GERMANE
GLOBAL JOURNAL OF EDUCATIONAL RESEARCH & MANAGEMENT
e-ISSN : 2805-4695 https://jurnal.nun-g.com/index.php/germane

CONFIRMATORY FACTOR ANALYSIS FOR 4T1R MODEL AND ISLAMIC EDUCATION MANAGEMENT PRACTICES OF PEOPLE'S RELIGIOUS SCHOOL MANAGEMENT, SOUTHERN THAILAND

AZMAN BADO,[1&2] RAHIMAH EMBONG,[1*] MUHAMATSAKREE MANYUNU[2]

1 Faculty of Islamic Contemporary Studies, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Terengganu, Terengganu, Malaysia
3 Faculty of Education, Fatoni University, 135/8 Moo 3, Tambon Khao Tum Chau Thanh Pattani District 94160 Pattani, Thailand
Email: azmanbado@gmail.com, makree4@yahoo.com

Corresponding Author's Email: rahimahembong@unisza.edu.my

Received: 3 October 2025 | Accepted: 25 October 2025 | Published: 25 November 2025

Abstract: There are two ways to conduct Confirmatory Factor Analysis (CFA) using individual confirmatory factor analysis or group confirmatory factor analysis based on the measurement model. The number of items depends on the construct used in the study and the measurement model analysis is conducted separately if the number of items in the construct is more than four. Whereas pooled CFA runs all measurement models at the same time. This Unidimensionality requirement can be met through the item deletion procedure that has a low factor loading value to reach the set level of fitness indexes. Items with a factor loading value of less than 0.6 are considered unimportant to the measurement of the construct and can be discarded Chik, Abdullah, Ismail and Mohd Noor (2024). A total of 384 study samples were involved in this research. Data were analysed using the IBM-SPSS-AMOS (Structural Equation Modeling-SEM) program version 21.0. Adjustment tests were conducted to ensure that the tested indicators truly represent the construct being measured and Confirmatory Factor Analysis was conducted in this study as a prerequisite that must be met. The findings of the study show that all the correlations between the constructs 4T1R Model (based on Planning, Organize, Guiding, Surrender, Supervise), and Islamic Education Management Practices have a value less than 0.85 (<0.85) teachers People's Religious School Management, Southern Thailand. The results of the combined confirmatory factor analysis of all measurement models (Pooled CFA), prove that all constructs do not have a strong relationship with each other to avoid the existence of multicollinearity problems.

Keywords: 4T1R Model, Islamic Education Management Practices, Confirmatory Factor Analysis (CFA), Pooled CFA

Cite This Article: Azman Bado, Rahimah Embong, Muhamatsakree Manyunu. 2025. Confirmatory Factor Analysis for 4T1R Model and Islamic Education Management Practices of People's Religious School Management, Southern Thailand. *Global Journal of Educational Research and Management (GERMANE), 5*(4), 85-97.

INTRODUCTION

Various challenges in implementing effective management. Legal changes, security issues, and resource constraints are obstacles to effective curriculum implementation. Many folk religious schools face shortcomings in planning (*al-Takhtit*) and limited financial management, in addition to inadequate resource arrangements (*al-Tanzim*) and a shortage of teachers skilled in guidance (*al-Taujih*). The structured supervision mechanism (*al-Raqabah*) is still not stable, causing the implementation of the curriculum to be unbalanced and resilient. These factors affect the learning process that should focus on strengthening students' morals and life skills. In addition, the concepts and principles of teaching and learning in the 21st century require teachers to have qualifications beyond just teaching. They also need to have the ability to guide students in navigating the world of learning and learning from real experiences. Laws and educational plans are important factors that influence the implementation of Islamic education in folk religious schools in southern Thailand. Changes or dissolution of laws will cause changes in the education system and curriculum directly or indirectly. This shows how the education system is highly dependent on law-and-order factors (Piyawasan, 2006 in Muhamatsakree, 2008).

According to Simarmata (2024), education quality can be enhanced through carefully planned quality improvement management. Therefore, it is important to develop a national assessment center as a reference and strategy that can respond to the needs of students. Education in Thailand also faces the challenge of unequal access between urban and rural areas, which results in a wide educational gap, especially in the southern region inhabited by a large Muslim population (Sukprasert & Sinthun, 2023). Curricula that do not reflect the needs of students and the current social situation, coupled with problems in management and leadership, must be overcome to improve the quality of education (Niyom, 2021; Phan, 2022). Changes in educational policies and laws that occur without adequate preparation make it difficult for teachers and students to adapt. Security factors and political instability also hinder efforts to improve education (Cheng, 2024). Overall, there is a lack of in-depth research on the effectiveness of the management of religious schools of the people, especially in relation to the implementation of the 4T1R model. Although previous studies have focused more on leadership aspects and challenges of educational institutions, this study aims to analyse in depth how each element in the 4T1R model can improve the effectiveness of school management. The purpose of this research is to identify the influence of 4T1R Model (based on Planning, Organize, Guiding, Surrender, Supervise) on Islamic Education Management Practices People’s Religious School Management, Southern Thailand.

RESEARCH METHODOLOGY

The research method used is quantitative and uses research instruments that have been adapted according to the suitability of factors 4T1R Model (based on Planning, Organize, Guiding, Surrender, Supervise) and Islamic Education Management Practices People’s Religious School Management, Southern Thailand. Data were analysed using Structural Equation Modelling (SEM) with the help of the IBM-SPSS-AMOS version 21.0 program.

SEM is formed with two (2) main models namely Measurement Model and Structural Model. Before the SEM test is performed, an adaptation test should be conducted to ensure that the indicators tested truly represent the construct being measured. Confirmatory Factor Analysis (CFA) is a measurement model test to ensure that each construct meets procedures such as validity and reliability for each construct tested (Kline, 2016; Hair, Black, Babin, Anderson & Tatham, 2006; Schumacker & Lomax, 2004). The fit of the measurement model is very important to ensure that each latent construct in this study has fit with the data studied before SEM can continue (Kline, 2016; Schumacker & Lomax, 2004).

Using the CFA method can assess the extent to which the observed factors are significant to the latent construct used. This evaluation is done by examining the value of the strength of the regression structure path from the factor to the observed variable (i.e. Factor Loading value) instead of the relationship between the factors (Byrne, 2013). Using CFA, any item that does not fit the measurement model is dropped from the model. This discrepancy is due to the low value of the load factor. Researchers need to perform the CFA process on all the constructs involved in the model, either separately or in a pooled CFA model (Alias & Hartini, 2017). The suitability of the tested hypothesis model was verified by using Fitness Indexes to see the value of Root Mean Square Error of Approximation (RMSEA<0.08), Comparative Fit Index (CFI>0.90) and Chi Square/Degrees of Freedom (chisq/df<5.0). According to Hair et al. (2006) if the $\chi 2$ value is less than 2.00 but significant, then it is necessary to state whether the sample size is large or vice versa. A sample size that exceeds 200 can cause the $\chi 2$ value to be significant. Because of that, Hair and his colleagues suggested two other indices namely CFI and RMSEA to ensure that the CFA analysis forms the unidimensionality of the study model. If the CFI value exceeds 0.90 and the RMSEA is less than 0.08, it is said that there is unidimensionality for the formation of each construct.

FINDINGS

Confirmatory Factor Analysis (CFA)

There are two models that need to be analysed in carrying out Structural Equation Modelling (SEM), namely the Measurement Model and the Structural Model. Chik et al. (2024) suggest two steps that need to be carried out in a Structured Equation Modelling (SEM) namely: a) Confirming the Measurement Model of all the constructs involved through the Confirmatory Factor Analysis (CFA) method, and b) Modelling all the constructs into Structural Model as well as doing SEM procedures (Chik et al., 2024; Hoque, Awang, Jusoff, Salleh & Muda, 2017; Kashif, Samsi, Awang & Mohamad., 2016). The fit of the Measurement Model with the study data is important to validate a SEM. If the Measurement Model does not match the data from the field, then the constructed SEM is invalid. Therefore, the first step in SEM analysis is to determine the appropriateness of the Measurement Model to the data from the field. Analysis of the fit of the Measurement Model with field data is done by using Confirmatory Factor Analysis (CFA) to confirm the proposed Measurement Model of the construct. Testing the Validity and Reliability of the Measurement Model: Before evaluating the appropriateness of a constructed model, the evaluation of Unidimensionality, Validity and Reliability of the

Measurement Model of the construct of this study needs to be carried out first. Unidimensionality: This requirement can be met through the items deletion procedure that has a low Factor Loading value until it reaches the set Fitness Indexes level. Items with a Factor Loading value of less than 0.6 are considered unimportant to the measurement of the construct and should be discarded. Validity: The three types of validity that must be achieved by a construct measurement model are Construct Validity, Convergent Validity and Discriminant Validity. Construct Validity: Refers to the accuracy of a measurement instrument used to measure the intended construct in the study. Construct Validity describes the extent to which a statement in the item used can measure the construct that the researcher wants to measure. Construct Validity is achieved when all Fitness Indexes for the construct in question meet the specified level (Chik et al., 2024). Table 1 below shows the three categories of fit index that need to be achieved by a construct measurement model, namely Absolute Fit, Incremental Fit and Passionate Fit.

Table 1 Three (3) Categories of Matching Indexes and Recognized Index Types

Name of Category	Name of Index	Level of Acceptance
Absolute Fit Index	RMSEA	RMSEA < 0.08
	GFI	GFI > 0.90
Incremental Fit Index	AGFI	AGFI > 0.90
	CFI	CFI > 0.90
	IFI	IFI > 0.90
	TLI	TLI > 0.90
	NFI	NFI > 0.90
Parsimonious Fit Index	Chisq/df	Chi-Square/ df < 5.0

Source: Chik et al. (2024)

Convergent Validity: Refers to the relationship of a measurement model with other measurement models in theory. Convergent validity of a construct will be achieved if all Average Variance Extracted (AVE) values reach a minimum value of 0.50. Discriminant Validity: Explains the extent to which a construct does not have too strong a relationship with another construct in the same model so that it can be said that a construct is a shadow or repetition (redundant) of another construct. Discriminant Validity is assessed through the discriminant validity index summary. According to Chik et al. (2024) and Hoque et al. (2017), discriminant validity for a construct can be achieved if all diagonal matrix values are greater than other values in row cells and in column cells. The diagonal value of the matrix is the square root of the AVE, while the values in the matrix are the correlations between the constructs in the model. Average Variance Extracted (AVE): The AVE value is calculated from the factor loading value for each item in a certain construct and needs to reach a minimum limit of 0.50 (AVE > 0.5) to prove the reliability of the Measurement Model of a latent construct in this study, which can be achieved (Chik et al., 2024; Hoque et al., 2017). Reliability: SEM uses the Composite Reliability (CR) value to verify the reliability of the Measurement Model according to the factor loading value of each item. Each construct that

has a value of CR>0.6, has achieved Composite Reliability (Chik et al., 2024; Hoque et al., 2017).

CFA Analysis for the Measurement Model of 4T1R Model Based on Planning Construct

The analysis of Fitness Indexes in Table 2 below shows that the Planning construct Measurement Model has reached the level of the Fitness Index level as stated in Table 1 above. This means that Construct Validity has been achieved (Chik et al., 2024; Hoque et al., 2017).

Table 2 Analysis to Determine Validity for Planning Construct

Category Name	Index Name	Index Value	Findings
1. Absolute fit	RMSEA	0.073	Reach the set level
2. Incremental fit	CFI	0.912	Reach the set level
3. Parsimonious fit	ChiSq/df	3.032	Reach the set level

The Measurement Model for the Planning construct has reached the value of the Conformity Index level. This means that Construct Validity for this construct, has been achieved (Chik et al., 2024; Kashif et al., 2016).

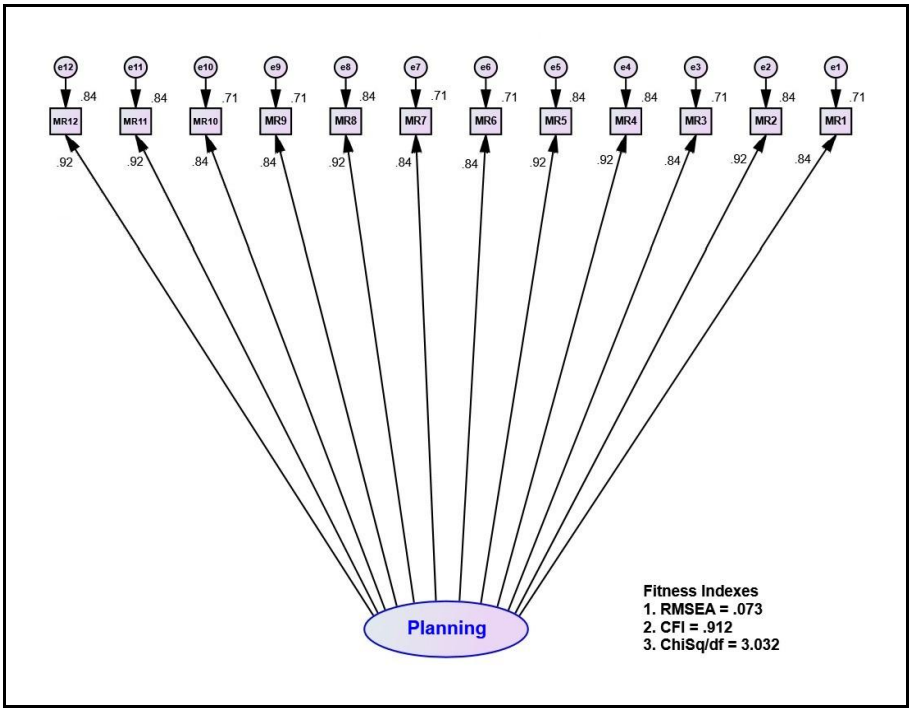

Figure 1. The Measurement Model of Planning Construct

CFA Analysis for the Measurement Model of 4T1R Model Based on Organize Construct

The analysis of Fitness Indexes in Table 3 below shows that the Organize construct Measurement Model has reached the level of the Fitness Index level as stated in Table 1 above. This means that Construct Validity has been achieved (Chik et al., 2024).

Table 3 Analysis To Determine Validity for Organize Construct

Category Name	Index Name	Index Value	Findings
1. Absolute fit	RMSEA	0.077	Reach the set level
2. Incremental fit	CFI	0.941	Reach the set level
3. Parsimonious fit	ChiSq/df	3.248	Reach the set level

The Measurement Model for the Organize construct has reached the value of the Conformity Index level. This means that Construct Validity for this construct, has been achieved (Chik et al., 2024; Kashif et al., 2016).

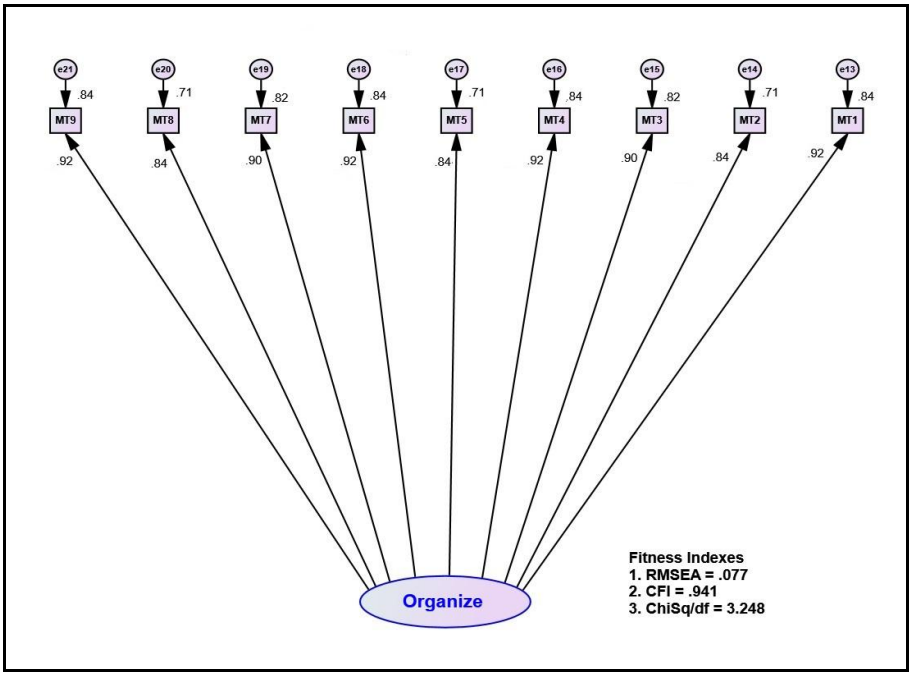

Figure 2. The Measurement Model of Organize Construct

CFA Analysis for the Measurement Model of 4T1R Model Based on Guiding Construct

The analysis of Fitness Indexes in Table 4 below shows that the Guiding construct Measurement Model has reached the level of the Fitness Index level as stated in Table 1

above. This means that Construct Validity has been achieved (Chik et al., 2024; Hoque et al., 2017).

Table 4 Analysis to Determine Validity for Guiding Construct

Category Name	Index Name	Index Value	Findings
1. Absolute fit	RMSEA	0.072	Reach the set level
2. Incremental fit	CFI	0.948	Reach the set level
3. Parsimonious fit	ChiSq/df	2.981	Reach the set level

The Measurement Model for the Guiding construct has reached the value of the Conformity Index level. This means that Construct Validity for this construct, has been achieved (Chik et al., 2024; Kashif et al., 2016).

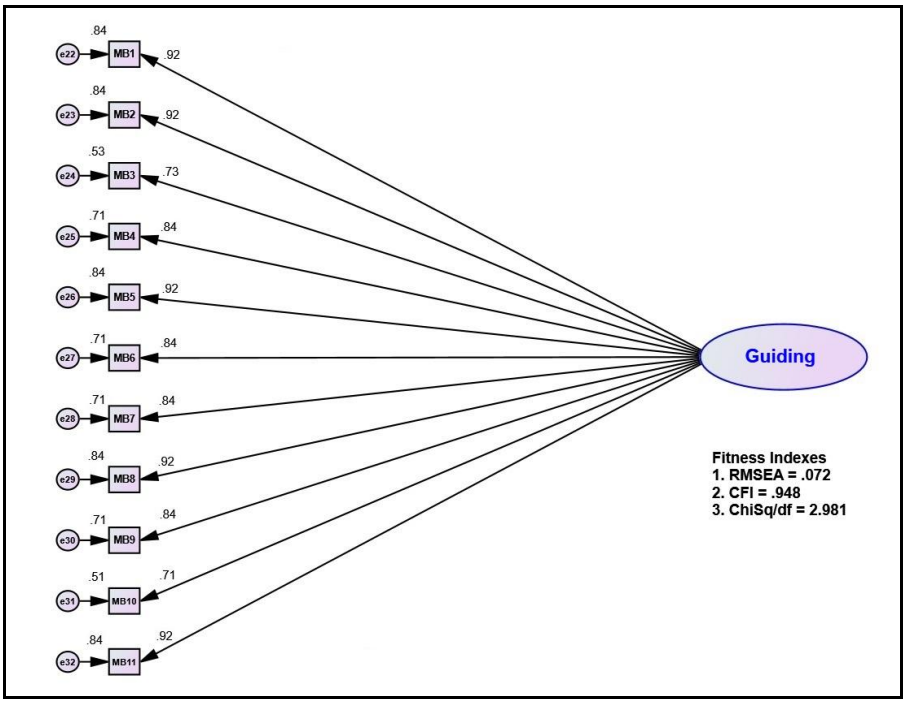

Figure 3. The Measurement Model of Guiding Construct

CFA Analysis for the Measurement Model of 4T1R Model Based on Surrender Construct

The analysis of Fitness Indexes in Table 5 below shows that the Surrender construct Measurement Model has reached the level of the Fitness Index level as stated in Table 1 above. This means that Construct Validity has been achieved (Chik et al., 2024; Hoque et al., 2017).

Table 5 Analysis To Determine Validity for Surrender Construct

Category Name	Index Name	Index Value	Findings
1. Absolute fit	RMSEA	0.062	Reach the set level
2. Incremental fit	CFI	0.935	Reach the set level
3. Parsimonious fit	ChiSq/df	3.595	Reach the set level

The Measurement Model for the Surrender construct has reached the value of the Conformity Index level. This means that Construct Validity for this construct, has been achieved (Chik et al., 2024; Kashif et al., 2016).

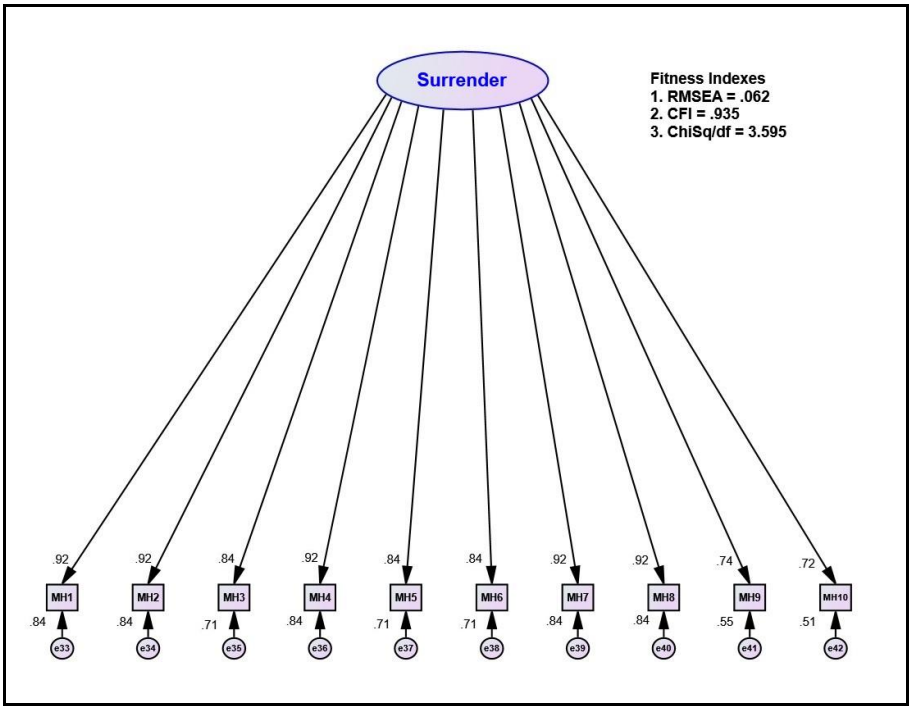

Figure 4. The Measurement Model of Surrender Construct

CFA Analysis for the Measurement Model of 4T1R
Model Based on Supervise Construct

The analysis of Fitness Indexes in Table 6 below shows that the Supervise construct Measurement Model has reached the level of the Fitness Index level as stated in Table 1 above. This means that Construct Validity has been achieved (Chik et al., 2024; Hoque et al., 2017).

Table 6 Analysis to Determine Validity for Supervise Construct

Category Name	Index Name	Index Value	Findings
1. Absolute fit	RMSEA	0.059	Reach the set level
2. Incremental fit	CFI	0.977	Reach the set level
3. Parsimonious fit	ChiSq/df	2.315	Reach the set level

The Measurement Model for the Supervise construct has reached the value of the Conformity Index level. This means that Construct Validity for this construct, has been achieved (Chik et al., 2024; Kashif et al., 2016).

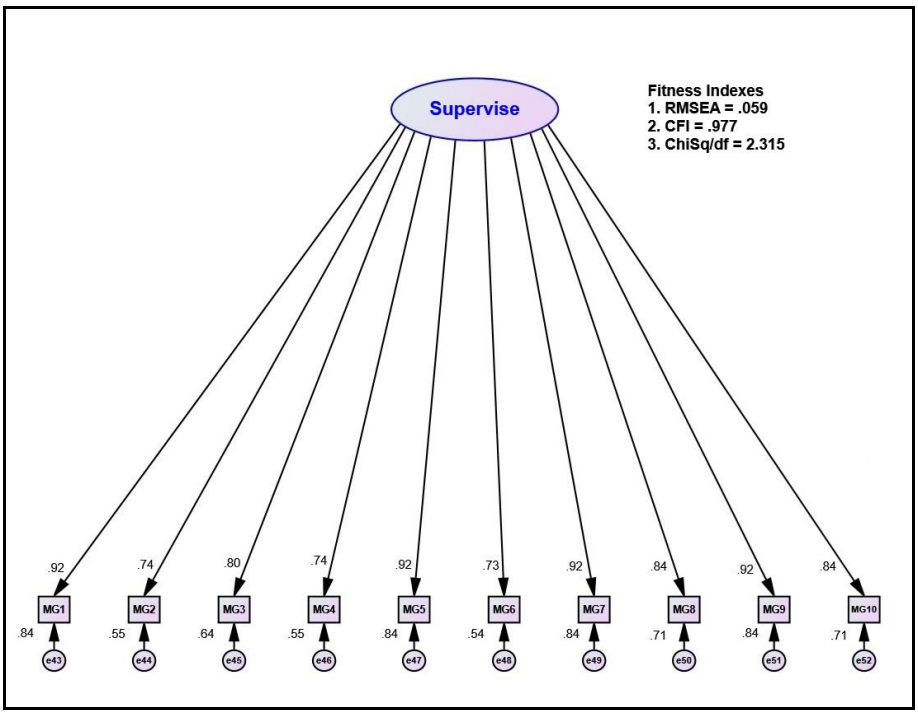

Figure 5. The Measurement Model of Supervise Construct

CFA Analysis for the Measurement Model of Islamic Education Management Practices Construct

The analysis of Fitness Indexes in Table 7 below shows that the Islamic Education Management Practices construct Measurement Model has reached the level of the Fitness Index level as stated in Table 1 above. This means that Construct Validity has been achieved (Chik et al., 2024; Hoque et al., 2017).

Table 7 Analysis to Determine Validity for Islamic Education Management Practices Construct

Category Name	Index Name	Index Value	Findings
1. Absolute fit	RMSEA	0.074	Reach the set level
2. Incremental fit	CFI	0.959	Reach the set level
3. Parsimonious fit	ChiSq/df	3.082	Reach the set level

The Measurement Model for the Islamic Education Management Practices construct has reached the value of the Conformity Index level. This means that Construct Validity for this construct, has been achieved (Chik et al., 2024; Kashif et al., 2016).

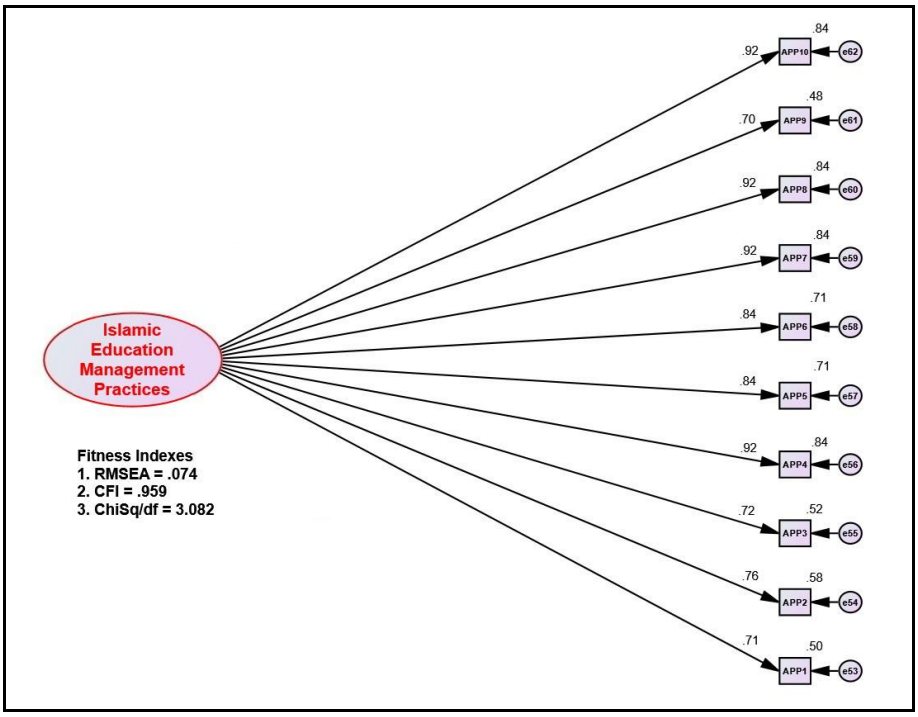

Figure 6. The Measurement Model of Islamic Education Management Practices Construct

Combined Confirmatory Factor Analysis of All Measurement Models (Pooled CFA)

This Pooled CFA analysis is necessary to evaluate the correlation value between the constructs in the Discriminant Validity procedure. If the correlation value between two constructs exceeds 0.85, then there is redundancy between the two constructs (Chik et al., 2024; Hoque et al., 2017). A model involving a second order construct is a construct that has dimensions or sub-constructs where each dimension or sub-construct has a certain number of items. Researchers will have difficulty combining all the second-level constructs in one model to conduct Pooled Confirmatory Factor Analysis (Pooled CFA). The solution, all

second order constructs need to be summarized into a first order construct model by taking the mean item of each sub-construct or dimension (Chik et al., 2024; Hoque et al., 2017). The results of the Pooled CFA procedure are shown in Figure 7 below. The single headed arrow value is the factor loading values of each item and the double headed arrow value is the correlation between constructs. Through the Pooled CFA method, only one model fit index that represents all the constructs is released. Table 8 below shows that all three categories of model fit index for the construct measurement model have been achieved.

Table 8 Analysis To Determine Validity for All Constructs and Sub-Constructs

Category Name	Index Name	Index Value	Findings
1. Absolute fit	RMSEA	0.068	Reach the set level
2. Incremental fit	CFI	0.944	Reach the set level
3. Parsimonious fit	ChiSq/df	1.043	Reach the set level

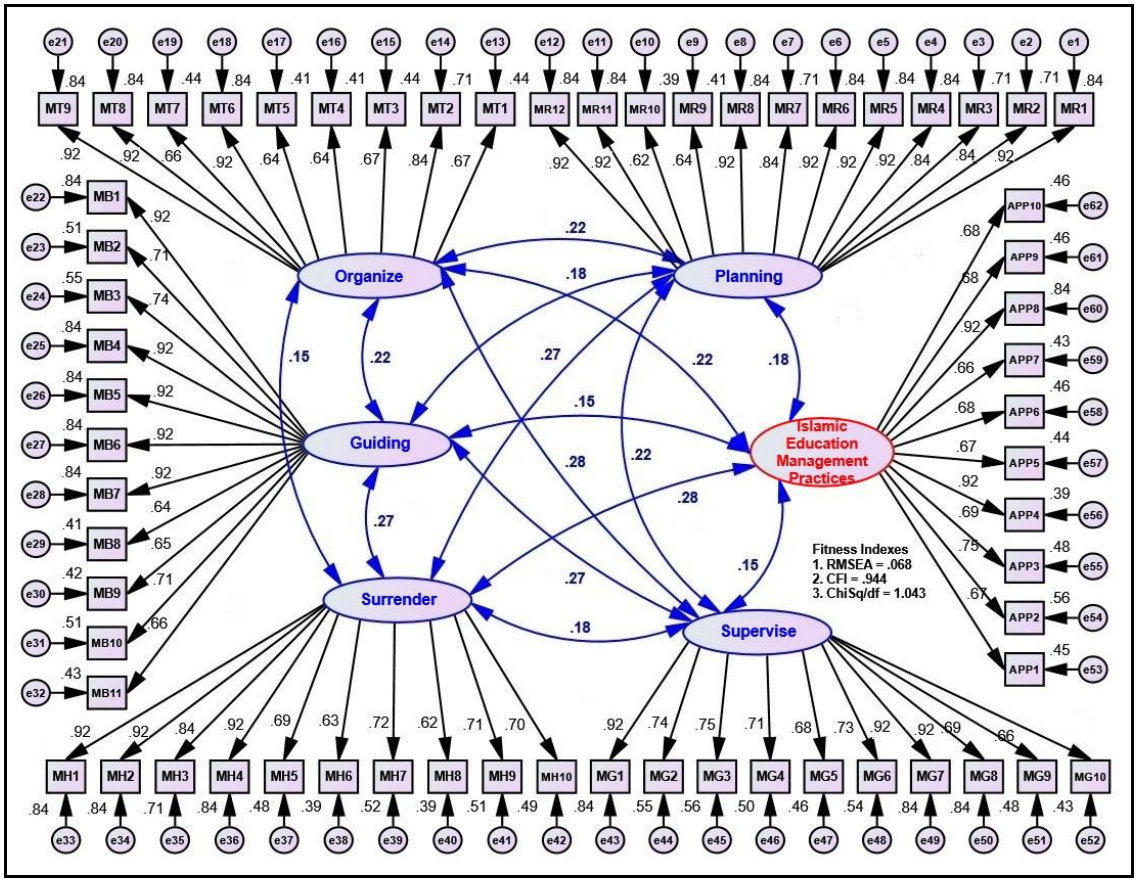

Figure 7. Pooled CFA Analysis Findings

Discriminant Validity is necessary to prove that all the constructs in the model do not have a strong relationship with each other leading to the problem of multicollinearity (Chik et al., 2024). Table 9 below shows the Discriminant Validity Index Summary between all the constructs in the model.

Table 9 Discriminant Validity Index Summary

Constructs	(a)	(b)	(c)	(d)	(e)	(f)
Planning (a)	0.858					
Organize (b)	0.220	0.837				
Guiding (c)	0.180	0.220	0.861			
Surrender (d)	0.270	0.150	0.270	0.837		
Supervise (e)	0.220	0.280	0.270	0.180	0.840	
Islamic Education Management Practices (f)	0.180	0.220	0.150	0.280	0.150	0.863

Table 9 above presents the square root value of AVE for each construct on the diagonal matrix. The other values in the table are correlations between the two constructs. According to Chik et al. (2024), Discriminant Validity will be achieved if all the values of the square root of AVE (Diagonal) are greater than other values whether the values are in rows or columns. Findings from Table 9 show that Discriminant Validity for all constructs in the model has been achieved.

CONCLUSION

Overall, the CFA analysis conducted on the measurement model for 4T1R Model (based on Planning, Organize, Guiding, Surrender, Supervise) and Islamic Education Management Practices construct, has reached the level of fitness indexes. The results of the combined confirmatory factor analysis of all measurement models (Pooled CFA), prove that all constructs do not have a strong relationship with each other to avoid the existence of multicollinearity problems.

ACKNOWLEDGEMENT

We would like to express our heartfelt appreciation to Universiti Sultan Zainal Abidin (UniSZA), Division Policy, Planning and Research Division & Commercialization Centre (RMIC) UniSZA & Ministry of Higher Education Malaysia (MOHE).

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