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Identification and Evaluation of the Most Important Criteria in Performance Evaluation of Kish Institute of Science and Technology Teachers

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ABSTRACT

Teachers are very important in training and the quality of teaching process depends on the qualities of the teachers and performance evaluation of teachers is very significant in every education system. Nowadays, there is a growing interest in developing teacher evaluation systems that these systems should incorporate many criteria of teacher performance and educational systems typically use many methods of performance evaluation. The purpose of this study is to identify and evaluation of the most important criteria in performance evaluation of Kish institute of science and technology teachers and for this reason, we used the DEMATEL method, to study the influence of the most important criteria and to find out the ranking of criteria in performance evaluation of Kish institute of science and technology teachers. Based on our research, we concluded that the top five important criteria are as follows: Experience, Proficiency and expertise in training, Student satisfaction, attempting to solve students' problems, and Efforts to increasing job skills.
KEY WORDS: Performance evaluation, Training, Kish institute of science and technology, DEMATEL

1. INTRODUCTION

Teachers, who are the most important elements of the education system and they have the highest power on the students and curriculum and as the quality of the teacher increases, the quality of education and the quality of the student which is the product of the process that increases (Sahan, 2009). Assessment literacy refers to teachers' knowledge and skills and strong knowledge in educational assessment are considered prerequisites (Alkharusi, 2011) and knowledge and skills are necessary for the teaching (Sahan, 2009). Performance assessment comes up as an accepted evaluation method (Çepni and Çil, 2009) and measurement and evaluating the performance of teachers are significant parts of the educational systems (Gokmen *et al*, 2010) and it is clear to see the significant role that performance appraisal has played in corporation management. Through study of literatures about performance appraisal we can find that the performance appraisal is very important both in human resource management and strategic management and payment, strategy and promotion opportunity are based on performance appraisal and most appraisal criteria have some subjectivity to affect equality, especially when task performance is not well defined (Hui and Qin-xuan, 2009). Effective and reasonable performance evaluation not only encourages them to continuously improve work efficiency, but also find the problems of organizational personnel structure and this is an important basis for firms to establish reasonable and effective human resources development strategy (Li *et al*, 2012). So, we need to design a powerful performance appraisal system, which can measure personnel performance at a scientific, accurate and fair level (Min-Peng *et al*, 2012).

The objective of this paper is to contribute to a better understanding of the factors which influence the success of performance evaluation of teachers in Kish institute of science and technology and the main purpose of this research is to determine these factors and also we want to design a practical and applicable personnel's performance appraisal model. Method of evaluation system in performance evaluation is always an important question and in this study, we have used the DEMATEL method to study the influence of the most important criteria in performance evaluation of Kish institute of science and technology teachers and our paper is organized as follows: Section 2 discusses the literature review in performance evaluation in educational systems. Section 3 discusses the methodology. Section 4 analyzes the results and Section 5 discuses the study.

2. LITERATURE REVIEW

Teachers are like a north star, they never tell the students where to go but they aid them to find their way (Sahan, 2009). Since 80's the introduction of new public, management principles has promoted the use of

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performance measurement to drive a more efficient, effective and accountable (Nuti *et al*, 2012) and the performance evaluation plays a more and more important role in the modern enterprise management (Zhang and Tan, 2011) and the studies use the terms "performance evaluation" and "performance appraisal" interchangeably (Üstünlüoglu, 2009). Appraisal is a formal means for educational systems to communicate organizational goals, conceptions of teaching, standards, and values to teachers (Al-ghanabousi and Idris, 2010) and performance evaluation is a significant part of human resource management and the core of performance management (Li *et al*, 2012). The personnel's performance appraisal is a complex issue (Min-peng *et al*, 2012) and performance appraisal and evaluation is identified as the identification, measurement and management of human performance in firms and provides individuals with useful feedback and coaches them to higher levels of performance (Üstünlüoglu, 2009) and performance evaluation has become a popular topic for both industrialists and academics and this evaluation can be defined as the process of quantifying the efficiency and effectiveness of action (Bourne, *et al*, 2009) and it is linked to skills (Zhan and Zhang, 2011). When the results of performance appraisal get out, we can often hear some staff express displeasure about unfairness. They think they do better than others but have not got a better appraisal, and then they think others may get higher score in performance appraisal in other informal ways. So, the most important, is the sense of being fairly treated and firms can set up a perfect communication system and performance appraisal feedback channel to ensure fairness of appraisal. Also, the leadership is important. Managers should lead employees to take part in all processes of performance appraisal from setting up appraisal standards to formal publication of performance appraisal report (Hui and Qin-xuan, 2009). Also, in order to make performance appraisal a true benefit for administration and to develop teachers in the system, the process should be well-structured and planned and teachers should have an obvious understanding of the performance appraisal process and how performance will be measured and effective evaluation should depend on trust and evaluation feedback should be shared in private by the evaluator and the person being evaluated (Üstünlüoglu, 2009).

The choice of evaluation methods is very important (Li *et al*, 2012) and the 360 degree performance feedback and the balanced score-card both are used in performance evaluation. BSC describes strategic requirement and pays great attention to employees' further development, showing one point which is to make staff the center. In addition, 360 degree performance feedback has four dimensions: manager, subordinate, colleague and customer (Hui and Qin-xuan, 2009). There are many comprehensive systems for the evaluation of teacher performance and guidelines for the development of these systems and multiple sources and types of data may be used to evaluate teaching. The most common sources of data are students, peers, and teachers themselves (Paulsen, 2002) and information should be collected from different sources such as students and other teachers (Üstünlüoglu, 2009). Although many experts agree that students are qualified to assess many aspects of classroom teaching such as: clarity of presentation, they also assert that for some aspects of teaching such as: mastery of content, course goals, course organization and materials, only peers have the substantive expertise required for powerful evaluation and experts in teaching and its evaluation also agree that the work of a teacher is valued more when it has been subjected to rigorous peer review (Paulsen, 2002). The design of performance appraisal system should be bound to important appraisal sources and performance appraisal can not only be a tool to control employees' behavior. Performance management ought to combine with corporation's strategic target and pay attention to objective leading, corporation development, customer satisfaction, and growth of employees (Hui and Qin-xuan, 2009). The performance evaluation system is designed for three purposes: 1- to improve teachers' job satisfaction and morale, 2- to provide an opportunity for each teacher to discuss job problems and interests with supervisor, and 3- to assemble substantiating data for use as a guide for promotions and disciplinary action (Üstünlüoglu, 2009) and some factors which effect 'higher appraisal' include: wishes to improve subordinate's performance, kind heart, avoidance to cause conflicts, and personal affairs in department. The factors which effect 'lower appraisal' include: warning subordinates and making some employees leave (Hui and Qin-xuan, 2009).

3. METHODOLOGY

Group decision-making (GDM) is a way to draw inference from varying degrees of experience, ideas and motivations (Gupta, 1991) and the aim of DEMATEL is to convert the relation between criterions, causal dimensions from a complex system to an understandable structural model of that system (Dalalah *et al*, 2011) and the DEMATEL method is a comprehensive method for making and analyzing a structured model involving causal relationships between complex factors. Using this method demonstrates the interrelations among criteria and applied matrices and digraphs for visualizing the structure of complicated causal relationships. Also, the DEMATEL method can separate the involved criteria of a system or subsystems into the cause and effect groups to assist in making effective decisions (Lin and Wu 2008). The DEMATEL can convert the relationship between cause and effect factors into an intelligible structural model of the system and the DEMATEL can propose the most important criteria which affect other criteria (Irajpour *et al*, 2012a).

Suppose that a system contains a set of elements $K = \{k_1, k_2, k_3 \dots . k_n\}$ and particular pairwise relations are determined for modeling with respect to a mathematical relation. First, we should select a committee of experts who

have experienced in the problem. Next, we should develop the evaluation criteria and in this study, we have 20 factors that are shown in table (1). After determining the criteria, the different degrees of influence of a factor on another factor are expressed and where scores of 0, 1, 2, 3, and 4 represent:"No influence", ''very low influence'', ''low influence'', ''high influence'', and ''very high influence''. Next, the method portrays the relation as a direct-relation matrix that is indexed equally on both dimensions by elements from the set T. Then, the ordered pair (k_i, k_j) is in relation, and there exists a relation in element k_i that effects element k_j. An initial direct-relation matrix T is a $n \times n$ matrix obtained by pair-wise comparisons in terms of influences and directions between criteria, in which T_{ij} is denoted as the degree to which the criterion i affects the criterion j, i.e…, T = $\left[T_{ij} \right]_{n\times n}$. Then a normalized direct-relation matrix S, i.e., S =$\left[S_{ij} \right]_{n\times n}$ and $0 \leq S_{ij} \leq 1$ can be obtained through the formulas (1) and (2).

$$K = \frac{1}{max 1\leq i\leq n \ \sum_{i=1}^{N} a_{ij}} \qquad (1)$$

$$S = K \times T \qquad (2)$$

A total-relation matrix M can be acquired by using the formula (3), in which the I is denoted as the identity matrix

$$M = S(I - S)^{-1} \qquad (3)$$

The sum of rows and the sum of columns are separately denoted as D and R within the total-relation matrix M through the formulas (4)–(6):

$$M = M_{ij} \qquad i,j = 1,2,\ldots,n \quad (4)$$

$$D = \left[\sum_{j=1}^{N} m_{ij}\right]_{n\times 1} \qquad (5)$$

$$R = \left[\sum_{i=1}^{N} m_{ij}\right]_{1\times n} \qquad (6)$$

where D and R denote the sum of rows and the sum of columns, respectively. Finally, a causal and effect can be acquired by mapping the dataset of (D + R, D − R), where the horizontal axis (D + R) is made by adding D to R, and the vertical axis (D − R) is made by subtracting R from D (Irajpour *et al*, 2012a). The (D + R) shows how important the criterion is and the (D − R) divides the criteria into cause and effect groups and if the value (D − R) is positive, the criterion belongs to the cause group and also, If the value (D − R) is negative, the criterion belongs to the effect group (Irajpour *et al*, 2012b).

4. RESULTS

The purposes of the current study were: (a) To design a practical and applicable personnel's performance appraisal model, and (b) to study the influence of the most important criteria in performance evaluation of Kish institute of science and technology teachers. In our study we showed how DEMATEL can be a valuable managerial tool to evaluate personnel's performance appraisal in educational systems and relationships between criteria to each other.

After the decision goals are determined, it is essential to gather the relevant criteria in order to be able to create a structural model, after literature studding, the researchers finally adopted 20 criteria (see Table 1).

Table 1- The important criteria

criteria	references
Academic educations (C_1)	Esfandyar *et al.*,(2011),
Experience (C_2)	Esfandyar *et al.*,(2011),
Time presence in the workplace (C_3)	Esfandyar *et al.*,(2011),
Adherence to regulations (C_4)	Esfandyar *et al.*,(2011), Ontario's TPA (2010),
Time management (C_5)	Esfandyar *et al.*,(2011), Ontario's TPA (2010),
Interest and willingness to training (C_6)	Esfandyar *et al.*,(2011),
Ability to teach different levels (C_7)	Esfandyar *et al.*,(2011),
Optimum use of facilities (C_8)	Esfandyar *et al.*,(2011), Ontario's TPA (2010),
Caring and responsibilities to work (C_9)	Esfandyar *et al.*,(2011),
Good relationships with colleagues, administrators and students (C_{10})	Esfandyar *et al.*,(2011), Ontario's TPA (2010),
Student satisfaction (C_{11})	Esfandyar *et al.*,(2011),
Intimacy and respect in the workplace (C_{12})	Esfandyar *et al.*,(2011), Ontario's TPA (2010),
Attempting to solve students' problems (C_{13})	Esfandyar *et al.*,(2011), Ontario's TPA (2010),
Proficiency and expertise in training (C_{14})	Esfandyar *et al.*,(2011), Zhan and Zhang (2011), Alkharusi (2011), Ontario's TPA (2010) , Sahan (2009),
Efforts to Increasing job skills (C_{15})	Esfandyar *et al.*,(2011),
Studying Literature and empirical studies related to the job (C_{16})	Esfandyar *et al.*,(2011), Ontario's TPA (2010),
Organizational commitment (C_{17})	Asgari *et al.*, (2008),
Organizational integrity (C_{18})	Asgari *et al.*, (2008),
appear Symmetry (C_{19})	Researcher
Innovation in training (C_{20})	Researcher

Also, in our study, a questionnaire was used in gathering the data. The questionnaire consisted of two sections. In the first section, there were items that questioned the personal information of the experts. In the second section, there were the developed questionnaire form and DEMATEL matrix. The sample for this study included 12 Iranian experts, and as the questionnaires were handed out and gathered by the researcher himself, all the questionnaires were taken back.

Then, the relationships between each pair of criteria were measured and the group of the chosen experts (12 people) was asked to make sets of pair wise comparisons. All of these experts were teachers of Kish institute of science and technology or teachers of universities, and experts in educational systems and since we are using DEMATEL to analyze the data, the results are not influenced by small sample size and in MCDM methods we collect the data in expert population and knowledge of experts is more important than the number of experts. Then, we calculated the normalized direct-relation matrix and the total-relation matrix were acquired and after computing it, the amounts of D, R, (D + R) , (D − R), and the ranking of criteria are calculated and are shown in Table 2.

Table 2: The amounts of D, R, (D + R) and (D − R)

Criteria	D	R	(D + R)	(D − R)	Ranking
(C_1)	3.88	3.04	6.93	0.84	13
(C_2)	4.64	4.27	8.91	0.37	1
(C_3)	2.46	2.98	5.44	-0.52	19
(C_4)	3.25	3.70	6.95	-0.45	12
(C_5)	2.80	3.43	6.23	-0.63	17
(C_6)	4.06	4.11	8.17	-0.04	6
(C_7)	3.91	3.56	7.46	0.35	11
(C_8)	2.97	3.42	6.39	-0.45	16
(C_9)	3.74	4.14	7.89	-0.40	8
(C_{10})	3.06	3.53	6.60	-0.47	14
(C_{11})	4.03	4.70	8.73	-0.66	3
(C_{12})	2.64	3.26	5.90	-0.62	18
(C_{13})	4.38	4.34	8.72	0.04	4
(C_{14})	4.63	4.10	8.73	0.53	2
(C_{15})	4.63	3.83	8.46	0.80	5
(C_{16})	4.23	3.68	7.91	0.55	7
(C_{17})	4.01	3.66	7.67	0.35	10
(C_{18})	3.14	3.37	6.51	-0.24	15
(C_{19})	1.99	2.17	4.16	-0.18	20
(C_{20})	4.32	3.48	7.79	0.84	9

The evaluation criteria were visually divided into the cause group, including: C_1 , C_2 , C_7, C_{13} , C_{14} , C_{15} , C_{16} , C_{17} and C_{20} and the effect group, including C_3 , C_4 , C_5 , C_6 , C_8, C_9, C_{10} , C_{11} , C_{12} , C_{18} and C_{19} . From the table 2, the criteria of Academic educations (C_1), Innovation in training (C_{20}), and Efforts to Increasing job skills (C_{15}), with the largest positive values of (D − R) , these three have the best effect on the other criteria. The criteria of Student satisfaction (C_{11}), Time management (C_5), and Intimacy and respect in the workplace (C_{12}), with the largest negative values of (D − R) , are the most easily improved of the effect group criteria. Also, we can see that the top five criteria with the largest(D + R) are as follows: Experience (C_2), Proficiency and expertise in training (C_{14}), Student satisfaction (C_{11}), attempting to solve students' problems (C_{13}), and Efforts to increasing job skills (C_{15}). So, the criterion of Experience (C_2), is the most important criteria.

5. DISCUSSION

Teacher performance evaluation is very significant in every educational system and it is a good approach to bring accountability and this evaluation is a significant part of the larger strategy for institute improvement and the results of evaluations should be used to further teacher development. In this study, we have used the DEMATEL method to study the influence of the most important criteria in performance evaluation of Kish institute of science and technology teachers and in our paper, we ranked the most important criteria in performance evaluation of teachers in this educational institute.

The findings obtained from this research demonstrate that the top five important criteria are as follows: Experience, Proficiency and expertise in training, Student satisfaction, attempting to solve students' problems, and Efforts to increasing job skills and the literature review that conducted by different authors helped ensure the content validity and the this study is align with research of Esfandyar *et al.*,(2011), Zhan and Zhang (2011), Alkharusi (2011), Sahan (2009), and Asgari *et al.*, (2008).

Also, we had some limitations in our research. One major limitation was the evaluation effort required with this technique. Another one is: the evaluation of the importance of the criteria in these types of studies is based on the connectedness and level of influence of factors on each other. This influence may only be observational and not necessarily be an importance characteristic of the factor. For example, even a criterion that does not have a strong causal relationship to other criterion may be critical to the organization due to a strategic and this information is not necessarily captured by this methodology and finally, the sample size of expert can be larger than this study. Future research may build upon the current study. For example: other criteria can be added to our models or other researcher can use other MCDM methods or they can use fuzzy DEMATEL method or develop DEMATEL method and also, it is better the performance evaluation, implement in larger sample size of teachers or experts.

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