International Journal of Education and Humanities
ISSN: 2770-6702 | Vol. 23, No. 3, 2026

Research on the Construction and Practice of a General Artificial Intelligence Curriculum System in Higher Vocational Colleges under the Guidance of Curriculum-based Ideological and Political Education

Sheng Chen, Xin Hu, Taizhi Lv*

School of Information Engineering, Jiangsu Maritime Institute, Nanjing 211100, China
* **Corresponding author**: Taizhi Lv (Email: lvtaizhi@163.com)

Abstract: In response to the current problems in general artificial intelligence (AI) courses in higher vocational colleges, such as limited course coverage, superficial integration of ideological and political education with professional education, and monotonous teaching methods, this study constructs a "double helix" curriculum system intertwining an "ideological-political chain" and a "professional chain," alongside a "trinity" educational system encompassing "knowledge, ability, and quality." This construction is based on the ADDIE model, the Outcome-Based Education (OBE) paradigm, and constructivist theory, in alignment with the requirements of curriculum-based ideological and political education. The findings indicate that this curriculum system facilitates the deep integration of ideological-political education and professional education, effectively enhances students' AI literacy, and provides theoretical support and practical reference for cultivating application-oriented, interdisciplinary, and innovative "AI+X" talents in higher vocational colleges.

Keywords: Curriculum-based Ideological and Political Education, Artificial Intelligence, General Curriculum System, Double Helix Model.

1. Introduction

Since 2024, generative artificial intelligence technology has undergone transformative iterations, with its influence deeply permeating key fields such as technology, industry, and education. Reports from the Organisation for Economic Co-operation and Development (OECD) explicitly state that "intelligence + skills" have become core attributes for future talent. China consistently attaches high importance to the development of AI education. In 2020, the Ministry of Education, jointly with the National Development and Reform Commission and the Ministry of Finance, issued the "Several Opinions on Promoting Discipline Integration in 'Double First-Class' Construction Universities and Accelerating Graduate Cultivation in the Field of Artificial Intelligence," proposing the construction of a core AI knowledge curriculum system to lay the foundation for high-level talent cultivation. In September 2024, General Secretary Xi Jinping emphasized "thoroughly implementing the national strategy for digitalizing education" and "focusing on leveraging artificial intelligence to facilitate educational transformation" at the National Education Conference, further charting a clear direction for the advancement of general AI education [1].

As the main front for cultivating technical and skilled talents, higher vocational colleges need to advance the construction of general AI courses to proactively adapt to the practical demands of industrial upgrading and social development [2].

However, the current development of general AI courses in higher vocational colleges still faces multiple challenges: the course coverage is relatively narrow, often limited to computer-related majors, failing to benefit students across all disciplines. The student body generally has a weak mathematical foundation and relatively low learning interest, with the learning threshold being significantly high for non-computer science majors [3]. The integration of ideological and political education into the curriculum often remains superficial, lacking depth in its fusion with professional education. Teaching content tends to be fragmented, and teaching methods are relatively singular and rigid, making it difficult to effectively meet the diverse needs of students from different majors.

Therefore, constructing a systematic general AI curriculum system guided by curriculum-based ideological and political education has become an urgent task for higher vocational colleges to optimize their talent cultivation models.

2. Research Significance

2.1. Theoretical Significance

The theoretical significance of this research is threefold: Firstly, it enriches the theoretical framework for constructing general AI courses in higher vocational colleges, innovatively proposing a "double helix" integration model of "ideological-political chain and professional chain," offering a new theoretical perspective for the deep integration of curriculum-based ideological and political education and professional education. Secondly, it organically combines the ADDIE model and the OBE paradigm, further refining the full-process framework for the design and implementation of general AI courses [4]. Thirdly, it expands the application scenarios of constructivist theory in the teaching practice of technical general education courses, providing a reference paradigm for theoretical research on similar courses.

2.2. Practical Significance

This research addresses the practical problems of current general AI courses in higher vocational colleges. It aims to

expand course coverage, enhance the AI literacy of non-computer science majors [5], cultivate students' sense of national identity, commitment, technological ethics, and social responsibility through the organic integration of ideological-political and professional education. It also seeks to construct a teaching model adapted to the characteristics of higher vocational college students, improve teaching quality and learning outcomes, and provide an operable practical plan for cultivating "AI+X" interdisciplinary talents.

3. Related Research and Current Shortcomings

In recent years, domestic scholars have explored the construction of general AI courses in higher vocational colleges. Regarding curriculum system design, Li Baiyang et al. [1] constructed a "knowledge-skill" navigation framework covering four levels: basic cognition, core understanding, tool application, and innovative development, balancing universality and personalization. Wang Jianhua et al. [2] proposed a modular teaching model, dividing the course into basic, application, programming language, and experimental modules, emphasizing practicality and applicability. Concerning the integration of ideological and political education, Liu Zhiming et al. [4] focused on designing ideological-political cases based on cutting-edge achievements in big data and AI, achieving implicit integration of ideological-political elements and course content. Han Juan [5] proposed a hierarchical curriculum-based ideological and political system, progressively enhancing student literacy from cultivating patriotism to shaping innovation awareness. Regarding teaching method reform, Zhao Jiaqi et al. [7] adopted a blended teaching method combining case analysis and project collaboration to stimulate student interest. Li Yuekun et al. [8] constructed a teaching implementation process of "pre-class inquiry, in-class research, and post-class extension" based on digital literacy orientation. In terms of interdisciplinary integration, Chu Wenhua et al. [6] achieved the integration of traditional disciplines and AI using the theme of bionic robotic fish, while Wang Hao et al. [9] explored a "AI + Emerging Engineering" general curriculum system to promote the integration of AI with various majors.

Despite certain achievements, existing research still shows apparent shortcomings: Firstly, the integration of ideological-political education and professional education lacks systematicity, often involving scattered case embeddings rather than a cohesive integration system throughout the course. Secondly, curriculum system design lacks sufficient targeting, failing to fully adapt to the characteristics of higher vocational students, such as weak foundational knowledge and strong vocational orientation. Thirdly, teaching methods and assessment approaches are not flexible enough to meet the differentiated learning needs of students from different majors. Fourthly, attention to digital literacy and technological ethics is not comprehensive enough, failing to fully cover the comprehensive requirements for talents in the AI era. Based on this, this study focuses on constructing a systematic and operable general AI curriculum system under the guidance of curriculum-based ideological and political education.

4. Theoretical Foundation of the Research

4.1. ADDIE Model

The ADDIE model, comprising Analysis, Design, Development, Implementation, and Evaluation, provides a systematic methodology for curriculum system construction. In this study, it is applied to analyze the talent cultivation objectives, student profiles, and industry demands of higher vocational colleges, design the double helix curriculum system and teaching plans, develop teaching cases and resources, implement blended teaching, and employ diversified evaluation methods for continuous course quality optimization.

4.2. OBE (Outcome-Based Education) Paradigm

OBE is centered on student learning outcomes, emphasizing that curriculum design and teaching implementation revolve around expected outcomes. This study, aiming at cultivating "AI+X" interdisciplinary talents, clarifies expected outcomes in knowledge, ability, and quality, and reverse-designs course content, teaching methods, and assessment approaches to ensure precise alignment between teaching activities and educational objectives.

4.3. Constructivist Theory

Constructivist theory posits that students are active constructors of knowledge, and learning occurs through interaction and practice in specific contexts. This study adopts teaching methods such as case analysis and project design, creates authentic learning situations, and guides students to construct their AI knowledge system and enhance practical application abilities through self-exploration and group collaboration.

5. The Double Helix Curriculum System Model

A "double helix" curriculum system is constructed, where the "Ideological-Political Chain" and the "Professional Chain" are interwoven and advance synergistically, achieving deep integration of ideological-political education and professional education.

The **Ideological-Political Chain** is grounded in the basic tenets of Marxism and the core socialist values, mining three core ideological-political elements throughout the entire teaching process:

(1) **National Identity and Commitment:** Introducing China's major achievements in AI and the stories of researchers overcoming difficulties to stimulate students' national pride and commitment to serving the country through science and technology.

(2) **Technological Ethics:** Using cases like data privacy protection to guide students in establishing correct ethical views on technology and regulating the use of AI technology.

(3) **Cultural Confidence:** Combining cases of innovative integration between traditional culture and AI, such as intelligent cultural relic restoration and digital intangible cultural heritage protection, allowing students to appreciate the charm of traditional culture and the value of technological innovation.

The **Professional Chain** follows a gradient design principle of "Foundation, Application, Innovation," balancing

knowledge popularization and skill cultivation:

(1) **Basic Cognition Layer:** Covers the definition, history, and core concepts of AI, helping students establish a preliminary cognitive framework.

(2) **Technical Principle Layer:** Simplifies complex theories, introduces classic machine learning algorithms and the logic behind core technology applications, meeting the learning needs of non-computer science majors.

(3) **Innovative Application Layer:** Introduces AI application scenarios in various industries like manufacturing, logistics, healthcare, and education, tailored to different majors, achieving interdisciplinary integration of "AI+X."

6. The "Trinity" Educational System

Building upon the double helix model, a "trinity" educational system of "Knowledge, Ability, and Quality" is constructed to comprehensively enhance students' overall competence.

Knowledge Dimension: Master basic AI theories, core technologies, application scenarios, and ethical norms, forming a systematic knowledge structure.

Ability Dimension: Cultivate the ability to apply AI tools, solve interdisciplinary problems, think innovatively, and engage in lifelong learning, adapting to career development needs in the intelligent era.

Quality Dimension: Shape national identity and commitment, social responsibility, technological ethics, and craftsmanship spirit, achieving the synergistic enhancement of technical capability and humanistic literacy.

7. Teaching Method Design and Implementation Pathway

7.1. Design of Blended Teaching Method

A blended teaching method combining case analysis and project design is adopted to suit the learning characteristics of students from different majors, reduce learning difficulty, and stimulate interest.

Case Analysis: Selects representative cases categorized into basic cognition cases, ideological-political integration cases, and professional application cases. Through contextual inspiration, technical analysis, and extended discussion, it helps students understand the intrinsic connection between knowledge and ideological-political elements.

Project Design: Designs personalized projects based on students' professional backgrounds, allowing student groups to complete project planning, implementation, and presentation, fostering teamwork and innovative application abilities.

7.2. Course Implementation Pathway

Follows a three-phase implementation process of "Pre-class Inquiry, In-class Research, Post-class Extension," combined with an online-offline blended teaching model.

Pre-class Inquiry: Releases case materials and preview tasks via the Chaoxing platform, guiding students in self-learning basic knowledge points and completing online questionnaires. Teachers adjust teaching focus based on learning analytics.

In-class Research: Employs various interactive teaching forms like lectures, group discussions, case analysis, and project practice, embedding ideological-political elements.

Post-class Extension: Assigns extended projects, course papers, or research reports, encouraging students to conduct independent practice, participate in AI competitions or corporate internships, deepening knowledge application and ability enhancement.

8. Conclusion

Addressing the practical challenges in constructing general AI courses in higher vocational colleges, this study, based on the ADDIE model, the OBE paradigm, and constructivist theory, constructs a "double helix" curriculum system of "ideological-political chain and professional chain" and a "trinity" educational system of "knowledge, ability, and quality." It designs a blended teaching method combining case analysis and project design, along with diversified assessment methods. This system achieves deep integration of curriculum-based ideological and political education with professional education, balances knowledge popularization, skill cultivation, and value shaping, and is well-suited to the learning characteristics and vocational orientation needs of students in higher vocational colleges.

Acknowledgments

This paper was supported by the Teaching Research Project of Computer Basic Education, China Association of Computer Basic Education in Higher Education Institutions in 2025: Research on the Construction and Practice of Artificial Intelligence General Education Curriculum System under the Guidance of Curriculum Ideology and Politics (2025-AFCEC-482).

References

[1] Li, B., & Sun, R. (2024). Construction of a general education curriculum for artificial intelligence literacy based on a "knowledge-skill" navigation framework. Journal of Library and Information Science in Agriculture, 36(8), 34–42.

[2] Wang, J., Min, X., & Wu, M. (2021). Teaching and practice of content construction for artificial intelligence general courses in higher vocational colleges. Computer Knowledge and Technology, 17(20), 108–109.

[3] Zou, C., Sun, F., & Liu, X. (2021). Practical exploration of artificial intelligence general courses in higher vocational colleges. Contemporary Educational Practice and Teaching Research, (17), 34–35.

[4] Liu, Z., Cai, J., Huang, Y., et al. (2024). Construction of ideological and political cases for computer general courses focusing on the fields of big data and artificial intelligence. Computer Education, (6), 109–113.

[5] Han, J. (2024). Basic concepts for offering artificial intelligence general courses in higher vocational colleges. Digital Communication World, (12), 250–252.

[6] Chu, W., Chen, X., & Kong, X. (2021). Reform and construction of general education curriculum under the background of artificial intelligence. Science and Education Guide, (2), 62–63.

[7] Zhao, J., Zhou, Y., Yao, R., et al. (2022). Teaching practice and exploration of computer general courses in colleges under the background of artificial intelligence. Technology Wind, (17), 1–3.

[8] Li, Y., & Huang, Y. (2024). Research on teaching reform of higher vocational courses guided by digital literacy: Taking the video editing and production course as an example. Equipment Manufacturing Technology, (3), 91–94.

[9] Wang, H., Wu, G., Hu, X., et al. (2019). Construction and practice of artificial intelligence general series courses under the background of emerging engineering education. Computer Education, (2), 112–114.