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Research on Teaching Reform and Practice of Integrating Ideological and Political Education into the Java Programming Course

Ze Yang[1,a,*], Xuejuan Chen[1,b], Lihong Chen[1,c]

[1]School of Information Technology, Guangdong Technology College, Zhaoqing, China
[a]yangze@gdlgxy.edu.cn, [b]158881727@qq.com, [c]chenlihong@gdlgxy.edu.cn
[*]Corresponding author

Abstract: *Java Programming is a core foundational course for computer-related majors, playing a significant role in cultivating students' programming abilities, logical thinking, and engineering practice competencies. Taking the course at Guangdong Technology College as an example, this paper adheres to the principle of fostering virtue through education, explores the ideological and political elements embedded in the curriculum, and establishes a trinity of teaching objectives encompassing "knowledge imparting — ability cultivation — value guidance." It designs a multidimensional integration pathway, innovates teaching and assessment models, and achieves synchronized resonance between professional instruction and ideological-political education. It is demonstrated through practice that the organic integration of ideological-political elements into teaching, practice, and assessment effectively enhances students' professional and humanistic qualities, cultivating computer professionals with solid technical skills, strict adherence to professional ethics, and a strong sense of social responsibility.*

Keywords: *Java Programming; ideological and political education in curricula; teaching reform; professional education*

1. Introduction

In the new era, higher education takes fostering virtue through education as its fundamental task, requiring that all courses align and move in the same direction with ideological and political courses to form a synergistic educational effect. As the core front for cultivating technical talents in the digital economy era, computer-related majors must not only impart technical knowledge and cultivate practical abilities through their specialized courses, but also, and more importantly, shape students' correct worldviews, outlooks on life, and values, and cultivate their patriotic dedication to serving the country through technology and their professional ethics. Java Programming, as a foundational core course for computer-related majors, is characterized by strong logicality, a practical orientation, and a wide range of application scenarios[1]. It contains rich ideological and political elements such as rigor and truth-seeking, collaborative awareness, social responsibility, and an innovative spirit. However, traditional teaching often centers on technical knowledge, exhibiting problems such as emphasizing skills over character development and valuing theory over values, thus failing to fully leverage the course's potential for ideological and political education.

Based on this, integrating the practical experience of constructing the demonstration course for ideological-political education in Java Programming at Guangdong Technology College, this paper systematically explores the teaching reform pathways for ideological-political education in the Java Programming course from various aspects, including the restructuring of teaching objectives, exploration of ideological-political elements, teaching design and implementation, innovation in teaching methods, and improvement of the assessment and evaluation system[2]. It aims to provide a practical reference for the ideological-political construction of foundational courses in computer-related majors.

2. Construction of the Teaching System for Ideological-Political Education in Curricula

Integrating the characteristics of the Java Programming course with the requirements of ideological-political education, the original unitary technical teaching objectives are restructured to form an integrated, three-dimensional goal system encompassing knowledge imparting, ability cultivation, and

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value guidance, thereby achieving an organic fusion of these three aspects.

2.1. Restructuring of Teaching Objectives

The course objectives are delineated into three dimensions: knowledge, ability, and value. The knowledge objective is to equip students with core technologies such as the fundamental syntax of the Java language, object-oriented programming paradigms, the use of standard libraries, database programming, and multithreaded programming, thereby constructing a solid knowledge system in programming. The ability objective is to cultivate students' logical thinking, problem-solving, engineering practice, teamwork, and innovation capabilities, enhancing their proficiency in program design, development, and application. The value objective is to instill in students a deep sense of patriotism and social responsibility, foster the spirit of craftsmanship characterized by continuous improvement, uphold the professional ethics of honesty and trustworthiness, cultivate a team spirit of cooperation and mutual benefit, strengthen cultural confidence and global perspective, and establish a correct view of technology and profession.

2.2. Exploration of Ideological-Political Elements

Each knowledge module within the Java Programming course contains ideological-political elements that can be explored. Through a systematic review of the course content, these ideological-political elements are categorized into four main types: ideological concepts, professional ethics, competency traits, and social values, achieving a precise alignment between ideological-political elements and specialized knowledge. The specific correspondence between core knowledge modules and ideological-political elements is shown in Table 1.

Table 1: Correspondence between Core Knowledge Modules of Java Programming and Ideological-Political Elements

Core Knowledge Module	Ideological-Political Elements
Java Language Overview and Development Environment	Lifelong learning awareness, innovation consciousness, patriotic dedication to contributing to the nation through technology
Basic Syntax (Data Types, Operators, Control Structures)	Logical thinking, rigor and truth-seeking, rule awareness, precise expression
Object-Oriented Programming (Classes, Objects, Inheritance, Polymorphism)	Social roles and responsibilities, inheritance and innovation, equality and fairness, spirit of contract
Exception Handling	Courage to face difficulties, risk prevention awareness, sense of responsibility, problem-solving ability
Collection Framework and Generics	Collectivism, teamwork, adaptability and diversity, efficiency optimization awareness
File I/O and Database Programming	Data security, privacy protection, information literacy, professional ethics, data management responsibility
Multithreaded Programming	Cooperation and coordination, rule awareness, complex problem-solving ability, holistic thinking

2.3. Research Methods and Teaching Implementation Framework

This paper adopts a research methodology combining action research, case study, questionnaire survey, and interview methods to carry out the teaching reform of ideological-political education in the Java course. Through the action research cycle of "design-implementation-reflection-improvement," the teaching design and implementation pathways for ideological-political education within the curriculum are continuously optimized. Concurrently, a teaching implementation framework for ideological-political education in the Java Programming course, characterized by "One Core, Dual Drivers, Three Dimensions, Four Pathways," has been constructed. The framework diagram is shown in Figure 1.

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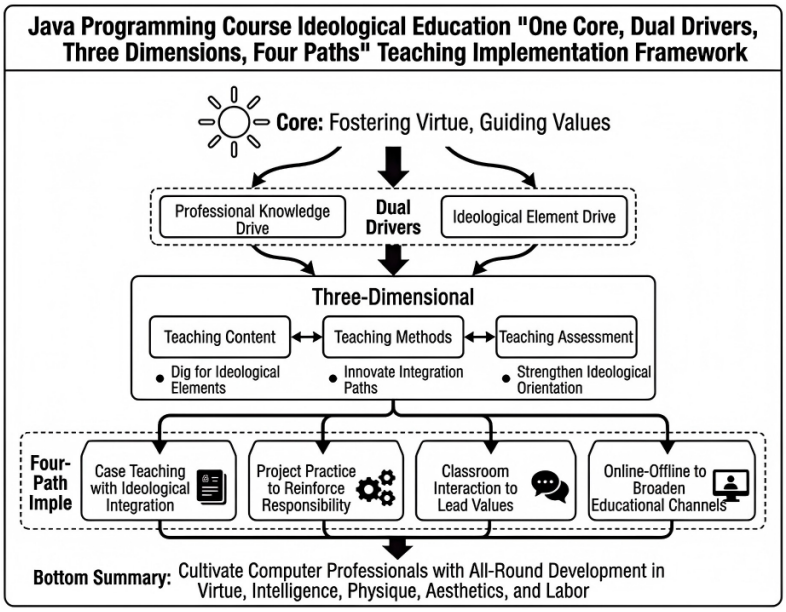

Figure 1: Teaching Implementation Framework for Ideological-Political Education in the Java Programming Course featuring "One Core, Dual Drivers, Three Dimensions, Four Pathways"

This course constructs an implementation system for ideological-political education characterized by "One Core, Dual Drivers, Three Dimensions, Four Pathways." It takes fostering virtue through education as its core, integrating value guidance throughout the entire teaching process, and conducting all teaching activities around cultivating computer professionals with comprehensive development in morality, intelligence, physique, aesthetics, and labor skills. It is driven by the dual drivers of professional knowledge and ideological-political elements, using professional knowledge as the carrier and ideological-political elements as the soul to promote their integration and mutual reinforcement, achieving synchronized resonance between technical teaching and ideological-political education. It achieves the integration of ideological-political education across three dimensions: teaching content, teaching methods, and teaching evaluation. This involves exploring ideological-political elements from the content, innovating integration pathways through methods, and strengthening the ideological-political orientation through evaluation. Furthermore, through four implementation pathways—case teaching, project practice, classroom interaction, and online-offline integration—it embeds ideological-political elements comprehensively and at multiple levels into all aspects of the course teaching.

3. Teaching Design and Implementation of Ideological-Political Education in Curricula

3.1. Ideological-Political Restructuring of Teaching Content

Based on the course textbook, and integrating industry development trends with the nation's scientific and technological advancement needs, the teaching content undergoes an ideological-political restructuring. This ensures both the systematic and cutting-edge nature of professional knowledge while achieving the precise integration of ideological-political elements. In terms of content selection, core topics such as Java basic syntax, object-oriented programming, exception handling, collection frameworks, file I/O, database programming, and multithreaded programming are chosen as teaching priorities. Concurrently, application cases of Java technology in major national projects, public services, and the digital economy are introduced—such as Java's application in aerospace engineering data processing, government service platform development, and information technology construction for rural revitalization. This enables students to recognize the close connection between technological development and national needs, thereby inspiring a patriotic dedication to contributing to the nation through technology[3].

Regarding the organization of teaching content, following the progressive principle of "basic cognition — ability enhancement — comprehensive application," ideological-political elements are integrated into each teaching stage, advancing from the shallower to the deeper. The basic cognition stage focuses on cultivating students' rule awareness, rigorous and truth-seeking spirit, and lifelong learning ability. The ability enhancement stage emphasizes the cultivation of teamwork, innovative thinking, and

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professional ethics. The comprehensive application stage concentrates on fostering students' sense of social responsibility, engineering ethics, and the consciousness of serving society through technology.

3.2. Ideological-Political Innovation in Teaching Methods

In consideration of the practical nature of the Java course and the learning characteristics of computer science students, a variety of innovative teaching methods are adopted, including case-based teaching, project-driven approach, flipped classroom, collaborative group learning, and exploratory learning. Ideological-political elements are seamlessly integrated into the implementation process of these diverse teaching methods, breaking away from the traditional one-way "teacher lectures, students listen" model, thereby stimulating students' learning initiative and resonance with ideological-political education.

3.2.1. Case-Based Teaching Method

Java programming cases with ideological-political connotations are selected. These cases encompass not only key technical application points but also ideological-political elements such as professional ethics, social responsibility, and engineering ethics. For instance, when explaining database programming, a case study involving social issues arising from data breaches is presented to guide students in discussing the importance of data security and the professional responsibilities of programmers. When teaching multithreaded programming, a case study on team collaboration in distributed system development is used to cultivate students' awareness of cooperation and coordination. Through case analysis and classroom discussion, students are enabled to master the technology while deeply contemplating the social values and ethical issues behind it[4].

3.2.2. Project-Driven Approach

Practical Java programming projects with real social significance are designed, such as environmental data statistics systems, public service information platforms, or community service management systems. Students, working in groups, complete the project lifecycle including requirements analysis, design, development, and testing. During the project implementation process, emphasis is placed on professional qualities such as teamwork, division of responsibilities, and honesty and trustworthiness. Students are required to pay attention to the social benefits of the project, allowing them to appreciate the value of serving society through technology through hands-on practice and strengthening their sense of social responsibility.

3.2.3. Flipped Classroom + Exploratory Learning

An online teaching platform is utilized to release pre-class preparation resources, including technical knowledge points, micro-lectures on ideological-political themes, and industry case studies, enabling students to engage in self-directed learning before class. Classroom time is then dedicated to activities such as Q&A sessions, group discussions, and hands-on practice to guide students toward a deeper understanding of the knowledge. Concurrently, challenging exploratory tasks are designed, such as developing innovative Java mini-applications or optimizing the performance of existing programs, encouraging students to think proactively, make bold attempts, and cultivate their autonomous learning ability, innovative thinking, and problem-solving skills[5].

3.3. Ideological-Political Extension of Teaching Means and Carriers

Information technology means are fully utilized to construct a blended online-offline teaching carrier system, broadening the pathways for ideological-political education and achieving its comprehensive coverage.

3.3.1. Offline Teaching Carriers

An "Ideological-Political + Technology" classroom teaching scene is created. Ideological-political elements are presented intuitively through multimedia courseware, blackboard writing, and physical demonstrations. A course practice laboratory is established, equipped with comprehensive programming facilities and experimental resources, allowing students to appreciate the ideological-political connotations through hands-on practice. Industry experts and corporate engineers are invited to deliver offline lectures, sharing practical experience in Java technology application and requirements for professional ethics, thereby broadening students' industry perspectives.

3.3.2. Online Teaching Carriers

An online teaching platform is utilized to release course resources, including courseware integrated

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with ideological-political elements, teaching videos, a repository of ideological-political cases, and industry news, for students' self-directed learning. An online discussion forum is set up, featuring ideological-political discussion topics such as "Professional Ethics of Programmers" and "Technological Innovation and National Development," guiding students to engage in online exchanges and discussions. The platform's assignment and quiz functions are leveraged to incorporate open-ended questions related to ideological-political education into technical assessments, reinforcing students' ideological-political understanding[6].

3.3.3. Textbook and Supplementary Material Carriers

In self-compiled Java course textbooks, ideological-political elements are systematically integrated, combining technical knowledge with ideological-political cases, professional norms, and industry ethics. Supporting supplementary materials are developed, such as exercise collections focused on ideological-political themes and guidebooks for practical projects, ensuring that ideological-political education permeates students' after-class learning and practice processes.

4. The Assessment and Evaluation System for Ideological-Political Education in the Java Programming Course

4.1. Principles for Constructing the Assessment and Evaluation System

The assessment and evaluation of ideological-political education in the curriculum adheres to the principles of combining process evaluation with outcome evaluation, integrating professional competence assessment with ideological-political literacy evaluation, and merging quantitative assessment with qualitative evaluation[7]. This approach breaks away from the traditional single-mode written examination model, constructing a comprehensive, multi-dimensional assessment and evaluation system to holistically measure students' achievement in professional knowledge, practical abilities, and ideological-political literacy.

4.2. Multi-Dimensional Contents and Methods of Assessment and Evaluation

The course adopts a comprehensive, multi-dimensional assessment and evaluation system. The total score is composed of three components: professional knowledge assessment accounting for 40%, practical ability assessment accounting for 30%, and ideological-political literacy assessment accounting for 30%. Each assessment module integrates process evaluation with outcome evaluation, achieving a comprehensive evaluation of students' entire learning process. The professional knowledge assessment encompasses forms such as pre-class preparation check-ins, classroom questioning, unit quizzes, and final written examinations. It not only assesses students' mastery of core Java technical knowledge but also includes relevant open-ended essay questions in the written exam, realizing the combined assessment of professional knowledge and ideological-political cognition. The practical ability assessment includes content such as lab assignments, classroom practice, group projects, and course design. It evaluates not only students' Java programming practical ability, problem-solving skills, and teamwork capabilities but also considers program functionality implementation, technical proficiency, as well as project social benefits, teamwork effectiveness, and code standardization. The ideological-political literacy assessment revolves around aspects such as classroom performance, group collaboration performance, the embodiment of ideological-political elements in practical projects, and reflections on ideological-political understanding. Employing a combination of quantitative scoring and qualitative evaluation, it assesses students' level of ideological-political literacy from dimensions including rule awareness, team spirit, social responsibility, and the understanding and internalization of ideological-political elements.

5. Conclusions

As a core foundational course for computer-related majors, the construction of ideological-political education in the Java Programming course constitutes a significant measure for implementing the fundamental task of fostering virtue through education. Taking the Java Programming course at Guangdong Technology College as an example, this paper has constructed a teaching implementation framework for ideological-political education characterized by "One Core, Dual Drivers, Three Dimensions, Four Pathways." It systematically explores the pathway for deep integration between ideological-political education and specialized Java teaching from multiple aspects, including the

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restructuring of teaching objectives, exploration of ideological-political elements, teaching design and implementation, innovation in teaching methods, and improvement of the assessment and evaluation system. Practice has demonstrated that organically integrating ideological-political education throughout the entire teaching process of the Java Programming course can effectively achieve the trinity of knowledge imparting, ability cultivation, and value guidance. This approach not only enhances students' professional and technical abilities but also cultivates their patriotic feelings, professional ethics, social responsibility, and comprehensive humanistic qualities.

The ideological-political construction of specialized courses in computer-related majors is a process of continuous exploration and ongoing improvement. In the future, it is necessary to persistently adhere to the core principle of fostering virtue through education, integrate professional characteristics and industry demands, continuously deepen the reform of ideological-political education in curricula, innovate pathways for integrating ideological-political elements, and enhance the effectiveness of ideological-political education. This will lay a solid foundation for cultivating more high-quality computer professionals equipped with both technical skills and humanistic qualities, thereby providing talent support for the national digital economy development and the construction of a technologically powerful nation.

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