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Application of fuzzy evaluation method in college enterprising training system

Miao Miao[1]*, Yunli Bai[2], Jingjing Kang[1]
[1]Commercial College, Shijiazhuang University of Economics, (CHINA)
[2]Academy of Art & Design, Hebei Vocational & Technical College of Building Materials, (CHINA)
E-mail: oaimmiaomm@163.com

ABSTRACT

Students who start their own business need support and helps in many aspects. Education training system is the essential factor. In order to know whether the input resources achieves expected effect and whether the training system operates effectively, this paper introduced the fuzzy evaluation method into system of education training, cleared the basic procedures of the method and set effectiveness evaluation index. It established college enterprising training system evaluation model in aspects of factor sets, weight sets and evaluation sets, and made visual assessment and evaluation on it. This model can be used to evaluate the training system of individual colleges as well as the comparison research on college training room. This paper also made explanation and illustration on the application of the evaluation model.

KEYWORDS

College entrepreneurship; Training system; Evaluation index; Fuzzy evaluation method.

INTRODUCTION

Enterprising education and training of university students is a systematic project, among which, enterprising education of university students is the new education development direction in current colleges and universities in our country[1,2]. Enterprising training education is a new field of current education theory research and education practice at home and abroad. Many characteristic college enterprising education patterns appears, and some pattern solves problems such as weak pertinence of enterprising education, unsatisfactory teaching effect, low success rate of enterprising practice, etc[3]. In colleges and universities, developing enterprising education are the important measurements for stimulating employment by entrepreneurship and promoting full employment of college graduates[4]. So far, Chinese college enterprising education faces with the problems such as deviation of enterprising education recognition and positioning, shortage of enterprising educator, course system, etc[5,6]. Therefore, most researchers are dedicated to cultivation of enterprising university and teachers for enterprising education[7,8], research on construction of enterprising education course system and professional education development. But the discussion on growth pattern of enterprising university students, especially the research on college enterprising training system, is rare. This paper applied fuzzy evaluation method to evaluate college enterprising training system combined with the construction of college enterprising training system evaluation index. On the one hand, we can systematically and objectively evaluate the development level of enterprising training education and master the specific situation of enterprising education; on the other hand, we can make deep research on the the weakness of current enterprising education training, designed out solution and provide basis for formulating macro development plan.

OVERVIEW OF FUZZY EVALUATION METHOD

Fuzzy evaluation method is to make scientific evaluation on project using fuzzy mathematics and fuzzy statistical method through comprehensive consideration on the factors that affect affairs. Its basic thought is to consider the factors related to the evaluated objective using fuzzy linear change principle and maximum membership principle; the comprehensive evaluation starts from factors at the lowest level, then upward until to the highest objective, and at last obtain the final evaluation result[9]. It is characterized by clear result and strong systematicness. It can better solve problems which is fuzzy and is difficult to quantize, thus to provide practical and effective method and means for solving various theoretical and practical problems[10]. In evaluation on college enterprising training involving a great deal of comprehensive evaluation on subjective factor has large, the fuzziness of subjective factor is large. Fuzzy comprehensive evaluation can preform fuzzy advantage and achieve a better result.

EVALUATION INDEX OF ENTERPRISING TRAINING SYSTEM

Enterprising training system is a new field for promoting full employment of university students and starting education practice. Whether the enterprising training system is perfect mainly reflects on enterprising teaching system and enterprising teaching support, which is the important index of college enterprising training system, this paper analyzed and classified the evaluation factors of training system, according to the function process of enterprising training system and the formulation, implementation and feedback of training system and obtained four level one indexes: enterprising education concept, enterprising teaching system, enterprising education culture and enterprising education support. Then the four level one indexes was divided into several key evaluation points, to form level one indexes, thus to form the evaluation index of enterprising training system, as shown in TABLE 1.

TABLE 1: Evaluation index of enterprising training system

	Level one index	Level two index
Enterprising training system index U	Teaching concept of enterprising training U1	Enterprising concept of students U_{11}
		management concept of manager U_{12}
		Concept of family and society U_{13}
	Culture construction of enterprising training U2	Construction of enterprising teaching atmosphere U_{21}
		Enterprising training policy U_{22}
		Regional economic industry U_{23}
	Teaching system of enterprising training U_3	Design of enterprising plan competition U_{31}
		Teaching staff U_{32}
		Settlement of enterprising course U_{33}
		Training teaching method U_{34}
	Teaching support of enterprising training U_4	Government support U_{41}
		School support U_{42}
		Enterprise support U_{43}

APPLICATION OF FUZZY EVALUATION METHOD IN COLLEGE TRAINING SYSTEM

College enterprising training is comprehensively evaluated by various indexes based on evaluation index of college enterprising training system and fuzzy evaluation method. The detailed process is as follows:

Confirming evaluation factor set

This paper divided college training evaluation indexed into four levels, as shown in TABLE 1. Then the comprehensive evaluation factor set is U={U1,U2, U3,U4}. Single factor set is:

U1= {U11, U12, U13}   **(1)**
U2= {U21, U22, U23}   **(2)**
U3= {U31, U32, U33, U34}   **(3)**
U4= {U41, U42, U43}   **(4)**

Confirming comment set of evaluation factor

Comment set of various factors in fuzzy comprehensive evaluation need to be established after confirming the evaluation factors of enterprising training system. Comment set can be established different comment grade theory domain according to different demand. Generally speaking, evaluation grades number is more than 4 but not exceed 10. Combined with the characteristics of evaluation index of enterprising training system, the evaluation set is divided into excellent, good, common, poor and bad, expressing as V={excellent, good, common, poor and bad}. Fuzzy evaluation obtains a fuzzy evaluation vector because of the confirmation of comments. The degree of membership of the evaluated object to comment grade is expressed through fuzzy vector through this fuzzy vector, which can reflect the fuzziness of evaluation.

Confirming evaluation weight set

In factor set, the importance degrees of evaluation factors in evaluation system are different. The factors are given corresponding weight, in order to reflect the importance degree of the factors. The set composed of weights is called weight set. Establish weight set A in U: A=(a1, a2, …, as) that meet normalization $\sum_{i=1}^{s} a_i = 1$ (a1≥0). Establish weight set A1 in UI: AI=(ai1, ai2, …, aim). $\sum_{j=1}^{m} a_{ij} = 1$ (a1≥0).

Obtain the weight of evaluation index U applying analytic hierarchy process (AHP)[11-12]: A= (0.25, 0.17, 0.46, 0.12). Weight of U1, U2, U3, U4 is:

A1= {0.542, 0.221, 0.237}
A2= {0.231, 0.583, 0.186}
A3= {0.215, 0.552, 0.130, 0.103}
A4= {0.527, 0.254, 0.219}.

Confirming fuzzy evaluation matrix

Different kinds of experts including evaluation subjects are invited to form diversified evaluation expert team according to evaluation index system and evaluation standard. Factor set of the factors is expressed as X={x1, x2, …, xn}. Evaluation set is expressed as Y={y1, y2, …, ym}. As stated above, five level evaluation systems is adopted: y1 is excellent, y2 is good, y3 is common, y4 is poor, y5 is bad. Therefore, the fuzzy comprehensive evaluation matrix in level one can be expressed as:

$$T = \begin{bmatrix} t_{11} & t_{12} & \cdots & t_{1n} \\ t_{21} & t_{22} & \cdots & t_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ t_{n1} & t_{n2} & \cdots & t_{nm} \end{bmatrix}$$

Among which, t ij = number of people who evaluate index xi as yj / the number of people who participate evaluation

We can obtain the fuzzy evaluation situation of evaluation factor set according to function relationship:

$$T_{U_1} = \begin{bmatrix} 0.40 & 0.40 & 0.20 & 0.0 & 0 \\ 0.15 & 0.60 & 0.25 & 0.0 & 0 \\ 0.15 & 0.45 & 0.30 & 0.1 & 0 \end{bmatrix}$$

In same way, we can obtain TU2, TU3 and TU4.

Model comprehensive evaluation

Fuzzy comprehensive evaluation for level two index:

Make comprehensive evaluation on factor set. The weight of factor set is A[a1,a2,…an]. Then the value of evaluation matrix is: H=A·T. Thus we can obtain:

$$H_{U_1} = A_1 \cdot T_{U_1} = \begin{bmatrix} 0.542 & 0.221 & 0.237 \end{bmatrix} \cdot \begin{bmatrix} 0.40 & 0.40 & 0.20 & 0.0 & 0 \\ 0.15 & 0.60 & 0.25 & 0.0 & 0 \\ 0.15 & 0.45 & 0.30 & 0.1 & 0 \end{bmatrix}$$

= [0.285 0.456 0.235 0.024 0]

The teaching concept of college enterprising training is "good" judged by maximum subordination principle.

By same method, we can obtain $H_{U_2} = A_2 \cdot T_{U_2} = [0.145 \quad 0.387 \quad 0.315 \quad 0.153 \quad 0]$, that is, the culture construction fuzzy evaluation for enterprising system of that college is "good"; $H_{U_3} = A_3 \cdot T_{U_3} = [0.511 \quad 0.302 \quad 0.146 \quad 0.041 \quad 0]$, that is, the fuzzy evaluation for enterprising teaching system of that college is "excellent"; $H_{U_4} = A_4 \cdot T_{U_4} = [0.132 \quad 0.387 \quad 0.325 \quad 0.156 \quad 0]$, that is, the fuzzy evaluation for enterprising training support of that college is "good".

Fuzzy comprehensive evaluation for level one index:

$$H = A \cdot T = \begin{bmatrix} 0.25 & 0.17 & 0.46 & 0.12 \end{bmatrix} \cdot \begin{bmatrix} 0.285 & 0.456 & 0.235 & 0.024 & 0 \\ 0.145 & 0.387 & 0.315 & 0.153 & 0 \\ 0.511 & 0.302 & 0.146 & 0.041 & 0 \\ 0.132 & 0.387 & 0.325 & 0.156 & 0 \end{bmatrix}$$

$$= [0.3468 \quad 0.36515 \quad 0.21846 \quad 0.06959 \quad 0]$$

The overall fuzzy comprehensive evaluation for enterprising training system of that college is "good" judged by maximum subordination principle.

CONCLUSION

The evaluation for the college enterprising training system is complex system engineering. The application of fuzzy comprehensive analysis can quantitatively evaluate the college enterprising training system based on the qualitative analysis on the college enterprising training evaluation index system, ensuring the objectivity, fairness and rationality. This paper analyzed the evaluation of factor set, comment set and weight set combined with index system for college enterprising training and based on the evaluation of fuzzy comprehensive evaluation method on enterprising training, and finally made overall evaluation on the college enterprising training system. Through careful analysis on the evaluation result, it is concluded that the weakness of college enterprising training mainly reflect on the construction of teaching staff and enterprising policy. To solve these problems, we can master the development of enterprising training more accurately and improve these weaknesses. Meanwhile, we can also find the gap between advantage and disadvantage of the enterprising training system, which is good for making good for deficiency and improving the effectiveness of training system.

REFERENCES

[1] Y.C.Wang, Y.Chen; American enterprising education pattern and its enlightenment on college enterprising education in Jiangsu, Education and Vocation, **32**, 170-172 **(2011)**.
[2] N.Wang, K.Ru; Innovation of autonomous enterprising training system of university students, Manager Journal, 102 **(2010)**.
[3] Y.F.Tong; Discussion on the role and function of college instructor in enterprising education of university student. Success (Education), **3**, 200-201 **(2012)**.
[4] Ministry of Education, Promoting the Relative Situation of Enterprising Education Innovation in China's Colleges and Universities, Higher Education Department.
[5] Y.J. Zhou; Research on problem and solution faced by enterprising education in China's universities and universities, Journal of Zhengzhou University (Philosophy and Social Sciences), **43(1),** 174-176 **(2010)**.
[6] Z.X.Huang, Z.H.Song; University students entrepreneurship education facing three transformations, Exploring Education Development, 45-48 **(2011)**.
[7] J.T.Gong; Analysis and reflection on construction of enterprising college teacher team, Kaoshi Zhoukan, **30**, 22-23 **(2011)**.
[8] S.T.Liu; Construction of enterprising education course system in higher vocational colleges, Journal of Innovation and Enterprise Education, **2(1),** 79-81 **(2011)**.
[9] J.F.Wu, J.G.Yao, et al; Fuzzy comprehensive evaluation of power customer energy efficiency assessment, Relay, **35(13)**, 94-95 **(2010)**.
[10] J.L.Yu, Y.L.Xu; A comprehensive study on the quality evaluation of the teaching course system, Journal of Tianjin Normal University, **1**, 73-76 **(2010)**.
[11] Y.M.Kang; Network study evaluation on the basis of fuzzy theory and AHP, International Electronic Elements, **19(3)**, 113-115 **(2011)**.
[12] H.S.Shi, L.N.Han; The Application of Fuzzy AHP in Performance Evaluation of Teachers in Colleges and Universities, **19(15)**, 105-170 **(2011)**.