Examining the psychometric properties of the deputy-principal mentoring questionnaire

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Article Info

ABSTRACT

This article intends to inspect and validate the Malay language version of the self-developed instrument on informal leadership mentoring used by principals with their deputy principals in the Malaysian primary school context. This article relies on the survey responses by 318 Malaysian primary deputy principals. Descriptively, the responses to all 25 items produced high mean scores which indicated that deputy principals are well-satisfied with the mentoring and guidance provided to improve their leadership prowess. Based on exploratory factor analysis, three factors emerged: guidance, informal approaches, and substituting principals in official meetings. However, the third factor was removed because it was only represented by one item. Thus, there are two major factors: guidance and informal approaches with 24 items, all of which had high factor-loading values and were consistent in their internal validity. In addition, the average variance extracted and composite reliability were also calculated which received acceptable values. Lastly, the confirmatory factor analysis (CFA) results indicated that all 24 items achieved acceptable values.

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1. INTRODUCTION

In school, another pertinent school leader who significantly influences the school's achievement is the deputy principal (DP). Based on this premise, it is assumed that the role of DP as 'supporters' to principals relates to the school's administrative operation, implementing strategies for overcoming disciplinary challenges [1], [2] and lastly organizing programs to promote the school's vision and objectives [3], [4]. DPs played significant roles in ensuring that all the school's routine procedures were performed [5], [6]. Nevertheless, despite their prominent roles and contributions, many described DPs as 'forgotten leaders" compared to principals [7]–[9]. In exploring how DPs learned and improved their leadership knowledge and skills, many have pointed out the pivotal roles of principals in providing DPs with support and their contribution as mentors and guides to DPs in developing their leadership prowess [10], [11]. In this sense, Shakir [10] explained that principals have established initiatives and a systematic approach to meeting DPs' development and training needs. The topic of principals' guidance has been thoroughly discussed and, significantly, it was postulated that including the workplace is considered important for the development of school leaders [12],

especially for DPs. Swain [13] hypothesizes that principals' positive influence has significant implications for DPs' self-efficacy and leadership performance. Retelle [14] has argued that it is the role of principals to support DPs with leadership knowledge, skills, and experiences. Thus, principals are requested to serve as a coach and mentors in supporting DPs' leadership learning. In this sense, it is initially believed that, whether formally or informally, principals have a direct and significant influence on developing DPs' knowledge through a mentoring relationship [15], [16].

In understanding this collaborative approach between principals and their deputies, a model of mentoring will be employed as the underpinning theoretical framework for this study. In explaining the positive relationship between both parties (principals and their DPs), a model of mentoring enactment theory (MET) is widely employed to signify its collaborative nature. As initially defined, mentoring is a helping process between two individuals or persons to assist, provide guidance, and share their knowledge and skills [17], [18]. The proposed model by Kalbfleisch [19] explains the informal relationships and approaches used by mentors with their mentees. By definition, this model explains how a mentor (defined as being a skillful individual with successful experience) proves his/her willingness to share or encourage practices with those with less experience to train them to become successful [17], [19]. Thus, the mentee or protégé is defined as less experienced but willing to learn and to be mentored by other parties to become personally and professionally successful individuals [19]. Thus, it was assumed that the mentor and mentee have a close relationship involving informal or formal guidance. Figure 1 depicts the theoretical framework for informal mentoring based on the MET's model. Based on the mentoring model, there are three major aspects: guidance, approaches, and substituting for their mentors.
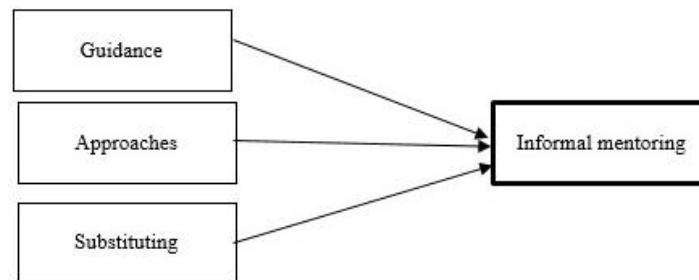

Figure 1. Theoretical framework

Therefore, this paper will explore the gap in our knowledge of how DPs were initially guided and informally mentored as part of DPs' initial exposure and training [13]. There is a lack of suitable items or instrumentation that examine and measure how principals guide their DPs as a second-layer leader and the role of leadership mentoring (specifically in a Malay language version) is critically debated. Previous studies that had explored the positive relationship or configuration between principals and DPs are mostly based on a qualitative research design without using any standard instrumentation for measuring the mentoring relationship. Thus, to date, we still lack items or questionnaires that can measure the leadership mentoring between principals and their deputies. Hence, this study is intending to fill the existing gap in exploring the principals' guidance and mentoring with their DPs or leadership mentoring between principals and their DPs. This study aims to develop and validate an analysis of instruments for principal-deputy principals' informal mentoring questionnaires in the Malaysian context.

Undoubtedly, this manuscript provides many essential points on reasons related to the substantial contribution. First, not many studies have been conducted by deputy principals within the context of the school leadership framework. Many previous researches focus on the roles of principals in determining the school's effectiveness and improvement. Second, most of the existing studies revolve around the effectiveness of mentoring programs for future school leaders: thus, many have neglected to explore the positive relationship and trust between principals with their second person in the school hierarchy which is the deputy principals. This includes how deputy principals were supported and nurtured by their principals as part of informal continuous professional programs that happened on the school premises. Third, there are limited numbers of studies that examine and investigate and at the same time develop items and suggest a questionnaire on informal mentoring that measures the relationship between principals with their deputy principals. Fourth, the deputy-principal mentoring questionnaire was developed as a tool for practice and research and explicitly stated the valid, consistent, and relevant instrument to assess the informal mentoring relationship. Admittedly, these three points are elements that differentiate this study from previous similar

research involving deputy principals related to their informal mentoring practices which received the least attention from previous researchers on deputy principals. The significant reason why these deputy principals were chosen as the sample for this study is because they are the essential individuals who later will hold the principalship position which insisted knowledge and skills in leading their schools.

2. METHOD

2.1. Participants

In obtaining deputies' responses to the developed items, a total of 318 DPs from primary schools were asked to complete the survey. Of these, 126 (39.6%) deputies were male and 192 females (60.4%). In terms of their experience as deputies, a large number of 259 deputies (81.4%) had held their appointment as a DP for more than 3 years, another 33 deputies (10.4%) for two years, and only 26 (8.2%) had been a deputy for at least a year. Out of this sample, a total of 140 (44%) deputies held the most senior position as deputy principal (administration) in schools followed by another 116 (36.5%) who were deputy principal (students' affairs) and 54 (17.8%) who were a DP (extra-curricular). Finally, only eight (2.5%) DPs represented the DP for evening sessions.

2.2. Instrumentation

After deputies gave their consent to participate in the study, they were asked to provide demographic information on their gender, years of experience of being deputy principal, and their positions, e.g. deputy principal of administration, student affairs, extra-curricular activities, or evening sessions. The next section contained the deputy principal's leadership mentoring (DPMGQ) items, deputies were given a total of 25 items of DPMGQ to provide their responses. The standard scaling for this section was based on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All items in the DPMGQ were developed in the Malay Language to provide clear and easy understanding for deputies who are familiar with and competent in Malay. Items were developed based on previous studies on deputies-principals' interactions to identify deputies' knowledge and skills in leading schools. All items were comprehensively checked by two deputies who were trained as Malay Language teachers and experts were selected to resolve all mistakes within the process of constructing items.

2.2.1. Content validity

All items were also assessed by the experts in school leadership, retired deputy primary principals, and primary principals, to ensure content validity. Their comments were considered adequate in improving the quality of the items which were self-developed by the researchers. The significant reason for requesting comments from the retired deputy principals was to obtain an accurate, clear, and exact picture of the guidance provided by their primary principals for their deputies.

2.2.2. Pilot study

As part of the pilot study, a reliability test was carried out to determine the measurement precision of 20 deputies who were excluded and purposely selected as the pilot sample for this study. In the pilot study, reliability analysis indicated values of 0.966. The reliability values for the DPMGQ's 25 items ranged from 0.964 to 0.971. After the pilot test, some further changes were made based on the recommendations and suggestions provided by the deputies to ensure the content validity of the 4 items.

2.3. Data statistical analysis procedure

The process of data analysis was divided into three phases. In phase one, data are checked and the reliability values are determined using Cronbach's alpha. To be accepted, a Cronbach's alpha value of 0.70 or more is usually required. In the descriptive analysis phase, the mean scores and standard deviations for all items along with their skewness and kurtosis values are reported.

The second phase involves exploratory factor analysis (EFA). According to previous researchers, one significant approach to comparing theoretical aspects with the empirical data is through EFA [20], [21]. Thus, Nordholm et al. [22] cautioned that the inspection of the data needs to be checked and scrutinized. In using EFA, checking that the eigenvalues must be greater than 1 is required [21], [22] and the scree plot test for extracting factors is applied [23]. EFA involves data-driven statistical analysis which is predominantly suitable for the analysis of questionnaires. In performing the EFA test, researchers were flexible and did not specify the factor structure of the questionnaire. This positive attitude has allowed the EFA to cluster items belonging to the same aspect. Before performing the EFA, the Kaiser-Meyer-Olkin (KMO) and Bartlett tests of sphericity were employed to assess the suitability of the data [24]. In addition, performing the scree plot will measure the number of factors emerging from the questionnaire [23]. According to Jöreskog [25], the number of factors that emerged can be seen on the elbow of the curve from the scree plot. The cut-off to accept an item's

loading value has been a matter of debate but here the generally accepted good loading value of 0.55 was used. Thus, items with values lower than 0.55 are considered poor and need to be disregarded. Also in this phase, the average variance extracted (AVE) and composite reliability index (CR) were calculated.

The final phase of the analysis involved the process of establishing the measurement model using structural equation modelling based on the maximum likelihood approach. Using the SEM approach, the measurement model will be developed using confirmatory factor analysis (CFA) which can specify the measurement model parameters which consist of several factors and variables loaded to each factor/construct. These are elements that are considered pertinent in establishing the internal scale consistency for the questionnaire items. To use CFA, an analysis of moment structure (AMOS) was performed with all 25 DPMGQ items. The CFA analysis was performed to inspect the items' structural validity which is needed to confirm the internal structure found in the EFA analysis [26], [27]. Later, the measurement model is analyzed and inspected based on fit statistics values indicated by the comparative fit index (CFI), the Tucker-Lewis index (TLI), and later by assessing the root mean square error of approximation (RMSEA). The RMSEA is an absolute fit index in that it assesses how far a hypothesized model is from a perfect model [28]. Moreover, the fit statistics indicated on the incremental fit indices compared the fit based on the hypothesized model with the baseline model [26], [29].

3.   RESULTS
3.1. Descriptive statistics, normality, and reliability analyses

As shown in Table 1, descriptive findings were totaled based on responses by 318 DPs. As suggested by several researchers [30], [31], Cronbach's alpha categorizations are based on the values obtained. Thus, values less than 0.50 are considered insufficient, from 0.50 to 0.69 moderate, values between 0.70 to 0.79 are labeled as satisfactory and those exceeding 0.80 are considered as acceptable [32]. The overall Cronbach's alpha value was indicated at 0.966 which exceeded the 0.70 recognized as the acceptable value. The Cronbach's alpha values for all 24 items ranged from 0.69 to 0.84 except for item B9 which showed the lowest Cronbach's alpha value of 0.14. In examining the highest and lowest mean scores and standard deviations for all items, all 24 items had high mean scores of above 4.00 which showed that DPs highly agree with the guidance and approaches employed by principals in mentoring and coaching them as future principals. The range for mean scores is between the lowest mean score of 4.10 which is for item B25– "guide from my principals has changed my leadership style." This finding indicated that DPs slightly agreed that guidance provided by their principals has changed their leadership preferences. As for the highest mean score, the majority of DPs seem to agree that item B3–"I always refer to my principal whenever making decisions" and item B5–"being a member of the school leadership team" are approaches and guidelines provided by principals to DPs as mentoring and guidance by providing skills, knowledge, and competencies to be future school principal.

In this section, normality analysis was also inspected and performed for all 25 items on principals' informal leadership mentoring with their deputy principals. The normality analysis needs to be implemented to determine whether the data was distributed normally while fulfilling the multivariate analysis. In determining whether data was tabulated normally, it was suggested that the normal data were distributed between -2.00 to +2.00 for the skewness value [33], [34] and between -7.00 and +7.00 for the kurtosis value [32], [35]. Table 1 indicates the skewness and kurtosis values for all 25 items showing the normality of data distribution. The values for kurtosis for all 25 items were between 0.339 to 4.815 while the skewness values ranged between 0.280 to 1.299 [32]. In this study, we also checked on the discriminant validity of all 25 items studied using the correctional matrix as presented in Figure 2. Based on the findings from the inter-correlation values, the lowest value for correlation is $r=0.415$ and the highest correlation value is r=0.756. The correlational values for all 24 items that were reported exclude item B9 which had the lowest correlational value [36], [37].

3.2. Exploratory factor analysis (EFA)

The next phase in inspecting the factor structure of the DPMGQ items exploratory factor analysis was conducted using a principal component method with the varimax rotation procedure. Before proceeding with the EFA analysis, the KMO test to measure sampling adequacy was performed to examine the adequate and accepted sample size for performing the EFA [38]. It was suggested that KMO values exceeding 0.90 were considered as excellent, 0.80 worthy, 0.70 average, 0.60 mediocre, and less than 0.50 miserable and unacceptable [24]. The results from the KMO analysis indicated a value of 0.961 with high values on Bartlett's test of sphericity (Approx. X^2=6.828E3; df=300; ρ=0.000). In addition, the 'total variance explained' also reported a value of 67.801% which exceeded the suggested value of 60% [39], [40]. In the EFA analysis, the scree plot was also performed as shown in Figure 3. Based on the finding in Figure 3, the

scree plot has suggested a three-factor structure based on the indication of the curve's elbow [25] which has explained 67.80% of the common variance.

In the exploratory factor analysis procedure, two major factors were extracted. Along with these findings, item 9 was omitted due to the values of the factors loading being no higher than 0.30 as suggested by Hair et al. [33]. Based on the EFA analysis, the scree plot test showed a three-factor model consisting of: i) principals' guidance to DPs; ii) principals' approaches in assisting DPs; and iii) substituting for the principal in meetings. Figure 2 shows the results from the rotated component matrix. Based on the EFA results, a three-factor model emerged: principals' guidelines, principals' approaches, and substituting for their principals. The first factor consisting of 13 items accounted for 58.20%, 5.079% for the second factor which encompassed nine items, and 4.519% for the third factor which represented only a single item. Thus, it was decided to omit the last factor leaving only two factors: principals' guidelines and principals' approaches. The next phase of the EFA analysis was calculating the AVE and CR values. The AVE value for the principals' guidance was calculated as 0.457 while the CR value was calculated as 0.920. For the second factor–the principals' approach-the AVE value was 0.483 and the CRI value 0.932.

Table 1. Descriptive results for all items in the DPMGQ questionnaire

	Items	α	Mean scores	Standard deviations	Skewness	Kurtosis
B1	I was mentored on how to make decisions.	.70	4.25	0.62	1.024	3.656
B2	Principal taught me the effective ways to lead schools.	.74	4.24	0.58	0.577	1.920
B3	I always refer to my principal whenever making decisions.	.63	4.48	0.57	0.882	1.430
B4	My principal shares the school's values, procedures, and direction.	.68	4.13	0.62	0.280	0.146
B5	Being a member of the school leadership team.	.69	4.46	0.53	0.296	0.339
B6	Principals share the priorities in leading schools.	.75	4.31	0.56	0.488	1.930
B7	My principal shared how to deal with or manage teachers.	.69	4.21	0.66	1.048	3.089
B8	Share information about teachers.	.75	4.15	0.65	0.775	1.694
B9	Representing principal at official meetings.	.14	3.75	0.80	0.847	0.808
B10	Get the chance to make a decision.	.63	4.13	0.62	0.969	3.646
B11	You are mentored on how to lead.	.79	4.19	0.66	1.083	3.233
B12	Always discuss action with principals for the purpose of assisting me.	.78	4.19	0.65	0.903	2.197
B13	My principal emphasized my professional development as a school leader.	.77	4.14	0.62	0.656	1.697
B14	My principal emphasized knowledge in becoming a school leader.	.76	4.14	0.62	0.410	1.512
B15	My principal guides me on how to lead the school.	.82	4.14	0.61	1.002	4.031
B16	My principal is my source of reference.	.81	4.19	0.64	1.132	4.310
B17	I was taught how to lead the school's instructional functions.	.84	4.13	0.61	1.070	4.815
B18	My principal guided me on how to deal with stakeholders.	.79	4.14	0.58	0.696	2.695
B19	You were given the chance to give your ideas in leading schools.	.79	4.22	0.62	0.898	3.139
B20	My principal always corrected me when I make mistakes.	.74	4.24	0.54	0.623	4.494
B21	Principal shares the important documents to refer to when leading.	.75	4.12	0.63	0.709	1.920
B22	I always discuss with my principal when solving complicated problems.	.73	4.39	0.54	0.324	0.611
B23	My principal always supports me when I'm facing problems.	.76	4.27	0.66	1.410	5.434
B24	When you are having stress, the principal always gives support.	.75	4.16	0.68	1.299	4.508
B25	Guidance from my principal has changed my leadership style.	.82	4.10	0.70	1.181	3.541

Note: the overall Cronbach's alpha value is 0.966.

Items	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25
B1	1																								
B2	.723	1																							
B3	.522	.504	1																						
B4	.564	.571	.623	1																					
B5	.548	.535	.667	.696	1																				
B6	.585	.676	.499	.660	.609	1																			
B7	.537	.605	.434	.546	.468	.684	1																		
B8	.557	.566	.487	.519	.540	.627	.572	1																	
B9	.016	.056	.015	.111	.049	.049	.038	.045	1																
B10	.434	.424	.395	.373	.439	.393	.417	.213	215.	1															
B11	.609	.591	.515	.557	.546	.605	.560	.551	.089	712	1														
B12	.592	.605	.509	.517	.588	.601	.514	.486	.140	.658	.696	1													
B13	.528	.620	.440	.495	.527	.607	.508	.500	.154	.589	.629	778	1												
B14	.513	.599	.418	.493	.507	.612	.575	.501	.143	.725	.661	.699	.712	1											
B15	.645	.719	.493	.552	.558	.599	.610	.554	.144	.696	.696	.613	.599	.755	1										
B16	.573	.643	.480	.530	.473	.597	.562	.481	.166	.677	.644	.688	.735	.776	.753	1									
B17	.596	.667	.496	.568	.576	.686	.601	.503	.169	.656	.638	.650	.639	.661	.701	.701	1								
B18	.523	.627	.462	.511	.579	.611	.633	.608	.206	.594	.616	.629	.613	.591	.628	.682	.674	1							
B19	.537	.513	.533	.566	.452	.552	.578	.487	.133	.579	.584	.550	.598	.664	.596	.674	.560	.620	1						
B20	.512	.527	.535	.555	.656	.523	.461	.468	.142	.605	.558	.605	.594	.664	.655	.709	.673	.615	.610	1					
B21	.533	.615	.442	.548	.575	.570	.616	.493	.188	.551	.590	.524	.563	.552	.586	.627	.552	.718	.562	.520	1				
B22	.455	.484	.646	.513	.519	.528	.523	.569	.062	.608	.643	.573	.565	.599	.634	.663	.597	.717	.561	.562	.727	1			
B23	.465	.498	.521	.424	.544	.561	.511	.549	.027	.650	.608	.555	.569	.555	.610	.655	.626	.655	.666	.561	.630	.774	1		
B24	.493	.524	.500	.424	.519	.531	.504	.581	.050	.549	.650	.650	.555	.569	.610	.655	.691	.626	.665	.584	.561	.630	.774	1	
B25	.596	.577	.502	.554	.544	.589	.533	.601	.128	.541	.734	.680	.706	.655	.719	.756	.737	.710	.690	.599	.666	.608	.699	722	1

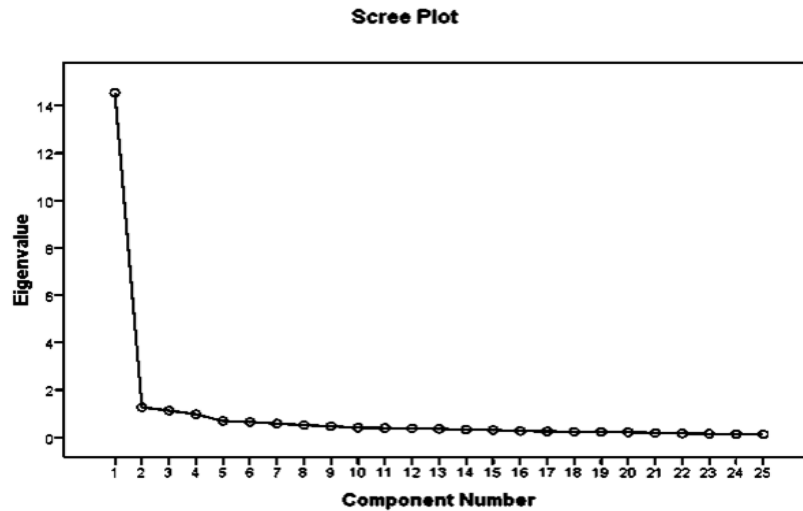Figure 2. Correlational results for all items in the DPMGQ's questionnaire

Scree Plot

Figure 3. Screen plot for the DPMGQ's questionnaire

3.3. Confirmatory factor analysis (CFA)

After completing the EFA analysis, the loadings for the DPMGQ items were later examined through the establishment of the measurement model as part of the CFA. As suggested by Albright and Park [41], the CFA can specify the measurement model parameters which consist of the number of factors and variables loaded into each factor/construct. These are elements that are considered pertinent in establishing the internal scale consistency for the questionnaire items. To use CFA, an analysis of moment structure (AMOS) was performed for all 24 DPMGQ items. Based on this analysis, it was found that 23 of 24 items had a factor loading value of more than 0.30, the exception being item B9 which was below 0.25 [42]. Thus, it was decided to eliminate item B9. The final measurement model for the DPMGQ item loadings is shown in Figure 4.
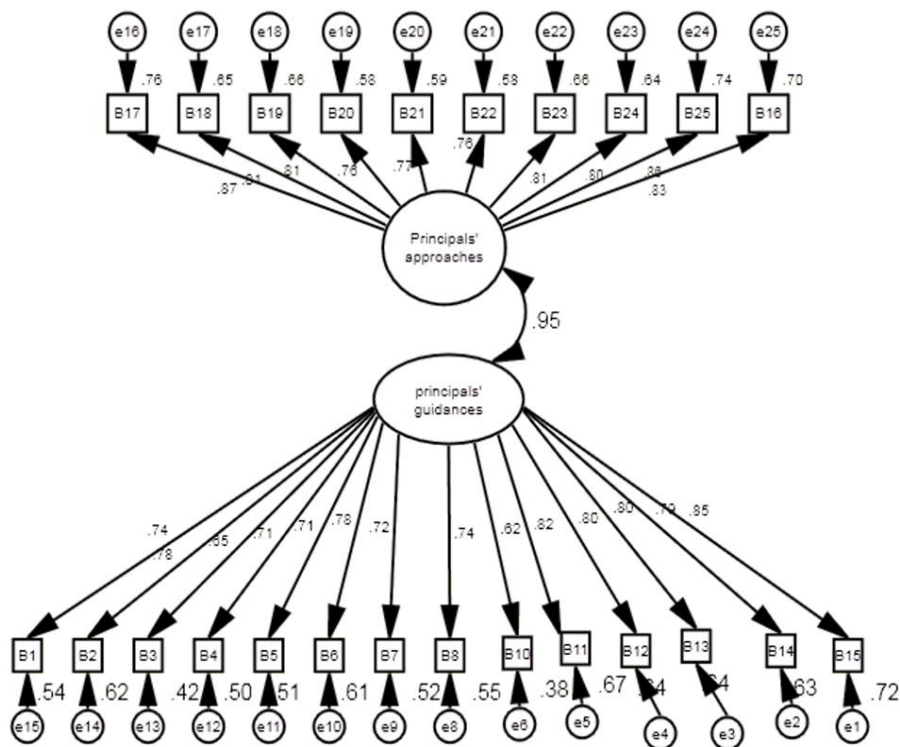
Figure 4. The measurement model of DPMGQ's questionnaire

In Figure 4, the two-factor model encompasses two major constructs: principals' guidance and strategies employed by principals in mentoring their DPs. Based on the results and suggestions [33], [43], the reported fit statistics were at the accepted values. In this model, the CMIN/DF value was reported lower than 0.50 which is at 4.554, and matched the suggested values of less than 0.50. Further, the other fit statistics were also inspected and checked. In general, all fit statistics have shown their accepted values of above 0.85 (CFI=0.867; IFI=0.868; RFI=0.805; NFI=0.837) [43], [44]. The RMSEA value of 0.106 exceeds the accepted value of 0.08 suggested by previous researchers [24], [43], [45], [46]. All 24 items in the DPMGQ questionnaire reported values above 0.25. In addition, the correlation values between the two major constructs principals' guidance and principals' approaches were strong (r=0.95; Sig=0.000) and considered accepted [44]. The strong correlation between the two constructs incorporating all 24 items indicates that these items were internally consistent [44], [47]. Table 2 indicates the findings for the DPMGQ items' loadings, estimates, critical ratios, and the significance of path coefficients.

Based on the AMOS results, 13 items representing the construct of principals' guidance are well above the 0.50 values which indicated accepted values based on the path coefficients stated in Table 3. In Table 3, the factor loadings for principals' guidance constructs were between 0.33 to 0.87. This finding from the analysis showed that all items are significantly represented within the principals' guidance construct. As for principals' approaches, findings are displayed in Table 4. The table depicts the findings related to path coefficients related to principals' approaches. Similarly, all 10 items had a loading exceeding the 0.50 value which is considered the accepted value for factor loadings [32], [45] which indicated principals' approaches in assisting their DPs.

After constructing the DPMGQ measurement model using the CFA analysis, the discriminant validity was also calculated from both subconstructs: guidance and approaches in mentoring. Table 3 shows the correlation values between the two sub-constructs studied. Table 3 depicts the correlational matrix findings which indicate that the construct of 'guidance' is correlated with the construct of 'approaches. The next process is to inspect the convergent validity which consists of Cronbach's alpha, construct's reliability (CR), and average variance extracted (AVE). As suggested, the value for the CR cut-off value was set at 0.70 [40] and the cut-off value for AVE was set at 0.50 [42], [44], [47].

Table 2. Rotated component matrix of DPMGQ's items

Items	Factor loadings		
	1 Principals' guidance	2 Principals' approaches	3 Substitute principals
B1.	.837		
B2.	. 770		
B3.	.743		
B4.	.720		
B5.	.688		
B6.	.664		
B7.	.656		
B8.	.651		
B9.			.655
B10.	.629		
B11.	.629		
B12.	.614		
B13.	.596		
B14.	.569		
B15.		.823	
B16.		.806	
B17.		.739	
B18.		.738	
B19.		.666	
B20.		.658	
B21.		.616	
B22.		.586	
B23.		.582	
B24.		.647	
Percent of variance loading	58.203	5.079	4.519
Average variance extracted	0.457	0.483	
Composite reliability index	0.920	0.932	

Table 3. The correlational matrix for DPMGQ's constructs

Constructs	MS	SD	Guidance	Approaches
Guidance	4.25	0.46	1	0.951*
Approaches	4.19	0.51	0.951*	1

**correlation significant at 0.01; * correlation significant at 0.05.

Table 4 depicts the findings based on CFA results in examining the convergent validity for the DPMGQ items. After item B9 was deleted, only 14 items represented the first construct which is the principals' guidance. The item factor loading ranges from 0.62 to 0.85. Cronbach's alpha was reported at 0.91. The CR value for the guidance (GD) was stated at 0.731 and the AVE value was indicated at 0.571. As for the second construct, which is the principals' approach (AP), only 10 items were calculated. The Cronbach's alpha value was reported at 0.88, while the CR was noted at 0.949 and the AVE value was indicated at 0.652 which is considered an accepted value [32], [46].

From the analysis, it is concluded that the DPMGQ consistently has only 24 items that are accepted and tested its psychometrics and factor structure comparing the initial total of the items which was 25 items. The tested DPMGQ consists of two major constructs of informal mentoring with their principals: guidance and approaches. One construct was deleted which was replacing or substituting principals in official meetings. An item which deleted was item B9.

Table 4. Estimation of DPMGQ's convergent validity

Construct	Item	Factor loading	Cronbach's alpha	Composite reliability	AVE
Guidance (GD)	B1	0.74	0.91	0.731	0.571
	B2	0.78			
	B3	0.65			
	B4	0.71			
	B5	0.71			
	B6	0.78			
	B7	0.72			
	B8	0.74			
	B10	0.62			
	B11	0.82			
	B12	0.80			
	B13	0.80			
	B14	0.79			
	B15	0.85			
Approaches (AP)	B16	0.83	0.88	0.949	0.652
	B17	0.87			
	B18	0.81			
	B19	0.81			
	B20	0.76			
	B21	0.77			
	B22	0.76			
	B23	0.81			
	B24	0.80			
	B25	0.85			

4. DISCUSSION

This article set out to inspect the factor structure and to validate and determine the internal consistency of the self-developed items included in the DPMGQ questionnaire which was in the Malay language version and based on feedback from Malaysian primary DPs. Descriptively, Cronbach's alpha for the 25 items showed that they were all above 0.70 which is considered to be high and to demonstrate good internal consistency [48]. The overall value for Cronbach's alpha was reported at 0.966 which indicated a good internal consistency. In terms of feedback provided by the 318 DPs, a majority of items indicated high mean scores which showed that DPs mostly agreed that their principals have provided them with informal mentoring to improve DPs' leadership knowledge and self-efficacy, thereby preparing them to be future principals. From the correlational values, we strongly believed that all 25 items for our Malay language version of the DPMGQ questionnaire showed good reliability and validity. The correlations indicate a strong discriminant validity for all 25 items and subscales. Based on the responses, it is also summarized that DPs have the inclination to choose their leadership styles when asked to lead their schools.

Based on the findings from the EFA analysis, three major factors emerged based on the scree plot: the principals' guidance, substituting for principals, and the principals' approaches to guiding DPs. Nevertheless, the third factor was eliminated as it contained only 1 item. About the first dimension, the analysis identified several sub-constructs that encompassed the principals' guidance to their DPs. The first construct consists of 13 items that address guidance elements on how to make effective decisions, learn the school's priorities, communicate with teachers and stakeholders, instructional leadership, source of reference during complicated situations, possess knowledge and skills in leading and understanding the school's values, procedures and direction. In this sense, the findings are also capable of illustrating the

positive relationship between DPs and principals as part of a DP informal job-embedded workplace learning processes which prepare them to be effective school leaders. The second construct involves principals' approaches to guiding and assisting their DPs while in schools. This construct has ten items that address aspects such as providing support, discussion to solve complicated school problems, changes in DPs' leadership style, the chance to contribute ideas, principals' corrective behaviors, and being a member of the school leadership team. The AVE and CR results also showed the accepted values which also supported the proposition that the DPMGQ questionnaire was internally consistent. In terms of the measurement model, the CFA analysis showed the goodness of fit indices were lower than 0.90 although the CMIN/DF values exceed the suggested value of 0.50.

In terms of the factor loadings, all items reported above the value of 0.25 which indicated the values on factor loading in the measurement model are acceptable. The factor loadings for all items are between 0.65 to 0.83 which are accepted values for all items within the DPMGQ instrument. Although the fit statistic indices were below the acceptable values, most of them showed high values ranging from 0.805 to 0.867, exceeding the 0.85 value and approaching the 0.90 value. In addition, The RMSEA reading also indicated a value of 0.106 which exceeds the accepted value of 0.08 suggested by Hair *et al.* [40]. In addition, the correlation values between the two major constructs - the principals' guidance and approaches - indicated a strong correlation value (r=0.95; Sig=0.000). The strong correlation between the two constructs indicates the discriminant validity for the DPMGQ items which is reflected in its internal consistency. From the CFA model, both discriminant and convergent validities indicated the accepted values based on suggestions [34], [40] related to the correlational, composite reliability, and average variance extracted values.

5. CONCLUSION

These findings of the psychometrics testing have proved the empirical evidence on the DPMGQ items' consistency which can be employed for future studies that measure the informal mentoring with their seniors or employers. In addition, the developed items are not just to measure the informal mentoring practices in the educational sectors but also for the private institutions that practiced mentoring as part of their strategic leadership development approach. Based on the results, this study has suggested the DPMGQ items had addressed the mentoring relationships which focus on the leadership development of DPs in various ways as part of the implication of the study. First, the instrument has two major aspects that indicate the importance of principals' guidance for DPs' informal leadership development within their workplace experiences. Second, in measuring the approaches employed by principals in assisting and helping their DPs, this study has also produced 24 items, known as DPMGQ, which introduce a new scale that is relevant in measuring the mentoring relationship within the context of DPs' leadership development which can later be improved and applied in the context of leadership mentoring research and practice.

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