AHP and Fuzzy Comprehensive Analysis of the Performance Evaluation of University Students' Ideological and Political Education

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Abstract. The performance evaluation of University students' ideological and political education is an important part of the performance evaluation of ideological and political education. This paper presents a combination of AHP and fuzzy comprehensive evaluation method, namely using AHP method to determine each weights of the index in performance evaluation of University students' ideological and political education, then fuzzy evaluation method to analyze data. With this method, the evaluation and analysis shows that the performance evaluation of University students' ideological and political education in Hubei University of Economics is excellent.

Keywords: Ideological and political education, AHP, Fuzzy comprehensive evaluation.

1. Introduction

The performance evaluation of University students' ideological and political education is an important part of the performance evaluation of ideological and political education. Reasonable evaluation can make the task of the ideological and political education undertaker reflect on their work performance and error, control and adjustment, optimize the factors that affect education goals, and thus more help to achieve the short-term goal and long-term goal of ideological and political education, namely, continuously to the value of ideological and political education, to create and realize the value of ideological and political education.

How to make the performance evaluation of university students' ideological and political education more scientific, objective and feasible, many scholars have studied from different angles. But because of the content of fuzziness and uncertainty evaluation scope in performance evaluation of university students' ideological and political education, there are varying degrees of defects to make the scientific nature, objectivity and operability in these studies. Most previous relevant researchers both at home and abroad in terms of the performance evaluation of university students' ideological and political education research mainly related to the macro theory, less involved the study of evaluation methods. Even if a bit of a quantitative research, it is a simple, bold. Based on the above problems, the author takes Hubei university of economics example, based on a questionnaire survey, using AHP and fuzzy comprehensive evaluation method to analyze the performance evaluation of university students' ideological and political.

2. The index system of performance evaluation of university students' ideological and political education

Setting up scientific and practical evaluation index system is the performance evaluation of university students' ideological and political education. According to the connotation of university students' ideological and political performance, based on the related research literature [1-4], figure 1 shows the index system of the performance evaluation of university students' ideological and political education.
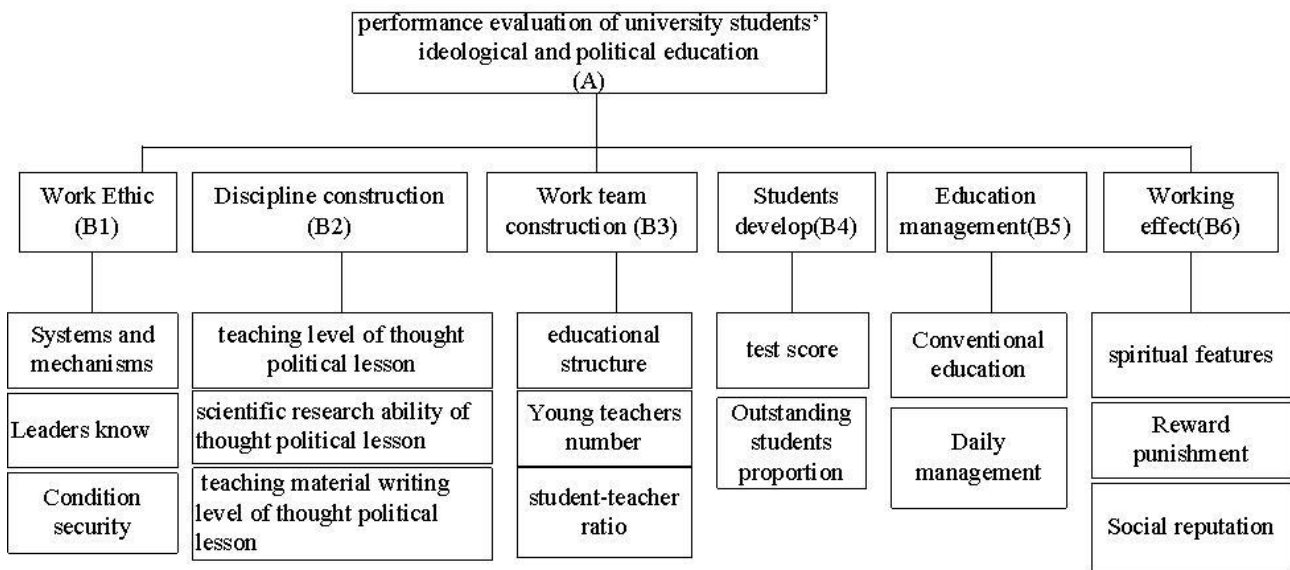
Fig. 1 The index system of performance evaluation of university students' ideological and political education

3. AHP and Fuzzy comprehensive analysis

3.1 AHP method to determine index weight

Analytic hierarchy process is a decision-making of many objects method which combines methods of quantitative analysis and analysis. It through the same layer between the targets of the importance of pair wise comparison, get the judgment matrix, solving the judgment matrix eigenvector as upper relative weights of indicators.

In order to get the above evaluation index weight, on the basis of consulting expert opinion, by using Delphi method, to determine the importance of the factors is the same level. Using the 1-9 scale expert assignment method, the factors were compared with each other at first to get the quantized judgment matrix(A ,B1,B2,B3,B4,B5,B6); Then the root values of all elements in every row of matrix were calculated, and the consistency of judgment matrix is being on. According to the theory of AHP, selecting root method, determining the weight steps are as follows:

Step 1: Calculating product m_i of each line element in judgment matrix

$$m_i = \prod_{j=1}^{n} a_{ij} (i = 1,2,\cdots,n)$$

Step 2: Calculating n root value of m_i: $\overline{w_i} = \sqrt[n]{m_i}$

Step 3: normalization： $w_i = \dfrac{\overline{w_i}}{\sum_{j=1}^{n} \overline{w_j}}$

Step 4: Calculate the maximum characteristic root judgment matrix

$$\lambda_{max} = \sum_{i=1}^{n} \frac{(A\vec{w})_i}{n w_i}$$

In this study, for the convenience of operation, the author use the Delphi language developed A program to help complete the operation process, the content of the matrix A input, the program interface is as follows:
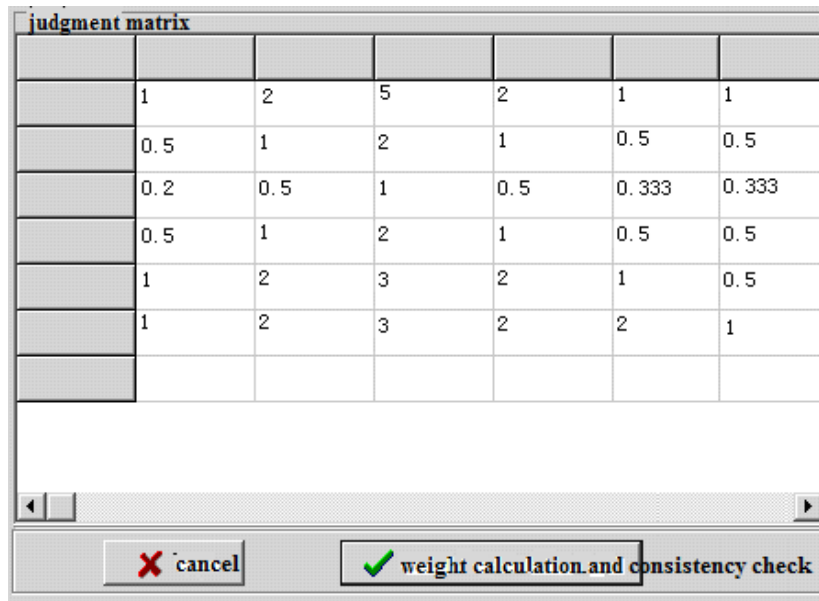
Fig. 2 The program interface
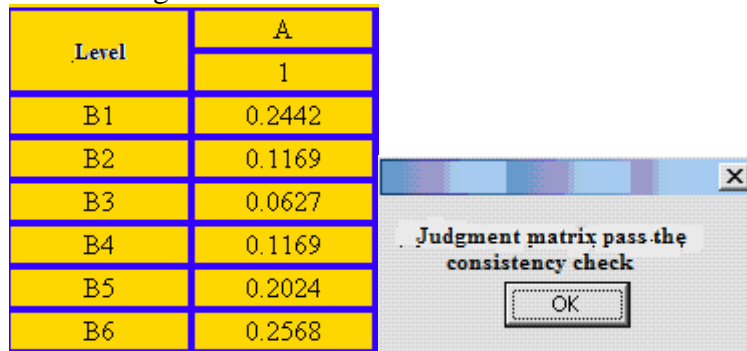
The results are as follows in Fig. 3:

Fig. 3 The results

Using the above methods and input other relevant judgment matrix, to obtain the secondary index weight in Table 1.

Table 1 The secondary index weight

B11	B12	B13	B21	B22	B23	B31	B32	B33	B41	B42	B51	B52	B61	B62	B63
0.30	0.40	0.30	0.28	0.52	0.2	0.35	0.3	0.35	0.5	0.5	0.6	0.4	0.42	0.26	0.32

3.2 Fuzzy comprehensive evaluation method to evaluate results

Fuzzy comprehensive evaluation method [5-6] is a kind of fuzzy mathematics principle analysis and evaluation system with "ambiguity" of things analysis method. To assess university students' ideological and political performance, based on the above index system of evaluation, a questionnaire study has been done for Hubei University of Economics. This research put out 300 investigating questionnaires, and receives 258 available questionnaires. Analysis of questionnaire data processing, in the first-level index "work ethic", the secondary index (B11) the excellent was 42%, and good was 38%, the average was 15%, the difference was 5%. The results available fuzzy sets Sl = {0.42, 0.38, 0.15, 0.05}. Similarly, the other secondary indicator is each corresponding to a set of fuzzy evaluation, so that can get "work ethic" fuzzy evaluation matrix:

$$R_1 = \begin{bmatrix} 0.42 & 0.38 & 0.15 & 0.05 \\ 0.39 & 0.16 & 0.33 & 0.12 \\ 0.44 & 0.37 & 0.12 & 0.07 \end{bmatrix}$$

Using the weighted average model, based on the fuzzy matrix synthesis arithmetic of the evaluation results on the second floor:

$$B1 = w_i \cdot R_i = \begin{bmatrix} 0.3 & 0.4 & 0.3 \end{bmatrix} \cdot \begin{bmatrix} 0.42 & 0.38 & 0.15 & 0.05 \\ 0.39 & 0.16 & 0.33 & 0.12 \\ 0.44 & 0.37 & 0.12 & 0.07 \end{bmatrix}$$

$$= \begin{bmatrix} 0.414 & 0.289 & 0.213 & 0.084 \end{bmatrix}$$

This is the evaluation of the first-level index "work ethic", other indicators evaluation results are obtained by the same ways. Using the weighted average to get the final result:

$$U1 = w_i \cdot R = \begin{bmatrix} 0.2442 & 0.1169 & 0.0627 & 0.1169 & 0.2024 & 0.2568 \end{bmatrix} \cdot \begin{bmatrix} 0.414 & 0.289 & 0.213 & 0.084 \\ 0.425 & 0.285 & 0.202 & 0.088 \\ 0.3 & 0.28 & 0.26 & 0.16 \\ 0.342 & 0.328 & 0.225 & 0.105 \\ 0.402 & 0.305 & 0.214 & 0.079 \\ 0.398 & 0..358 & 0.225 & 0.019 \end{bmatrix}$$

$$= \begin{bmatrix} 0.3931 & 0.3135 & 0.2193 & 0.0740 \end{bmatrix}$$

Due to the maximum membership grade principle, performance evaluation of university students' ideological and political education is "excellent".

4. Conclusion

This study based on the AHP method to determine the performance evaluation of the university students' ideological and political the weight of each index in the index system, using computer aided programming to complete the process, and fuzzy evaluation method to analyze the data, the performance evaluation of the ideological and political results are obtained. The validation process shows that it is a kind of effective method worthy of learning.

Acknowledgements

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