



# A Study on Student-Centered Evaluation of Ideological and Political Education in Professional Curriculums Based on AHP-Fuzzy Comprehensive Evaluation Method

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**Abstract.** “Ideological and Political Education in Professional Curriculums” is the current development direction of university education. The construction of standardized curriculum evaluation system is the key link and important guarantee to efficiently promoting the construction of professional courses. From the long-term development, the ideological and political education in professional curriculums still needs to strengthen the function of the student subjects, constantly optimize the teaching content construction of political education in professional curriculums. Meanwhile, it needs to make appropriate design and modification according to the teaching orientation, teaching design, teaching content and teaching objectives. It is especially important to build the evaluation system with students as the main body of evaluation.

**Keywords:** Ideological and political education in professional curriculums · Student Subjects · Fuzzy comprehensive evaluation method · AHP-Fuzzy Comprehensive Evaluation Method

## 1 Introduction

On January 5<sup>th</sup> 2020, the Ministry of Education released the “Guideline for the Construction of Ideological and Political Education in Professional Curriculums in the University”, which emphasizes to comprehensively promote the construction of the ideological and political education in professional curriculums in the university, and promote the ideological and political education in professional curriculum from theory to practice.

At present, the exploration of the construction of the ideological and political education in professional curriculums is mostly considered from the teachers’ perspective, and the curriculum design is mostly from the teachers’ perspective, lacking research and evaluation from the students’ perspective, and the curriculum selection of the construction of the ideological and political education in professional curriculums has not formed a complete system. Also, the existing evaluation system has not yet determined specific

criteria. Therefore, the teaching mode and evaluation of the ideological and political education in professional curriculums are mostly established according to teachers' own teaching objectives and teaching styles, lacking students' participation. Students are in a passive acceptance position, which leads to unsatisfactory teaching effects.

Considering the high proportion of learning time in the professional curriculums and its close relationship with students' career development, this study aims to integrate value shaping, knowledge transfer and ability cultivation by constructing a learner-centered evaluation of ideological and political education in professional curriculums based on the AHP-fuzzy comprehensive evaluation method. It forms a complete evaluation of ideological and political education in professional curriculums.

## 2 Literature Review

Throughout the research literature related to student-centered education evaluation system at home and abroad, scholars have made useful explorations on the evaluation system of ideological and political education in professional curriculums from different perspectives.

Foreign research on student-centered evaluation has been fruitful and can be broadly classified into four areas of research: conceptual analysis of student-centered evaluation, analysis of the role of student-centered evaluation, research on the development of student-centered evaluation, and research on how student-centered evaluation is conducted. Peterson (2018) suggests that student evaluation is an activity used by institutions to measure the cognitive, affective, and behavioral dimensions of student learning achievement and development [1]. Suskie (2018) argues that student-centered evaluation is an ongoing process by which institutions systematically collect, analyze, and interpret information that describes how student learning matches institutional and public expectations, and is a way for institutions to further understand and improve the student learning process based on evaluation results [2]. Wei Deguang (2017) and William (2017) argue that student-centered evaluation aims to provide evidence for institutional quality improvement [3].

The research on student-centered education concept in China started a little late, and it was not until 1990s that the student-centered education concept began to receive attention and focus in the education sector in China. Reviewing the information available at home and abroad, there are abundant research results on "international higher education quality assessment model" from global perspective, "higher education assessment subject" from subject perspective, "higher education quality assessment system in China". There are abundant research results on three major topics, but there is a relative lack of research on "student-centered higher education evaluation".

The existing exploration of the construction of ideological and political education in professional curriculums is mostly designed from the teachers' perspective, lacking research from the students' perspective, neglecting the play of students' subjectivity, and the evaluation indexes and systems need to be improved. There are differences in the definition of evaluation dimensions among scholars, but there are generally drawbacks such as single subject and limited perspective. At present, a more comprehensive research on the relationship between the three is conducted by Zhang Quanzhou (2019), who puts

forward three suggestions on curriculum thinking and government based on the play of students' subjectivity: insisting on moral education, strengthening "student-oriented", improving teaching methods based on students' needs, and mobilizing students' consciousness to cultivate their all-round development, but there are still gaps in the research on the construction of specific evaluation systems.

Most scholars still keep close attention to the construction of the evaluation system of the ideological and political education in professional curriculums and the play of students' subjectivity in the construction. Since the concept of ideological and political education in professional curriculums is relatively new, there are fewer studies on this aspect. With the in-depth implementation of ideological and political education in professional curriculums, more research on this topic may emerge in the academic field in the future.

### **3 Theoretical Foundation and Impact Factor Determination**

#### **3.1 Theoretical Foundation**

##### **3.1.1 Purpose of Evaluation**

By constructing a student-centered evaluation system of ideological and political education in professional curriculums, the following three purposes can be achieved: Firstly, to put forward students' demands in a learner-centered manner, and to raise the importance of the current education system to students' subject identity. Through the evaluation, teachers are given timely feedback, students' needs are emphasized, weaknesses and missing points in the process of the reform of the professional courses are identified, bilateral communication between "teaching" and "learning" is promoted, and the quality of the implementation of the student-centered evaluation system of ideological and political education in professional curriculums is effectively ensured. Additionally, through the evaluation, students are guided to study the spiritual connotation of the ideological and political education in professional curriculums in depth, put emphasis on the learning of theoretical knowledge while combining theory and practice, analyze the changes in thinking, cognition and values of college students in the ideological and political education in professional curriculums, cultivate practical literacy, and become talents to meet the needs of social development and national construction with high quality. Thirdly, by constructing an evaluation system, we can provide reference for future teaching quality improvement, and then reflect on whether the current environment is adapted to students' needs, whether teachers' teaching methods can help improve students' learning effectiveness, whether students and teachers can effectively use available resources, give full play to learners' potential and subjective initiative. The aim is to understand human responsibility, human and social growth and development, and to adapt to the development trend of world education reform and enhance the international competitiveness of China's education.

### 3.1.2 Evaluation Principles

In order to ensure that the evaluation system constructed is scientifically valid and properly implemented, and to achieve the purpose of the evaluation described in the previous section, the following principles should be followed.

① Flexibility principle.

Due to the individual differences of students, the development of individuals is also very personalized and different, their quality, ability, development direction and development level are different, it is difficult for the same method to play an educational and motivating role for all individuals and all aspects. Therefore, the hierarchical analysis method and fuzzy comprehensive evaluation method are introduced in the process of building the evaluation system to form a comprehensive evaluation system, which is a good way for individuals of different levels and different development directions to get more impartial evaluation results.

② Developmental principle.

Developmental evaluation requires a dynamic, developmental perspective. In the process of implementation, the ideological and political education in professional curriculums will also face the process of continuous deepening and reforming, and the depth and requirements of the reform of the curriculum will continue to improve as it advances, and the requirements and expectations of the cultivation effect will also be different. Therefore, in the selection of indicators and weight setting should reflect the principle of development, to keep pace with the times and timely adjustment to meet the development of the times.

③ Systematic principle.

The evaluation indicators need to be systematic and objective in the construction process of the evaluation system, and truly reflect the results of the research and study. The overall index structure should present the characteristics of clear hierarchy, sharp focus and complete structure. The test criteria should be considered comprehensively and the implementation effect should be shown again.

## 4 Rating System Design

Based on the in-depth study of related literature at home and abroad, comprehensive analysis of the system construction and research methods in the existing research system, according to the overall construction concept of ideological and political education in professional curriculums and the needs of the student-centered evaluation system, this paper carries out a comprehensive research design from four aspects: “teacher morality”, “knowledge transfer”, “ability cultivation”, “quality improvement” and “value shaping”.

### 4.1 Design Methodology

#### 4.1.1 APH-Fuzzy Comprehensive Evaluation Method

APH-fuzzy comprehensive evaluation method is a method that integrates AHP and fuzzy comprehensive evaluation method with each other, it has high reliability.

The integrated evaluation process of AHP and FCE is as follows.

① Construct the judgment matrix A.

Determine the research objectives, determine the n first-level indicators  $U = \{U_1, U_2, \dots, U_n\}$  of the evaluation according to the characteristics of curriculum Civics, and decompose them into impact factors  $U = \{U_{n1}, U_{n2}, \dots, U_{nm}\}$  layer by layer to form a complete curriculum Civics evaluation index system, and the importance weights of  $U_i$  to the research objectives are  $w_i$  ( $i = 1, 2, \dots, n$ ). Since the influence factors  $U_n$  have different degrees of influence on the objectives, importance weights  $w_i$ , the degree of influence of  $U_n$  is compared two by two to obtain the full comparative results.

$$A = \begin{bmatrix} w_1/w_2 & \cdots & w_1/w_n \\ \vdots & \ddots & \vdots \\ w_n/w_1 & \cdots & w_n/w_n \end{bmatrix} \tag{1}$$

Here the matrix A is defined as a judgment matrix.

② Determine the weight distribution of evaluation indicators.

If A satisfies the consistency condition  $CR \leq 0.1$ , where  $CR = CI/RI$ , the  $w = (w_1, w_2, \dots, w_n)^T$  obtained by solving the eigenvalue problem  $Aw = \lambda w$  is normalized as the weight of the influence factor  $U_n$  of the target, and the weight vector matrix W is obtained as

$$W = [\omega_1, \omega_2, \dots, \omega_n] \tag{2}$$

③ Construct the fuzzy evaluation matrix R.

Constructing a fuzzy evaluation matrix R based on the fuzzy relationships existing between the set of factors of the comment indicators and the evaluation indicators.

$$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix} \tag{3}$$

④ Perform fuzzy synthesis to find the fuzzy comprehensive evaluation set.

$$B = W * R \tag{4}$$

⑤ De-fuzzy sets for quantitative evaluation.

Based on the five evaluation levels, the measurement scale H is obtained,  $H = (h_1, h_2, \dots, h_5) * 1$ , and the quantitative evaluation score P can be calculated by multiplying the measurement scale with the fuzzy comprehensive evaluation set B.

$$P = B * H \tag{5}$$

The quantitative values of each level are shown in the Table 1.

**Table 1.** Quantification table of each grade

Evaluation Level	Strong	Stronger	General	weaker	weak
Score	90–100	80–89	60–79	40–59	0–40

## 5 Study Design

### 5.1 Determining the Set of Factors, Evaluation Set

This paper integrates and analyzes domestic and foreign studies, and finally determines the indicators according to the characteristics and actual situation of the ideological and political education in professional curriculums as follows.

First level indicators  $U = \{U1, U2, U3, U4, U5\}$ , where U1 stands for “teacher morality”, U2 stands for “knowledge transfer”, U3 stands for “ability development”, U4 stands for “quality improvement”, U1 stands for “value shaping”. U4 represents “quality improvement” and U5 represents “value shaping”.

Secondary indicators  $U_n$ , where  $U1 = \{U11, U12, U13\}$ ,  $U2 = \{U21, U22\}$ ,  $U3 = \{U31, U32, U33\}$ ,  $U4 = \{U41, U42, U43\}$ ,  $U5 = \{U51, U52\}$ , where U11 is teaching attitude, U12 is teaching method, U13 is teaching quality, U21 is teaching content, U22 is quality monitoring, U31 for learning ability, U32 for practical ability, U33 for innovative ability, U41 for ideological and political quality U42, for professional knowledge quality, U43 for physical and psychological quality, U51 for conceptual leadership, and U52 for ideological penetration.

At the same time, the evaluation set  $V$  is established and the value space is divided into 5 classes.

$$V = \{\text{important, more important, average, less important, unimportant}\}$$

### 5.2 Analysis of the Weighting of Price Indicators Based on Hierarchical Analysis Evaluation

In this study, the hierarchical analysis method is used to determine the indicator weights  $W$ . The data sources are obtained in the form of expert scoring, and experts use the 1 ~ 9 scale method to score the evaluation indicator system based on years of industry experience, and construct the judgment matrix of the primary and 5 secondary indexes. Subsequently, the judgment matrix is normalized and the maximum eigenvalues and eigenvectors are calculated. Finally, the consistency test was performed to determine the weights of each indicator. The results are showed in the Table 2 (Tables 3, 4, 5, 6 and 7).

### 5.3 Determine the Index Affiliation and Fuzzy Evaluation Matrix

The questionnaire method was used to design the Rickett 5 scale table according to “important”, “more important”, “average”, “less important” and “unimportant” to evaluate

**Table 2.** Judgment matrix, weights and consistency test of first-level indicators

U-U <sub>i</sub>	U <sub>1</sub>	U <sub>2</sub>	U <sub>3</sub>	U <sub>4</sub>	U <sub>5</sub>	Weights
U <sub>1</sub>	1.00	3.33	2.00	0.67	0.40	0.19
U <sub>2</sub>	0.30	1.00	0.67	0.25	0.23	0.07
U <sub>3</sub>	0.50	1.50	1.00	0.33	0.40	0.11
U <sub>4</sub>	1.50	4.00	3.00	1.00	0.50	0.26
U <sub>5</sub>	2.50	4.30	2.50	2.00	1.00	0.37

$\lambda_{\max} = 5.089$ ,  $CI = 0.022$ ,  $RI = 1.12$ ,  $CR = 0.020 < 0.1$ , satisfying the consistency test

**Table 3.** Judgment matrix, weights and consistency test of “teacher moral and teacher style”

U-U <sub>i</sub>	U <sub>11</sub>	U <sub>12</sub>	U <sub>13</sub>	Weights
U <sub>11</sub>	1.00	1.50	2.00	0.46
U <sub>12</sub>	0.67	1.00	1.43	0.31
U <sub>13</sub>	0.50	0.70	1.00	0.23

$\lambda_{\max} = 3.000$ ,  $CI = 0.000$ ,  $RI = 0.520$ ,  $CR = 0.000 < 0.1$ , satisfying the consistency test

**Table 4.** “Knowledge transfer” judgment matrix, weights and consistency test

U-U <sub>i</sub>	U <sub>21</sub>	U <sub>22</sub>	Weights
U <sub>21</sub>	1.00	1.43	0.59
U <sub>22</sub>	0.70	1.00	0.41

$\lambda_{\max} = 2.000$ ,  $CI = 0.000$ ,  $RI = 0.000$ ,  
satisfying the consistency test

CR = null,

**Table 5.** “Competence development” judgment matrix, weights and consistency test

U-U <sub>i</sub>	U <sub>31</sub>	U <sub>32</sub>	U <sub>33</sub>	Weights
U <sub>31</sub>	1.00	1.25	0.77	0.32
U <sub>32</sub>	0.80	1.00	0.67	0.27
U <sub>33</sub>	1.30	1.50	1.00	0.41

$\lambda_{\max} = 3.001$ ,  $CI = 0.000$ ,  $RI = 0.520$ ,  $0.001CR = < 0.1$ , satisfying the consistency test

**Table 6.** “Literacy improvement” judgment matrix, weights and consistency test

U-U <sub>i</sub>	U <sub>41</sub>	U <sub>42</sub>	U <sub>43</sub>	Weights
U <sub>41</sub>	1.00	2.00	3.03	0.54
U <sub>42</sub>	0.50	1.00	2.00	0.30
U <sub>43</sub>	0.33	0.50	10	0.16

$\lambda_{\max} = 3.009, CI = 0.004, RI = 0.52, CR = 0.008 < 0.1$ , satisfying the consistency test

**Table 7.** Judgment matrix, weights and consistency test of “value shaping”

U-U <sub>i</sub>	U <sub>51</sub>	U <sub>52</sub>	Weights
U <sub>51</sub>	1.00	0.40	0.29
U <sub>52</sub>	2.50	1.00	0.71

$\lambda_{\max} = 2.000, CI = 0.000, RI = 0.000, CR = \text{null}$ , satisfying the consistency test

each secondary indicator. We obtained the e fuzzy evaluation matrix of the secondary indicators after organizing the 158 meaningful questionnaires.

$$\begin{aligned}
 R_1 &= \begin{bmatrix} 0.32 & 0.41 & 0.23 & 0.40 & 0.01 \\ 0.32 & 0.42 & 0.24 & 0.02 & 0.01 \\ 0.34 & 0.37 & 0.25 & 0.03 & 0.02 \end{bmatrix} \\
 R_2 &= \begin{bmatrix} 0.37 & 0.38 & 0.20 & 0.04 & 0.02 \\ 0.30 & 0.42 & 0.23 & 0.06 & 0.00 \end{bmatrix} \\
 R_3 &= \begin{bmatrix} 0.32 & 0.42 & 0.24 & 0.02 & 0.00 \\ 0.35 & 0.40 & 0.19 & 0.06 & 0.00 \\ 0.35 & 0.41 & 0.21 & 0.03 & 0.00 \end{bmatrix} \\
 R_4 &= \begin{bmatrix} 0.34 & 0.41 & 0.19 & 0.04 & 0.01 \\ 0.31 & 0.42 & 0.23 & 0.04 & 0.01 \\ 0.33 & 0.40 & 0.23 & 0.04 & 0.00 \end{bmatrix} \\
 R_5 &= \begin{bmatrix} 0.34 & 0.36 & 0.23 & 0.05 & 0.01 \\ 0.36 & 0.38 & 0.23 & 0.03 & 0.00 \end{bmatrix}
 \end{aligned}$$

**5.4 Perform Fuzzy Synthesis to Obtain Fuzzy Comprehensive Evaluation Set**

$$B_i = W_i * R_i, i = 1, 2, \dots, 5$$



Therefore,

$$\begin{aligned}
 B1 &= (0.32, 0.40, 0.24, 0.03, 0.01), \\
 B2 &= (0.34, 0.40, 0.21, 0.05, 0.00), \\
 B3 &= (0.34, 0.41, 0.21, 0.04, 0.00), \\
 B4 &= (0.34, 0.41, 0.21, 0.04, 0.01), \\
 B5 &= (0.35, 0.37, 0.23, 0.04, 0.00).
 \end{aligned}$$

After obtaining the first-level indicators, the evaluation evidence is obtained by higher-level fuzzy synthesis and normalization of the sum undertaking over.

$$\begin{aligned}
 B &= W * R = (0.19, 0.07, 0.11, 0.26, 0.37) * \\
 &\quad \begin{bmatrix} 0.32 & 0.40 & 0.24 & 0.03 & 0.01 \\ 0.34 & 0.40 & 0.21 & 0.05 & 0.00 \\ 0.34 & 0.41 & 0.21 & 0.04 & 0.00 \\ 0.34 & 0.41 & 0.21 & 0.04 & 0.01 \\ 0.35 & 0.37 & 0.23 & 0.04 & 0.00 \end{bmatrix} \\
 &= (0.34, 0.39, 0.22, 0.04, 0.01)
 \end{aligned}$$

5. 6 De-blurred sets

$$\begin{aligned}
 H &= [100, 80, 60, 40, 20]T \\
 P &= 80.20, P1 = 79.80, \\
 P2 &= 80.6, P3 = 81.4, \\
 P4 &= 81.2, P5 = 80.00
 \end{aligned}$$

Combining the quantitative evaluation results and comprehensive evaluation criteria, the overall evaluation and the evaluation results of the five first-level indicators of the evaluation system of the ideological and political education in professional curriculums of this study can be obtained. As shown in Table 8, the student-centered system (P) is more important to students, which shows the overall effectiveness of the system.

**Table 8.** Quantitative evaluation analysis and comprehensive evaluation grade

Evaluation Level	General Objectives	First Level Indicators				
		Teacher moral and ethical dimensions	Knowledge Transfer Dimension	Competence Development Dimension	Quality Improvement Dimension	Value Shaping Dimension
Quantitative Score	80.2	79.8	80.6	81.4	81.2	80
Evaluation Level	more important	Average	more important	more important	more important	more important

Among the five level indicators, the importance of the dimension of “teacher ethics” (P1) to students is average, while the other four dimensions (P2, P3, P4, P5) are more important.

## **6 Conclusions and Recommendations**

### **6.1 Research Findings**

In this paper, based on the characteristics of the evaluation system of the ideological and political education in professional curriculums and combined with the feasibility study report of the questionnaire research, the feasibility study of the project is comprehensively evaluated by using the fuzzy comprehensive evaluation method, which tests the effectiveness of the student-centered evaluation of ideological and political education in professional curriculums. The validity of the indicators and the reliability of the fuzzy comprehensive evaluation method in the project evaluation practice were examined. Among the five first-level indicators, the importance of “teacher ethics” to students was found to be average, the four dimensions of “knowledge transfer,” “competence development,” “quality improvement,” and “value building” are all more important.

This paper proposes the construction of a student-centered evaluation system of ideological and political education in professional curriculums. Through the perspective of course evaluation, it not only raises learners’ awareness of the ideological and political education in professional curriculums, but also organically combines course evaluation with the new form of course construction, realizes the effective application of traditional methods on something new, and puts forward the guarantee proposal of constructing the evaluation system of ideological and political education in professional curriculums more effectively.

### **6.2 Research Recommendations**

#### **6.2.1 Find the Right Entry Point**

The study found that student subjects pay more attention to the importance of ideological and political education in professional curriculums in the four dimensions of “knowledge transfer”, “ability development”, “literacy improvement” and “value shaping”. Therefore, in the process of course construction, we should make more efforts to explore the course knowledge itself, find the combination of knowledge and ability and innovation point, and apply the knowledge to development and innovation to a new level.

#### **6.2.2 Teaching Content Innovation**

It is found that student subjects are more concerned about whether the lecture content can be closely integrated with professional knowledge, whether it can keep up with the times, and whether the quality of the content is guaranteed. Therefore, in the process of course construction, teachers can make appropriate innovations in teaching contents, teaching cases, teaching materials and teaching methods, and study the teaching perspectives in many aspects and multiple dimensions. Teachers can collect diversified cases, keep the novelty of cases, keep up with the times, guide students’ thinking and improve their cognitive ability.

### 6.2.3 Meeting Individual Needs

In the course of course construction, teachers should focus on the comprehensive quality training of students, make the curriculum closer to the needs of students, meet the individual development of students, provide more diverse training programs and training methods, and eliminate some of the content that does not meet the needs of students.

### 6.2.4 Focus on Value Shaping

In the process of course construction, emphasis should be placed on thought leadership, which can be done through case inspiration and other ways to spiritually inspire students, motivate their growth, strengthen the shaping of their values and improve their professional loyalty. At the same time, research should be conducted on the frontier of the discipline to enhance students' enthusiasm and interest in learning.

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