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Exploratory Factor Analysis-Key to a Successful Mentoring Relationship

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Abstract – *Mentoring program in various methods either in formal or informal are reputed to be beneficial for mentees, mentors, and organization. Researches and case studies of successful individuals in their careers indicate that mentoring has a profound influence on professional development. As the increment of the complexities in the workplace, there is a growing recognition that mentoring programs are needed to help individuals to be successful throughout their career development. Besides that, the organization was able to produce peers support group and creates best learning community in transferring knowledge aspect, especially in education background. This paper will examine the determinants of individuals' advancement among the lecturers participating in mentoring program and help UiTM Negeri Sembilan to encourage academic staff to participate in mentoring systems. Exploratory factor analysis suggests that there are five determinants which account for 77.561% of the total variance with considerably reduce the complexity of the data set by using these components with 22.439% loss of information. Kaiser-Meyer-Olkin value is 0.790 and small values of the significance level of Bartlett's test of sphericity (0.000) indicate factor analysis is feasible for this data set. Principal Component Analysis with Varimax rotation was performed and five determinants identified as essential ingredients in a successful mentor-mentee relationship denoted as career development, formal mentoring, mentoring relationship, informal mentoring and psychosocial support. Main findings suggest that the resulting of 22-items scale is much more reliable instrument than the initial 35-items scale with Cronbach's alpha correlation coefficients of 0.913.*

Keywords: Exploratory factor analysis, Cronbach's alpha, Kaiser-Meyer-Oikin, Bartlett's test, Varimax rotation

1.0 INTRODUCTION

Nowadays employees' development such as enhancing two ways communication, coaching and mentoring has become an important element in organization's strategies and effort in improving employees' work and skills qualities, to face the era of globalization (Ismail et al., 2009), as well as social change and to incorporate the advances in sophisticated technology and demanded work design (Mclean & Joo, 2012). Ismail et al., (2009) also revealed that mentoring was becoming important in an education field and inspired the scholars in organizational development interpret the practice and concept that is in line with organizations development. Top managers including leaders in an organization viewed as mentors in helping their employees to enhance performance, cultivate sort of learning, improve the employees attitudes and produce positive outcomes in work environment, (William,1999) and with the

combination of systematic design and good coordinating in such mentoring programs it may have significant impact in the employees individual's advancement which are psychosocial support and career development (Allen et al.,2005;Wanberg et al.,2006).

There have been many evidences about mentoring program either in formal or informal being implemented in professional range and fields like universities, hospitals, school and public and private agencies (Ehrich & Hansford, 2008). In additions, Watty et al.(2006) found three areas of mentoring program in higher education field which are students mentoring, trainees who study for qualifications and "support for teaching staff as they enter a new establishment" mentoring program. The third area of mentoring focuses on developing the staffs through scholarly approaches in improving teaching and learning in higher education.

UiTM plays its role consistence with the human resources development in producing the competent employees that have the ability in self-management and the usage of their expertise and skills resulted to the best contributions to the university and the organization as a whole. Besides that, in producing professional workforce UiTM has to come out with systematic and integrative process in training to enhance their academicians that are capable for such purposes (Normala et al.,2006). Mentoring program for new lecturers in UiTM is marked by considerable variation of training in terms of planning and implementation strategies and priorities. The university policy on lecturer induction provides minimal direction as to the scope expected implemented by the nature of the faculties and branches of UiTM and the policy. It takes around 3 to 4 weeks basic induction program for lecturer funded by the Training and Staff Development Bureau, UiTM (Rugayah et al., 2003).

Therefore to support UiTM's policy in developing human capabilities UiTM Cawangan Negeri Sembilan (Kuala Pilah) also implement the mentoring program to assist new lecturers in developing their skills in both teaching and learning. As mentoring is a recognized activity concerned with the supported professional development of practitioners in work-based (Callan, 2006), UiTM Negeri Sembilan is practicing by assigning the mentors for the mentee in same field and work based within the faculty. The mentors assigned are from the lecturers who hold the senior post with grade DM52 and above in every faculty meanwhile the mentee are from the new lecturer groups with grade DM45 and DM41.

1.1 Literature Review

1.1.1 Psychosocial Support

Psychosocial support is defined as the aspect of relationship that emphasized on enhancement of individual competencies in professional roles, namely, role modeling, counseling, acceptance and confirmation as well as friendship (Birrell & Waters, 1999). The study shows that positive psychosocial support in mentoring program will result to higher level of affective organizational commitment thus leading to reduce numbers of turnover intention rate among employees in the organization (Craig et al, 2012). Weinberg & Lankau (2010) found in their study of 9-month mentoring program in insurance company explained that the mentoring effectiveness was significantly related to psychosocial support as well as marginally to mentoring function of role modeling. The results indicated that elements of communicating, listening and providing opportunities for development were the most influential factors in mentoring program. Moreover, de Janasz & Godshalk (2013) noted that e-mentoring in psychosocial support was effective as conventional face-to-face mentors, and the mentees were expected to increase their performance rate in duties. Individual who practiced good

interactions and maintain the development of relationship in mentoring paradigm might have effects on his or her individual advancement, namely, in psychosocial support and career development (Ismail et al, 2009).

1.1.2 Career Development

Career development in mentoring function is defined as the aspect in relationships that enhance in career advancement and career related support. Previous research showed that these two mentoring function are applicable in various samples, such as, administrators, IT staff, academicians, medical staff and teachers (Wanberg, Welsh & Hezlett, 2003). For this study which is focused on the UiTM Negeri Sembilan (public universities), the effort to enhance academicians' skill in teaching and learning competencies would be the crucial part towards the achievement of sustainability of high quality academic staff development environment (Othman et al, 2011). Specifically, UiTM Negeri Sembilan expected to have academicians who will carry out the tasks, duties, and responsibilities in professionalism terms to promote academic excellence and institutional policy. The outcomes of mentoring program in UiTM were expected to benefit all parties in terms of career development, spiritual fulfillment, personal growth, lifestyle enhancement, goal achievement and many more (Rugayah et al., 2003). Furthermore, Luna & Cullen (1995) noted that "Empowering the Faculty" synthesizes the literature on mentoring in conceptual framework, mentoring roles and arenas as well as the functions of mentors and mentees. The mentoring program was developed and implemented in UiTM Negeri Sembilan to empower organization in terms of strategies, guidelines as well as programs.

1.1.3 Mentoring Relationship

For the last few decades, many researches have investigated the importance of mentoring relationship in training for academic programs and it was viewed as a vital element for professional development, graduate education, academic development as well as socialization (Buyukgoze-Kavas, Taylor, Neimeyer, & Güneri, 2010). Mentoring relationship focused on interpersonal support, mutual exchange, guidance, role modeling, coaching as well as sharing of wisdom among experienced employees to another person (Zachary, 2005). Mentoring relationship can be said as a planned formal activity in accordance to formal procedures of an organization, or informally, as pro-social behaviour or naturally or informal mentoring (Erdem & O¨zen, 2003). One of the strongest examples of positive mentoring relationship was the intellectual and emotional relationship between a senior lecturer and a junior lecturer. It was known as an expert apprenticeship, where by the relationship between the mother or father–son or daughter (Erdem and Sarvan, 2000). The mentoring relationship in a university was a longer mentoring relationship as compared to other types of organization and the said relationship was important to an academic organization (Erdem & O¨zen, 2003).

1.1.4 Formal Mentoring

According to Ragin & Cotton (1999) there were an increased numbers of organizations that recognized the importance of mentoring program and the formal mentoring program was one type of mentoring in aspect of to build the mentoring relationship. Ragin again described formal mentorships normally needs the interference or assistance from respective organization to formulate the concept of mentoring which difference with informal mentoring. The formal relationship was usually much shorter duration than information relationships and the mentoring framework was depend on the organization (Ragin & Cotton, 1991). Formal

mentoring programs are programs that are planned, structures as well as coordinated from the human resource department in the organization (Ehrich, 2004). In addition, the administrator who initiated the formal mentoring program should ensure that the goals of programs are clear and known to mentors and mentees, well matched between mentors and mentees and gain support and commitment from organization. In other word, since the educational bodies had invested the considerable resources into mentoring programs, it is crucial for the administrators to minimize potential problems that could arise (Hansford et al., 2004).

1.1.5 Informal Mentoring

In the nature of an organization, people will come and leave due to some purposes such as retirement. Therefore, the senior employees should need to transfer their expertise and knowledge on their job specification as well as to give advice, counseling and guidance to new employees. Mentorship program can be done by both formal and informal. New employees can learn from senior employees through a mentoring relationship. They can work together as one team with senior employees (Bramley et al., 2014). The success of the informal mentoring program was correlated to choose the right mentors for mentees and it involved the process that strengthens the relationship (Allen et al., 2005). In many aspects, an informal mentoring relationship is the situation in which mentor and mentee freely and independently choose each other where it is similar to a friendship just because they choose the persons (mentor or mentee) because of the existence of good relationship (Germain, 2011). According to Khian Jui et al (2009) informal mentoring widely implemented in many organizations to complement and to strengthen formal mentoring program and normally it will last for many years compared to formal mentoring which have specific time. As a result if informal mentoring works effectively in the organization, it may lead employees to achieve organizational objectives, strategies and goals (Ismail et al, 2009).

2.0 METHODOLOGY

This study will focuses on young lecturers who are working in Universiti Teknologi MARA located in Kuala Pilah, Negeri Sembilan. Respondents from five faculties which are Faculty of Applied Sciences, Faculty of Computer Science & Mathematic, Faculty of Business Management, Academy of Contemporary Islamic Studies and Akademi Pengajian Bahasa will be the sample and UiTM Negeri Sembilan Cawangan Kuala Pilah will be representing the organization in this study.

As for the sample size, this study was determined through the use of an approach of Krejcie & Morgan (1970). Therefore, a sample size of 76 from a population of 93 elements was used for this study by using stratum proportion and then choosing representatives from each stratum using simple random sampling.

There are 5 faculties; 58 from Applied Science, 19 from Computer Science & Mathematic, 8 from Business Management, 3 from Academy of Contemporary Islamic Studies and 5 from Academy of Language Studies. Thus it can be represents as $N_1 = 58, N_2 = 19, N_3 = 8, N_4 = 3$ and $N_5 = 5$. Seventy six (76) questionnaires were distributed but only 63 questionnaires were returned, which a total of 83% response rate (**Table 1**).

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Table 1 Number of participants in the study

Faculty	(N)	(n)
Applied Science	58	47
Computer Science & Mathematic	19	16
Business Management	8	8
Academy of Contemporary Islamic Studies	3	3
Academy of Language Studies	5	5
Total	93	76

Factor analysis were used by considering the main objective in this study since it is denoted as a multivariate statistical method for reducing a large number of variables into a smaller set of factors. Some advantages of factor analysis are reduction of number of variables, by combining two or more variables into a single factor or more factors. Factors generated consist of variables that are highly correlated among them. Figure 1 portrays the theoretical framework of this research.

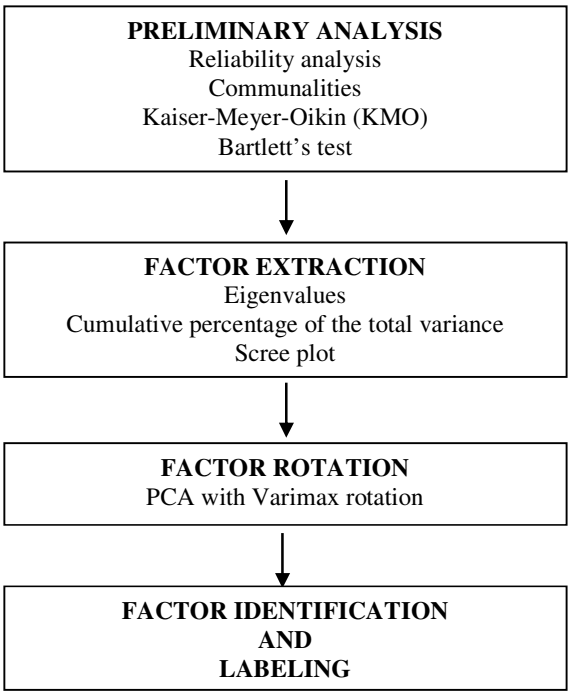

Figure 1: Theoretical Framework

The preliminary analysis consists of reliability analysis (Cronbach's alpha), communalities, Kaiser-Meyer-Oikin (KMO) and Barlett's test. Internal consistency coefficients (Cronbach's alpha) were acquired to assess the reliability of the scale. This study employed the use of reliability analysis in determining the retention or removal of items on the scale. In addition, any item with small value of extraction communalities was marked as a component to be deleted resulting in the Cronbach's alpha coefficient of the scale increased when such items were deleted. KMO and Barlett's test were acquired to indicate either factor analysis is feasible

or not. The higher the value of KMO and smaller the value of the significance level of Bartlett's test of sphericity indicate factor analysis is feasible for this data set.

Therefore, for the factor extraction purposes, it is take into account eigenvalues which is more than one and cumulative amount of the total variance for different factors. It is used to determine the optimal number of components useful to describe the data. The higher the cumulative amount of score variance, the less information will be missing. In addition, to access the factor extraction is by using graphical approach known as scree plot. It always displays a downward curve that shows the optimal number of components to be retained in the analysis. It shows the eigenvalues on the y-axis and the number of factors on the x-axis.

Varimax rotation with Kaiser Normalization was performed for the purposes of obtaining simple and interpretable factors. The finals result is the factor identification and labeling based on the higher loading factor for each component.

3.0 RESULTS AND DISCUSSION

The initial 35 items indicates Cronbach's alpha, KMO and cumulative percentage of total variance of 0.931, 0.691 and 76.106% respectively. Seven items were removed with regards to lower communalities value and with these items deletion, the scale of Cronbach's alpha, KMO and cumulative percentage of total variance recorded 0.925, 0.750 and 76.706% respectively. Similarly, the communalities value was considered to the decision of removing the next 6 items, resulting to the retention of 22 items. Further reduction of the items led to the final 22 items with Cronbach's alpha, KMO and cumulative percentage of total variance of 0.913, 0.79 and 77.561% respectively. The reliability analysis of Cronbach's alpha (0.913) suggesting that the items have relatively internal consistency. Therefore, the responded samples are suitable for the purpose of identifying the determinants for individuals' advancement among the lecturers participating in mentoring program (**Table 2**).

Table 2: The summary of 3 runs of components

Items	Number of Item Removed	Cronbach's Alpha	KMO	CPTV[a]
35	7	.931	.691	76.106%
28	6	.925	.750	76.709%
22	-	.913	.790	77.561%

[a]CPTV: Cumulative percentage of the total variance

For this data set, Kaiser-Meyer-Olkin value is 0.790 and small values of the significance level of Bartlett's test of sphericity (p-value<0.000) indicate factor analysis is feasible (**Table 3**).

Table 3: KMO and Bartlett's test

Kaiser-Meyer-Olkin		.79
Bartlett's Test of Sphericity	Approx. Chi-Square	1171.54
	Degree of Freedom	231
	Significance	.000

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Extraction communalities are estimates of the variance in each variable as depicted in Table IV for the final 22 items. High values indicate that variables fit well with the factor solution, and should be retained in the analysis (**Table 4**).

Table 4: Communalities (22 items)

Item	Extraction	Item	Extraction
1	.764	12	.739
2	.799	13	.744
3	.761	14	.632
4	.787	15	.709
5	.857	16	.886
6	.773	17	.753
7	.852	18	.729
8	.788	19	.758
9	.839	20	.829
10	.737	21	.888
11	.614	22	.826

Table 5 shows that the first five principal components from the extracted solution with eigenvalues greater than one. It is supported by the scree plot (**Figure 2)** where it shows bend at the fifth components. The cumulative percentage of the total variance explained by the factors extracted is 77.561% which considerably reduce the complexity of the data set by using these components with only 22.439% loss of information. Thus, it shows that those factors are clearly good and simpler substitute for all 35 items without losing much of the information.

Table 5: Eigenvalues and extraction sums of squared loadings

Component	Total	Percentage of variance	Cumulative percentage
1	8.589	39.040	39.040
2	3.550	16.137	55.177
3	2.035	9.250	64.427
4	1.639	7.448	71.875
5	1.251	5.686	77.561

Principal Component Analysis with Varimax rotation that produced the final 22-components suggested five (5) determinants of individuals' advancement among the lecturers participating in mentoring program as shown in **Table 6**.

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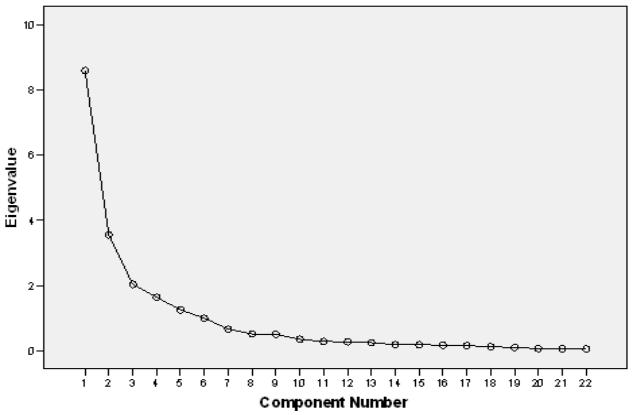

Figure 2: Scree Plot

Table 6: Rotated component matrix

Items	Component				
	1	2	3	4	5
1	0.768	-0.058	-0.081	0.292	0.154
2	0.895	-0.099	0.171	0.143	0.159
3	0.706	0.128	0.327	0.320	-0.169
4	0.811	-0.018	0.139	0.179	-0.139
5	0.756	-0.129	0.390	0.135	-0.009
6	0.864	0.061	0.193	0.165	0.122
7	0.919	0.066	0.067	0.183	-0.029
8	0.783	0.163	0.323	0.274	-0.076
9	-0.027	0.700	0.070	-0.321	0.433
10	-0.101	0.886	0.152	0.197	0.029
11	0.013	0.875	0.074	-0.016	0.029
12	0.123	0.888	0.102	0.183	0.067
13	0.294	0.163	0.777	0.180	0.123
14	0.380	0.082	0.796	0.032	-0.112
15	0.135	0.199	0.770	0.077	0.322
16	0.292	0.151	-0.264	0.642	0.152
17	0.443	0.028	0.140	0.715	0.109
18	0.449	0.168	0.389	0.600	-0.055
19	0.281	0.010	0.226	0.709	0.005
20	-0.010	0.114	-0.100	0.045	0.873
21	-0.028	0.134	0.221	0.052	0.877
22	0.138	-0.021	0.239	0.541	0.607

Eight items that were loaded onto Factor 1 were labeled as “Career development”. Four items that were loaded onto Factor 2 were labeled as “Formal mentoring”. Three items that were loaded onto Factor 3 were labeled as “Mentoring relationship”. Four items that were loaded onto Factor 4 were labeled as “Psychosocial support”. Three items that were loaded onto Factor 5 were labeled as “Informal mentoring” (**Table 7**).

Table 7: Factor-label of 22 items scale

Factor	Factor Labelled
1	Career development
2	Formal mentoring
3	Mentoring relationship
4	Psychosocial support
5	Informal mentoring

4.0 CONCLUSIONS

As conclusion, this study found that the suggested determinants in mentoring program could play a role as an effective determinant for the individuals' advancement in UiTM Cawangan Negeri Sembilan. An understanding of mentoring and the development of professions cannot be separated from the organizational culture. Thus, the objectives and the goals of organization must be clearly explained to all lecturers for better understanding in making mentoring program a success. In addition, these elements can lead to the sustained and supported organizational strategic vision and mission. The exploratory factor analysis of this research suggests that there are five determinants of individuals' advancement among the lecturers participating in mentoring program which account for 77.561% of the total variance which considerably reduce the complexity of the data set by using these components with 22.439% loss of information. Kaiser-Meyer-Olkin value is 0.773 and small values of the significance level of Bartlett's test of sphericity (p-value<0.000) indicate factor analysis is feasible for this data set. Principal Component Analysis with Varimax rotation that produced the final 22-components suggested five (5) determinants of individuals' advancement among the lecturers participating in mentoring program revealed as career development, formal mentoring, mentoring relationship, informal mentoring and psychosocial support. Main findings indicates that the resulting of 22-items scale is much more reliable instrument than the initial 35-items scale with Cronbach's alpha correlation coefficients of 0.913. Further research is recommended to determine the major determinant that contributes to the individual's advancement among lecturers in UiTM Negeri Sembilan by using Multiple Linear Regression.

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