

3.6 Implementation Plan

In the context of “AI + Education,” teaching design that integrates curriculum ideological and political education should organically combine artificial intelligence technology, subject knowledge, and ideological and political education, cultivating students’ professional abilities, innovative thinking, and values. The following is the teaching design framework:

(1) Teaching Design Concept

Cultivating virtue and talent: Use professional knowledge as a carrier, implicitly integrating ideological and political elements (such as patriotism, scientific spirit, ethical awareness, etc.).

Technology empowerment: Use AI tools (intelligent assessment, personalized learning, big data

analysis, etc.) to improve teaching efficiency and precision.

Student-centered: Achieve layered teaching and dynamic feedback through AI, balancing personalized learning with overall development.

(2) Teaching Objectives Design

Knowledge objectives: Master core knowledge points of the subject and understand the application logic of AI technology in this field.

Ability objectives: Develop critical thinking, AI tool application skills, and interdisciplinary problem-solving abilities.

Ideological and political objectives: Strengthen social responsibility; inspire patriotic sentiments in science and technology (e.g., examples of AI development in China).

(3) Teaching Process Design

1. Pre-class Preparation (AI-assisted)

Intelligent preview push: Use the learning platform to push micro-lesson videos that include subject knowledge plus related ideological and political cases.

AI analyzes preview data to identify students' difficulties.

2. In-class Implementation (Blended teaching)

Case introduction (5 minutes): AI selects cases and decomposes real enterprise project tasks, progressing from simple to complex, showing AI application scenarios, raising ethical issues behind the technology, and discussing values such as "technology for good."

Knowledge explanation + AI interaction (20 minutes): Teacher explains core theories, interspersed with AI tool demonstrations; student questions are collected in real-time through AI bullet screen tools to adjust teaching focus.

Group tasks (20 minutes): Based on the characteristics of software engineering, the teacher designs practical sections, project-oriented during the experimental phase, grouped to design "AI solutions" including social benefit analysis (a point of ideological and political fusion); the collaboration platform (e.g., Tencent Docs) is used to record the process in real-time, with AI evaluating participation.

Ideological and political elevation (10 minutes): Play a documentary clip about Chinese scientists overcoming difficulties and guide students in discussing "innovation and responsibility".

3. Post-class Extension (Personalized learning)

AI intelligent homework: The platform pushes differentiated exercises; automatically generates learning reports, providing feedback on achievement of ideological and political objectives.

Virtual practice: Simulate social impact scenarios of AI technology through virtual simulation platforms (e.g., VR labs).

In the teaching course, teachers should design practical sections based on the characteristics of software engineering, projects oriented to the experimental phase, to increase students' learning interest and team collaboration spirit. The course adopts a "AI + integration of postgraduate entrance exam and competition, task-driven + project-oriented" approach, combined with mind maps, incorporating

ideological and political elements into the teaching mode. This aims to cultivate students' professional software development abilities and modularly arrange teaching content.

By flexibly utilizing the advantages of AI + Education, students' interest in learning can be effectively stimulated, encouraging active thinking and practice, facilitating teacher-student interaction, and truly transforming the one-way flow of information and teacher-centered control in the classroom, while also fostering students' awareness of autonomous learning. Students' efforts and achievements should be promptly acknowledged, allowing them to experience the joy of success and motivating proactive learning.

4. Conclusions

The reform of a new teaching model that integrates ideological and political education into courses under the background of "AI education" is urgent. Intelligent teaching platforms built with AI can achieve personalized learning objectives by matching each student with a unique learning plan and ideological and political education materials based on their learning progress and mastery of knowledge points. This promotes students' self-motivated engagement in the learning process driven by their interests. At the same time, AI virtual simulation technology can create an immersive environment, allowing students to deeply engage with ideological and political requirements in practical situations, enhancing their political and ideological positioning in real business scenarios, further strengthening their understanding of course objectives and core values, and guiding them in this field to acquire judgment and action skills aligned with the direction of socialism.

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