

Research on AI-Empowered Teaching Reform of Curriculum Ideology and Politics in Safety Engineering—Taking the "Safety Facility Design Course" as an Example

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Abstract: Against the dual background of national promotion of curriculum ideology and politics construction and industrial intelligent upgrading, the safety engineering major, as an important carrier for cultivating high-quality talents in the field of safety production, urgently needs to overcome the integration dilemmas of traditional models in its curriculum ideology and politics teaching. This paper takes the "Safety Facility Design" course as the research object and proposes a three-dimensional teaching system of "Ideology and Politics + Profession + Industry" empowered by artificial intelligence (AI). The research adopts comprehensive strategies such as intelligent teaching platform construction, course content restructuring, innovative teaching models, and diversified evaluation methods. Through virtual simulation, big data analysis, and intelligent collaboration, it implants core concepts like "life first, safety first," the craftsman spirit of continuous improvement, and professional standards of strict law compliance into the entire teaching process. The article focuses on analyzing current problems in teaching, such as the disconnection between ideological and political elements and the profession, insufficient practical education, weak school-enterprise collaboration, and a singular evaluation system. It proposes using AI technology to deeply mine ideological and political elements, construct immersive practical scenarios, build open school-enterprise collaborative platforms, and establish a scientific evaluation closed loop, ultimately achieving the synergistic enhancement of students' professional abilities and ideological-political literacy, providing a replicable path and method for the ideological and political reform of similar professional courses nationwide.

1. Introduction

With the continuous deepening of China's emergency management system construction and the accelerated transformation of the safety industry from traditional models to intelligent and digital ones, the competency requirements for safety engineering professionals are undergoing significant

changes—the talent evaluation standard is gradually shifting from a singular "technical competence" to a composite ability structure encompassing both "value guidance" and "technical innovation." This change not only reflects the elevated strategic status of production safety concepts within industrial systems but also highlights the urgency of the dual tasks of value shaping and technical training in safety engineering education.

Against this backdrop, curriculum ideology and politics, as a strategic measure to implement the fundamental task of fostering virtue through education, urgently needs to achieve deep, coupled integration with professional courses to promote students' internalization of professional ethics and social responsibility while acquiring professional knowledge. "Safety Facility Design," as a core course in the safety engineering major, covers areas such as production safety protection, risk control technology, and life support system design in its content system. It naturally carries safety concepts like "life first," the engineering spirit of "continuous improvement," and professional standards of "law compliance." These intrinsic connotations are highly consistent with the value orientation of curriculum ideology and politics, making this course an important carrier for cultivating students' value awareness and engineering thinking.

However, at the current stage, the integration of ideological and political elements in the "Safety Facility Design" course still has significant shortcomings. On one hand, the extraction and application of ideological and political elements in current teaching often appear fragmented, remaining mostly at the level of simple "add-ons" or "labeling," lacking systematic integration based on safety design standards and engineering practice. On the other hand, constrained by the inherent safety risks of practical training scenarios in high-risk industries and the practical limitations of accessing enterprise resources, it is difficult for students to intuitively perceive the responsible values and social significance behind safety design through highly realistic real cases or on-site operation experiences. This leads to deficiencies in situational engagement and deep cognition for ideological-political education.

In recent years, the rapid development of artificial intelligence technology has provided new technical pathways to solve the above problems. Relying on functions such as virtual simulation, digital twins, big data analysis, and intelligent collaboration, AI technology can construct high-fidelity, low-risk virtual practice environments for safety engineering, realizing the visualization and interactivity of case scenarios, allowing students to experience the engineering complexity and ethical mission of safety design in immersive simulations. Simultaneously, personalized learning plans based on intelligent analysis can dynamically embed ideological and political elements into the course, forming knowledge chains with consistent goals alongside technical knowledge, thereby significantly enhancing the teaching effectiveness and penetration depth of curriculum ideology and politics.

Therefore, exploring AI-empowered teaching reform for curriculum ideology and politics in the "Safety Facility Design" course is not only an inevitable choice to respond to the national "AI + Education" strategic deployment and promote the digital transformation of education but also an important practical direction for improving the quality of safety engineering talent cultivation and achieving the organic unity of ideological-political education and professional education. This research holds significant strategic importance and application value for constructing a safety engineering talent training system that meets the needs of future industries.

2. Existing Problems in Ideological and Political Teaching of the Safety Facility Design Course

2.1 Insufficient Integration of Ideological-Political Elements and Professional Content, Fragmenting Educational Goals

In the current teaching practice of the "Safety Facility Design" course, there remains a significant

disconnection between ideological-political elements and the professional knowledge system, directly leading to the fragmentation of educational goals and making it difficult to form systematic value guidance^[1]. Most teachers, in the process of mining and presenting ideological-political content, tend to focus on explicit and easily referenced normative content such as safety laws, regulations, and industry design standards, while paying insufficient attention to implicit value elements embedded in the entire design process, such as "the sense of responsibility based on risk anticipation," "the innovative spirit centered on continuous optimization," and "the professional literacy demonstrated through interdisciplinary collaboration." These implicit elements actually possess stronger value-shaping power but are often overlooked in the existing teaching system.

A more prominent issue is that the current methods of integrating ideology and politics generally manifest as a linear superposition model where "individual ideological-political cases are added after the completion of professional knowledge instruction." This model fails to embed value guidance goals into the core links of teaching—such as the logical derivation of design principles, multi-dimensional demonstration of engineering solutions, and trade-off analysis of risk control decisions—to achieve organic integration throughout the process^[2]. For example, when teaching content related to "Fire and Explosion Protection Facility Design," most teachers only explain technical requirements based on code provisions, lacking the link that guides students to deep thinking combined with engineering accident cases. Taking a chemical plant explosion accident caused by facility design defects as an example, this case can not only reveal technical risks in the design process but also serve as an important teaching context for analyzing designers' responsibility and professional ethics. However, if this context is not effectively integrated into the teaching process, ideological-political education and professional knowledge transmission become "two separate layers," preventing students from naturally constructing value beliefs during technical learning, thereby affecting the overall educational effectiveness of the course.

2.2 Lack of Practical Educational Scenarios, Insufficient Experiential Sense of Ideology and Politics

In the safety engineering education system, the practical education component is key to transforming students' technical knowledge into professional values. However, industries involved in the "Safety Facility Design" course, such as chemical, mining, and construction, are typical high-risk fields. Their physical training is subject to multiple constraints: not only the practical problems of scarce site resources and high construction costs but also significant personal safety risks. This limitation fundamentally weakens the practical educational function of the course, as students find it difficult to directly participate in drills and design implementation in real engineering scenarios during their studies.

In the current teaching model, teachers mostly rely on textual descriptions, 2D drawings, or static images to showcase typical design cases. While these can convey relevant technical information, they are clearly insufficient in terms of situational restoration and sensory impact. Students struggle to form an intuitive understanding of the catastrophic consequences caused by failures in safety facility design, particularly the severe reality of life loss and property damage resulting from design defects. This lack directly affects the shaping of value concepts, causing the core principle of "safety first" to remain more at the level of passive acceptance in cognition, rather than forming an internalized mechanism for conscious practice in behavior and decision-making.

For example, when teaching "Emergency Exit Design," teachers usually only explain the design requirements for exit width through drawing standards and textual regulations, unable to provide an immersive experience for students to personally feel the danger that "insufficient exit width may lead to evacuation congestion and even mass casualties." Due to the lack of contextualized risk

experience, students' cognition of "facility design equates to safety responsibility" stays at the level of theoretical imagination, failing to form emotional resonance and value-driven professional judgment. This situation not only weakens the persuasive power of value guidance in curriculum ideology and politics but also affects students' professional consciousness and ethical adherence in the long term.

From the perspective of educational effectiveness, if ideological-political literacy cannot be reinforced through practical scenarios, it is often difficult for it to naturally permeate from the knowledge system into thinking modes and work habits. Therefore, how to break through the constraints of practical training conditions in high-risk industries and construct alternative yet equally impactful and immersive teaching scenarios has become an urgent task for the reform of curriculum ideology and politics in safety engineering.

2.3 Weak School-Enterprise Collaborative Education Mechanism, Difficulty in Transforming Industry Ideological-Political Resources

In the safety engineering talent training system, the school-enterprise collaborative education mechanism is a key link connecting classroom teaching and industry practice. Enterprises, as the main frontlines for the application of safety engineering technology and risk control, have not only accumulated rich technical experience and management models but also precipitated ideological-political resources with high educational value during long-term production operations. Examples include the responsible perseverance of senior engineers in high-risk environments, the "safety first" concept formed within corporate systems and culture, and the practice of professional ethics during accident response. These resources are characterized by freshness, contextuality, and strong value infectivity, making them important materials for deepening curriculum ideology and politics^[3].

However, existing school-enterprise collaboration mostly remains at a preliminary level of formal cooperation models, such as "enterprise visits" and "expert lectures," often centered on one-time activities, lacking systematicity and sustainability, and failing to form a deep integration matching the goals of classroom teaching. On one hand, high-value materials such as real enterprise engineering projects, typical accident cases, and on-site safety management processes rarely enter the core teaching links of the classroom. It is difficult for students to practically experience the industry's comprehensive requirements for "safety designers" in terms of technical proficiency, risk anticipation, and ethical responsibility through practical operations like design tasks and risk assessments. As a result, value guidance and knowledge transmission in the course remain primarily from the school's perspective, lacking the support of industry contexts.

On the other hand, enterprise experts have insufficient participation in the evaluation system for curriculum ideology and politics. Current evaluations rely more on teachers' subjective judgments or school-defined standards, lacking value assessment dimensions based on frontline industry experience, such as whether risk prevention foresight is reflected in safety scheme optimization, or whether responsible behavior is demonstrated in engineering collaboration. Without evaluation feedback from enterprises, students' sense of responsibility, professional literacy, and teamwork skills are difficult to validate against real industry standards, resulting in a clear disconnect between the educational goals of curriculum ideology and politics and the needs of the industry.

To address the above dilemmas, artificial intelligence technology can become a key tool for the deep integration of school-enterprise resources. Based on AI's multi-source data integration and semantic analysis capabilities, high-value ideological-political materials can be automatically extracted from enterprise production reports, accident investigations, and design scheme documents, building a digital case library that can be accurately matched with course knowledge points. The AI

collaborative platform can support enterprise experts' remote participation in student project reviews and value literacy evaluations in virtual teaching spaces. Through intelligent analysis of behavioral data (such as the number of scheme modifications, risk priority sorting, and team collaboration records), it can quantify students' sense of responsibility and professional ethics level, forming an evaluation feedback closed loop based on industry standards. This technical path not only improves the conversion rate of industry ideological-political resources but also provides a sustainable collaborative mechanism for cultivating "ethically and technically proficient" safety engineering talents that meet industry needs.

2.4 Singular Teaching Evaluation System, Difficulty in Measuring the Effectiveness of Ideological-Political Education

In the current teaching evaluation system of the "Safety Facility Design" course, the evaluation focus remains concentrated on final written examinations and single knowledge mastery tests. The evaluation criteria mainly target students' memory and understanding of professional theories, design specifications, and technical principles. This model, which emphasizes knowledge assessment, lacks systematicity and scientificity for the goals of curriculum ideology and politics—especially the cultivation and inspection of students' sense of responsibility, professional ethics, and craftsman spirit.

Even in some teaching practices where ideological-political evaluation dimensions are introduced, the indicator system is mostly limited to qualitative observational variables such as "enthusiasm in class participation " and "completeness of ideological-political expression in assignments." Although these indicators reflect students' participation level and value expression ability to some extent, they lack a quantitative and process-oriented evaluation mechanism for ideological-political literacy, making it difficult to effectively measure the real improvement of students' implicit literacy during the course learning process. For example, regarding the decision-making logic of whether a design scheme prioritizes "personnel safety" in multi-objective trade-offs, the existing evaluation system cannot provide verifiable quantitative data, nor can it distinguish whether students' value judgments are based on passive fulfillment of specifications due to technical logic or active optimization stemming from a sense of responsibility^[4]. This evaluation blind spot makes it difficult to form quantitative analysis and evidence support for the effectiveness of ideological-political education, further restricting the scientific formulation of teaching feedback and optimization paths.

More crucially, the lack of an effective evaluation closed loop for ideological-political education prevents the course from conducting precise interventions targeting students' weak points in value cognition in subsequent teaching designs. In the long run, the goals of curriculum ideology and politics may become merely conceptual in the implementation process, lacking regular monitoring of their achievement and actual effectiveness, as well as a data-based continuous improvement mechanism. This not only weakens the guiding role of the "Safety Facility Design" course in value shaping but also affects the quality assurance of the "ethically and technically proficient" talent training model in safety engineering.

3. Paths for AI-Empowered Reform of Ideological and Political Teaching in the Safety Facility Design Course

3.1 AI-Driven Deep Mining of Ideological-Political Elements, Constructing a "Professional-Ideological-Political" Integrated Content System

In the practice of ideological-political education in the "Safety Facility Design" course, how to

achieve deep coupling between value guidance and professional knowledge has always been a core issue in course reform. Leveraging artificial intelligence technology, especially the capabilities of big data analysis and intelligent recommendation, can effectively break through the limitations of traditional ideological-political element mining that relies on manual screening and subjective experience, thereby constructing a "professional-ideological-political" integrated content system for safety engineering. Its implementation path includes four links: resource digitization, element extraction, knowledge mapping, and intelligent recommendation.

To begin, we will develop an "Ideological and Political Elements Database" for the Safety Facility Design course by integrating multi-source data. This database will compile content from industry regulations, major accident reports, exemplary engineer deeds, corporate safety culture cases, and other relevant materials. This database not only stores professional knowledge points in a structured form but also uses Natural Language Processing (NLP) technology to perform tasks like word segmentation, sentiment analysis, and topic modeling on the original corpus, extracting implicit ideological-political elements highly relevant to the course's value goals, such as "sense of responsibility in risk anticipation," "innovation spirit reflected in continuous optimization," and "law-abiding compliance under institutional adherence." Subsequently, the resources are categorized and tagged based on the three dimensions of "course chapter, knowledge point, and ideological-political goal," enabling their precise alignment within the professional content structure. For example, when analyzing data from a "mine safety facility renovation project," the system can identify value labels such as "the dedication spirit of engineers overcoming difficulties" and "the social responsibility of the enterprise in ensuring employee safety," and automatically associate them with the "Mine Safety Facility Design" knowledge module.

Second, a teaching resource matching mechanism is established based on intelligent recommendation algorithms. During the teacher's lesson preparation stage, the system can dynamically retrieve cases and interpretation materials from the database that meet the preset teaching goals (e.g., "cultivating students' risk anticipation ability" or "enhancing awareness of system compliance"), and push them sorted by relevance. For instance, when the teaching focus is on predicting the failure probability of safety facilities, the AI system not only pushes "application cases of machine learning in risk early warning" but also attaches responsibility ethics analysis of that case, discussing the designer's responsibility boundaries and value orientation in the context of technological empowerment. This method of synchronous delivery enables the coordinated occurrence of technical knowledge transmission, ability cultivation, and value guidance in the same teaching scenario, avoiding the drawback of "separate presentation" of knowledge and value in traditional courses.

This "AI-driven deep mining of ideological-political elements and intelligent recommendation system," on one hand, enhances the discoverability and matching accuracy of ideological-political elements, reducing the time cost for teachers in resource collection and case selection; on the other hand, through embedded integration, it naturally integrates ideological-political goals into core teaching links such as engineering principle explanation, scheme demonstration, and risk decision-making, thus constructing a course content system that emphasizes both professionalism and ideological nature, and is dynamically updateable and iterable. This provides a replicable technical path and teaching paradigm for achieving the goal of cultivating "ethically and technically proficient" talents in the field of safety engineering.

3.2 AI Constructs Immersive Practical Scenarios, Strengthening Experiential Learning of Ideology and Politics

The application of artificial intelligence technology in the field of education, particularly the

integrated development of Virtual Reality (VR) and Augmented Reality (AR), provides new technical pathways to break the bottleneck of "lack of scenarios, weak experience" in the ideological-political teaching of safety engineering courses. Relying on the immersive environment construction capability driven by AI, it is possible to set up ideological-political practices with "real scenes, real problems," enabling students to engage in task-based learning in realistic engineering contexts, and internalizing professional responsibility and engineering technical training simultaneously.

In terms of VR scene construction, high-fidelity 3D accident simulation models can be established based on accident databases from high-risk industries and production site information. Zhang and Wang pointed out that virtual simulation experiments, by constructing a teaching closed loop integrating "scenario-task-reflection," can effectively enhance the emotional resonance and cognitive depth of ideological and political education^[5], providing theoretical support for the training path of "accident tracing - hidden hazard analysis - facility optimization design" in this course. For example, by restoring typical accidents such as chemical plant tank explosions, mine collapses, and building fires, and using physics engines to accurately simulate processes like fire spread, structural failure, and personnel evacuation. After wearing VR equipment, students can "personally experience" the dynamic process of the accident from a first-person perspective, intuitively perceiving the catastrophic consequences caused by the lack or improper design of safety facilities. Under the task guidance of the AI system, students can enter the training session of "accident tracing - hidden danger analysis - facility optimization design" after the experience, completing the cognitive transformation from situational impact to engineering improvement. For example, in a virtual task of "shopping mall fire protection system design," students first experience the scene where delayed initial fire suppression is caused by excessive distance between fire hydrants, and then optimize the layout of the fire protection system and pipeline parameters in the virtual environment, thereby deepening the value cognition that "facility design is life protection" in practice.

AR technology, on the other hand, can overlay virtual safety facility models in real space, combined with AI algorithms for real-time interaction and design evaluation. Through mobile terminals (phones, tablets, etc.), students can deploy virtual emergency signs, evacuation routes, firefighting equipment, and other facilities in real scenes such as campus teaching buildings and laboratory buildings, and adjust parameters (e.g., route width, turning angle, sign visibility distance) in real-time. The AI system performs real-time compliance detection on the design scheme and calls the case library to push accidents or successful response cases closely related to the current context. For example, in the task of "campus emergency route optimization," when the AI detects that the turning angle of a route is too sharp, potentially causing evacuation blockage, it will simultaneously display an instance where a school achieved rapid and safe evacuation due to reasonable route design, prompting students to naturally integrate the safety concept of "specifications as the bottom line" into their decision-making and implementation during the process of optimizing the design scheme.

This construction of immersive practical scenes based on AI not only significantly enhances students' safety risk perception ability and technical response level but also, through contextualized and task-based learning design, transforms curriculum ideology and politics from abstract concepts into perceivable and operable engineering practice processes, achieving the dual goal unity of knowledge transmission and value shaping. Therefore, systematically introducing such technology into the reform of the "Safety Facility Design" course can not only compensate for the lack of practical training in high-risk industries but also cultivate students' engineering responsibility and professional ethical literacy under low-risk conditions, providing strong technical support for constructing a "ethically and technically proficient" safety engineering talent training system.

3.3 AI Builds Open School-Enterprise Collaboration Platforms, Activating Industry Ideological-Political Resources

In the implementation of curriculum ideology and politics for safety engineering majors, school-enterprise collaboration is a key link in transforming real industry resources into educational materials. However, in actual teaching, information barriers and resource timeliness differences commonly exist between universities and enterprises, making it difficult to efficiently import core ideological-political resources accumulated by enterprises—such as safety culture, engineering responsibility cases, and professional ethics practices—into the classroom, thereby disconnecting the course's educational content from industry reality. To this end, building an open school-enterprise collaboration platform based on artificial intelligence becomes an effective way to bridge the education chain and the industry chain. It can not only enhance the breadth and depth of resource sharing but also achieve the precise embedding and dynamic updating of ideological-political elements, thus forming a new educational ecology suitable for safety engineering talent cultivation.

Relying on the data processing, semantic analysis, and task generation capabilities of artificial intelligence, this platform designs an application system with complementary functions to ensure the long-term stability and substantive development of school-enterprise cooperation. Firstly, in the platform's library of real enterprise projects, the system aggregates engineering project data related to safety facility design uploaded by enterprises, including cases such as mine ventilation system optimization, explosion protection isolation schemes for chemical industrial parks, and fire protection design for major public buildings. Artificial intelligence algorithms automatically break down the project content into teaching task chains like "demand analysis - scheme design - result review" according to engineering logic, and embed ideological-political elements highly consistent with industry practice at the nodes, such as "the responsibility stories of enterprise engineers in major safety decision-making" or "the safety culture concepts reflected during project implementation." Students complete tasks in teams, and process data is uploaded to the platform in real-time. Enterprise experts can remotely enter the task environment for online guidance, allowing students to truly experience the industry's comprehensive requirements for safety designers in terms of technical ability, professional conduct, and ethical responsibility.

Secondly, through course progress perception and expert resource matching functions, the platform dynamically invites frontline safety directors, senior engineers, or project managers from the industry to conduct live lectures or virtual meetings. These sessions not only provide technical interpretations of typical engineering cases but also focus on professional value guidance. For example, experts might share "career experiences of adhering to safety bottom lines" or "decision-making thinking and psychological games when dealing with sudden risks," combined with their own participation in major safety facility design projects, recounting real experiences of insisting on not lowering safety standards under pressure to reduce construction costs. This guides students to understand the balance between technical decisions and ethical responsibilities, subtly cultivating their professional ethics and sense of responsibility. Students can participate in interactive Q&A and online discussions through the platform, the persuasiveness and impact of the ideological-political education are significantly enhanced.

Finally, after students complete tasks or project designs, the platform will rely on an integrated AI evaluation model to automatically generate a dual-dimensional evaluation report covering "professional ability + ideological-political literacy." Evaluation elements include the compliance of the scheme, risk identification and anticipation ability, teamwork and communication performance, etc. Enterprise mentors can then supplement evaluation suggestions based on their own industry experience, such as "whether the scheme meets on-site construction constraints" or "whether it

reflects proactive is in caring for the safety of frontline workers," aligning the curriculum ideology and politics evaluation highly with the industry standard system. This dual-mentor mechanism ensures that students' learning outcomes meet both academic standards and practical industry needs, providing a powerful institutional guarantee for cultivating composite talents that meet the future requirements of the safety engineering industry.

3.4 AI Constructs a Diversified Evaluation System, Realizing a Closed Loop for Ideological-Political Education Effectiveness

Leveraging the data collection and analysis capabilities of artificial intelligence technology, a comprehensive curriculum ideology and politics evaluation system covering the three-dimensional structure of "process-oriented - summative - industry-oriented" can be established, thereby achieving closed-loop management of students' value shaping and ability cultivation. AI hierarchically structures the ideological-political literacy in the field of safety engineering into four first-level dimensions: "Sense of Responsibility," "Concept of Rule of Law," "Craftsman Spirit," and "Teamwork," with quantifiable secondary indicators under each dimension. For example, "Sense of Responsibility" can be broken down into the proportion of safety priority settings in the design scheme, the accuracy rate of accident risk anticipation, etc.; "Teamwork" can be decomposed into the frequency of cross-professional communication, the timeliness rate of collaborative task completion, etc. This structured system provides a data benchmark for subsequent automated analysis and personalized improvement.

In terms of evaluation methods, the AI system can achieve diversified and data-driven comprehensive assessment. In the process-oriented dimension, the system monitors students' behavioral data in virtual simulations and online project practices in real-time, such as whether they prioritize optimizing personnel safety-related facilities, or whether they actively consult and follow relevant safety regulations during scheme iterations, and automatically generates stage-based scores based on this. In the summative dimension, relying on natural language processing technology, it performs textual semantic analysis on the design reports submitted by students, extracting core information such as safety concepts and risk response measures, and matches them with the curriculum ideology and politics goals to quantify the depth and accuracy of value concept integration. In the industry-oriented dimension, by directly connecting with the enterprise-end platform, industry experts are invited to conduct comprehensive assessments of students' professional literacy based on real engineering standards, covering aspects such as safety ethics, work attitude, and risk awareness, ensuring that the evaluation results are directly linked to industry employment standards.

All evaluation data is fused and analyzed by the AI system to generate a multi-dimensional comprehensive evaluation report, and targeted improvement plans are automatically pushed. For example, if a student scores low in the "Sense of Responsibility" dimension, the system will match and recommend "cases of responsible behavior by excellent designers" and "virtual simulation training for accident reflection"; if performance is insufficient in the "Teamwork" dimension, the platform will arrange virtual design projects requiring multi-person collaboration, providing students with opportunities to enhance their professional literacy in collaborative contexts. Through such an evaluation-improvement closed-loop mechanism, the effectiveness of curriculum ideology and politics education can not only be scientifically measured but also dynamically optimized and personalized enhanced in a data-driven manner.

4. Conclusion and Outlook

This research demonstrates that artificial intelligence technology provides new technical support

and model innovation for the ideological-political teaching reform of the "Safety Facility Design" course in the safety engineering major. Through intelligent content integration, precise matching between course professional knowledge points and ideological-political elements is achieved; through the construction of immersive practical scenarios, the limitations of physical training in high-risk industries are broken through, significantly enhancing students' value experience and emotional resonance; through deep collaboration of school-enterprise resources, the bidirectional flow of real enterprise cases, industry culture, and classroom teaching is realized; through a precise evaluation system, the improvement of students' implicit literacy such as sense of responsibility, professional ethics, and craftsman spirit is quantified. These innovative measures effectively solve traditional teaching problems such as the "two separate layers" of ideology-politics and profession, insufficient practical experience, low conversion rate of industry resources^[6], and vague evaluation standards, promoting the formation of a "knowledge transmission - ability cultivation - value guidance" trinity educational model in the course.

Looking forward, the integration of AI and curriculum ideology and politics should be further deepened: The application potential of Artificial Intelligence Generated Content (AIGC) in creating ideological-political cases is explored to enable personalized scenario construction, automated case supplementation, and multi-dimensional emotional portrayal. This approach enhances the precision and persuasiveness of value-based education. Concurrently, ethical governance and safety assurance of AI in educational settings must be addressed, with particular attention to data security, privacy protection, and algorithmic fairness. This ensures that technological innovation consistently supports the fundamental goal of fostering virtue through education without deviating from its essence. Pei also emphasized that while generative AI empowers education and teaching, it is necessary to strengthen ethical norms and risk prevention, and build a dual-wheel drive mechanism of "technology empowerment + humanistic guidance"^[7], which provides important inspiration for the subsequent intelligent construction of this course.

It is foreseeable that, with the continuous empowerment of AI technology and the joint promotion of educational concepts, the ideological-political teaching of safety engineering professional courses is expected to achieve higher-quality development, supplying the industry with high-quality safety engineering talents possessing solid technical strength, a sense of responsibility, and adherence to professional bottom lines, thereby promoting China's production safety and engineering ethics construction to a new level.

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