



Design and Implementation of Ideological and Political Education in the Curriculum Based on Constructivist Learning Theory

—Taking "Introduction to Artificial Intelligence and Big Data" as an Example

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Abstract. The deep integration of classroom instruction and ideological and political education is a crucial pathway for curriculum reform and represents a significant task in the field of education in the new era. This study focuses on the teaching innovations in the fifth batch of model ideological and political education courses at Chongqing Polytechnic University of Electronic Technology, specifically the course "Introduction to Artificial Intelligence and Big Data." It explores effective pathways for the deep integration of ideological and political education with the teaching of artificial intelligence and big data, grounded in Constructivist Learning Theory. During the implementation process, student participation and engagement in ideological and political education increased significantly. This study provides significant reference value for the reform and practice of ideological and political education in relevant artificial intelligence courses.

Keywords: Curriculum Ideological and Political Education; Constructivist Learning Theory; Student-Centered; Practical Outcomes

1 Introduction

In 2020, the Ministry of Education issued the "Guidelines for the Construction of Ideological and Political Education in Higher Education Curricula," aimed at comprehensively advancing the integration of ideological and political education in college courses and enhancing the quality of talent cultivation in higher education institutions. The integration of classroom instruction and ideological and political education is a significant trend in contemporary teaching reform and holds a crucial position in the educational landscape. In 2022, the Ministry of Education and nine other departments issued the "Work Plan for Comprehensively Advancing the Construction of the 'Great Ideological and Political Course'," highlighting the issues of "superficial integration"

and "forced incorporation" in current ideological and political education in the curriculum. Therefore, how to achieve a deep integration of professional courses with ideological and political education to fulfill the overarching goal of cultivating moral character has become a focal issue in the current research on ideological and political education in the curriculum. This study, grounded in the teaching reform and practices of model ideological and political education courses at Chongqing Polytechnic University of Electronic Technology, explores effective pathways for the deep integration of professional courses with ideological and political education based on Constructivist Learning Theory, aiming to enhance student participation and engagement in ideological and political education.

2 Theoretical Framework

2.1 Research on Curriculum Ideological and Political Education

Currently, research on ideological and political education in professional courses can be categorized into three levels, progressing from macro to meso to micro. At the macro level, the focus is on studying the educational mechanisms, system design, and guiding principles of ideological and political education in the curriculum, with the aim of exploring its overarching design[1][2]. The meso-level research primarily focuses on the implementation pathways and methods of ideological and political education in the curriculum. This stage is crucial for translating the macro-level educational principles and overarching frameworks into specific teaching practices. It encompasses various aspects, including the development of curriculum-based ideological and political education[3][4], instructional implementation[5][6], and assessment and evaluation[7]. The micro-level research explores the methods of integrating ideological and political education[8], as well as the information technology tools employed in this process[9]. Certainly, the implementation process of ideological and political education in the curriculum also faces numerous challenges. One notable issue is the overly formal integration of ideological and political content, which fails to adequately consider students' actual needs and developmental growth, resulting in low levels of understanding and acceptance of the ideological and political material among students[10].

2.2 Constructivist Learning Theory and Curriculum Ideological and Political Education

The origins of constructivism can be traced back to Piaget's theories, Vygotsky's ideas, and Dewey's experiential learning theory. It highlights the complexity of learning tasks and the importance of collaborative learning.[11]In the paper by Bada et al.[12], seven teaching objectives for a constructivist learning environment are outlined, exploring the implications of constructivism for teaching and providing a range of instructional methods. In the paper by Fernando et al.[13], courses are designed using constructivist principles, discussing how participatory teaching methods enhance student engagement and ultimately improve learning outcomes.

"Introduction to Artificial Intelligence and Big Data" is a foundational platform course within the National Dual-High Professional Group for Information Security Technology Applications, comprising 48 class hours and classified as a Type A course. The course aims to cultivate technically skilled individuals with professional competence, vocational ethics, and scientific literacy. By incorporating elements of constructivist learning theory, key concepts such as "context" "collaboration" "initiative" and "experience" can be integrated into the ideological and political education of the course "Introduction to Artificial Intelligence and Big Data". As shown in Figure 1, this is a design framework based on constructivist learning theory. This approach aligns closely with the intrinsic needs and expectations of students' growth and development, fully respecting and highlighting their central role. The content design will be grounded in the course material while also extending beyond it. Through innovative teaching methods, students will be guided toward active, autonomous, and effective learning, significantly enhancing the relevance, specificity, and effectiveness of the ideological and political education within the course.

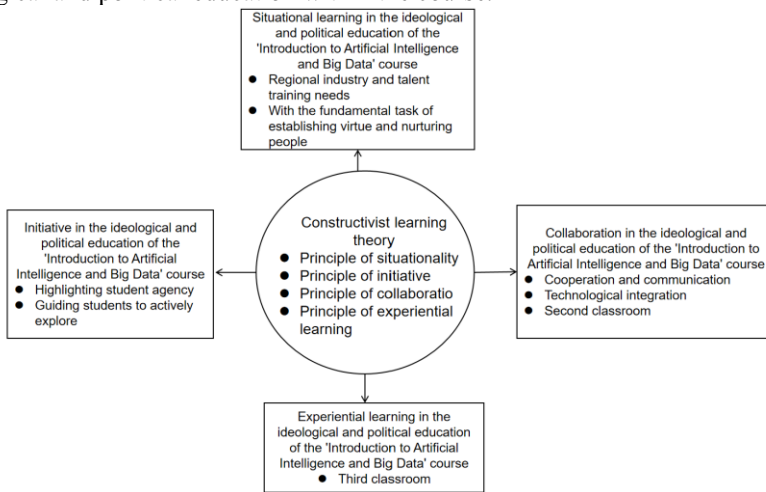


Fig. 1. Curriculum ideological and political education design framework based on constructivist learning theory

3 Curriculum Design for Ideological and Political Education

3.1 Teaching Objectives

From the perspective of constructivist learning theory, the design of teaching objectives places greater emphasis on students' initiative and agency. It aims to guide students in actively exploring knowledge, thereby fostering their abilities in self-directed learning and problem-solving.

3.2 Teaching Process

In the pre-class, in-class, and post-class stages, an innovative integration of a "blended learning" approach—combining online and offline, in-class and out-of-class, and on-campus and off-campus education—fully highlights the experiential and collaborative nature of constructivist learning theory. In this model, the application of Second Classroom and Third Classroom broadens the dimensions of ideological and political education, achieving a truly "comprehensive" approach to student development. The second classroom, which serves as a digital educational platform, skillfully utilizes smart learning platforms, new media, and new technologies. It deeply integrates diverse online educational formats into professional courses, allowing professional teaching to resonate with contemporary contexts. As shown in Figure 2, this illustrates the statistical data on the use of digital methods for implementing ideological and political education. The third classroom encompasses social activities and campus events. Social activities include "Understanding High-Tech Enterprises" internships, while campus activities feature events like "Model Workers Entering Campus" and "Masters Entering Campus". This approach encourages students to reflect while listening and grow through contemplation, truly integrating ideological and political education into the entire process of student development and success.

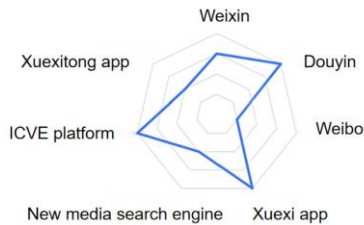


Fig. 2. Statistics on the technical integration methods used in the second classroom for implementing ideological and political education within curricula

3.3 Teaching Activities

To achieve teaching objectives, each teaching process includes a variety of teaching activities. Before class, the teacher posts a learning task and an online course that incorporates ideological and political elements on an online learning platform. After students download the task, they study the online resources and complete a pre-class test. The teacher analyzes the students' online learning data and their responses to the test to assess their understanding and set learning objectives, as well as identify key difficulties.

During the class, the teacher introduces a scenario, clarifies the learning objectives, and organizes student-centered activities such as discussions, innovative learning, group exercises, and inquiry-based learning.

After class, the teacher utilizes a second and third classroom with a strong ideological and political focus to provide students with a practical platform for practicing, consolidating, and expanding their knowledge. As shown in Figure 3, this is an overview of the teaching activities.

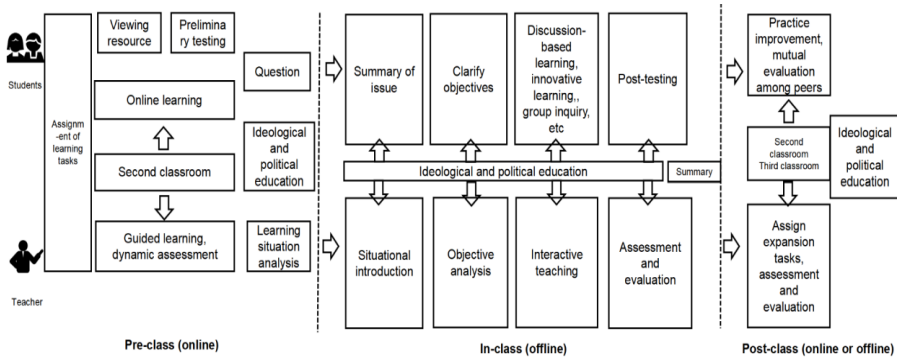


Fig. 3. Teaching activities

3.4 Course Assessment Methods

By aligning with enterprise production requirements, a "Production + Learning" evaluation mechanism is established, incorporating a four-dimensional indicator system. This framework focuses on professional knowledge, vocational skills, research spirit, and innovative abilities, centering around the students to develop assessment criteria. Finally, obtaining professional qualification certificates, winning skills competitions, developing software copyrights, and applying for invention patents are used as weighted items. The self-developed "Big Data Learning Assessment Platform" generates a multidimensional evaluation for students, selecting "Research Stars" and "Innovation Stars," thereby creating a value-added growth assessment. This mechanism not only sets examples for students and encourages their engagement in professional studies but also achieves a subtle effect of ideological and political education.

4 Investigation of the Effectiveness of Ideological and Political Education in Curriculum Teaching Practice

To validate the effectiveness of the deep integration of teaching and ideological and political education, the introduction team adopted an innovative approach, starting from a reflective teaching perspective[14], by designing a questionnaire survey as shown in Table 1. In the second semester of the 2023-2024 academic year, the introduction team randomly selected 3 classes with a total of 121 students to participate in the questionnaire survey.

Table 1. Student Participation in the Questionnaire

Process	Question	Option	Proportion
Content provision	(Single choice) Have students' interests, thinking styles, and psychological needs been adequately considered?	A. Yes	92.68%
		B. No	7.32%

	(Multiple choice) What are the most profound ideological and political guidance directions you have felt?	A. Spirit of Inquiry	78.05%
		B. Technological Innovation	78.05%
		C. Others, please specify _____	4.88%
	(Single choice) What is the effect of curriculum ideological and political education on student development?	A. Very good, it can achieve ideological and political education that subtly influences students.	73.33%
Teaching organization and implementation		B. Good, it can convey correct concepts and positive attitudes.	26.67%
		C. Average, the effect is not significant.	
		D. Needs improvement, the integration is forced.	0%
			0%

5 Conclusions

This study, based on the four principles of constructivist learning theory, deeply designed and implemented an innovative approach to integrating the teaching of 'Introduction to Artificial Intelligence and Big Data' with ideological and political education. The research results indicate that this integrated teaching model not only significantly enhances students' mastery of professional knowledge in artificial intelligence and big data but also effectively promotes the improvement of students' ideological and political quality. This fulfills the fundamental task of "establishing virtue and nurturing people" and provides a useful reference and demonstration for the organic integration of professional courses and ideological and political education in higher education in the new era.

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