A STUDY OF THE OCCUPATIONAL COMPETENCE OF AESTHETIC NURSES

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Abstract - In the paper, beauty experts with more than 5 years of practicing experience were invited to name the professional competencies a nurse esthetician should possess. Of 17 evaluation factors provided form past researches, 10 were selected as assessment factors. An assessment checklist was obtained from relative factor optimization. Ten candidates were evaluated by beauty salons for admission to job offer, and uses grey relational grade to calculate, after the results are found, then compared with traditional statistic procedure. It can find that three results of statistic methods ae the same, means that the mathematical model proposed by the paper is quite reasonable in this field.

Keywords - Practicing Experience, Nurse Esthetician, Evaluation Factors, Relative Factor Optimization, Grey Relational Grade.

I. INTRODUCTION

Occupational competence standard curriculum has been a developmental focus across nations to meet the needs of business development. Taiwan's Workforce Development Agency (TWDA), civilian units and experts have jointly worked out occupational competency-oriented curriculum. ICAP (Intensive Comprehensive Aphasia Program), an occupation development application platform, has been set up to offer educational training, aiming at seamless articulation between vocational training and job. It ensures quality vocational training and meets the purpose of "training and use in one."[1]

In earlier days, makeup, as well as food & drinks, clothing, was not regarded as an independent academic discipline. In the makeup industry, mentorship was the prevailing way of passing skills and knowledge from a mentor to his or her candidates. Different mentors inevitably transmitted different professional skills. After years of practice, the candidates eventually have become makeup experts. However, it is doubtful whether what they learned in earlier days meet the needs of contemporary consumers.

As of now, the essence of economic development has become human resource-oriented. Natural resources and capital resources are the main driving powers of economic development. A good control of professional talents and job analysis is sure to optimize the performance of human resource management.

In the paper, 17 vocational competencies regarded as necessary competencies required of aesthetic nurses were reorganized into 10 evaluation factors. Beauty salon managers were invited to rate nurse estheticians in terms of 10 factors. Grey relational analysis was applied for data computation and analysis, and compared with traditional statistic description to verify data reasonableness.

II. LITERATURE REVIEW

Proposed in 1973, "competence" suggests that occupational competence be far more influential on student learning efficacy than IQ. Neither is IQ a determining factor of job performance. Attitude, cognition and personal trait, instead, are determining factors of excellent performance. These factors are regarded as occupational competencies[2~5]. They include personal trait, self-perception, inner motivation and overt characteristics such as technical skill and knowledge. All these constitute an icy mountain model.

Self-concept and personal traits are hidden vocational competencies with training and development difficulty, while technical skills and knowledge are observable overt competencies easy to train and develop. The purpose of the icy mountain model is combining hidden competencies and overt competencies. According to Parry, vocational competencies include job-related knowledge, cognition and attitude. They can be used to promote personal job performance [6].

According to the regulations of National C-level Beautician Certification conferred by Taiwan's Ministry of Labor, vocational beautician training should include makeup skill, skin care skill and hygiene skill. Concerning classification of vocational competencies, professional competence of vocation refers to the capabilities or skills an employee needs to possess for performing a specific job. The standard of professional competence of vocation implies that

establishment of vocational competence needs to take into account the developmental prospect of a profession. It should address such common capability required of professional talents as deemed by different businesses of a specific profession on the one hand, and respond to the competence necessity of that profession on the other hand[7].

Taiwan's Workforce Development Agency defines vocational competence as "the performance of an individual or organization or combination of knowledge, skill, and attitude required of completing a task mission. It also includes integration skill, knowledge and habit"[8]

III. GREY RELATIONAL GRADE

Grey relational grade is one of the two pillars of gray system theory[9]. The main function is to calculate the measure between discrete sequences. The paper uses this method to calculate and to optimal the ranking in our system[10].

3.1 Localization Grey Relational Grade

1) x_0 **is standard sequence**

$$x_0 = (x_0(1), x_0(2), x_0(3), \cdots, x_0(k)) \tag{1}$$

2) x_i **are inspected sequences**

$$\begin{aligned} x_1 &= (x_1(1), x_1(2), x_1(3), \cdots, x_1(k)) \\ x_2 &= (x_2(1), x_2(2), x_2(3), \cdots x_2(k)) \\ x_3 &= (x_3(1), x_3(2), x_3(3), \cdots, x_3(k)) \\ &\vdots \\ x_m &= (x_m(1), x_m(2), x_m(3), \cdots, x_m(k)) \end{aligned} \tag{2}$$

$$i = 1,2,3,\cdots, m \quad k = 1,2,3,\cdots n$$

3)Based on equation (3) to calculate the localization grey relational grade [11]

$$\Gamma_{0i} = \Gamma(x_0, x_i) = \frac{\Delta_{\min.} + \Delta_{\max.}}{\overline{\Delta}_{0i} + \Delta_{\max.}}$$

$$\overline{\Delta}_{0i} = \left\{ \frac{1}{n} \sum_{k=1}^{n} [\Delta_{0i}(k)] \right\} \tag{3}$$

where: (a) $\overline{\Delta}_{0i}$ are the mean of Δ_{0i}

(b) $\Delta_{\max.}$ and $\Delta_{\min.}$ are the maximum and minimum values of Δ_{0i} .

3.2 Globalization Grey Relational Grade

The definition of globalization grey relational grade is that each sequence in equation (2) can become a standard sequence, and the value of globalization grey relational grade can be obtained[11].

$$\begin{aligned} x_1 &= (x_1(1), x_1(2), \cdot, \cdot, x_1(k)) \\ x_2 &= (x_2(1), x_2(2), \cdot, \cdot, x_2(k)) \\ x_3 &= (x_3(1), x_3(2), \cdot, \cdot, x_3(k)) \\ &\vdots = \vdots \\ x_m &= (x_m(1), x_m(2), \cdot, \cdot, x_m(k)) \end{aligned} \tag{4}$$

where: $i = 1,2,3,\cdots, m \quad k = 1,2,3,\cdots n$

1) Using equation (5) to get the grey relational grade for each sequence.

$$\Gamma_{ij} = \Gamma(x_i, x_j) = \frac{\Delta_{\min.} + \Delta_{\max.}}{\overline{\Delta}_{ij} + \Delta_{\max.}},$$

$$\overline{\Delta}_{ij} = \left\{ \frac{1}{n} \sum_{k=1}^{n} [\Delta_{ij}(k)] \right\} \tag{5}$$

where: i. $\overline{\Delta}_{ij}$:are the mean of Δ_{ij}

ii. $\Delta_{\max.}$ is the maximum values of Δ_{ij} .

iii. $\Delta_{\min.}$ is the minimum values of Δ_{ij} .

2) Based on the grey relational grade from equation (5) to build up the grey relational matrix, as shown in equation (6).

$$R_{m\times m} = \begin{bmatrix} \Gamma_{11} & \Gamma_{12} & \cdots & \Gamma_{1m} \\ \Gamma_{21} & \Gamma_{22} & \cdots & \Gamma_{2m} \\ \vdots & \vdots & \ddots & \Gamma_{11} \\ \Gamma_{m1} & \Gamma_{m2} & \cdots & \Gamma_{mm} \end{bmatrix} \tag{6}$$

And by using eigenvector method to rank the ranking in system, the steps are:

1)Build up the grey relational matrix $[R]_{m\times m}$.

2)Find out the eigenvalue in grey relational matrix.

3)The maximum eigenvalue corresponding with eigenvector are the weighting of the system.

IV. THE REAL CASE IN RECRUIT OF ARTISTS

4.1 Analysis Factors

A beauty salon decided to recruit ten beauty artists. The evaluation factors provided by five experts in makeup were subject to relative optimization. Table 1 indicate the factors for evaluation[12].

Dimension	Factor	Item	Full score
Professional	F1	Possessing aesthetic knowledge related to dermatology, human	10

knowledge		physiology and the meridian theory.	
	F2	Being able to identify facial skin tone and propose proper company products for daily care	10
Professional skill	F3	Possessing Level-C Beautician Certificate	10
	F4	Possessing skincare and SPA professional skill	10
Professional attitude	F5	Being able to follow company policy and possess team spirit and service enthusiasm	10
	F6	Possessing good skin, wearing smile and displaying good posture and manners	10
	F7	Being able to control emotion and resist high stress	10
	F8	Constantly learning and improving oneself	10
Personal trait	F9	Being amicable, prudent and laborious	10
Marketing ability	F10	Possessing good ability in communication and product marketing	10

Table 1 - Evaluation items and respective score

4.2 Content Description and Assigned score for Individual l Contents

1. F1. 3 contents: Taking no related credits (6 points), non-beauty science major (points) and beauty science major (10 points).
2. F2. 2 contents: Being able to get 1 right answer on the skin tone card and completely explain key points of care (5 points) and being able to get 2 right answers on the skin tone card and completely explain key points of care (10 points) .
3. F3. 2 contents: Possessing no Level-C Beauty Certificate (5 points) and possessing a Level-C Beauty Certificate (10 points).
4. F4. 2 contents: Possessing one professional skill (5 points) and possessing 2 professional skills (10 points).
5. F5. 2 contents: Being willing to accept store transfer shift; participating in company tour and allowing company to check customer sales service card ((1 content (6 points); 2 contents (8 points); 3 contents (10 points)).
6. F6. 3 contents: Wearing proper makeup for office, wearing uniform and wearing smiles ((1 content (6 points); 2 contents (8 points); 3 contents (10 points)).
7. F7. 2 contents: Participating in annual promotion activity and accepting sales performance requirement ((1 content (5 points); 2 contents (10 points)).
8. F8. 3 contents: Taking free development courses, taking partially free development courses and taking completely self-paid development courses ((1 content (6 points); 2 contents (8 points); 3 contents (10 points)).
9. F9. 2 contents: Detailed consultation on pre- and post-customer service and taking daily in-store cleaning shift duty ((1 content (5 points); 2 contents (10 points)).
10. F10. 3 contents: Listening to the customer, understanding customer needs and advising customer to use company makeup products for effective skin care ((1content (6 points); 2 contents (8 points); 3 contents (10 points)).

4.3 The Raw Data

After interview with all candidates, the results are shown in Table 2.

Person/Factor	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
01(x_1)	10	10	10	10	10	10	5	6	10	10
02(x_2)	10	5	10	0	10	10	0	0	0	0
03(x_3)	10	10	10	10	10	10	5	6	10	8
04(x_4)	10	10	10	5	10	10	10	6	10	8
05(x_5)	10	10	10	10	10	10	10	6	10	8
06(x_6)	10	5	5	5	6	8	5	6	0	0
07(x_7)	10	10	10	10	10	10	10	6	10	10
08(x_8)	8	0	5	0	10	10	5	6	0	0
09(x_9)	10	5	10	5	6	8	0	0	10	8
10(x_{10})	10	10	10	10	10	10	10	6	10	10

Table 2 The evaluation score of ten candidates

4.4 The Calculation of Localization Grey Relational Grade

Based on the mathematics model, the analysis steps are:

1. Through Table 2 to get the standard sequence, which is the maximum value in each factor: $x_0 = (10, 10, 10, 10, 10, 10, 10, 10, 10, 10)$
2. The others data ae inspected sequences:

$x_1 = (10, 10, 10, 10, 10, 10, 5, 6, 10, 10)$

$x_2 = (10, 5, 10, 0, 10, 10, 0, 0, 0, 0)$

$x_3 = (10, 10, 10, 10, 10, 10, 5, 6, 10, 8)$

$x_4 = (10, 10, 10, 5, 10, 10, 10, 6, 10, 8)$

$x_5 = (10, 10, 10, 10, 10, 10, 10, 6, 10, 8)$

$x_6 = (10, 5, 5, 5, 6, 8, 5, 6, 0, 0)$

$x_7 = (10, 10, 10, 10, 10, 10, 10, 6, 10, 10)$

$x_8 = (8, 0, 5, 0, 10, 10, 5, 6, 0, 0)$

$x_9 = (10, 5, 10, 5, 6, 8, 0, 0, 10, 8)$

$x_{10} = (10, 10, 10, 10, 10, 10, 10, 6, 10, 10)$

3. Using equation (3) to find out the values of localization grey relational grade, in which $\Delta_{\max.} = 10.0000, \Delta_{\min.} = 0.0000$.

$\Gamma(x_0, x_1) = 0.79174, \quad \Gamma(x_0, x_2) = 0.6452,$

$\Gamma(x_0, x_3) = 0.9009, \quad \Gamma(x_0, x_4) = 0.9009,$

$\Gamma(x_0, x_5) = 0.9434, \Gamma(x_0, x_6) = 0.6667,$

$\Gamma(x_0, x_7) = 0.9615, \quad \Gamma(x_0, x_8) = 0.6410,$

$\Gamma(x_0, x_9) = 0.7246, \quad \Gamma(x_0, x_{10}) = 0.9615.$

the results are shown in Table 3.

Candidate	1	2	3	4	5	6	7	8	9	10
Γ	0.9174	0.6452	0.9009	0.9009	0.9434	0.6667	0.9615	0.6410	0.7246	0.9615
Rank	4	9	5	5	3	8	1	10	7	1

Table 3 - The ranking of ten candidates by using localization grey relational grade

4.5 The Calculation of Globalization Grey Relational Grade

Based on the mathematics model, the analysis steps are

1)Using the data in Table 2 as the inspected sequences x_i

$x_1 = (10, 10, 10, 10, 10, 10, 5, 6, 10, 10)$

$x_2 = (10, 5, 10, 0, 10, 10, 0, 0, 0, 0)$

$x_3 = (10, 10, 10, 10, 10, 10, 5, 6, 10, 8)$

$x_4 = (10, 10, 10, 5, 10, 10, 10, 6, 10, 8)$

$x_5 = (10, 10, 10, 10, 10, 10, 10, 6, 10, 8)$

$x_6 = (10, 5, 5, 5, 6, 8, 5, 6, 0, 0)$

$x_7 = (10, 10, 10, 10, 10, 10, 10, 6, 10, 10)$

$x_8 = (8, 0, 5, 0, 10, 10, 5, 6, 0, 0)$

$x_9 = (10, 5, 10, 5, 6, 8, 0, 0, 10, 8)$

$x_{10} = (10, 10, 10, 10, 10, 10, 10, 6, 10, 10)$

2)Using equation (5) to find out the values of globalization grey relational grade, in which $\Delta_{\max.} = 1.4653, \Delta_{\min.} = 0.0000$**. Then, by using equation (6) to build up grey relational matrix, as shown below.**

$$R_{10\times10} = \begin{bmatrix} 1.0000 & 0.2416 & 0.8799 & 0.5498 & 0.6767 & 0.2633 & 0.7456 & 0.2377 & 0.3357 & 0.7446 \\ 0.2416 & 1.0000 & 0.5498 & 0.2498 & 0.2302 & 0.3518 & 0.2232 & 0.3892 & 0.3377 & 0.2232 \\ 0.8799 & 0.2498 & 1.0000 & 0.5944 & 0.7456 & 0.2731 & 0.6767 & 0.2456 & 0.3518 & 0.6767 \\ 0.5498 & 0.2498 & 0.5944 & 1.0000 & 0.7456 & 0.2731 & 0.6767 & 0.2456 & 0.3518 & 0.6767 \\ 0.6767 & 0.2302 & 0.7456 & 0.7456 & 1.0000 & 0.2498 & 0.8799 & 0.2266 & 0.3141 & 0.8799 \\ 0.2633 & 0.3518 & 0.2731 & 0.2731 & 0.2498 & 1.0000 & 0.2416 & 0.4487 & 0.3012 & 0.2416 \\ 0.7456 & 0.2232 & 0.6767 & 0.6767 & 0.8799 & 0.2416 & 1.0000 & 0.2198 & 0.3012 & 1.0000 \\ 0.2377 & 0.3892 & 0.2456 & 0.2456 & 0.2266 & 0.4487 & 0.2198 & 1.0000 & 0.2198 & 0.2198 \\ 0.3357 & 0.3357 & 0.3518 & 0.3518 & 0.3141 & 0.3012 & 0.3012 & 0.2198 & 1.0000 & 0.3012 \\ 0.7456 & 0.2232 & 0.6767 & 0.6767 & 0.8799 & 0.2416 & 1.0000 & 0.2198 & 0.3012 & 1.0000 \end{bmatrix}$$

3)Though the matrix calculation, the λ_{max} =5.2485, and the corresponding with eigenvector are (0.3706, 0.1735, 0.3698, 0.3445, 0.3937, 0.1844, 0.3971, 0.1703, 0.2094, 0.3971), and are shown in Table 4.

Candidate	1	2	3	4	5	6	7	8	9	10
Γ	0.3706	0.1735	0.3698	0.3445	0.3937	0.1844	0.3971	0.1703	0.2094	0.3971
Rank	4	9	5	6	3	8	1	10	7	1

Table 4 - The ranking of ten candidates by using globalization grey relational grade

4.6 The Calculation of Traditional Method

Also by using summation method to get the final results, and ae shown in Table 5.

Candidate	1	2	3	4	5	6	7	8	9	10
Summation	91	45	89	89	94	50	96	44	62	96
Rank	4	9	5	5	3	8	1	10	7	1

Table 5 - The ranking of ten candidates by using traditional method

V. CONCLUSION

Traditional evaluation has tended to add up scores. However, there are cases where adding up scores can lead to indecision. It is interesting to know whether a new mathematic method can be used for such a situation. The paper found that all three methods, including localization grey relational grade, globalization grey relational grade, and traditional method, attained the same sorting result. The highest-scoring candidates were No. 10 (1st) and No. 7 (1ST), followed by No. 5 (3rd). Three of the candidates were, based on vocational competence evaluation, qualified for the job offered by the beauty salon. The paper also found that the professional competence of vocation suggested by experts were consistent with what is deemed necessary in the beauty industry. In their recruitment of beauticians, beauty salons may refer to different selection methods. This allows salons to hire professionals who really meet salons' needs. Forthcoming research is advised to implement more precise analysis by assigning weighting to each factor, thus attaining more reasonable results.

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