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Research on the Quality Evaluation of Substituted Post Exercitation for Hotel Management Major Based on AHP-TOPSIS

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ABSTRACT
Substituted post exercitation is an important link in the training of hotel management major, and its quality will impact on the realization of talent training objectives. According to the established substituted post exercitation quality evaluation index system for the hotel management major, this paper evaluates the quality of in-post practice for hotel management students by AHP-TOPSIS, and verify the effectiveness and practicability of the method.

Keywords: *Hotel management major, evaluation index, substituted post exercitation quality, AHP-TOPSIS method*

1. INTRODUCTION

As a high practicality major, the hotel management major requires the students to both proficiency in professional knowledge and skill at professional and practical, thus, most the universities will arrange the hotel management major students to substituted post exercitation to cooperation hotel for six months in order to develop their professional skills and enhance their understanding on future career plan.
However, currently, many universities fail to formulate the specific and effective quality evaluation system for substituted post exercitation. Even if some universities have complied with the evaluation system, the factors in the indicators are not strongly targeted, the weight of each indicator is hardly considered, and the evaluation method is too simple. The results of substituted post exercitation are hard to objectively and scientifically reflect the study quality and the key points of study quality, as a result, fail to continuously improve the weak links in the internship process[1]. Therefore, it is very necessary and important to establish a quality evaluation system of substituted post exercitation suitable for hotel management major and to adopt scientific evaluation methods. Nowadays, in China, in the view of the substituted post exercitation for hotel management major, through some researches has been done on the assessment indicator system of substituted post exercitation quality for hotel management major, few researches are targeted to adopt quantitative methods for evaluation. In conclusion, this paper tries to evaluate the substituted post exercitation study quality for hotel management major by AHP-TOPSIS.

2. DETERMINATION OF THE QUALITY EVALUATION INDEX SYSTEM FOR THE SUBSTITUTED POST EXERCITATION OF HOTEL MANAGEMENT MAJOR

Scientific and effective evaluation must be based on a set of systematic evaluation index system[2]. Therefore, according to the comprehensive analysis on the literature, the actor preliminarily draws up a set of quality evaluation index system suitable for the substituted post exercitation for hotel management major and then invites the hotel industry managers and experts to revise the index system, and determines a set of the indexes with three levels(Table 1). This index system is divided into 3 first-level indexes and 12 second-level indexes under the overall index of "quality evaluation of substituted post exercitation in hotel management major".

Table 1 Quality evaluation index system of substituted post exercitation for hotel management major

	First-level indexes	Second-level indexes
Evaluated substituted post exercitation student A	Basic professional ability B1	Service ethics C_1
		Service awareness C_2
		Service specification C_3
		Professional responsibility C_4
	Professional knowledge and skills B2	Position knowledge C_5
		General knowledge of hotel C_6
		Post operation skills C_7
	Comprehensive ability B3	Communication and communication ability C_8
		Organization and coordination capacity C_9
		Seeking knowledge and exploring ability C_{10}
		Ability to handle and solve complex problems C_{11}
		Anti-pressure ability C_{12}

3. THE SUBSTITUTED POST EXERCITATION QUALITY EVALUATION METHOD FOR HOTEL MANAGEMENT STUDENTS

3.1 Determine the Weight of Each Index in the Index System by AHP

On the basis of the constructed evaluation index system, according to the actual situation, the internship instructor and the management personnel of the hotel industry establish the judgment matrix by the 1-9 proportional scale method proposed by T.L.Saaty and the formation of the comparing the importance of two indexes[3].

Determine the weight of each index according to the judgment matrix. That is, by calculation the sum of each column of the judgment matrix, normalize each column, add the normalized each column vectors, obtain the square root vector quantity, and W is obtained after the vector quantity is normalization processing.

Test the consistency of judgment matrix. It is judged by calculating the consistency ratio C.R. If C.R $\leq$ 0.1, then it is considered that the judgment matrix passes the consistency test. The obtained W= $\{w_1^0, w_2^0, \ldots\ldots w_n^0\}^T$ takes as the weight of TOPSIS, otherwise the judgment matrix needs to be readjusted.

3.2. By TOPSIS, Evaluate and Rank the Quality of the Selected Substituted Post Exercitation Students

As a common method in multi-objective evaluation, TOPSIS, proposed by C.L.Hwang &K.Yoon (1981) is an evaluation method that ranks according to the close degree between the evaluation objects and the ideal solution and calculates the relative merits [4] .

Suppose: there are n evaluation objects (evaluated students), and m evaluation indexes, and the evaluation object Di (I = 1, 2 ……,n), in the evaluation index system Bj, the value is Xij, and construct the original data matrix Xij = {Xij}.

By equation (1), process the assimilate and normalize to the original matrix, the weighted gauge matrix Z=（z_{ij}）$_{n\times m}$ is obtained, where$Z_{ij}=w_j^0\ y_{ij}$（j=1、2……,m), and w_j^0 is determined by the weight coefficient of the above-mentioned AHP method.

$$Y_{ij}=\frac{x_{ij}}{\sqrt{\sum_{i=1}^{n}x_{ij}^2}} \quad j=1,2,\ldots\ldots\ m \qquad (1)$$

Construct the optimal vector $Z^+=(Z_1^+,Z_2^+,\ldots\ldots Z_m^+)$ and the worst vector$Z^-=(Z_1^-,Z_2^-,\ldots\ldots Z_m^-)$.

Calculate the distance between the best vector and the worst vector of each evaluation object.

$$D_i^+ = \sqrt{\sum_{j=1}^{m}(Z_{ij} - Z_j^+)^2} \quad \text{i=1,2,……,n} \quad (2)$$

$$D_i^- = \sqrt{\sum_{j=1}^{m}(Z_{ij} - Z_j^-)^2} \quad \text{j=1,2,……,m} \quad (3)$$

By equation (2), calculate the degree of closeness, and calculate the degree of closeness of each evaluation object and the optimal scheme (the ideal degree), to evaluate and rank.

$$C_I = \frac{D_i^-}{D_i^- + D_i^+} \quad \text{i=1,2, …… n} \quad (4)$$

C_I takes the value between 0 and 1. Ranked by the CI value, the closer CI value is to 1, the higher the quality of the student's substituted post exercise is.

4. EXAMPLE ANALYSIS

In this study, as the evaluation objects of 5 hotel management students that are substituted post exercitation in a 5-star hotel, rank and evaluate the contents in substituted post exercitation quality evaluation model by above methods. The detail steps are shown, as follows:

4.1 Construct Judgment Matrix and Check the Consistency

Invite hotel industry experts and instructors to compare between any two indexes and mark in sequence in first-level (B_1, B_2 and B_3) and second-level (C_1-C_{12}) and construct the judgment matrix. (Table 2)
compare between any two indexes and mark in sequence in second-level (C_1-C_{12}) and construct the judgment matrix. The following vector:
W_0 =(0.5526,0.1008,0.0709,0.2757)
W_1 =(0.2797,0.0936,0.6267)
W_2 =(0.3485,0.0643,0.1595,0.3040,0.1237)
According to the above calculation, it can be known that all levels' judgment matrix pass the consistency test, the following vector :
W={0.172,0.031,0.022,0.086,0.055,0.018,0.123,0.172,0.032,0.079,0.150,0.061}^{T}
It can be evaluated index weight by TOPSIS method:
4.2 Evaluate and rank by TOPSIS

According to the constructed index system, invite the HR Department management staffs, and the relevant department's management staffs in hotel and instructors to mark the 5 students being substituted post exercitation in that hotel and obtain the original matrix of the substituted post exercitation quality evaluation for hotel management major after sorting out the results (Table 3). Then, the original matrix was assimilated and normalized to obtain the weighted norm matrix.

Table 2 judgment matrix A-B (first-level index system)

A-B	B_1	B_2	B_3	w
B_1	1	2	1/2	0.3108
B_2	1/2	1	1/2	0.1958
B_3	2	2	1	0.4934

λ_{max}=3.0536 CI=0.0268 CR=0.046＜0.1

Table 3 hotel management major substituted post exercitation quality evaluation original matrix

No.	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}	C_{12}
A	6.2	8.3	7.5	7．4	7.2	7.5	8.9	7.9	6.8	7.0	7.6	6.2
B	7.5	8.0	7.2	6.9	8.6	7.4	7.2	8.5	6.9	7.1	8.3	6.8
C	8.3	6.1	7.0	7.5	7.8	7.4	8.3	6.6	7.1	8.2	6.9	8.2
D	7.9	7.4	8.1	8.4	6.9	7.6	6.7	7.7	7.0	8.1	7.4	7.7
E	6.8	7.6	7.6	6.3	8.0	7.7	7.4	8.1	6.9	7.8	8.0	7.1

Table 4 weighted matrix Z

No.	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}	C_{12}
A	0.0646	0.0153	0.0099	0.0388	0.0229	0.0080	0.0632	0.0780	0.0140	0.0323	0.0666	0.0234
B	0.0782	0.0148	0.0095	0.0362	0.0274	0.0079	0.0512	0.0840	0.0142	0.0328	0.0727	0.0256
C	0.0865	0.0112	0.0092	0.0393	0.0248	0.0079	0.0590	0.0652	0.0146	0.0378	0.0605	0.0309
D	0.0824	0.0136	0.0106	0.0441	0.0220	0.0081	0.0476	0.0761	0.0144	0.0374	0.0648	0.0290
E	0.0709	0.0140	0.0100	0.0330	0.0255	0.0082	0.0526	0.0800	0.0142	0.0360	0.0701	0.0268

Table 5 the evaluation object closeness

	D^+	D^-	C
A	0.0262	0.0223	0.459794
B	0.0182	0.0275	0.601751
C	0.0238	0.0273	0.534247
D	0.0205	0.0254	0.553377
E	0.0230	0.0205	0.471264

According to the weighting matrix shown in Table 4, calculate the positive ideal solution Di+ and negative ideal solution Di+of the evaluation object.

Di+= （ 0.0865,0.0153,0.0106,0.0441,0.0274,0.0082,0.0632,0.0840,0.0146,0.0378,0.0727,0.0309）

Di-=(0.0646,0.0112,0.0092,0.0330,0.0220,0.0079,0.0476,0.0652,0.0140,0.0323, 0.0605,0.0234)

According to the positive and negative ideal solutions, obtain the distance from the each evaluation indexes to positive and negative ideal solutions and relative closeness coefficient, as shown in Table 5.4.2.4 Evaluate and select excellent by rank. According to the number of the close value obtained in Table 5, carry out the ranking and the result is B > D > C > E > A, that is, the substituted post exercitation quality of student B is the best, and that of student A is the worst.

5. CONCLUSION

As the high applicability and practicalness major, substituted post exercitation is a key part of hotel management major, thus, scientific and reasonable evaluation of students substituted post exercitation quality has matter with the student's profession development and future growth[5]. Combined with the AHP method and TOPSIS evaluation, this paper evaluates and ranks the substituted post exercitation quality for hotel management major, verifies by practice and explains the practicability and guiding significance of constructed evaluation model[6]. As a result, the evaluation results are scientific and reliable and can relatively accurately and objectively evaluate the intern quality of substituted post exercitation for hotel management student. The result has certain constructive significance to the related research and development.

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