STRUCTURAL EQUATION MODELLING (SEM) OF TAHFIZ TEACHERS' KNOWLEDGE, SKILLS AND ATTITUDES IN IMPLEMENTING HIGHER ORDER THINKING SKILLS (HOTs)[(*)]

**Mohd Faizulamri Mohd Saad[1], Nur Syuhada Mohd Ataa[2],
Sabri Mohamad[3], Najah Nadiah Amran[4], Hamdi Ishak[5]**

ABSTRACT

Tahfiz teachers recognize the importance of applying Higher Order Thinking Skills (HOTs) in the process of teaching Hifz al-Quran. The objective of the study is to examine the relationships among knowledge, skills and attitude of tahfiz teachers in implementing HOTs while also investigating whether years of teaching experience and frequency of professional training moderate these relationships. This study uses quantitative research methods. The research sample includes 198 teachers from different tahfiz institution in Malaysia. The data are analyzed using Statistical Package for the Social Sciences (SPSS) and SPSS Analysis of Moment Structure (AMOS) software. The analysis yields significant direct relationships between knowledge, skills and attitude. However, no significant moderating effects of teaching experience or training frequency

[(*)] This article was submitted on: 28/04/2025 and accepted for publication on: 18/11/2025.

[1] Research Centre for Quran and Sunnah, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. (Main Author)
Email: faizam@ukm.edu.my

[2] Research Centre for Quran and Sunnah, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia. (Corresponding Author)
Email: syuhadaataa.gojes@gmail.com, Tel: +6010-551 7991.

[3] Research Centre for Quran and Sunnah, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia.
Email: sabri_m@ukm.edu.my

[4] Research Centre for Quran and Sunnah, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia.
Email: najah@ukm.edu.my

[5] Research Centre for Quran and Sunnah, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia.
Email: drhamdiishak@gmail.com

were found. These findings highlight that teacher competencies in knowledge, skills and attitude are interdependent and essential for effective HOTs implementation in tahfiz education. This study implies that the SEM related to teachers' competency will serve as a baseline framework for future research in educational field.

Keywords: *Tahfiz Teachers' Competency; Higher Order Thinking Skills; Structural Equation Modelling*

1.0   INTRODUCTION

Teachers significantly influence educational outcomes with their knowledge, skills and attitude serving as essential elements that enhance effective teaching practices (Tamuri et al., 2012; Zulkifli et al., 2022). Knowledge establishes the theoretical and subject-matter foundation, skills facilitate the application of pedagogical techniques and attitude affects teacher motivation, engagement and responsiveness to students' needs. Research indicates that effective teaching relies not only on content knowledge but also on pedagogical skills and professional attitudes (Shulman, 1987; Darling-Hammond, 2000).

Despite this, teachers frequently encounter challenges in implementing Higher Order Thinking Skills (HOTs) in tahfiz teaching. These challenges include difficulty in differentiating student cognitive levels, insufficient understanding of HOTs components and limited assessment strategies (Rifin et al., 2021). Past studies reveal that teachers face challenges in differentiating skill levels related to students' cognitive abilities, possessing a thorough understanding of HOTs and effectively assessing students using HOTs components. Insufficient understanding of effective higher-order thinking teaching practices and lack of support from school management impede academic achievement (Rajendran, 2000; Zohar, 2013; Sundara Rajoo, 2018).

The Standard Curriculum and Assessment Document (DSKP) for the Hifz al-Quran subject under the Tahfiz Integrated Curriculum (KBT) explicitly incorporates HOTs elements across cognitive, affective and psychomotor domains to develop students' higher-order thinking capabilities (Mohd Saad et al., 2023). Drawing on Anderson and Krathwohl's (2001) Revised Bloom's Taxonomy, the DSKP operationalizes HOTs through progressively complex cognitive processes beginning with C1 remembering of Quranic verses advancing to C2 understanding meanings and contexts followed by C3 applying

memorization and Tajwid rules in practical settings. Higher-order levels include C4 analyzing textual structures and meanings, C5 evaluating interpretive accuracy and C6 creating integrative understanding through synthesis of memorization, Tajwid and application in real-life contexts (Curriculum Development Division, 2017, Curriculum Development Division, 2015a, Curriculum Development Division, 2015b, Curriculum Development Division, 2019a and Curriculum Development Division, 2019b).

In the affective domain, HOTs implementation emphasizes adab (etiquette) during memorization, recitation and presentation aligning with A1 to A5 levels of valuing, responding and internalization. Similarly, the psychomotor domain focuses on accurate articulation, rhythm control and writing Quranic verses using rasm Uthmani and dabt orthographic rules, ensuring physical execution complements cognitive mastery (Curriculum Development Division, 2017). The DSKP assessment framework employs Performance Level (TP1–TP6), a standards performance to evaluate students holistically across these three domains ensuring that Hifz al-Quran teaching transcends rote memorization towards higher-order analytical, evaluative and creative thinking (Mohd Saad et al., 2023).

In Malaysian tahfiz institutions, additional barriers have been identified such as limited teacher preparedness for HOTs implementation, deficiencies in pedagogical skills, inadequate subject mastery and low levels of student readiness and interest in learning (Mohd Zhaffar et al., 2020; Siti Rashidah, 2020; Zakaria & Ismail, 2022). The critical thinking skills of tahfiz students are notably deficient, particularly in analytic and logical reasoning (Hashim et al., 2021). This limitation stems from conventional teaching methods that provide minimal opportunities for students to move beyond rote memorization toward deeper cognitive engagement. Learning in the 21st century requires both conceptual comprehension and the capacity to analyze, evaluate and apply knowledge effectively. Innovative and analytical teaching approaches are therefore essential to help students develop higher-order thinking abilities while shaping them into morally responsible individuals (Nor et al., 2015; Hashim et al., 2021).

There exists a notable correlation between the competency of tahfiz teachers in pedagogical knowledge and learning facilities and the quality of teaching (Haron et al., 2020). A report by the Islamic Education Division (2021) on the implementation of HOTs in the Dini Integrated Curriculum (KBD) and the Tahfiz Integrated Curriculum (KBT) identified areas requiring further investigation concerning HOTs and KBT. A promising area for research pertains

to the challenges faced by tahfiz teachers in implementing higher-order thinking skills in their instruction.

Teacher competencies are further shaped by experience and professional training. While early-career teachers often show rapid growth, studies indicate that teaching effectiveness may plateau without continuous professional development (Rockoff, 2004; Papay & Kraft, 2015). Moreover, experience alone does not guarantee improved instructional quality without ongoing, practical and contextually relevant training interventions (Guskey, 2002; Avalos, 2011). Training programs grounded in passive knowledge transfer have limited impact, whereas those involving active engagement, problem-solving and real classroom applications demonstrate greater effectiveness (Timperley et al., 2007; Kennedy, 2016). Therefore, the frequency, quality and applicability of training determine its influence on teachers' knowledge, skills and attitudes toward HOTs implementation (Borko, 2004; Darling-Hammond et al., 2017).

Given these gaps, this study adopts a quantitative research approach using Structural Equation Modelling (SEM) to examine the relationships among knowledge, skills and attitude of tahfiz teachers in implementing HOTs. It also investigates whether years of teaching experience and frequency of professional training moderate these relationships, thereby offering evidence-based insights for enhancing teacher competency in HOTs implementation.

2.0　PROBLEM STATEMENT

Teachers face significant challenges in implementing Higher Order Thinking Skills (HOTs), particularly in differentiating students' cognitive levels, acquiring sufficient knowledge of suitable HOTs instructional strategies and obtaining adequate institutional support. These limitations hinder the quality of teaching and overall learning outcomes (Rifin et al., 2021; Rajendran, 2000; Sundara Rajoo, 2018; Zohar, 2013). In tahfiz institutions, additional teacher-related issues include lack of pedagogical skills, inadequate mastery of subject content, insufficient training opportunities and limited resources explicitly targeting HOTs implementation (Mohd Zhaffar et al., 2020; Alias, 2020). Research also highlights a strong relationship between teacher competency in pedagogical knowledge, access to teaching facilities and the quality of instruction provided (Haron et al., 2020). Reports on the implementation of HOTs in both the Dini Integrated Curriculum (KBD) and Tahfiz Integrated Curriculum (KBT) indicate the need for systematic investigation into teachers' knowledge, skills and attitudes in applying HOTs, particularly within the KBT framework (Islamic Education

Division, 2015, 2021; Curriculum Development Division, 2017).

On the students' side, poor readiness, low motivation levels and weak critical thinking skills have been frequently documented in tahfiz institutions (Hashim et al., 2021). Traditional, one-dimensional teaching approaches further limit students' opportunities to engage in analytical, evaluative and creative thinking processes (Hashim et al., 2021; Nor et al., 2015). These limitations contribute to persistent gaps in cognitive development, despite the KBT's aim to foster "maximizing thinking ability" in learners through holistic educational strategies (Curriculum Development Division, 2017; Islamic Education Division, 2015, 2021).

Given this complexity where multiple interrelated factors (teacher knowledge, skills, attitudes, years of experience and training frequency) interact, Structural Equation Modelling (SEM) is particularly well-suited to untangle these constructs. SEM enables simultaneous analysis of direct and indirect effects among latent variables and observed measures, offering richer insights than traditional regression models (Kim, 2022).

3.0   METHODOLOGY

3.1   Participants and Procedures

This quantitative study examined relationships between knowledge, skills, attitude, years of teaching Hifz al-Quran experience and HOTs training frequency among tahfiz teachers. A total of 198 teachers from four randomly selected schools in the central zone of peninsular Malaysia participated, ensuring a representative sample. Schools were chosen for their trained teachers and readiness in HOTs implementation. Sample adequacy was determined through a priori power analysis using G*Power 3.1.9.7 (Miles, 2003; Ali Memon et al., 2020; Kang, 2021), based on a medium effect size ($f^2 = 0.15$), $\alpha = 0.05$ and power $= 0.95$. The required sample size was 107, with the actual power reaching 0.9517, confirming adequacy. The final sample of 198 exceeded this threshold, allowing robust detection of effects. Participants were selected through simple random sampling, with approvals obtained via the Ministry of Education's eRAS 2.0 system. Following school consent, questionnaires were distributed in person by designated representatives to ensure anonymity and confidentiality. Eligible respondents were Hifz al-Quran teachers under the Tahfiz Integrated Curriculum (KBT) who volunteered for the study. Of these, 52.5% were male and 47.5% female, with most having 5–10 years of teaching experience (67.7%), while 25.8% had less than 5 years and 6.6% more than 10 years as shown in Table 1.

Table 1

Demographic Profile of Respondents

Demography	Category	Frequency	Percentage (%)
Gender	Male	104	52.5
	Female	94	47.5
Years of Teaching Experience in Hifz al-Quran subject	< 5 years	51	25.8
	5 to 10 years	134	67.7
	> 10 years	13	6.6
HOTs Training Frequency	Never	16	8.1
	1 – 2 times	61	30.8
	3 – 4 times	84	42.4
	5 – 6 times	27	13.6
	> 7 times	10	5.1

3.2   Research Instruments

This survey utilized a questionnaire developed based on an extensive review of relevant literature with adaptations from established models and theories. The instrument drew upon Shulman's Pedagogical Content Knowledge (1986), the Iceberg Competency Model (McBer, 1996), the Teacher Competency Profile (Koster et al., 2005), Malaysian Teacher Standards 2.0 (Teacher Professionalism Division, 2023) and the Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001). These frameworks were integrated to ensure a comprehensive approach to assessing the constructs related to tahfiz teachers' implementation of Higher Order Thinking Skills (HOTs). The instrument was structured around one section of demographic profile and three constructs—knowledge, skills and attitude—comprising a total of 35 items measured using a 5-point Likert scale. Each construct was designed to capture essential aspects of HOTs integration, aligning with the study's objectives, as shown in Table 2.

Table 2

Questionnaire Instrument and Item Information

Section	No. of Items	Items	Category/Scale
Teachers' Knowledge in	13	Higher Order Thinking Skills (HOTs) is one of the 21st	5-point Likert Scale:

Implementing HOTs	century teaching and learning (PdPc) skills. Mastery of Curriculum Standards (SK) in the Hifz al-Quran curriculum contributes to the acquisition of 21st century skills among students. Mastery of Learning Standards (SP) in the Hifz al-Quran curriculum contributes to the acquisition of 21st century skills among students. HOTs can produce students who think critically. The Hifz al-Quran syllabus contains elements of HOTs. "Remembering" and "Understanding" are cognitive levels of Lower Order Thinking Skills (LOTs) in Revised Bloom's Taxonomy. "Applying," "Analyzing," "Evaluating" and "Creating" are cognitive levels of HOTs in Revised Bloom's Taxonomy. Appropriate Teaching Aids (BBM) are used to enhance students' HOTs. The integration of HOTs in the syllabus is based on students' cognitive levels. The integration of HOTs in the syllabus is based on students' abilities. The use of suitable questioning and assessment methods can promote students' HOTs. There are cognitive limitations that affect the stimulation of HOTs in Hifz al-Quran	1= Poor, 2= Fair, 3= Good, 4= Very good, 5= Excellent

Teachers' Skills in Implementing HOTs	12	teaching. Various teaching strategies are used to help students achieve HOTs. I plan lessons by organizing content in a structured manner. I plan the integration of HOTs to enhance students' memorization outcomes in the Hifz al-Quran subject. Before questioning students, I analyze their thinking ability levels. I use HOTS verbs (analyze/apply/evaluate/create) in the curriculum. I not only help students memorize Quranic verses but also stimulate their HOTs. I ask students to explain the lessons taught and provide other examples. I give students sufficient time to think before answering. I use student-centered teaching strategies to integrate HOTs into the learning process. I use teaching aids (BBM) to help students access accurate information. I ensure the teaching aids used connect Quranic memorization with students' character development. I apply the knowledge gained from HOTs workshops/courses in Hifz al-Quran teaching. I use students' performance levels (TP) to assess their HOTs.

Teachers' Attitude in Implementing HOTs	10	I keep up to date with current issues related to HOTs. I am aware of the importance of HOTs for students in the Hifz al-Quran subject. I understand HOTs as one of the aspirations in the Malaysian Education Blueprint (PPPM) 2013–2025. I am willing to learn HOTs approaches for teaching. I am willing to conduct lessons using HOTs. I create and find suitable teaching aids (BBM) aligned with HOTs to apply in teaching. I ensure HOTs integration relates to the content of the Hifz al-Quran subject. I discuss with fellow teachers to plan HOTs-based lessons. I realize students not only need to complete memorization but also master HOTs related to the Quran. I prefer preparing students for examinations rather than teaching HOTs to meet various expectations.	5-point Likert Scale: 1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree

Knowledge construct was established using the Shulman's Pedagogical Content Knowledge (1986) and Malaysian Teacher Standards 2.0 (Teacher Professionalism Division, 2023) to assess the participants' knowledge in implementing HOTs. Under this construct, comprising 13 items respondents rated their understanding and awareness of HOTs concept, principles and others on a 5-point Likert scale, ranging from 'Excellent' to 'Poor'. In this study, the validity of the measurement model was confirmed by analyzing a Confirmatory Factor Analysis (CFA). This study employed Revised Bloom's Taxonomy (2001) and Malaysian Teacher Standards 2.0 (Teacher Professionalism Division, 2023)

to evaluate skills construct. There were 12 items and the scale were the same as used by knowledge construct. Meanwhile, the evaluation of attitude construct was using the Iceberg Competency Model (McBer, 1996) and Malaysian Teacher Standards 2.0 (Teacher Professionalism Division, 2023) and 10 items were created. The scale used were differed to knowledge and skills construct which using 'Strongly agree' to 'Strongly disagree'. In this study, the validity of the measurement models was confirmed by analyzing a CFA.

3.3 Mathematical Statistics

The study employed a three-step Structural Equation Modelling (SEM) approach using Statistical Package for the Social Sciences (SPSS) (version 30.0) and SPSS Analysis of Moment Structure (AMOS) (version 29.0). First, the measurement model was assessed for validity and reliability through Average Variance Extracted (AVE > 0.5), the Fornell-Larcker criterion for discriminant validity and Construct Reliability (CR > 0.6) as recommended by Awang (2012). CR was preferred over Cronbach's Alpha for its robustness in SEM (Cheung et al., 2023). Normality was also confirmed through skewness (–2 to +2) and kurtosis (–7 to +7) values (Hair et al., 2010). Second, Confirmatory Factor Analysis (CFA) was conducted, with acceptable fit determined by RMSEA < 0.08, χ^2/df ratio of 1–3, CFI > 0.95 and GFI and TLI > 0.90 (Fabrigar et al., 1999; Bentler, 1990; Mulaik et al., 1989). Finally, the structural model was tested and hypotheses were evaluated using bootstrapping with 5,000 resamples (Banjavonic & Osborne, 2016; Shreffler & Huecker, 2023).

4.0 RESULTS

4.1 Assessment of Validity and Reliability of the Measurement Model

Convergent Validity was assessed through the analysis of the Average Variance Extracted (AVE) values associated with each construct. Fornell and Larcker (1981) assert that AVE values exceeding 0.5 demonstrate sufficient convergent validity.

Table 3

Convergent, Discriminant Validity Indices and Pearson Correlation of Knowledge, Skill and Attitude Constructs

Constructs	AVE	CR	Knowledge	Skill	Attitude
Knowledge	0.567	0.944	0.753[a]		0.532[b]
Skills	0.603	0.948	0.636[b]	0.777[a]	

Attitude	0.527	0.907	0.658[b]	0.726[a]

AVE average variance extracted, CR construct reliability.

[a] Diagonal value (Bolded Square Root of AVE).

[b] Pearson Correlation is significant at the 0.01 level = p < 0.01.

The data demonstrates that all the three constructs; knowledge (AVE = 0.567), skills (AVE = 0.603) and attitude (AVE = 0.527), surpassed the threshold of 0.5 indicating that the indicators adequately represent their corresponding latent constructs. Each construct is strongly related to its items in the model therefore establishing discriminant validity as shown in Table 3. Discriminant validity was established using the Fornell-Larcker criterion, which showed that the square root of the AVE for each construct; knowledge (0.753), skills (0.777) and attitude (0.726) was higher than its correlations with other constructs. The highest correlation, between skills and attitude (r = 0.658), remained below the square root of the AVE for each, indicating clear discriminant validity.

4.1.1   Normality Test

The normality test was conducted by assessing skewness and kurtosis. All the constructs exhibited skewness values within the acceptable range of normality based on Hair et al. (2010), which was between -2 and +2. Knowledge and skills constructs were slightly negatively skewed meanwhile attitude demonstrated a near symmetric distribution stated an even spread of responses around the mean. Table 4 represented all the skewness values for the constructs.

Table 4
Descriptive Analysis

Constructs	Mean	SD	Skewness	Kurtosis
Knowledge	4.40	0.513	-0.697	0.653
Skill	4.12	0.608	-0.327	-0.242
Attitude	4.04	0.493	-0.832	2.986

Regarding kurtosis value, all fall within the acceptable threshold for normality. For instance, knowledge (0.653) and skills (-0.242) displayed near normal distributions because their values were closed to zero. Thus, it indicated that neither excessive peakedness nor flatness. Even though attitude exhibited a relatively higher kurtosis value, it still falls under the acceptable range limit of +7.

All constructs satisfied the assumptions of normality. Based on the validity, reliability and normality test, the constructs data suitable to further analysis in Confirmatory Factor Analysis (CFA) to evaluate hypothesized measurement model's fit.

4.1.2   Confirmatory Factor Analysis (CFA) for Assessment of Model Fit

Confirmatory Factor Analysis (CFA) was performed using Statistical Package for the Social Sciences Analysis of Moment Structure (SPSS AMOS) and referred to the established fit indices. The results demonstrated that the model displayed a good fit, affirming that the latent constructs accurately represented their corresponding observed variables. The CFA phase evaluated the model's fit through various indices, such as Chi-Square (χ^2), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) and Goodness-of-Fit Index (GFI), in accordance with the guidelines established by Fabrigar et al. (1999), Bentler (1990) and Mulaik et al. (1989).

The first time running the CFA the results indicated issues with model fit as the RMSEA value was at an unacceptable level of 0.111. Consequently, parceling of items within all constructs was necessary. Parceling enhances model parsimony and yields a more interpretable structure while retaining construct integrity. Empirical evidence highlights its advantages with studies showing improvements in model fit indices for instance reducing RMSEA from 0.100 to 0.078 demonstrating parceling's ability to produce a more robust and reliable measurement structure. In the present study the random disaggregation strategy was employed whereby items were randomly assigned into parcels according to predetermined parcel numbers. This strategy is conceptually the same as the subset-item-parcel approach described by Matsunaga (2008) which randomly allocates items to parcels without relying on theoretical or empirical grouping. Such an approach has been shown to improve fit measures effectively particularly in models where unidimensionality is established (Hall et al., 1999; Landis, Beal & Tesluk, 2000). Rocha and Chelladurai (2012) further confirm that random parceling is a viable method as it provides acceptable fit measures and can mitigate issues of model instability especially when sample sizes are moderate and the ratio of sample size to estimated parameters is low. By adopting this strategy the current study ensured that the improved measurement model (Figure 1) retained theoretical coherence while addressing limitations of poor fit indices in the initial CFA results.

Figure 1
Final CFA Model
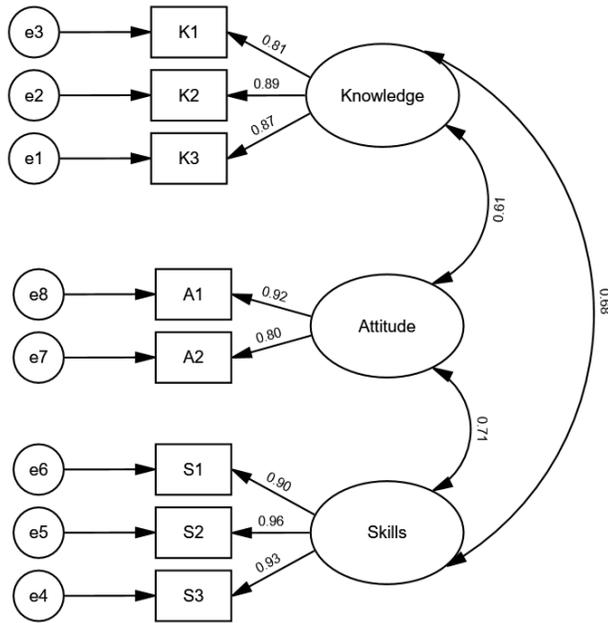
The CFA results indicated that all fit indices satisfied the recommended thresholds for an adequately fitting model. The model exhibited a Chi-Square value of 37.355 with 17 degrees of freedom (df), resulting in a (χ^2/df) ratio of 2.20, which is within the acceptable range of 1 to 3, suggesting an adequate model fit. The RMSEA was 0.078, remaining below the cutoff of 0.08 (Fabrigar et al., 1999), thereby affirming the model's acceptability. The CFI was 0.985, which is above the recommended threshold of 0.95 (Bentler, 1990). The TLI was 0.975, exceeding the minimum requirement of 0.90 (Mulaik et al., 1989; Bentler, 1990). The GFI was 0.955, exceeding the 0.90 threshold, which indicates a strong absolute fit to the data. The indices collectively indicated that the measurement model was consistent with the observed data. Table 5 below represents the results.

Table 5
Fit Index for CFA results

Fit Index Category	Name of Index	Fit Index Value[a]	Threshold	Sources

Absolute fit	RMSEA (Root Mean Square Error of Approximation)	0.078	≤ 0.05 (Good), ≤ 0.08 (Acceptable	Fabriger et al. (1999)
	GFI (Goodness-of-Fit Index)	0.955	≥ 0.90 (Good)	(Mulaik et al. (1989); Bentler (1990)
Incremental fit	CFI (Comparative Fit Index)	0.985	≥ 0.95 (Good)	Bentler (1990)
	TLI (Tucker-Lewis Index)	0.975	≥ 0.95 (Good)	(Mulaik et al. (1989); Bentler (1990)
Parsimonious fit	Chi-Square (χ^2/df)	37.355 / 17 = 2.20	≤ 3 (Good), ≤ 5 (Acceptable)	Bentler (1990)

[a] Fit index value for the studies

The results obtained showed that the measurement model exhibited an adequate fit, thereby supporting the construct validity of the latent variables. The elevated CFI and TLI values demonstrated that the model accounted for a substantial portion of the variance in the data, whereas the acceptable RMSEA and χ^2/df values indicated that the residual errors remained within an acceptable range. The findings confirmed the appropriateness of the measurement model for subsequent structural analysis. The robust fit indices indicated that the observed indicators effectively measured their corresponding latent constructs, establishing a reliable basis for further hypothesis testing and model validation.

The CFA results validated a suitable measurement model, allowing the study to advance to Structural Equation Modeling (SEM) to examine the proposed relationships among constructs. During the subsequent SEM phase, bootstrapping with 5000 resamples was conducted in accordance with the guidelines established by Banjanovic and Osborne (2016) to improve the robustness of parameter estimates. Additionally, hypothesis testing was performed utilizing significance criteria derived from p-values, in accordance with the

guidelines established by Shreffler and Huecker (2023). This stage established the structural relationships among the variables and validated the theoretical model proposed in this study.

4.2   Development and Evaluation of the Structural Equation Model (SEM)

This study aimed to examine the relationship between knowledge, skills and attitude among tahfiz teachers in implementing HOTs in Hifz al-Quran subject. It was hypothesized that knowledge directly or indirectly influences skills and attitude, with skills serving as a potential mediator in this relationship. Structural Equation Modelling (SEM), Confirmatory Factor Analysis (CFA) and moderation analysis were employed to test these relationships. The results indicated that knowledge has a significant positive effect on skills and attitude, while skills play a crucial role in mediating the impact of knowledge on attitude. Additionally, moderation effects of years of teaching Hifz al-Quran experience and HOTs training frequency were tested but found to be insignificant, suggesting that the knowledge-skills-attitude relationship remains stable across different levels of teaching experience and training frequency. These findings emphasize the importance of knowledge enhancement as a key factor in skill development and attitude formation, reinforcing the need for targeted educational interventions.

The SEM was tested after confirming the validity of the measurement model. The final SEM model fit indices indicated a good model fit: χ^2/df = 2.15, CFI = 0.962, TLI = 0.899, GFI = 0.978 and RMSEA = 0.076 (Bentler, 1990; Fabriger et al., 1999; Mulaik et al., 1989). Given that all key model fit indices met or approached their recommended thresholds, the structural model was considered theoretically meaningful and empirically valid, allowing for subsequent hypothesis testing and interpretation of path relationships.

4.2.1   Direct Effects

The analysis revealed nine hypotheses of the final model of SEM that showed only direct effects are significant compared to moderating effects and control variables. The results of the SEM analysis indicate that knowledge significantly predicts skills (β = 0.612, p < 0.001) and skills significantly influence attitude (β = 0.532, p < 0.001). Additionally, knowledge exerts a weak yet statistically significant direct effect on attitude (β = 0.174, p = 0.012) as shown in Table 6.

Table 6

Direct, Moderating Effects and Control Variables of SEM Final Model

Hypothesis	Path	β (Standardized Path Coefficient)	p-value	Significance
Direct Effects				
H1	Knowledge → Skills	0.612	<0.001	Significant
H2	Skills → Attitude	0.532	< 0.001	Significant
H3	Knowledge → Attitude	0.174	0.012	Significant
Moderating Effects				
H4	Interaction Knowledge X Years of Teaching Hifz al-Quran Experience → Skills	0.008	0.884	Not Significant
H5	Interaction Knowledge X Years of Teaching Hifz al-Quran Experience → Attitude	0.028	0.598	Not Significant
H6	Interaction Knowledge X HOTs Training Frequency → Skills	-0.088	0.119	Not Significant
H7	Interaction Knowledge X HOTs Training Frequency → Attitude	-0.052	0.341	Not Significant
Control Variables				
H8	Years of Teaching Hifz al-Quran Experience → Skills	0.017	0.762	Not Significant
	Years of Teaching Hifz al-Quran Experience → Attitude	-0.048	0.358	Not Significant

H9	HOTs Training Frequency → Skills	0.026	0.635	Not Significant
	HOTs Training Frequency → Attitude	-0.025	0.634	Not Significant

4.3   Analysis of Moderating Effects

4.3.1   Moderating Effects

The study aimed to examine whether years of teaching Hifz al-Quran experience and HOTs training frequency moderated the relationships between knowledge, skills and attitude. Hypotheses 4 to 7 (H4–H7) tested the interaction effects between knowledge and these moderators to determine whether they significantly influenced the development of skills and attitude. However, the results revealed that all moderation effects were statistically insignificant, suggesting that the relationships between knowledge, skills and attitude remain stable regardless of variations in the moderating effects.

4.3.2   Model Fit Adjustment

Two covariances were incorporated to enhance model fit, as indicated by Modification Indices. The covariances do not signify causal relationships; instead, they represent statistical adjustments to address shared variance among related variables. The inclusion of these covariances enhanced model fit, as indicated by a reduction in χ^2/df from 3.42 to 2.15 and an increase in Comparative Fit Index (CFI) from 0.899 to 0.962, as shown in Table 7. Therefore, it is confirmed that the modifications improved the model's explanatory power.
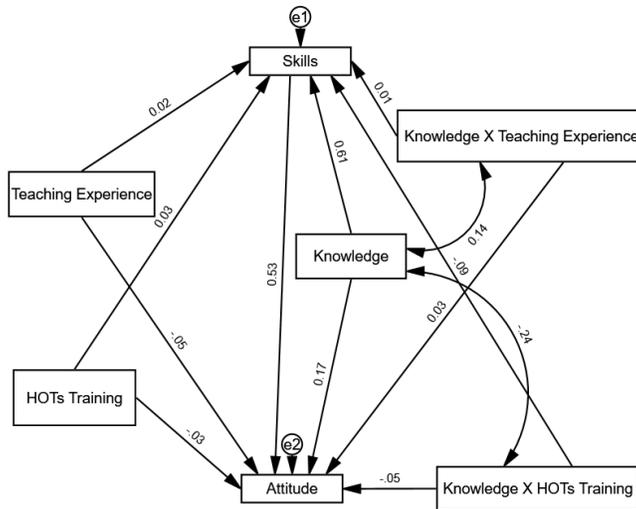
Table 7
Fit Index Values After Modification

Fit Index	Before Modification	After Modification	Improvement
Chi-Square (χ^2/df)	3.42	2.15	✓
CFI (Comparative Fit Index)	0.899	0.962	✓
TLI (Tucker-	0.788	0.899	✓

Lewis Index)			
GFI (Goodness-of-Fit Index)	0.954	0.978	✓
RMSEA (Root Mean Square Error of Approximation)	0.111	0.076	✓

The final model SEM to represent these studies and the relationship of teachers' knowledge, skills and attitude were illustrated in Figure 2.

Figure 2
Measurement Model of Knowledge, Skill and Attitude Levels of Tahfiz Teachers in Implementing HOTs in Hifz al-Quran

5.0   DISCUSSION

The assessment of model fit was conducted through Confirmatory Factor Analysis (CFA). Initial CFA results indicated poor model fit, which required item parceling to achieve acceptable levels. Parceling is a method that aggregates individual items into composite parcels and is widely used in Structural Equation Modelling (SEM) as it enhances stability, normality and interpretability of the measurement model. When theoretically justified, parceling reduces the number of indicators per latent construct, simplifying the model and improving fit indices (Little et al., 2002). Treating items individually can otherwise lead to inflated

measurement errors, cross-loadings and high Chi-square values.

The results concerning H4 and H5 challenge conventional assumptions that teaching experience moderates the relationship between knowledge, skills and attitude. According to experiential learning theory (Kolb, 1984; Eraut, 2004), practical experience should facilitate the translation of knowledge into applied skills. However, the non-significant moderation effects (H4: $\beta = 0.008$, $p = 0.884$; H5: $\beta = 0.028$, $p = 0.598$) suggest that skill development and attitude formation are not strictly dependent on years of teaching practice. Instead, these outcomes may be shaped by contextual factors such as continuous professional development, reflective teaching practices or institutional culture (Darling-Hammond & Bransford, 2005; Abakah, 2023).

Experienced teachers are expected to undergo cognitive and affective transformations over time, leading to refined professional attitudes (Korthagen, 2004; Day et al., 2006). It was anticipated that novice teachers, due to limited exposure would demonstrate greater variability in attitude development while experienced teachers would exhibit more stable internalized attitudes. However, the findings indicate that knowledge contributes to attitude formation independently of experience level. This suggests that attitude development may be more strongly influenced by external factors such as institutional expectations, peer collaboration or professional motivation, rather than teaching experience alone (Avalos, 2011). This is consistent with cognitive dissonance theory (Tueanrat & Alamanos, 2023), which posits that individuals adjust their attitudes to align with newly acquired knowledge regardless of prior experience.

The findings for H6 and H7 further show that the frequency of HOTs training does not significantly moderate the relationship between knowledge and skills or knowledge and attitude (H6: $\beta = -0.088$, $p = 0.119$; H7: $\beta = -0.052$, $p = 0.341$). While repeated training is often assumed to strengthen competencies (Kolb, 1984; Ericsson, 2006), the negative but non-significant coefficients suggest diminishing returns. Frequent exposure to identical training may lead to redundancy or cognitive overload, consistent with the law of diminishing returns in learning (Anderson, 2000). This indicates that the impact of training depends less on frequency and more on quality, novelty and relevance. Attitude formation, moreover, may be influenced more strongly by intrinsic motivation, personal beliefs and institutional support than by training frequency (Wu et al., 2021; Xu et al., 2023).

In the context of Tahfiz Integrated Curriculum (KBT), the Standard

Document for Curriculum and Assessment (DSKP) for Hifz al-Quran embeds HOTs elements across three domains, which were cognitive, affective and psychomotor that aligned with Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001). For example, cognitive processes go beyond rote memorization (*mengingat*) to include comprehension, application and evaluation when students interpret meanings, apply tajwid, present recitations (*tasmik*) and verses writing using *rasm Uthmani* standards. Affective elements such as presenting (*mempamer*) and valuing (*menghayati*) reinforce internalized discipline, while psychomotor elements are developed through accurate recitation and writing (Mohd Saad et al., 2023). Thus, HOTs integration is inherent in the structure of the Hifz al-Quran curriculum.

Therefore, while HOTs training frequency was not a significant moderator, the analysis suggests that HOTs is already embedded in the pedagogical objectives of the curriculum. Skills such as applying, analyzing, evaluating and creating are integrated into teaching practices like for instance, applying tajwid rules, analyzing verse meanings, evaluating memorization accuracy and creating links between Quranic teachings and contemporary contexts (Mohd Saad et al., 2025). This implies that effective HOTs implementation in tahfiz education depends less on the quantity of training and more on teachers' ability to internalize and operationalize HOTs elements in their pedagogy. These findings highlight that HOTs integration in tahfiz pedagogy is not merely a statistical relationship between constructs but a curricular reality embedded in the DSKP. Teachers' knowledge, skills and attitudes remain central in bridging memorization with higher cognitive, affective and psychomotor engagement, thereby advancing the objectives of 21st century learning in tahfiz education.

6.0   CONCLUSION

This study demonstrates that knowledge significantly enhances skills, which then positively influences attitude, thereby underscoring the essential role of knowledge acquisition in teacher's implementation of HOTs in teaching Hifz al-Quran. The study initially hypothesized that years of teaching Hifz al-Quran experience and HOTs training frequency would moderate these relationships. However, the findings indicated no significant moderation effects. This suggests that the knowledge-skills-attitude relationship remains stable irrespective of experience level or training frequency. This novel insight challenges the assumption that professional experience and training frequency inherently improve learning outcomes, emphasizing that knowledge-driven interventions

should be prioritized over experience-based differentiation in teaching and learning process. The findings indicate that training programs should prioritize the optimization of knowledge quality, applicability and contextual relevance over simply increasing training frequency or customizing content according to experience levels. Future research should investigate alternative moderators including self-efficacy, motivation and workplace environment to gain a deeper understanding of the factors that may facilitate or hinder knowledge application. Further studies could examine the longitudinal effects of knowledge acquisition on sustained skill development and attitude transformation that offer insights into the evolution of teacher's teaching strategy over time.

ACKNOWLEDGEMENTS

REFERENCES

Abakah, E. (2023). Teacher learning from continuing professional development (CPD) participation: A sociocultural perspective. *International Journal of Educational Research Open, 4,* 100242.

Alias, N. (2020). Kurikulum Bersepadu Tahfiz (KBT). In M. K. Jusoh (Ed.), *Sejarah dan perkembangan pendidikan tahfiz al-Quran di Malaysia: Edisi II* (pp. 42–52). Darul Quran JAKIM. Retrieved December 12, 2024, from http://irep.iium.edu.my/id/eprint/82121

Ali Memon, M., Ting, H., Cheah, J.-H., Thurasamy, R., Chuah, F., & Huei Cham, T. (2020). Sample size for survey research: Review and recommendations. *Journal of Applied Structural Equation Modeling, 4*(2), 1–20.

Anderson, J. R. (2000). *Learning and memory: An integrated approach.* John Wiley & Sons.

Anderson, L. W., & Krathwohl, D. R. (2001). *Taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy.* Longman Publishing.

Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. *Teaching and Teacher Education, 27*(1), 10–20.

Awang, Z. (2012). Validating the measurement model: CFA. In *A handbook on SEM* (2nd ed., pp. 54–73). Universiti Sultan Zainal Abidin.

Banjanovic, E. S., & Osborne, J. W. (2019). Confidence intervals for effect sizes:

Applying bootstrap resampling. *Practical Assessment, Research and Evaluation, 21*(1), 5.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238.

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher, 33*(8), 3–15.

Cheung, G. W., Cooper-Thomas, H. D., Lau, R. S., & Wang, L. C. (2024). Reporting reliability, convergent and discriminant validity with structural equation modeling: A review and best-practice recommendations. *Asia Pacific Journal of Management, 41*(2), 745–783.

Curriculum Development Division. (2015a). *Kurikulum Standard Sekolah Menengah Hifz al-Quran Tingkatan 2*. In *Standard Document for Curriculum and Assessment (DSKP)* (pp. 1–19). Ministry of Education Malaysia.

Curriculum Development Division. (2015b). *Kurikulum Standard Sekolah Menengah Hifz al-Quran Tingkatan 3*. In *Standard Document for Curriculum and Assessment (DSKP)* (pp. 1–21). Ministry of Education Malaysia.

Curriculum Development Division. (2017). *Kurikulum Standard Sekolah Menengah Hifz al-Quran Tingkatan 1*. In *Standard Document for Curriculum and Assessment (DSKP)* (pp. 1–42). Ministry of Education Malaysia.

Curriculum Development Division. (2019a). *Kurikulum Standard Sekolah Menengah Hifz al-Quran Tingkatan 4*. In *Standard Document for Curriculum and Assessment (DSKP)* (pp. 1–39). Ministry of Education Malaysia.

Curriculum Development Division. (2019b). *Kurikulum Standard Sekolah Menengah Hifz al-Quran Tingkatan 5*. In *Standard Document for Curriculum and Assessment (DSKP)* (pp. 1–39). Ministry of Education Malaysia.

Darling-Hammond, L. (2000). How teacher education matters. *Journal of Teacher Education, 51*(3), 166–173.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development.* Learning Policy Institute.

Darling-Hammond, L., & Bransford, J. (Eds.). (2005). *Preparing teachers for a changing world: What teachers should learn and be able to do.* Jossey-Bass.

Day, C., Sammons, P., Stobart, G., Kington, A., & Gu, Q. (2006). *Teachers matter: Connecting work, lives and effectiveness.* McGraw-Hill Education.

Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education, 26*(2), 247–273.

Ericsson, K. A. (2006). The influence of experience and deliberate practice on the development of superior expert performance. In *The Cambridge handbook of expertise and expert performance* (pp. 683–703). Cambridge University Press.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*(3), 272.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50.

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching, 8*(3), 381–391.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson.

Hall, R. J., Snell, A. F., & Foust, M. S. (1999). Item parceling strategies in SEM: Investigating the subtle effects of unmodeled secondary constructs. *Organizational Research Methods, 2*(3), 233–256.

Haron, M. Z., Md Zalli, M. M., Mohd Akil, F. N., Salleh, I., & Ahmad, M. H. (2020). Pengetahuan pedagogi, kemudahan pembelajaran dan hubungannya dengan kualiti pengajaran guru tahfiz Model Ulul Albab (TMUA) di Malaysia. In *Seminar Darulaman 2020 Peringkat Kebangsaan* (pp. 123–130).

Hashim, A., Samsudin, N., Huda, M., & Maseleno, A. (2021). Exploring critical thinking in religious education: An empirical research for Hafazan (memorisation) context. *Turkish Journal of Physiotherapy and Rehabilitation, 32*(2), 3697–3699.

Islamic Education Division. (2015). *Maklumat asas pelaksanaan Kurikulum Bersepadu Tahfiz*. Ministry of Education Malaysia. Retrieved December 9, 2024, from http://jpnperak.moe.gov.my/jpn/attachments/article/2558/KBT%20Maklumat%20Asas%202015.pdf

Islamic Education Division. (2021). *Laporan kajian penerapan kemahiran berfikir aras tinggi (KBAT) dalam pengajaran dan pembelajaran bagi Kurikulum Bersepadu Dini (KBD) dan Kurikulum Bersepadu Tahfiz (KBT).* Ministry of Education Malaysia.

Kang, H. (2021). Sample size determination and power analysis using the G*Power software. *Journal of Educational Evaluation for Health Professions, 18*(17). https://doi.org/10.3352/JEEHP.2021.18.17

Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research, 86*(4), 945–980.

Kim, Y. H., & Na, S. I. (2022). Using structural equation modelling for understanding relationships influencing the middle school technology teacher's attitudes toward STEAM education in Korea. *International Journal of Technology and Design Education, 32,* 2495–2526. https://doi.org/10.1007/s10798-021-09708-z

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Prentice Hall.

Korthagen, F. A. J. (2004). In search of the essence of a good teacher: Toward a more holistic approach in teacher education. *Teaching and Teacher Education, 20*(1), 77–97.

Koster, B., Brekelmans, M., Korthagen, F., & Wubbels, T. (2005). Quality requirements for teacher educators. *Teaching and Teacher Education, 21*(2), 157–176.

Landis, R. S., Beal, D. J., & Tesluk, P. E. (2000). A comparison of approaches to forming composite measures in structural equation modeling. *Organizational Research Methods, 3*(2), 186–207.

Matsunaga, M. (2008). Item parceling in structural equation modeling: A primer. *Communication Methods and Measures, 2*(4), 260–293.

McBer, H. (1996). *Scaled competency dictionary.* Hay McBer.

Miles, J. (2003). A framework for power analysis using a structural equation modelling procedure. Retrieved from http://www.biomedcentral.com/1471-2288/3/27

Mohd Saad, M. F., Mohd Ataa, N. S., Mohamad, S., & Ishak, H. (2023). Analisis elemen KBAT dalam dokumen standard kurikulum dan penilaian (DSKP) Hifz al-Quran di bawah kurikulum bersepadu tahfiz (KBT). *Tinta Artikulasi Membina Ummah, 9*(2), 80–89.

Mohd Saad, M. F., Mohd Ataa, N. S., Mohamad, S., Ishak, H., & Nur, A. (2025). Minds illumination: Exploring higher order thinking skills (HOTs) in the Tahfiz Integrated Curriculum. *Islamiyyat, 47*(1), 96–106. https://doi.org/10.17576/islamiyyat-2025-4701-08

Mohd Zhaffar, N., Wan Abdullah, W. A. A., Nor, N., Musa, N. A., & Othman, M. S. (2020). Kekangan penerapan kemahiran berfikir aras tinggi dalam pengajaran Kurikulum Bersepadu Dini dan Kurikulum Bersepadu Tahfiz. In *Persidangan Antarabangsa Sains Sosial dan Kemanusiaan Ke-5 (PASAK 5)* (pp. 430–438).

Mulaik, S. A., James, L. R., Van Alstine, J., Bennett, N., Lind, S., & Stilwell, C. D. (1989). Evaluation of goodness-of-fit indices for structural equation models. *Psychological Bulletin, 105*(3), 430.

Nor, N., Suhaimi, N. S., Abdul Wahab, N. S., Che Ismail, M. K., Che Noh, M. A., & Abdul Razak, K. (2015). Pelaksanaan KBAT dalam pengajaran dan

pembelajaran Pendidikan Islam sekolah menengah: Satu tinjauan di Putrajaya. In *Proceedings of the 7th International Seminar on Regional Education* (pp. 361–375).

Papay, J. P., & Kraft, M. A. (2015). Productivity returns to experience in the teacher labor market: Methodological challenges and new evidence on long-term career improvement. *Journal of Public Economics, 130,* 105–119.

Rocha, C. M., & Chelladurai, P. (2012). Item parcels in structural equation modeling: An applied study in sport management. *International Journal of Psychology and Behavioral Sciences, 2*(1), 46–53.

Shreffler, J., & Huecker, M. R. (2023). Hypothesis testing, P values, confidence intervals and significance. In *StatPearls* [Internet]. StatPearls Publishing.

Shulman, L. S. (1986). Paradigms and research programs in the study of teaching: A contemporary perspective. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 3–36). McMillan Publishing Company.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1–22.

Siti Rashidah, A. R. (2020). Isu pendidikan guru tahfiz: Pengetahuan pedagogi dan amalan dalam proses pengajaran dan pembelajaran di pusat tahfiz persendirian di Selangor. *Islamiyyat, 42*(Special Issue), 104. https://doi.org/10.17576/islamiyyat-2020-42IK-13

Sundara Rajoo, K. (2018). Masalah-masalah mengintegrasikan KBAT dalam pengajaran sewaktu praktikum oleh guru pelatih IPG Ipoh. In *Proceedings of the International Conference on The Future of Education (IConFEd) 2018* (pp. 435–444).

Rajendran, N. (2000). Teaching higher-order thinking skills in classrooms: Learning from experiences of Malaysia. In *Thinking Qualities Initiative Conference Hong Kong 2000.*

Rifin, F., Ahmad, A., & Othman, N. (2021). Kompetensi guru dalam penerapan kemahiran berfikir aras tinggi dalam pengajaran pendidikan Sejarah. *Malaysian Journal of Social Sciences and Humanities (MJSSH), 6*(1), 194–205. https://doi.org/10.47405/mjssh.v6i1.632

Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review, 94*(2), 247–252.

Tamuri, A. H., Ismail, M. F., & Jasmi, K. A. (2012). Komponen asas untuk latihan guru pendidikan Islam: Basic components for Islamic education teacher training. *Global Journal Al-Thaqafah, 2*(2), 53–63.

Teacher Professionalism Division. (2023). *Standard Guru Malaysia 2.0.* Ministry of Education Malaysia.

Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Teacher professional learning and development: Best evidence synthesis iteration (BES).* Ministry

of Education, New Zealand.

Tueanrat, Y., & Alamanos, E. (2023). Cognitive dissonance theory: A review. In S. Papagiannidis (Ed.), *TheoryHub Book*. Retrieved from https://open.ncl.ac.uk/theories/7/cognitive-dissonance-theory/

Wu, Y., Sun, J., Fan, F., Wang, X., & Peng, Y. (2021). The influence of motivation, attitudes and obstacles for middle school students' participation in leisure activities on their leisure satisfaction in Southwest China. *Frontiers in Psychology, 12,* 758858.

Xu, L., Duan, P., Ma, L., & Dou, S. (2023). Professional identity and self-regulated learning: The mediating role of intrinsic motivation and the moderating role of sense of school belonging. *SAGE Open, 13*(2), 21582440231177034.

Zakaria, Z., & Ismail, A. (2022). Personality traits of Muslim teachers: A brief overview. *Islamiyyat, 44*(2), 124. https://doi.org/10.17576/islamiyyat-2022-4402-09

Zulkifli, H., Tamuri, A. H., & Abdul Hafidz, N. S. (2022). Teacher's evaluation of student progress in Islamic education using Hikmah pedagogy. *Islamiyyat, 44*(2), 138.

Zohar, A. (2013). Challenges in wide-scale implementation efforts to foster higher-order thinking (HOT) in science education across a whole school system. *Thinking Skills and Creativity, 10,* 233–249.