



Research and Regression Analysis of Curriculum Ideological and Political Education Based on the Bidirectional Fixed Effect Model

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Abstract. As one of the themes of education in the new era, how to introduce ideological and political education into professional courses is both a key and difficult point. This article examines the necessity of integrating ideological and political education into professional courses. The impact of incorporating ideological and political elements into the classroom on the assessment of students' ideological and political literacy was tested through a two-way fixed effects model. "Youth Study Program" was used as a mediating variable to verify its intermediate effect, and multiple important factors were listed as control variables for the study. The comprehensive reasons affecting students' ideological and political literacy were analyzed comprehensively.

Keywords: Ideological and political education, Professional courses, two-way fixed effects model.

1 INTRODUCTION

In the context of the new era, the field of higher education is facing unprecedented changes and challenges. Among them, "curriculum ideology and politics" is an important component of the new era education concept, aiming to deeply integrate ideological and political education with professional knowledge dissemination, and achieve the fundamental task of cultivating morality and talents. The research by Zhu Kaiyan and others emphasizes the importance of ideological and political education in the field of electronic information under the background of the "New Project" [1]. Su Wenling and others demonstrated how to explore the ideological and political elements in professional courses, strengthen students' professional ethics and social responsibility [2]. Miao Dan and others established an ideological and political teaching system aimed at

political values, life values, and engineering ethics^{[3][4]}. Peng Xiaodong and others suggest using the stories of typical scientists and examples of national technological progress to seamlessly integrate ideological and political content such as scientific spirit, technological spirit, and innovative consciousness with professional courses^[5]. Zhong Huijuan and others have integrated patriotism, values, and scientific literacy into the curriculum by building a database of ideological and political elements, strengthening practical applications, and cultivating students' comprehensive literacy and innovation ability^[6]. Wang Jianhua and others constructed a "2+N" practical teaching model in their research on "Exploration of Ideological and Political Education in High Frequency Electronic Circuit Courses". By combining different professional courses, they completed the entire process of project case development and successfully practiced the deep integration of professional knowledge and ideological and political education^[7]. Wang Mengjun and others have implemented a full chain ideological and political education from theory to practice, from knowledge learning to engineering ethics. They emphasize embedding ideological and political content in professional courses, adopting project-based learning and small class teaching, and cultivating students' rigorous scientific attitude, collaborative spirit, and craftsmanship spirit^[8].

2 ANALYSIS OF THE NECESSITY OF INTEGRATING IDEOLOGICAL AND POLITICAL EDUCATION INTO PROFESSIONAL COURSES

In today's rapidly developing era, artificial intelligence, as a key force driving technological progress and industrial transformation, requires not only students to master cutting-edge technologies and professional skills, but also to focus on cultivating composite talents with a high sense of responsibility, mission, and good moral qualities. Therefore, it is essential to integrate ideological and political education into professional courses. Firstly, in the face of the widespread application of artificial intelligence technology and potential ethical challenges, deeply integrating ideological and political education with vocational education can help students establish correct values, enhance their understanding of technological ethics and social responsibility. As pointed out by Mo Hongwei and others, it is necessary to integrate ideological and political elements into the course of Introduction to Artificial Intelligence, such as introducing China's achievements in the field of artificial intelligence, inspiring students' patriotism and innovative spirit, and cultivating future talents with the spirit of a great country's craftsman^[9]. The complexity and intersectionality of artificial intelligence courses require innovation in teaching models, and the introduction of ideological and political education in courses provides a new path for cultivating students' comprehensive abilities. Liu Zhiming and others use ideological and political teaching cases that are closely integrated with practical cases to guide students to form correct worldviews, life philosophies, and values, while enhancing their scientific literacy and innovation awareness^[10].

The integration of ideological and political education into artificial intelligence courses is not only an inherent requirement of the fundamental task of cultivating morality and talents, but also an inevitable trend in adapting to the cultivation of artificial intelligence talents in the new era. It can not only promote the synchronous improvement of students' professional skills and moral qualities, but also stimulate students' deep thinking on technological ethics, guide them to explore and practice in the field of artificial intelligence, adhere to the correct value orientation, and contribute to the sustainable development of the country and society.

3 IDEOLOGICAL AND POLITICAL STRATEGY AND MODEL CONSTRUCTION

With the deepening of the construction of "New Engineering", this article mainly studies how to creatively integrate ideological and political education into professional courses, and analyzes the importance of different measures. This study takes innovative teaching models, exploring ideological and political education resources, enhancing ideological and political awareness, and constructing an evaluation system as the main measures for ideological and political education.

3.1 Exploring the Ideological and Political Elements of Course Content

In deepening the ideological and political education of Professional Courses, it is crucial to explore and integrate the ideological and political elements in the course content. The integration of history and achievements is an important entry point for exploring ideological and political elements. In professional courses, teachers can inspire students' national pride and patriotism by introducing China's major breakthroughs and achievements in the field of artificial intelligence, such as the original contributions of Chinese scientists in deep learning, natural language processing, and other fields. The specific ideological and political objectives and corresponding course content are shown in Table 1.

Table 1. Ideological and political elements and content of courses

Ideological and political elements	Content of courses
Patriotism and patriotism	China's achievements and challenges in the field of artificial intelligence; Comparison of domestic and international artificial intelligence development strategies.
Social Responsibility	Case analysis of artificial intelligence ethics, such as the application and controversy of facial recognition technology in public safety; The role of AI in promoting the Sustainable Development Goals (SDGs).
Ethical and moral concepts	Theoretical basis of ethical principles in artificial intelligence; Ethical considerations of artificial intelligence in the medical field, such as the attribution of responsibility for AI assisted diagnosis.

3.2 Model Construction

To test whether incorporating ideological and political elements into the classroom can enhance students' ideological and political literacy, this article constructs a panel data fixed effects model, as shown in equation (1).

$$Y_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_1 Control_{it} + \varepsilon_{it} + \mu_t + \delta_t \quad (1)$$

Among them, Y_{it} is the dependent variable, representing the ideological and political education assessment results of the i -th student in the year t ; X_{it} is the explanatory variable that represents the i -th student's evaluation of teachers' ideological and political education in the year t , reflecting the situation of teachers' ideological and political education in the classroom; $Control_{it}$ is the control variable; α_0 is a constant term, α_1 and α_2 are regression coefficients; ε_{it} is the random error term; μ_t and δ_t represent individual fixed effects and time fixed effects, respectively.

Formula (1) mainly explores the direct effect of ideological and political elements on students' ideological and political assessment results. To test the impact of students' "Youth Study Program" on ideological and political assessment results, this article sets up a mediation effect model, as shown in formulas (2) and (3).

$$Stu_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Control_{it} + \varepsilon_{it} + \mu_t + \delta_t \quad (2)$$

$$Y_{it} = \gamma_0 + \gamma_1 X_{it} + \gamma_2 Stu_{it} + \gamma_3 Control_{it} + \varepsilon_{it} + \mu_t + \delta_t \quad (3)$$

In formula (2), Stu_{it} represents the assessment performance of the i -th student during their "Youth Study Program" in year t . Formula (3) represents the elements of ideological and political education, as well as the testing of students' ideological and political assessment through Youth Study Program.

4 DATA COLLECTION AND VARIABLE SETTING

4.1 Data Sources

This article examines the impact of integrating ideological and political elements into the classroom on students' ideological and political literacy through ideological and political assessments. Considering the availability of data, this article summarizes the results of students' ideological and political assessments from 2021 to 2023 in our college and serves as the research data for this article. In order to demonstrate the integration effect of ideological and political elements in the classroom, this article collected the evaluations of students on the ideological and political teaching of their teachers each semester. At the same time, considering that students participate in the Youth Study Program and take learning exams every semester, this article collected exam data from the Youth Study Program from 2021 to 2023, as well as other data that may affect ideological and political assessments.

4.2 Variable Setting

Explained Variable. The dependent variable of this study is the results of students' ideological and political education assessments each year, which are conducted at the end of each semester. A total of six assessments will be conducted from 2021 to 2023, and the assessment format will be offline quizzes. The answer adopts a percentage system, and the content of the questions includes five aspects: students' political attitudes, ideological expressions, moral qualities, ideals and beliefs, and social responsibility. Moral qualities involve the manifestation of students' honesty and trustworthiness, as well as their civic consciousness; Ideal beliefs involve students' understanding of the relationship between personal ideals and national dreams, as well as their comprehension and inheritance of Marxist and communist beliefs; Social responsibility involves students' attention to social welfare undertakings and their understanding of social responsibilities such as environmental protection, energy conservation, and emission reduction.

Explanatory Variable. This article takes the ideological and political teaching situation in the classroom as an explanatory variable, and reflects the teacher's ideological and political teaching situation in the classroom through students' evaluation of the teacher's ideological and political teaching. Students are evaluated through online questionnaires, and the evaluation results are presented in the form of scores. We categorize the scores into four levels to indicate the effectiveness of the teacher's ideological and political education: very effective, effective, average, and ineffective, the result is shown in Figure 1.

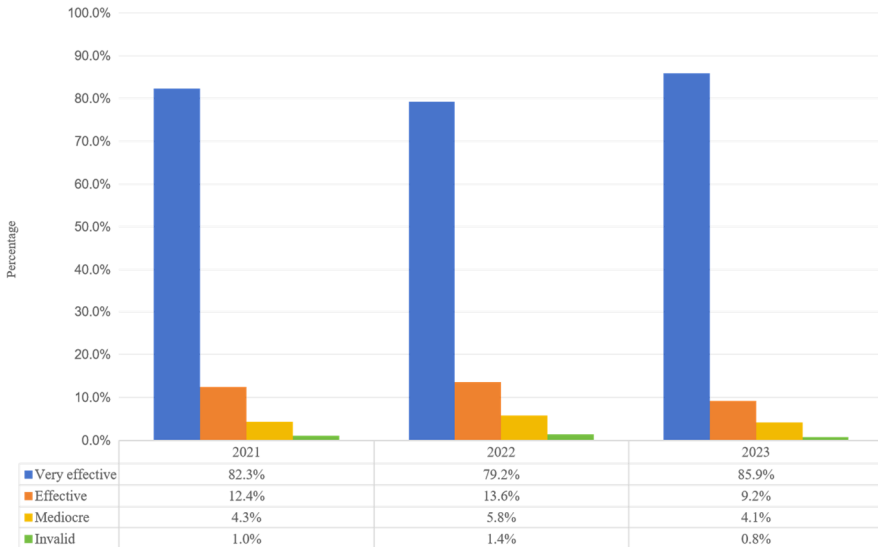


Fig. 1. Evaluation level

Intermediary Variable. Students participate in the Youth Study Program every semester, which covers topics such as Party history education, national development, legal education, and technological innovation. The aim is to strengthen the ideological and political education and theoretical learning of young people, and enhance their ideological and political literacy. This article uses the assessment results of the Youth Study Program each semester as a mediator variable.

Control Variable. This article considers that the assessment results of ideological and political education may also be influenced by other factors, including students' mental health, community service participation, and academic performance. These three factors are important in students' daily activities, so they are used as control variables.

Student Mental Health.

A good mental health state can promote students' active participation in ideological and political education activities and improve learning outcomes. On the contrary, mental health issues may lead to students' lack of interest, distraction, and even resistance, affecting the absorption and understanding of ideological and political education. Therefore, maintaining good mental health is crucial to ensuring the effectiveness of ideological and political education.

Community Service Participation.

By participating in community service activities, students can not only apply the theoretical knowledge learned from ideological and political education to practice, but also personally experience the value and significance of serving society, enhance their sense of social responsibility and civic awareness.

Academic Achievement.

Usually, students with good academic performance may be more receptive to and understand the content of ideological and political education. These students have strong learning abilities and higher self-confidence, which helps them actively participate in ideological and political education activities and benefit from them.

This article primarily utilizes data from the assessment of students' ideological and political literacy between 2021 and 2023, gathering and organizing data that influences the assessment outcomes. Additionally, data with omissions and anomalies were removed and linearly interpolated, yielding a total of 642 samples. All data are on a percentage scale, and we normalize the data. Descriptive statistics for the variables are presented in Table 2.

Table 2. Descriptive statistics of variables

Variable	Mean value			Standard deviation		
	2021	2022	2023	2021	2022	2023
Ideological and political literacy	0.81	0.78	0.85	0.13	0.14	0.07
Teacher's evaluation of ideological and political education	0.85	0.84	0.88	0.16	0.28	0.14
Assessment results of Youth	0.74	0.75	0.77	0.11	0.12	0.08

Study Program						
Student mental health	0.83	0.86	0.85	0.03	0.09	0.07
Community service participation	0.31	0.52	0.33	0.15	0.14	0.14
Academic achievement	0.77	0.79	0.76	0.18	0.22	0.12

5 EMPIRICAL TESTING AND RESULT ANALYSIS

5.1 Benchmark Regression Analysis

Prior to the baseline regression, this study performed a multicollinearity test on both explanatory and control variables. Results revealed that the VIF (Variance Inflation Factor) values for both sets of variables peaked at 5.53, with the model's overall VIF at 2.23, all well below the threshold of 10, suggesting no issues of multicollinearity. Building on this, the study proceeded with benchmark regression analysis, initially employing the Hausman test to ascertain whether the regression model should be based on fixed or random effects. The test yielded a P-value of 0.00, leading to the rejection of the null hypothesis in favor of the fixed effects model. The benchmark regression results of students' evaluation of teachers' ideological and political education and ideological and political literacy are shown in Table 3.

Table 3. Benchmark regression results

Variable	Model 1	Model 2	Model 3	Model 4
Teacher's evaluation of ideological and political education	0.0162####	0.0141##	0.0337####	0.0382####
Student mental health		0.0014##	0.0010#	0.0008
Community service participation			0.0992	0.1311##
Academic achievement				-1.1342####
N	642	642	642	642
R ²	0.1426	0.1521	0.1574	0.1780

Note: #, ##, #### representing significance levels of 10%, 5%, and 1% respectively

In Table 3, Model 1 presents the regression results of teachers' evaluations on political education. Models 2 to 4 show the regression results after progressively adding other control variables that may influence the outcomes of political education assessments, based on Model 1. As shown in Table 3, in Model 1, the digital literacy of rural households is significantly positive at the 1% level, with a regression coefficient of 0.0162. This indicates that incorporating ideological and political elements into the classroom has a promoting effect on the assessment results of students' ideological and political education.

5.2 Analysis of Intermediary Effect

In theoretical analysis, this article posits that the assessment results of the Youth Study Program may influence students' evaluation of ideological and political education. To investigate this mediating effect, the article selects the assessment results of the Youth

Study Program as the mediator variable. A mediation effect model is constructed using a two-way fixed effects model for empirical testing. The mediation effect analysis is presented in Table 4. The results in Table 4 indicate that the assessment results of the Youth Study Program exhibit a partial mediating effect.

To ensure the reliability of the test results, this article employs the Bootstrap resampling method to conduct 300 random repeated samplings of the data. Mediation effect regression analysis is then performed using these 300 sets of samples. Upon verification, the confidence interval does not include zero, indicating a significant indirect effect and confirming the presence of mediating effects.

Table 4. Analysis of intermediary effect

Variable	Model 1	Model 2
Teacher's evaluation of ideological and political education assessment results of the Youth Study Program	0.0132###	0.0175##
N	642	642
R ²	0.7351	0.6811

Note: #, ##, ### representing significance levels of 10%, 5%, and 1% respectively

6 CONCLUSIONS

This article verifies the impact of incorporating ideological and political elements into the classroom on the assessment of students' ideological and political literacy by constructing a two-way fixed effects model. Reflecting the integration effect of classroom ideological and political elements through students' evaluation of teachers' ideological and political education. This article constructs multiple models to test the impact of incorporating ideological and political elements into the classroom on students' ideological and political literacy assessment under the influence of multiple control variables. The results show that incorporating ideological and political elements into the classroom has a promoting effect on students' ideological and political education assessment results.

The results of the mediation effect analysis show that incorporating ideological and political elements into the classroom not only directly affects students' ideological and political literacy assessment results, but also indirectly affects students' ideological and political literacy assessment results through the mediation effect of assessment results of the Youth Study Program. Integrating ideological and political elements into the classroom can encourage students to actively participate in the Youth Study Program, thereby improving their ideological and political literacy.

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