The Dilemmas and Exploration of Teaching Reform for Python Curriculum Ideology and Politics in the Era of Artificial Intelligence

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Abstract. The rapid development of the artificial intelligence industry has imposed higher demands on talent cultivation in electronic information disciplines at higher vocational institutions. This paper proposes an integrated teaching approach for Python courses that aligns with AI industry needs, focusing on three dimensions: restructuring educational objectives, incorporating ideological and political education into teaching content, and designing a diversified evaluation system. Research demonstrates that this approach effectively achieves a synergistic integration of knowledge transmission, competency development, and value cultivation, providing a practical framework for reforming Curriculum Ideology and Politics in Python courses at higher vocational institutions.

Keywords: Artificial Intelligence; Python Course; Curriculum Ideology and Politics

1 Introduction

Guided by the goal of powerful country in education and fulfilling the fundamental mission of strengthen moral education and cultivate people, Curriculum Ideology and Politics serves as a crucial vehicle for ideological and political instruction[1]. In recent years, the extensive application of artificial intelligence technologies in education has provided innovative technical support and practical scenarios for implementing curriculum-based ideological and political education[2][3]. As a compulsory course for information-related majors, Python serves as a crucial bridge connecting foundational academic learning with industrial technology applications. However, its traditional teaching approach has long suffered from a disconnect between professional knowledge delivery and ideological guidance—a challenge that urgently requires resolution.

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2 The Dilemma of Curriculum Ideology and Politics

2.1 The Disconnection Between "Hard Skills" and "Soft Competencies" in Personnel training

Traditional Python courses focus primarily on teaching technical syntax, algorithms, and tool applications, while lacking in-depth exploration and guidance regarding the ethical, legal, social impact, and national consciousness values underlying these technologies[4]. Typically, instructors rely solely on fragmented personal experiences to incorporate ideological and political elements, without a systematic or standardized framework for content integration. In many courses, such integration either involves additional ideological lectures after class or the forced imposition of political labels on case studies, making it difficult to achieve a natural blend of professional content with value-oriented guidance. As a result, students concentrate solely on whether code runs and functions are implemented, rarely engaging proactively in reflecting on the boundaries and responsibilities of technology application—thus reducing ideological and political guidance to a mere formalistic supplement.

2.2 The Teaching Content is Out of Sync with Industry Needs

The Python teaching cases in existing textbooks predominantly focus on basic syntax exercises. The course content lags behind industry developments, fails to align with contemporary trends, and integrates ideological and political education in a mechanical manner[5]. There is a notable lack of contemporary ideological themes relevant to China's independent innovation in information technology and breakthroughs in critical bottleneck technologies. Consequently, students struggle to develop a value recognition that technology serves national development and promotes social progress through technical practice, nor can they meet the practical demands for ethical competence among technical professionals in the artificial intelligence era.

2.3 The Disconnect Between the Course Evaluation System and the Cultivation of Students' Ideological Literacy

Current evaluations of Python courses predominantly focus on assessing knowledge points, primarily measuring student learning outcomes through code submissions, written tests, and final project grades. These evaluations concentrate solely on hard skill indicators such as syntax mastery and functional implementation, completely omitting the assessment of soft competencies like students' understanding of ideological and political elements and their practice of technical ethics[6][7]. This singular evaluation approach inadvertently encourages students to prioritize technical training over the enhancement of ideological literacy, exacerbating the bias of "emphasizing technique over principle." Moreover, it fails to reflect the actual educational impact of course-based ideological and political education, lacks a basis for its continuous optimization, and does not align with the modern requirements for cultivating information professionals who excel in both moral integrity and technical proficiency.

3 A Pathway for Ideological and Political Education in Python Courses to Break Traditional Challenges

3.1 Reconstructing Talent Development Objectives

The course restructures the educational goals into an integrated system encompassing knowledge, skills, and character development, overcoming the current fragmentation between these elements. At the knowledge level, it strengthens foundational expertise in Python syntax, control structures, functions, modules, data analysis, and visualization. At the skill level, it emphasizes programming implementation, problem-solving, project development, and teamwork. At the character level, it incorporates ideological and political content such as scientific literacy, awareness of laws and regulations, and patriotic sentiment.

3.2 Ideological Transformation of Teaching Content

Aligned with trends in the digital economy, big data, and artificial intelligence, and closely tied to national strategies such as Digital China and technological self-reliance, the course content is restructured and optimized to integrate ideological and political education. Outdated examples are replaced with real-world applications that meet job market demands, including ship shipping data analysis, personal income tax calculation, and calendar development. Fundamental topics like syntax, data processing, and visualization are embedded within industry-based practical scenarios. Meanwhile, ideological elements are deeply integrated. While enhancing professional application capabilities, the curriculum fosters patriotism, national pride, and a strong sense of professional mission.

3.3 Designing a Multifaceted Evaluation System Focused on Ideological Development

A multidimensional, full-process evaluation system centered on character development is established. The evaluation framework moves beyond a sole focus on technical skills, comprising three main components: professional competence, ideological and political literacy, and learning process. Professional competence assesses mastery of knowledge and project development abilities; ideological literacy covers learning attitude, teamwork, online ethics, responsibility, and professional conduct; and the learning process evaluates classroom participation, performance in practical training, and independent study.

4 Implementation of Curriculum Ideology and Politics in Python Courses

4.1 Integrate Ideological and Political Education into Teaching Content Across Multiple Dimensions

Adhering to the teaching ways of the Python course— "Basic → Advanced → Comprehensive" —and applying to Tongyi Qwen, the teaching case of Curriculum Ideology and Politics is identified across multiple dimensions: knowledge, application, and value.

4.1.1 Basic Grammar Study: Integration of Integrity Literacy and Learning Attitude Education.

The introduction begins by showcasing domestic large-scale models, serving as an educational foundation that fosters confidence in China's technological capabilities and allowing students to initially appreciate the strength behind the nation's scientific progress[8]. In basic Python syntax teaching, the local Tongyi Qwen model was used to design teaching examples, such as "rigor, meticulousness, integrity, and self-discipline." For instance, guidance on variable naming and code indentation encourages standardized programming practices, while using Qwen for error correction emphasizes that "code reflects one's attitude," cultivating diligent and meticulous learning habits. In the calendar mini-program, discussions about the lack of ten days of 1582 and the pursuit of excellence convey the principles of "rigorous attention to detail and practical application of knowledge." This approach guides students to adopt proper learning attitudes, discourages reliance on AI-generated code or perfunctory assignments, and enables them to appreciate programming's true value through hands-on functional development.

4.1.2 Advanced Application Study: Integrating National Sentiment and Technological Confidence Education.

Integrating advanced Python concepts (lists, dictionaries, file operations) with domestic AI technology to design practical teaching example,such as legal compliance, social responsibility, patriotism[9]. First, Developing a "Personal Income Tax Calculator" mini-program. By leveraging file manipulation techniques, the program retrieves relevant tax policies, utilizes the Qwen model to provide clear explanations, generates tax education content. This guides students to understand that "complying with tax laws is a fundamental civic duty". Second, domestic AI application encourage students to use the Tongyi Lingma in PyCharm for advanced programming. The program explains the development history and achievements of domestic large-scale models like Tongyi Qwen and ChatGLM, allowing students to witness firsthand advancements in AI technology, enhance technological confidence, and cultivate the ideal of "using technology to serve the nation." Additionally, students are guided to utilize domestic AI tools to promote positive values such as legal compliance and tax

fulfillment, achieving deep integration of technological application with ideological and political education.

4.1.3 Comprehensive Practice Study: Integration of Responsibility and Innovation Education.

Development Python project with integrating domestic AI technologies, this project was designed to meet societal needs,such as incorporating ship data analysis and human-machine dialogue program, enabling students to apply ideological and political education principles during project development and achieve the integration of "learning, thinking, and application, as well as the unity of knowledge, belief, and action." In the ship data analysis case, students utilize Python data processing tools (Pandas, Matplotlib) to extract shipping data, employ the Qwen model for data analysis, and generate navigation optimization recommendations[10]. This process helps students understand the importance of building a maritime powerhouse and fosters their sense of responsibility. In the AI-powered dialogue case, building on foundational and advanced Python knowledge, students develop conversational AI programs using the ChatGLM model to provide educational consultations on ship-related knowledge and maritime laws. This approach not only enhances students' coding integration and AI implementation skills but also reinforces principles of legal compliance and ethical technology application.

4.2 The Teaching Model Integrates Ideological and Political Education into the Curriculum Across Multiple Dimensions

4.2.1 AI-Assisted Teaching Model: Enhancing the Targeted Nature of Ideological and Political Guidance.

A teaching model combining "AI assistance + teacher guidance" has been established, with students' laptops equipped with the Doubao, Qwen, and Tongyi Lingma tools, enabling AI to serve as an auxiliary tool for ideological and political education. When students lack sufficient understanding of shipping operations or familiarity with laws and regulations such as personal income tax, teachers provide guidance by offering keywords for AI searches. By integrating responses from multiple AI versions, teachers further enhance ideological guidance and help students develop sound values.

4.2.2 Practical Inquiry Model: Enhancing the Proactivity in Ideological and Political Comprehension.

Adopting a "project driven + practical inquiry" approach, ideological and political education objectives are integrated into project-based practices[11], enabling students to actively grasp the underlying ideological and political implications as they complete tasks. For example, in the comprehensive practical training, the project-driven model encourages students to form teams independently to develop human-computer chat programs, design question keywords incorporating ideological and political elements, and produce summary reports. From project conception and code development

to final presentation, students engage in self-directed inquiry throughout the process, deepening their understanding of "technology serving the people" through solving real-world problems.

4.2.3 Diverse Interactive Models: Enhancing the Effectiveness of Ideological and Political Communication.

By integrating diverse interactive methods such as group collaboration and outcome sharing, ideological and political education is incorporated throughout the entire interactive process. First, the group collaboration model divides students into teams to work collaboratively on practical projects, fostering their teamwork spirit and sense of responsibility. Second, the outcome sharing model regularly organizes students to present their practical projects and reflections; while showcasing Python+AI projects, they also share their understanding of ideological and political elements, achieving the effect of "one person sharing, multiple people reflecting," thereby expanding the reach and effectiveness of ideological and political education.

4.3 Multi-dimensional Teaching Evaluation Integrates Ideological and Political Education Throughout the Curriculum

4.3.1 Process-oriented Evaluation: Focus on the Regular Assessment of Ideological and Political Performance.

Process evaluation accounts for 60% of the total score and primarily assesses students 'professional performance and ideological development, encompassing three dimensions: First, classroom performance (20%), evaluating students' initiative in AI applications, engagement in ideological discussions, and integrity during class (e.g., avoiding code plagiarism and demonstrating independent thinking); Second, practical assignments (25%), assessing not only code accuracy and standardization but also students 'integrity (e.g., completing work independently and refusing AI-assisted writing); Third, group collaboration (15%), measuring students' teamwork skills and sense of responsibility in group projects. The process evaluation is conducted through a combination of "teacher assessment + peer evaluation + AI-assisted assessment" to ensure objectivity and comprehensiveness.

4.3.2 Final Evaluation: A Comprehensive Assessment Focusing on the Connotation of Ideological and Political Education.

Comprehensive evaluation accounts for 40% of the assessment, with project development at its core, focusing on assessing the integration of students 'professional competence and ideological and political literacy. Students are required to independently develop new features based on the human-computer chat program. The evaluation covers four aspects: first, professional competence (25%), assessing code completeness, functional implementation effectiveness, and AI tool application skills; second, innovation (5%), evaluating the project's originality in integrating ideological and political education and applying AI; third, ideological reflection (10%), assessing the depth of understanding regarding "the integration of technology and ideological

and political education" and "the combination of professionalism and responsibility" in the project summary submitted by students.

5 Conclusion

This paper reformulates the teaching content of the Python course through ideological and political education, establishing a comprehensive multi-dimensional evaluation system that addresses the three major challenges of traditional teaching—where skill development and value guidance are often separated. It achieves seamless integration between professional knowledge and ideological elements, providing a replicable reference for cultivating maritime information professionals who excel in both ethics and technical expertise, meeting the demands of the new era.

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