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Exploratory Factor Analysis: Evaluating the Validity and Reliability of the Middle Leader Competency Model

Norliza Samad[1], Mohd Asri Mohd Noor[2*] & Mahaliza Mansor[3]

[1]Faculty Management and Economics, Sultan Idris Education University, 35900 Tanjong Malim, Perak, Malaysia
norlizas@gmail.com
[2] Faculty Management and Economics, Sultan Idris Education University, 35900 Tanjong Malim, Perak, Malaysia
mohd.asri@fpe.upsi.edu.my
[3] Faculty Management and Economics, Sultan Idris Education University, 35900 Tanjong Malim, Perak, Malaysia
mahaliza@fpe.upsi.edu.my
[*]Corresponding Author

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Abstract: The validity and reliability of an instrument is used as an indicator of its quality and usability in achieving research objectives effectively. However, only a few studies have empirically assessed the validity and reliability of developed instruments using Exploratory Factor Analysis (EFA). Therefore, this study aims to determine the validity and reliability of the Middle Leader Competency Model instrument through EFA. This study employed a qualitative approach using a survey method with the use of a questionnaire as the instrument of the study. The research instrument contains four constructs namely Leadership, Instructional, Governance and Self-Emotion with a total of 90 items collectively. A total of 179 respondents participated in this pilot study. The validity and reliability of the instrument were obtained through descriptive analysis of Cronbach's Alpha reliability and EFA using SPSS software. The overall analysis showed that 68 items met the fit of EFA with a KMO value of more than 0.6, and the value of Bartlett's test is significant, eigenvalue is greater than 1.0 at percentage of variance greater than 60 percent. The remaining 22 items were dropped. The value of Cronbach's Alpha coefficient is more than 0.70 for all four main constructs of the study. The findings show that the research instrument has high validity and reliability and has the potential to be used as a guide in the development of middle leader competency in schools. Furthermore, the findings are also able to make a positive impact to achieve the fifth shift in the Malaysia Education Blueprint 2013-2025 aspirations.

Keywords: EFA, Validity, Reliability, Competency model, Middle leader

1. Introduction

A middle leader in a school is an ordinary academic teacher who is then given the trust to be the team leader (Rosenfield et al., 2018) either formally (Bush, 2019) or informally (Lu & Hallinger, 2018). Cohen dan Schechter (2019) defines a middle leader as an individual who lay between top leaders and teachers. In addition to performing duties as a teacher in the classroom (Gurr, 2019; Nehez et al., 2021), they are also teacher leaders who are responsible for curriculum management and school administration (Highfield & Robertson, 2016; Bassett & Shaw, 2018; Vijian & Jamalul, 2020). In fact, they are often seen as assistants who share administrative workloads (Forde & Kerrigan, 2022).

1.1 Literature Review

Studies pertaining to the role and functions of middle leaders in school organizations have been conducted by many education scholars globally (Harris et al., 2018; Bryant et al., 2020; Pavlopoulos, 2021). However, studies focusing on the need for the competence of middle leaders have received less attention from researchers (Tay et al., 2019) internationally and even in Malaysia. Since middle leaders represent the second most important leader after the principle in the school, they should be equipped with relevant competencies (Duong, 2020; Irvine, 2020; Lokman et al., 2023; Nehez et al., 2021; Slater-sanchez, 2020). Inadequate competencies coupled with the absence of clear guidelines cause them difficulties in carrying out their duties (Bush, 2019; Friebel et al., 2022). In addition, according to Suhaili et al. (2020), the burden of teaching and managing the curriculum simultaneously causes a lack of focus in carrying out their role as leaders, especially in administrative tasks (Splitter et al., 2023; Sukor et al., 2020).

Based on the literature, it is found that there is still no competency model specifically developed for middle school leaders in Malaysia. Therefore, the development of a competency model based on their actual needs must be properly conducted so that the proposed training is aligned with the needs of the organization (Aminuddin Baki Institute, 2020). Proper design of needs-based training can positively impact the Ministry of Education and can even result in the most favorable return on investment (ROI) (Momin, 2018). Similar initiatives have been undertaken and practised by neighbouring countries that have embedded specific competency models for Middle Leader Development. These includes Singapore, Ireland, Brunei, the UK, and many more. In other words, the growing popularity of this trend proves that this method capable to uphold the excellence and effectiveness of middle leaders in schools (Lokman et al., 2021). This corresponds with the view of Silam et al. (2020) who suggest identifying and developing the competencies of middle leaders needs to be done first before they can effectively carry out their roles and duties in schools.

For this reason, an instrument has been developed based on the literature from the theoretical framework of the study. The items in the research instrument

were derived based on competency mapping of Social System Model for School (Hoy & Miskel, 2013), Curriculum Area Middle Manager (White, 2000) and a Model for Effective Performance (Boyatzis, 1982). Competency elements are categorized into three main constructs as found in many competency models developed abroad, namely Leadership, Instructional and Governance constructs. Moreover, this study also found a new construct, Self-Emotion, which was apparently not reported in any previous middle leadership models, making it a novelty in this study. Next, an instrument validity testing needs to be done to ensure that the items developed are able to provide answers to the study questions (Hair et al., 2020). According to Hair et al. (2020), an item is said to have a high validity value if the item can measure what it is supposed to measure. In addition, this process is also crucial in ensuring the accuracy of the items in the research instrument (Mannogaran & Nor Shaid, 2023). For that purpose, a pilot study needs to be carried out to determine the validity and reliability of the instrument.

A pilot study is conducted to assist researchers to identify suitability, precision, accuracy and usability, and scrutinize possible ambiguities in the instrument before it can be used in actual situations as suggested by Merriam (2015). Furthermore, the pilot study also aims to assess the consistency of the items from the aspects of appropriate rating, objective, understandability, usability and instructions (Roid & Haladyna, 1982). This process can be done repeatedly until an optimum prototype is obtained that is able to fulfil the scope of the data collection in the actual study (Yin, 2018). In the context of this study, the researcher used the Exploratory Factor Analysis (EFA) method to verify the consistency in each construct and the designed items (Mansor et al., 2018; Amatan et al., 2021; Nadia et al., 2023). This procedure will result in several factors which may be related to theories that support the competence of middle leaders in schools.

1.2 Research Objective

The purpose of this study was to determine the preliminary reliability and validity of the competency model instrument through Exploratory Factor Analysis (EFA).

1.3 Exploratory Factor Analysis (EFA) Procedure

Exploratory Factor Analysis (EFA) is carried out to obtain the validity of the items in the instrument before being employed in the field. Through EFA, the adaptation and tendency of each item to be within its construct will be seen more systematically. This procedure aims to identify, reduce and organize several questionnaire items into specific constructs in the study (Hair et al., 2020). There is also the possibility of overlap of items that should not be in the specific construct (Muda et al., 2018).

Table 1 shows a summary of the suggested requirements (Hair et al., 2018) for the compatibility index to be met in the EFA.

Table 1. Fit Indices for Exploratory Factor Analysis (EFA)

EFA Fit Indices	Suggested value
Kaiser-Meyer-Olkin (KMO)	>0.60
Bartlett's Test of Sphericity, χ^2	<0.05
Communal value	≥0.30
Factor Loading	≥0.50
Eigenvalue	>1.00
Percentage of variance	≥60%

Through EFA, the number of constructs and the structure of the factors which underlies the variables under study can be identified. The structure of the factors formed is based on feedback from the study sample. Each item in the competency construct must be aligned with the EFA compatibility index testing as set out in Table 1.

2. Methodology

This study employed a quantitative approach that is carried out by using a cross-sectional survey. The sample size in a pilot study is between 25 to 100 participants as suggested by Cooper and Schindler (2011). According to Cooper and Schindler (2011), it is sufficient as a pilot study is practically a small-scale study. Meanwhile, referring to Awang (2015) and Hair et al. (2017), the sample size in a pilot study should exceed 100 respondents to ensure validation of the EFA conducted. Therefore, in the context of this pilot study, a simple random sample of 200 middle leaders in the primary school category has been selected within the National Professional Qualification for Educational Leaders (NPQEL) participation circles for 2022.

The research instrument consists of five parts. Part A is the demographics of the respondents while parts B, C, D and E are the four main constructs of the study, namely the constructs of Leadership, Instructional, Governance and Self-Emotion, respectively. The questionnaire instrument contained 90 items based on the level of agreement with a 5-point Likert scale as an alternative scale as suggested by Likert (1932). The questionnaire link was circulated via Google Forms through the Head of the NPQEL Department at the Aminuddin Baki Institute (IAB).

The analysis of the findings of the pilot study was carried out using SPSS software version 27.

3. Findings and Discussion

Standard deviation is used to identify the distribution of data. Out of a total of 200 respondents, only 190 responses were received, and 179 responses were valid for analysis. It was found that 11 responses provided standard deviation (SD) values of less than 0.25. According to Collier (2020), data with SD values <0.25 are non-responsive data and removed from the data list. The eleven responses included the

1st, 2nd, 27th, 29th, 30th, 51st, 67th, 71st,112th, 135th, dan 153rd responses. The demographics of the 179 respondents for the pilot test are as shown in Table 2.

Table 2. Demographic Data

Demographic	Categories	Frequencies	Percentages, %
Type of school	National (SK)	131	73.2
	National Type (Chinese) (SJKC)	38	21.2
	National Type (Tamil) (SJKT)	8	4.5
	Others	2	1.1
Gender	Male	78	43.6
	Female	101	56.4
Academic	Diploma	19	10.6
	Degree	140	78.2
	Master's Degree	20	11.2
	Doctorate	0	0
Age	Less than 39 years old	10	5.6
	40 to 49 years old	68	38.0
	50 to 59 years old	101	56.4
	More than 60 years old	0	0

Table 2 shows the demographics of the 179 respondents who participated in the pilot study. The findings show that 131 respondents are middle leaders in National Schools (SK). A total of 38 respondents were from Chinese National Schools (SJKC), eight respondents from Tamil National Schools (SJKT) and two respondents from other types of schools. The study involved a total of 101 female participants and 52 male participants.

In terms of academics, findings of the study show that a total of 140 middle leaders in primary schools have a degree, 20 have a Master's degree and 19 have a Diploma. The data also shows that a total of 101 respondents are between 50 and 59 years old. While 68 respondents are between 40 and 50 years old and only 10 respondents are less than 39 years old.

3.1 Exploratory Factor Analysis (EFA)

The validity of the items in the instrument was determined using the EFA method. The EFA procedure will systematically extract each item according to the adaptation in its construct. Several EFA index compatibility conditions must be fulfilled in EFA.

The KMO and Bartlett's tests will determine the adequacy of the data to carry out the EFA procedure. Based on the fit index as suggested by Hair et al. (2018), the value of KMO>0.6 and Bartlett's is significant at $p<0.05$ to ensure that the item is free and suitable for EFA.

The KMO and Bartlett's test analysis is shown in Table 3.

Table 3. The analysis of the KMO and Bartlett's tests

Competency Construct	No. of Items	KMO Test	Bartlett's Test
Leadership	28	0.909	0.000
Instructional	26	0.954	0.000
Governance	18	0.933	0.000
Self-Emotion	18	0.942	0.000

Table 3 shows that all competency constructs provide value of KMO > 0.6 and Bartlett's test scores are significant at p <0.05 for all constructs. Factor analysis for each construct was conducted separately.

The EFA analysis of the Leadership construct is shown in Table 4.

Table 4. Factor Analysis of the Leadership Construct.

Factor	Eigenvalue	Cumulative Variance (%)	Item Code	Communal	Factor Loading
Factor 1 Goal achievement	8.159	42.941	KK1	0.817	0.816
			KK2	0.869	0.729
			KK3	0.594	0.796
			KK4	0.583	0.760
			KK5	0.611	0.727
			KK6	0.665	0.722
			KK7	0.625	0.712
Factor 2 Personality	2.364	55.380	KK20	0.546	0.641
			KK21	0.628	0.677
			KK23	0.651	0.711
			KK24	0.508	0.741
			KK25	0.539	0.667
			KK26	0.672	0.784
			KK27	0.562	0.784
			KK28	0.365	0.558
Factor 3 Relationship Management	1.477	63.153	KK16	0.684	0.865
			KK17	0.670	0.748
			KK18	0.450	0.618
			KK19	0.556	0.786

Table 4 shows that all items have a communal value >0.3 with a range of 0.365 to 0.869. At eigenvalue>1.00 with a percentage of variance>60%, extracted items have formed three factors with a cumulative variance of 63.153%. Factor 1 (Goal achievement) consists of seven items, while Factor 2 (Personality) has eight items and Factor 3 (Relationship Management) with four items. Items with the code KK8, KK8, KK9, KK10, KK11, KK12, KK13, KK14, KK15 and KK22 gave a loading value of less than 0.5 and were dropped from the leadership construct.

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The EFA analysis of the Instructional construct is shown in Table 5.

Table 5. Factor Analysis of the Instructional Construct.

Factor	Eigenvalue	Cumulative Variance (%)	Item Code	Communal	Factor Loading
Factor 1 Curriculum Management	14.34	55.16	KI1	0.719	0.960
			KI2	0.644	0.791
			KI3	0.563	0.531
			KI4	0.642	0.689
			KI5	0.677	0.746
			KI6	0.556	0.738
			KI7	0.647	0.783
			KI9	0.599	0.580
			KI20	0.611	0.568
			KI22	0.574	0.575
			KI23	0.543	0.644
			KI25	0.605	0.672
			KI26	0.531	0.708
Factor 2 Instructional Activities	1.26	60.02	KI11	0.421	0.533
			KI12	0.737	0.552
			KI13	0.680	0.549
			KI14	0.706	0.648
			KI15	0.533	0.552
			KI16	0.679	0.820
			KI17	0.666	0.847
			KI18	0.585	0.817
			KI19	0.614	0.654

Table 5 shows that all items in the Instructional construct have a communal value >0.3 and ranges between 0.421 and 0.737. At eigenvalues>1.00 with percentage variance>60%, the items were extracted into two factors with a cumulative variance of 60.02%. Factor 1 (Curriculum Management) consists of 13 items while Factor 2 (Instructional Activities) consists of nine items. Item codes KI8, KI10, KI21 and KI24 were dropped because they had a loading value of less than 0.5.

The EFA analysis of the Governance construct is shown in Table 6.

Table 6. Factor Analysis of the Governance Construct.

Factor	Eigenvalue	Cumulative Variance (%)	Item Code	Communal	Factor Loading
Factor 1 Operation Resources	7.980	57.002	KTU2	0.531	0.834
			KTU3	0.574	0.886
			KTU4	0.540	0.681
			KTU5	0.678	0.651
			KTU8	0.603	0.577
			KTU9	0.521	0.583
			KTU16	0.528	0.550
			KTU17	0.586	0.538
Factor 2 Human Resources	1.172	65.376	KTU6	0.558	0.510
			KTU11	0.638	0.609
			KTU12	0.469	0.597
			KTU13	0.809	0.923
			KTU14	0.721	0.934
			KTU15	0.597	0.599

Table 6 shows that all items in the Governance construct have a communal value >0.3 with a range of 0.469 to 0.809. At an eigenvalue>1.00 with a percentage of variance>60%, the extracted items have formed two factors with a cumulative variance of 65.376%. Factor 1 (Operation Resources) consists of eight items, while Factor 2 (Human Resources) consists of six items. Item coded KTU1, KTU7, KTU10 and KTU18 were dropped from the Governance construct because they did not meet the requierd loading value of 0.5.

The EFA analysis for the Self-Emotion construct is shown in Table 7.

Table 7. Factor Analysis of the Self-Emotion Construct.

Factor	Eigenvalue	Cumulative Variance (%)	Item Code	Communal	Factor Loading
Factor 1 Self-awareness	7.873	60.562	KED2	0.655	0.672
			KED3	0.604	0.589
			KED11	0.662	0.716
			KED12	0.679	0.813
			KED13	0.573	0.773
			KED14	0.616	0.830
			KED15	0.580	0.779
			KED17	0.652	0.777
			KED18	0.594	0.555
Factor 2 Self-control	1.005	68.293	KED7	0.447	0.549
			KED8	0.691	0.941
			KED9	0.699	0.858
			KED10	0.653	0.594

Table 7 shows that all items in the Self-Emotion construct have a communal value >0.3 ranges between 0.447 and 0.699. At an eigenvalue>1.00 with a percentage variance>60%, the extracted items have formed two factors with a cumulative variance of 68.293%. Factor 1 (Self-awareness) consists of nine items whereas Factor 2 (Self-control) consists of four items. Items coded KED1, KED4, KED5, KED6 and KED16 were dropped because they had a loading value of less than 0.5.

3.2 Instrument Reliability

The internal reliability of an instrument can be identified through the Cronbach's Alpha value. The Cronbach's Alpha value must exceed 0.7 to ensure the effectiveness of the item in of measuring the construct consistently. Based on Lim's (2007) reliability grading for Cronbach's Alpha, $\alpha>0.9$ is interpreted as having a very high reliability, $0.80 < \alpha < 0.89$ is at a satisfactory level, while at a value of $0.60 < \alpha < 0.79$ is moderate. However, according to Nunnally (1994), at a value of $\alpha>0.6$ reliability is adequate and acceptable.

Internal reliability analysis of each item in the competency construct as shown in Table 8.

Table 8. Reliability Analysis

Competency Construct	Sub-Construct	No. of item	Cronbach's Alpha
Leadership	Goal achievement	7	0.905
	Personality	4	0.886
	Relationship Management	8	0.851
Instructional	Curriculum Management	13	0.949
	Instructional Activities	9	0.922
Governance	Operation Resources	8	0.906
	Human Resources	6	0.906
Self-Emotion	Self-Awareness	9	0.934
	Self-Control	4	0.874
	Total items	68	0.904

Table 8 shows the value of Cronbach's Alpha >0.7 for all sub-constructs and range from 0.851 to 0.949. The Alpha Cronbach's reliability value for each sub-construct also shows that the Curriculum Management dimension has the highest Alpha Cronbach's reliability value, which is 0.949, followed by the Alpha Cronbach's reliability value for the Self-Awareness of 0.934, Instructional Activities of 0.922, while the sub-constructs Goal achievement, Operation Resources and Human Resources at 0.906, 0.906 and 0.905 respectively. All these six sub constructs have a very high internal reliability. This information verified the

main responsibility of middle leaders as the curriculum leader and administration in schools (Beram et al., 2020; Gurr, 2019; Vijian & Jamalul, 2020).

Personality dimension with Alpha Cronbach's reliability value at 0.886, Self-Control, 0.874 and Relationship Management at 0.851 are three sub-constructs that are considered to be at a good level of trustworthiness. These three sub-constructs are closely related to self-management in communication. Communication is the most important element in ensuring information can be conveyed and received effectively especially to those working in the middle. Communication skills according to Hussin et al. (2021) also prioritize an attitude of openness in accepting the views of others. Middle leaders who have this attitude can simultaneously improve quality, productivity and ensure a harmonious work environment (Wahab & Bahfen, 2021; Zhaparova et al.,2023).

Overall reliability analysis based on Table 8 shows that the middle leader competency model consisting of 68 items provides a Cronbach's Alpha value of 0.904. This indicates that all 68 items in the nine sub-constructs are consistent and have very high internal reliability (George & Mallery, 2003).

4. Conclusions

Based on the results of the study, it was found that all the main competency constructs had achieved EFA fit with KMO values exceeding 0.6 and Bartlett's test values significant at p values <0.05. This tests validated the adequacy of the items for running the EFA analysis. The EFA analysis has generated nine new factors at eigenvalues > 1.0 with a percentage of variance> 60%. These factors are sub-constructs of the core competencies in the research model. Cronbach's Alpha values >0.7 on all constructs indicated that the research instrument achieved high internal consistency and reliability criteria and verified fit for further use in the field.

Table 9 shows the summary of the total number of items after the pilot study.

Table 9. Analysis of the Number of Items in Research Instruments

Competency Construct	Original Items	Dropped Items	Final Items
Leadership	28	9	19
Instructional	26	4	22
Governance	18	4	14
Self-Emotion	18	5	13
Total	90	22	68

Table 9 shows that 22 items were dropped from the original 90 items. A total of 68 final items were retained in the questionnaire instrument of the competency model after undergoing the EFA procedure. This confirms the fact that Exploratory Factor Analysis is a robust tool used to identify underlying factors that can help researchers make optimal decisions in determining specific competencies that are reliable and relevant to the success of middle school leaders in schools.

In conclusion, this study contributes and has implications in the development of existing theories and knowledge. The proposed instrument for

middle leaders competency model was developed based on competency mapping from the model of system in school (Hoy & Miskel, 2008), theory of middle leadership (White, 2000) and model for competent manager (Boyatzis, 1982). It was found that the development of this competency model was the first study to combine task-based school environment theory with middle leaders' Self-Emotion intelligence. The results of this study also proved that the high validity and reliability of the competency model instrument is expected to create a pool of outstanding middle leaders in Malaysian schools who excel in work and personal emotions.

5. Suggestion for Future Study

Recommendations for further studies can be made by measuring the validity and reliability of the instrument using other methods such as Content validity ratio (CVR). This recommendation will be able to expand the development of knowledge in different research methodologies. Since the study respondents are middle leaders in primary schools, it is recommended that this instrument be used by middle leaders in secondary schools and also in Institute of Teacher Education (IPG). This can also be extended to middle leaders in primary schools in other countries. This proposal is hoped to add new knowledge with diverse outputs according to different populations.

Co-Authors' Contribution

Co-authors affirmed that there is no conflict of interest in this article. Author1 prepared the literature review, carried out the field work and managed the draft of writing. Author3 revised the interpretation of the data analysis. Author2 validated the overall write-up.

References

Amatan, M. A., Han, C. G. K., & Pang, V. (2021). Pembinaan dan pengesahan soal selidik faktor konteks pelaksanaan elemen pendidikan STEM dalam pengajaran dan pembelajaran guru. *International Journal of Education, Psychology and Counseling, 6* (40), 180-192.

Aminuddin Baki Institute. (2020). *Buku Laporan Tahunan.* Aminuddin Baki Institute.

Awang, Z. (2015). *A Handbook on SEM*. MPWS Publisher.

Bassett, M., & Shaw, N. (2018). Building the confidence of first time middle leaders in New Zealand primary schools. *International Journal of Educational Management*, *32*(5), 749-760. https://doi.org/10.1108/IJEM-05-2017-0101

Beram, S., Awang, M., & Ismail, R. (2020). Pembangunan model kompetensi pemimpin pertengahan : satu kajian reka bentuk dan pembangunan. *Journal of Educational Research & Indegenous Studies Journal*, *2*(1).

Boyatzis, R. E. (1982). *The competent manager: A model for effective performance.* Wiley.

Bryant, D. A., Wong, Y. L., & Adames, A. (2020). How middle leaders support in-service teachers' on-site professional learning. *International Journal of Educational Research*, *100*. https://doi.org/10.1016/j.ijer.2019.101530

Bush, T. (2019). Collaborative school leadership: Can it co-exist with solo leadership in high accountability settings? *Educational Management Administration and Leadership*, *47*(5), 661–662. https://doi.org/10.1177/1741143219853202

Cohen, R., & Schechter, C. (2019). Becoming an assistant principal: Mapping factors that facilitate or hinder entering the role. *International Journal of Educational Leadership Preparation*, *14*(1), 99–112.

Duong, P. Q., & Lam, P. Q. (2020). Building the capacity framework of a professional leader for primary school. *International Journal of Advanced Research*, *8*(4), 653–659. https://doi.org/10.21474/ijar01/10823

Friebel, G., Heinz, M., & Zubanov, N. (2022). Middle managers, personnel turnover and performance: A long-term field experiment in a retail chain. *Management Science 68*, 211-229. https://doi.org/10.1287/mnsc.2020.3905

Forde, C., & Kerrigan, K. (2022). *Middle Leaders in the Schools. In: The Palgrave Handbook of Teacher Education Research* . Palgrave Macmillan. https://doi.org/10.1007/978-3-030-59533-3_26-1

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference 11.0 update* (4th ed.). Allyn & Bacon.

Gurr, D. (2019). School middle leaders in Australia, Chile and Singapore. *School Leadership and Management*, *39*(3–4), 278–296. https://doi.org/10.1080/13632434.2018.1512485

Hair, J. F., Thomas, G., Hult, M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on Partial Least Squares Structural Equation Modeling (2nd ed.)*. Thousand Oakes.

Hair, J. F., Page, M., & Brunsveld, N. (2020). *Essentials of business research methods (4th ed.).* Routledge.

Harris, A., & Jones, M. (2018). Middle leaders matter: reflections, recognition, and renaissance. *School Leadership and Management*, *37*(3), 213–216. https://doi.org/10.1080/13632434.2017.1323398

Highfield, C., & Robertson, J. (2016). *Professional learning and development facilitation practices that enhance secondary school middle leader effectiveness*. Paper presented at the Australian Association of Research in Education, Melbourne, Australia. http://www. aare.edu.au/publications-database.php.

Hoy, W. K.,& Miskel, C.G. (2013). *Educational Administration* (9th ed.). McGraw-Hill.

Hussin, A., Yaacob, M. R. H., Harun, M. S., Jusoh, R., Yassin, Z. M., Zakaria, A., Yusoff, N., Liew, Y. F., Ibrahim, S., Zulkernain, F., Abdullah, J. B., Subramaniam, S., & Husien, M. (2021). The Impact of National Professional Qualification for Educational Leaders Program (NPQEL 2.0)

on School Leaders. *Management Research Journal*, *10*, 66–81. https://ojs.upsi.edu.my/index.php/MRJ/article/view/5956

Irvine, P. A., & Brundrett, M. (2019). Negotiating the next step: The part that experience plays with middle leaders' development as they move into their new role. *Educational Management Administration and Leadership*, *47*(1), 74–90. https://doi.org/10.1177/1741143217720457

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 140, 1–55.

Lim, C.P. (2007). Effective integration of ICT in Singapore schools: Pedagogical and policy implications. *Educational Technology Research and Development*, *55*(1), 83-116.

Lokman M.T., Mohammed Berhandden M., Mohd Fadzli A., Abdul Halim A., & Mohd Hilmi H. (2021). Principals' views on continuing professional development programmes: Evidence from Malaysia. *Educational Management & Leadership*. https://doi.org/10.1177/1741143221988953

Lokman M.T., Norazah A.A., Mohd Fadzli A., M.Al-Muzammil Y., Lina Mursyidah H., & Hanin Naziha H. (2023). Leadership Development Programmes Perceived as Important by Malaysian Primary Deputy Principals: Do Demographic Factors Matter? *Asian Journal of University Education*, *19*(2), 320–339. https://doi.org/10.24191/ajue.v19i2.22298

Lu, J. & Hallinger, P. (2018). A mirroring process: From school management team cooperation to teacher collaboration. *Leadership and Policy in Schools, 17*(2), 238-263.

Mannogaran, V., & Nor Shaid, N. A. (2023). Kesahan dan Kebolehpercayaan instrumen Mengenai Pengetahuan, Sikap dan Cabaran Guru dalam Pelaksanaan Pentaksiran Bilik Darjah. *Malaysian Journal of Social Sciences and Humanities (MJSSH), 8*(1), e001958. https://doi.org/10.47405/mjssh.v8i1.1958

Mansor, M., Mohd Noor, M. A., Musa, M. K.,& Yusof, H. (2018). The development, validity and reliability of teacher leadership inventory. *Management Research Journal 8*(1), 132-145.

Merriam, S. B. (2015). Qualitative research: Designing, implementing, and publishing a study. In *Handbook of research on scholarly publishing and research methods* (pp. 125-140). IGI Global.

Momin, Zafar Abdulmajid. (2018). *Identifying the competencies of middle managers leading successful strategy implementation*. [Doctoral dissertations]. Singapore Management University. Dissertation and Theses Collection (Open Access). https://ink.library.smu.edu.sg/etd_coll/147

Muda, H., Lognathan, N., Awang, Z., Jusoh, H., & Baba, Z. S. (2018). *Application of theory, methodology and analsis in condusting research: A practical guide to quantitative research and thesis writing.* Penerbit Unisza. ISBN:978- 967-2231-11-0

Nadia, A., Ahmad Mazli, M., & Zainudin, A. (2023). Development and Validation of Critical Reading Intention Scale (CRIS) for University Students using Exploratory and Confirmatory Factor Analysis. *Asian Journal of University Education*, *19*(1), 39–52. https://doi.org/10.24191/ajue.v19i1.21231

Nehez, J., Blossing, U., Gyllander Torkildsen, L., Lander, R., & Olin, A. (2021). Middle leaders translating knowledge about improvement: Making change in the school and preschool organisation. *Journal of Educational Change*. https://doi.org/10.1007/s10833-021-09418-2

Nunnally, J. C. (1994). *Psychometric Theory 3E*. Tata McGraw-Hill Education.

Pavlopoulos, E. (2021). How to make a difference as a middle leader. *Management in Education*, *35*(3). https://doi.org/10.1177/0892020620973038

Roid, G., & Haladyna, T. (1982). *A technology for test-item-writing.* Academic Press.

Rosenfield, S., Newell, M., Zwolski, S., Jr & Benishek, L.E. (2018). Evaluating problem-solving teams in K–12 schools: do they work? *American Psychologist, 73* (4), 407-419.

Silam, D., Pang, V., & Lajium, D. (2020). Kompetensi kepimpinan pengetua sekolah di pulau di negeri Sabah. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, *5*(12), 45-61. https://doi.org/10.47405/mjssh.v5i12.557

Slater-sanchez, J. (2020). *The Efficacy of the Co-Principal Model of School Administration as Viewed Through the Lens of the California Professional Standards for Education Leaders.* A Dissertation by Irvine, California School of Education Submitted in partial fulfillment of the req. March.

Splitter, V., Jarzabkowski, P., & Seidl, D. (2023). Middle managers' struggle over their subject position in Open Strategy processes. *Journal of management studies*, *60*(7), 1884-1923.

Suhaili, A., Osman, K., & Matore, M. E. @ E. M. (2020). Issues and challenges of subject leadership competency for Malaysian head of science panels (HoSP). *International Journal of Academic Research in Progressive Education and Development*, *9*(2), 229–241. https://doi.org/10.6007/ijarped/v9-i2/7296

Tay, H. Y., Tan, K. H. K., Deneen, C. C., Leong, W. S., Fulmer, G. W., & Brown, G. T. L. (2019). Middle leaders' perceptions and actions on assessment: the technical, tactical and ethical. *School Leadership & Management, 0*(0), 1–19. https://doi.org/10.1080/13632434.2019.1582016

Vijian, G., & Jamalul, A. W. L. (2020). Kepimpinan transformasional guru besar dan kepuasan kerja guru-guru di sekolah jenis kebangsaan Tamil. *International Journal of Educational and Pegagogy*, *2*(2), 18–31.

Wahab, N. A., & Bahfen, N. (2021). Messaging in the Malaysian Workplace: Communication, Social Media and Employee Wellbeing. *Asia Pacific Media Educator*, *31*(2), 248-268. https://doi.org/10.1177/1326365X211048580

White, P. (2000). *The leadership role of curriculum area middle managers in selected Victorian government secondary schools.* [Unpublished doctorate dissertation]. The University of Mebourne.

Yin, R. K. (2018*). Case study research and applications: Design and methods* (6th ed.). Sage.

Zhaparova, B., Kolyeva, N., Akhmuldinova, A., Shnaider, F., & Mambetalina, A. (2023). Influence of virtual reality on the process of personality socialization: A distance model of socialization. *International Journal of Innovative Research and Scientific Studies*, *6*(2), 235-241.