Jurnal Pendidikan Islam 11 (2) (2025) 376-389
DOI: https://doi.org/10.15575/jpi.v11i2.44968
http://journal.uinsgd.ac.id/index.php/jpi

p-ISSN: 2355-4339
e-ISSN: 2460-8149

THE COGNITIVE-PEDAGOGICAL LINK: WORKING MEMORY STRATEGIES AND THE ENHANCEMENT OF QUR'AN MEMORIZATION AND RETENTION

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Received: April 2025. Accepted: October 2025. Published: December 2025.

ABSTRACT
Memorization of sacred texts, particularly the Qur'an (*Hifz*), is a vital global pedagogical practice in Islamic education, yet institutions consistently face challenges related to variations in students' memorization speed and the durability of retention. These inconsistencies stem from varying individual cognitive capacities. This study aims to identify, apply, and evaluate the effectiveness of targeted working memory strategies in enhancing cognitive capacity and optimizing both the immediate memorization and long-term retention of Qur'anic content among students. Employing a quantitative approach, the study recruited 32 participants from the Faculty of Dirasat Islamiyah at Syarif Hidayatullah State Islamic University in Jakarta. Data were analyzed using non-parametric statistical tests, specifically the Wilcoxon signed-rank test, Mann-Whitney U-test, and Kruskal-Wallis test, alongside descriptive statistics, to compare pre- and post-intervention memorization and retention scores. The findings indicated a statistically significant difference between the mean pre-test and post-test scores, accompanied by a medium effect size, confirming the strategies' immediate efficacy. Crucially, the decrease in scores between the post-test and subsequent retention measurement was significantly smaller than the decrease between the pre-test and initial retention measurement. The memorization strategy model used effectively enhances working memory function and significantly improves both initial learning and retention rates. This research strongly recommends the application of this strategy model within Islamic educational institutions to optimize students' *Hifz* performance, bridging the gap between traditional practices and cognitive-pedagogical advancements.

Keywords: Attitude, Effectiveness, Forgetting Curve, Qur'an Memorization, Retention, Working Memory

INTRODUCTION
In the global landscape of education, memory is a crucial component for knowledge acquisition, yet the fundamental challenge of retaining newly learned information persists. The classic Modal Model of Memory posits that information not actively rehearsed decays rapidly from short-term memory (Atkinson & Shiffrin, 1968). This phenomenon is empirically validated by the forgetting curve, which shows that at least 50% of memorized information is initially forgotten, leading to a steep decline in retention before stabilizing (Murre & Dros, 2015). This highlights the universal importance of memory strategies in facilitating effective long-term recall (Wang, 2025). In Islamic education globally, memorization of the Qur'an (*Hifz*) is a widespread, high-stakes activity, but it faces the same cognitive challenges: inconsistency in memorization speed and, critically, the durability of the memorized content (retention rate). The cognitive demands of mastering large volumes of sacred text require strategic intervention to ensure long-term stability and effective recall.

The challenge of ensuring high retention rates is not unique to Indonesia but is faced by Qur'an memorization students worldwide. While the practice of *Hifẓ* is believed to contribute to the development of positive values (Karman et al., 2021) and enhanced cognitive abilities (Black et al., 2020; Gulamhusein & Momanyi, 2020), maintaining this memorization presents significant obstacles. Memorizing the Qur'an involves intensive working memory activity, which is the system that temporarily holds and manipulates information for cognitive tasks (Baddeley & Larsen, 2003). Unlike initial learning, retention, the amount of information that remains after a period has passed (Radvansky et al., 2022), requires continuous, lifelong practice and rehearsal (Saleem, 2018). A failure to sustain this effort often leads to the steep decline predicted by the forgetting curve. In the context of higher Islamic education, this issue has tangible consequences. For example, according to the data provided by the Faculty of Dirasat Islamiyah at UIN Syarif Hidayatullah Jakarta in 2021, where students are required to memorize at least eight *juz'* (chapters), failure rates in memorization assessments range significantly (27% to 48%), directly contributing to prolonged study durations and low on-time graduation rates.

Existing studies on Qur'an memorization have examined numerous factors, including demographics (gender, age), institutional environments, group techniques, and pedagogical strategies such as *tahsin* and meaning-based memorization (Abu Al-Khair, 2014; Ikhwanuddin, 2013; Fitri et al., 2020). However, this research primarily focuses on teaching strategies and contextual factors rather than the core cognitive processes that govern recall and retention. Furthermore, while the application of Ebbinghaus's forgetting curve theory has been successful in fields such as mathematics and language learning (Liu & Areerungruang, 2024; Peng et al., 2023), its application in the context of Qur'an memorization remains scarce.

Despite the global proliferation of *tahfiẓh* programs, a critical research gap remains in understanding the cognitive mechanisms driving successful, long-term Qur'an retention. Existing literature focuses primarily on pedagogical or environmental factors, largely neglecting the integration of cognitive science principles, specifically the enhancement of working memory, with the traditional practice of *Hifẓ*. This study addresses the gap by moving beyond surface-level techniques to examine the interplay between working memory capacity and memorization success, and to investigate how structured cognitive strategies can significantly enhance performance and retention rates.

METHOD

This quantitative study employed a within-subjects design and a cross-sectional approach to investigate the impact of working memory strategies on Qur'an memorization and retention. The theoretical underpinnings integrate three seminal cognitive frameworks: the Modal Model of Memory (Atkinson & Shiffrin, 1968), which describes the flow of information through memory stages; the Working Memory Model (Baddeley, 1992), which focuses on the active processing components like the phonological loop and visuo-spatial sketchpad; and Ebbinghaus' Forgetting Curve (Murre & Dros, 2015), which guides the assessment of retention decay over time. The research specifically explored whether structured cognitive strategies, such as rehearsal, chunking, and associative learning, could significantly improve Qur'anic retention by maximizing the functionality of working memory's components. Participants were recruited using purposive sampling from a population of 160 third-semester students at the Faculty of Islamic Studies, Syarif Hidayatullah State Islamic University Jakarta. As shown in Table 1, a sample of 32 students was selected, with confidentiality maintained by replacing names with ID numbers after obtaining informed consent.

Table 1. Frequency table of gender and educational background

Variable	N	Percent
Gender		
Male	13	40.6
Female	19	59.4
Educational Background		
SMA (Non-boarding public school)	3	9.4
Madrasah Aliyah (Non-boarding religious school)	6	18.8
Pondok Pesantren (Boarding public or religious school)	23	71.9

The experiment was conducted online via Zoom and Google Meet, comprising four distinct stages designed to test immediate learning and long-term retention against the Forgetting Curve: a pre-test (using baseline methods), a post-test (using structured memory strategies like rehearsal and chunking), and two subsequent retention tests conducted one month later (Retention 1 and 2). Performance in all stages was evaluated based on the accuracy and number of lines memorized from participants' recorded recitations. Data analysis used IBM SPSS Statistics, employing the Wilcoxon signed-rank test for within-subjects comparisons, and the Mann-Whitney U test and Kruskal-Wallis test to examine performance differences based on gender and educational background, respectively.

RESULTS AND DISCUSSION

To achieve the study's objectives, data were collected across four key measurement stages: the pre-test and post-test assessed immediate learning gains, while Retention 1 and Retention 2 (conducted one month later) measured memory stability. This descriptive overview provides a foundational snapshot of central tendencies and score variability across the participants' learning trajectory, highlighting crucial shifts in achievement prior to the detailed inferential analysis in Table 2.

Table 2. Descriptive statistics of pre-test, post-test, retention 1, and retention 2

	N	Minimum	Maximum	*M*	*SD*
Pre-Test	32	4	40	15.91	8.884
Post-Test	32	8	47	18.28	10.675
Retention 1	32	0.5	31	13.70	8.007
Retention 2	32	2	42	11.88	8.011
Valid N (listwise)	32				

In Table 2, the output displays the pre-test and post-test scores for 32 participants, ranging from 4 to 40 and 8 to 47, with means of 15.91 and 18.28, respectively, and standard deviations of 8.884 and 10.675. It also shows the retention scores of participants 1 and 2, which range from 0.5 to 31 and 2 to 42, with means of 13.70 and 11.88, and standard deviations of 8.007 and 8.011, respectively. The Wilcoxon signed-rank test was employed to assess the statistical significance of the improvement, as the data were non-normally distributed and the measurements were paired. Table 3 presents a summary of score changes, indicating whether the proposed strategy significantly enhanced students' Qur'an memorization performance.

Table 3. Wilcoxon signed-rank test for the comparison of participants' performances of memorizing the Qur'an before and after the proposal of the strategy
(a) Descriptive Statistics, (b) Test Statistics

(a) **Descriptive Statistics**

	N	Percentiles 25th	50th (Median)	75th
Pre-Test	32	8.000	15.000	19.000
Post-Test	32	11.000	17.000	21.000

(b) **Test Statistics**[a]

	Post-Test - Pre-Test
Z	-2.094[b]
Asymp. Sig. (2-tailed)	.036

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Table 3 portrays A Wilcoxon signed-rank test was conducted to evaluate the impact of the strategy on participants' performance scores in memorizing the Qur'an. Based on the above table, it can be identified that there was a statistically significant increase in the scores from Pre-Test to Post-Test following participation in the strategy program, $z = -2.094$, $p < .05$, with a medium effect size ($r = .3$). The median score on the performances scores of memorizing the Qur'an increased from pre-test ($Md = 15$) to post-test ($Md = 17$). The Wilcoxon signed-rank test was used to compare scores across the pre-test, post-test, and retention phases to examine if the strategy produced statistically significant shifts in memorization stability. Table 4 presents the descriptive statistics and inferential test results across these intervals.

Table 4. Wilcoxon signed-rank test for the comparison of participants' performances of memorizing the Qur'an during pre-test to retention 1 and post-test to retention. (a) Descriptive Statistics, (b) Test Statistics

(a) **Descriptive Statistics**

	N	Percentiles 25th	50th (Median)	75th
Pre-Test	32	8.000	15.000	19.000
Retention 1	32	8.000	13.500	16.500

(b) **Test Statistics**[a]

	Retention 1 - Pre-Test
Z	-2.956[b]
Asymp. Sig. (2-tailed)	.003

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

A Wilcoxon signed-rank test was conducted to evaluate the impact of the strategy on participants' retention scores for memorizing the Qur'an. The results showed a statistically significant decrease in scores from Pre-Test to Retention 1, with $z = -2.956$, $p < .05$, and a medium effect size ($r = .37$). Specifically, the median score decreased from the pre-test ($Md = 15$) to retention 1 ($Md = 13.5$). Table 5 compares immediate post-test scores with the second retention test scores to assess the durability of the skills gained after the strategy program. The

Wilcoxon Signed Ranks Test was used to determine the significance and direction of the score changes during this delayed recall phase, as summarized in Table 5.

Table 5. Descriptive Statistics and Wilcoxon Signed Ranks Test for Post-Test and Retention 2 Scores. (a) Descriptive Statistics, (b) Test Statistics

(a) **Descriptive Statistics**

	N	Percentiles 25th	50th (Median)	75th
Post-Test	32	11.000	17.000	21.000
Retention 2	32	5.750	10.500	17.000

(b) **Test Statistics**[a]

	Retention 2 - Post-Test
Z	-3.919[b]
Asymp. Sig. (2-tailed)	<.001

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

Based on the Table 5, it can be identified that there was a statistically significant decrease in the scores from Post-Test to Retention 2 following participation in the strategy program, z = -3.919, $p < .001$, with a large effect size ($r = .5$). The median score on the performances scores of memorizing the Qur'an decreased from post-test ($Md = 17$) to retention 2 ($Md = 10.5$). To investigate the influence of gender on post-intervention memorization results, an independent-samples Mann–Whitney U-test was performed. Table 6 delineates the median scores for male and female students and provides the test statistics for significant differences.

Table 6. Independent-samples Mann-Whitney U-Test for the differences between gender on post-test scores. (a) Hypothesis Test Summary, (b) Independent-Samples Mann-Whitney U-Test Summary, (c) Report Post-Test

(a) **Hypothesis Test Summary**

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of Post-Test is the same across categories of Gender.	Independent-Samples Mann-Whitney U-Test	.850[c]	Retain the null hypothesis.

a. The significance level is .050.
b. Asymptotic significance is displayed.
c. Exact significance is displayed for this test.

(b) **Independent-Samples Mann-Whitney U-Test Summary**

Total N	32
Mann-Whitney U	128.500
Wilcoxon W	318.500
Test Statistic	128.500
Standard Error	25.714
Standardized Test Statistic	.194
Asymptotic Sig. (2-sided test)	.846
Exact Sig. (2-sided test)	.850

(c) **Report** Post-Test		
Gender	N	Median
Male	13	14.000
Female	19	17.000
Total	32	17.000

A mann-whitney U-Test revealed no significant difference in the post-test scores of males (*Md* = 14, *n* = 13) and females (*Md* = 17, *n* = 19), *U* = 128.5, z = .194, *p* = .85, *r* = .03. The Kruskal–Wallis test was employed to assess whether students' post-test performance significantly varied based on their prior educational background (SMA, Madrasah Aliyah, or Pondok Pesantren), as summarized in Table 7.

Table 7. Kruskal-Wallis test for the differences between educational background on post-test scores. (a) Hypothesis Test Summary, (b) Independent-Samples Mann-Whitney U-Test Summary, (c) Report Post-Test

(a) **Hypothesis Test Summary**

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of the Post-Test is the same across categories of Educational Background.	Independent-Samples Kruskal-Wallis Test	.802	Retain the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

(b) **Independent-Samples Kruskal-Wallis Test Summary**	
Total N	32
Test Statistic	.440[a]
Degree Of Freedom	2
Asymptotic Sig. (2-sided test)	.802

a. The test statistic is adjusted for ties.

(c) **Report** Post-Test		
Educational Background	N	Median
SMA	3	17.000
Madrasah Aliyah	6	17.000
Pesantren	23	17.000
Total	32	17.000

A Kruskal-Wallis test revealed no significant difference in the post-test scores across three different educational background groups (Gp1, *n* = 3: SMA, Gp2, *n* = 6: Madrasah Aliyah, Gp3, *n* = 23: Pondok Pesantren (Boarding public or religion school), χ^2 (2, *n* = 32) = .44, *p* = .80. All the educational background groups reported the same median values of 17.

Descriptive statistics were generated for all items on the attitude scale to understand participants' perceptions of the memorization strategies used in the program. These items were categorized into three groups: rehearsal, chunking, and connecting information to prior knowledge, to reflect the different cognitive strategies promoted. Table 8 displays the score distribution for each item, including mean values, variability, and distribution characteristics, providing an overview of how students rated each strategy.

Table 8. Descriptive statistics of participants' attitudes

	N	Min	Max	Sum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Attitude Scale 1	32	1	5	142	4.44	.878	-2.2	.41	6.62	.81
Attitude Scale 2	32	1	5	122	3.81	1.03	-.73	.41	.361	.81
Attitude Scale 3	32	1	5	123	3.84	.884	-.87	.414	1.98	.809
Attitude Scale 4	32	1	5	148	4.62	.793	-3.3	.414	13.9	.809
Attitude Scale 5	32	1	5	125	3.91	1.12	-.84	.414	.004	.809
Attitude Scale 6	32	1	5	142	4.44	.948	-2.2	.414	5.48	.809
Attitude Scale 7	32	2	5	130	4.06	.914	-.67	.414	-.33	.809
Attitude Scale 8	32	1	5	122	3.81	.998	-.64	.414	.461	.809
Attitude Scale 9	32	1	5	134	4.19	.965	-1.5	.414	2.92	.809
Attitude Scale 10	32	1	5	129	4.03	.933	-1.3	.414	2.63	.809
Attitude Scale 11	32	2	5	129	4.03	.861	-.71	.414	.146	.809
Total Attitude Scale	32	13	55	1446	45.2	8.05	-2.3	.414	7.47	.809

Based on Table 8, items 1-4 have mean scores ranging from 3.81 to 4.62. These items represent the rehearsal strategy. Item number 5 has a mean score of 3.91. This item represents the chunking strategy. Items 6-9 have mean scores ranging from 3.81 to 4.44. These items represent the final strategy, i.e., the connecting information-to-prior-knowledge strategy. This result indicates that most participants scored three or higher out of 5 on the Attitude Scale.

The results indicate a positive attitude among participants toward the proposed working memory strategies, implying they perceived the methods as highly useful for Qur'an memorization. Collectively, the data demonstrate the strategies' effectiveness in achieving short-term improvement, evidenced by the statistically significant gains in post-test scores. However, the subsequent decline in retention scores highlights a crucial limitation, suggesting that while the strategies aid initial learning, additional reinforcement is necessary to maintain long-term

memorization stability. Participants' favorable attitudes strongly support the utility and feasibility of these methods, suggesting they are excellent candidates for refinement and broader adaptation within Islamic educational curricula.

To address the study's objective of identifying effective working memory strategies for Qur'an memorization, the research applied three structured cognitive approaches based on the Modal Model of Memory (Atkinson & Shiffrin, 1968): rehearsal, chunking, and associative learning (connecting information to prior knowledge). The first strategy, Rehearsal (repetition), involves participants reading the verses multiple times, a method that directly aligns with Ebbinghaus's spaced-repetition principle to mitigate memory decay and strengthen recall. Participants often repeated the verses 5 to 10 times, or more, before successful memorization. Crucially, this repetition was paired with an understanding of the verse's meaning, thereby maximizing working memory efficiency and strengthening the speed of transfer to long-term memory, supporting findings that constant rehearsal is fundamental for increasing retention capacity (Saleem, 2018). The second key strategy identified was Chunking, which addresses the limited attentional capacity of working memory (Baddeley, 2006) by grouping verses into smaller, manageable pieces organized by specific themes. Given that the Qur'an contains 30 *juz'* and 114 *surah* with varied content, grouping related verses eases the cognitive load, allowing memorizers to remember the verses' order and storyline more easily, thereby significantly strengthening working memory.

The strategy of Chunking the verses of the Qur'an involves grouping them to enhance working memory and facilitate their transfer to long-term retention. This grouping can be effectively achieved through three primary methods: first, Grouping by Theme, where the memorizer organizes verses within a *juz'* based on their subject matter, such as faith, worship, or the nature of believers and hypocrites, making the content easier to categorize and recall. Second, verses can be grouped By Story, utilizing the rich narratives of the Qur'an, including tales of previous nations and Prophets, to establish a sequential, engaging framework that aids both memorization and sequential recall, thereby enhancing working memory performance. Third, grouping is achieved By Remembering the Position of the Verse, leveraging the visuo-spatial sketchpad component of working memory by mentally noting the verse's location on the physical page of the Qur'an, whether it is in the corner, middle, or end, which provides a strong visual cue for retrieval.

The final cognitive approach investigated was Connecting the Information to Prior Knowledge, which involves the Qur'an memorizer relating new verses to previously memorized content based on thematic similarities, narrative continuity, or critical differences. This strategy aligns with the principle that meaningful information remains in long-term memory for a longer period (Baddeley, 2006; Wixted, 2024). Furthermore, the core objective of examining the strategies' overall effectiveness was achieved: the study demonstrated a statistically significant increase in mean scores from the pre-test to the post-test, accompanied by a large effect size. This finding confirms the immediate suitability and powerful role of the combined memorization strategies in improving the participants' working memory function and initial *Hifz* performance.

The study investigated whether the implementation of working memory strategies resulted in a higher memory retention rate for Qur'an memorization. The key finding was that the mean decrease between the pre-test and Retention 1 scores was greater than the mean decrease between the post-test and Retention 2 scores. This demonstrated that the strategies successfully reduced the rate of memory decay compared to the baseline condition. This outcome directly supports the literature emphasizing the necessity of constant practice and preservation to prevent memorized verses from fading from memory (Aziz et al., 2019).

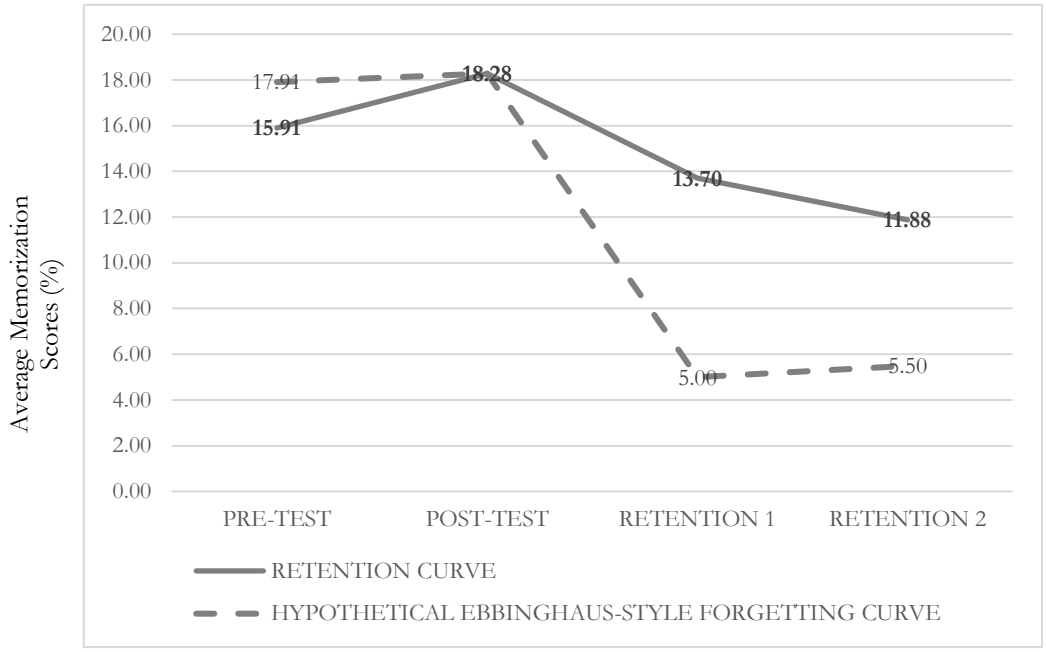

Figure 1. Retention curve aligned with the hypothetical Ebbinghaus forgetting curve

As illustrated in Figure 1 above, the retention curve for the intervention group exhibits a significantly gentler slope than the hypothetical Ebbinghaus forgetting curve. This visual representation underscores that using these structured working memory strategies directly enhances working memory capacity, thereby facilitating improved, more durable retention of information during delayed recall.

The study examined the influence of gender and prior educational background on the effectiveness of the working memory strategies. Analysis of the post-test scores revealed no statistically significant difference in performance based on the participants' gender. Similarly, when participants were divided into three groups based on their educational background, SMA (non-boarding public school), Madrasah Aliyah (non-boarding religious school), and Pondok Pesantren (Islamic boarding school), the results also showed no significant difference in post-test scores among the groups. This indicates that the strategies are uniformly effective, benefiting male and female students, and those from traditional *pesantren* backgrounds equally with those from secular or non-boarding religious schools.

Finally, this study aimed to identify participants' attitudes towards the proposed strategies for memorizing the Qur'an. The findings showed that the participants' attitudes are positive. The strategies were represented by the items in the Attitude Scale developed by the researchers. Items number 1-4 represent the rehearsal strategy. In these items, participants' mean scores range from 3.81 to 4.62. For the chunking strategy, item number 5 was used to represent the strategy. The participants' mean score was 3.91. Items number 6-9 were used to represent the final strategy, i.e., connecting information to prior knowledge strategy. The participants' mean scores range from 3.81 to 4.44 in these items. These findings indicate that most participants scored three or higher on the 5-point Likert scale for the Attitude Scale. These findings indicate a failure to reject the study's hypothesis, which posited that participants' attitudes towards the strategies are positive.

The quantitative results provide compelling evidence supporting the cognitive-pedagogical link between structured working memory training and enhanced *Hifẓ* performance. The significant increase in mean scores from the pre-test to the post-test, coupled with a large effect size, confirms the immediate and powerful role of the combined strategies in improving initial memorization. This finding directly rejects the null hypothesis and aligns with prior

studies that emphasize the strong relationship between effective learning strategies and academic performance (Hashim, 2015). The immediate success is primarily driven by associative learning, which maximizes the efficiency of the central executive by leveraging existing semantic networks (prior knowledge) to create meaningful links between old and new verses. This ensures information bypasses superficial rehearsal and achieves deeper encoding for prolonged retention (Baddeley, 2006; Wixted, 2024).

The efficacy of the intervention is rooted in its direct utilization of the Working Memory Model. The integrated approach ensures that rehearsal maximizes the duration of the phonological loop, continuously refreshing the auditory and verbal information until encoded into long-term memory (Harris & Qualls, 2000). Chunking addresses capacity limitations by grouping verses thematically, which reduces cognitive load and activates the central executive to create robust semantic links. Furthermore, the subsequent analysis showed that the mean decay rate was significantly slower following the intervention (Post-Test to Retention 2) compared to the baseline (Pre-Test to Retention 1). This slower decay, visually represented by a gentler slope than the hypothetical Ebbinghaus forgetting curve, proves that the strategies optimized the encoding process, allowing verses to be stored more firmly and mitigating expected memory loss over time, aligning with the necessity of constant practice for preservation (Aziz et al., 2019; Murre & Dros, 2015).

Regarding demographic factors, the strategies demonstrated uniform effectiveness. The analysis found no statistically significant difference in post-test scores based on either gender or prior educational background (SMA, Madrasah Aliyah, or Pondok Pesantren). This result contrasts with some prior literature that observed gender differences in *Hifẓ* strategy use and performance among high school students (Hashim, 2015; Yusoff & Mohd, 2008). The non-significance here suggests that the cognitive mechanisms targeted by the strategies are equally accessible to both sexes (Herlitz et al., 1997). Furthermore, the homogeneity across educational backgrounds implies that the university's rigorous entrance selection process successfully standardized the *Hifẓ* abilities and dedication of the participants, confirming that the strategies operate on fundamental cognitive mechanisms rather than relying on prior pedagogical training. This outcome supports the theological perspective that the Qur'an is accessible for remembrance by all (Al-Qomar, 54:17, 22, 32, 40).

The study's quantitative success is reinforced by the high positive attitudes exhibited by the participants towards the strategies. The consistently high mean scores across all items on the attitude scale confirmed that participants perceived the methods, especially the meaningful rehearsal, load-reducing chunking, and accuracy-enhancing associative learning, as highly useful and feasible tools. This strong positive perception is crucial because it validates the pedagogical feasibility of integrating these cognitive science-based methods into traditional *Hifẓ* curricula (Muchtar et al., 2022). Student willingness is a key factor in the successful adoption of new learning strategies, suggesting these methods are readily adoptable and viewed as effective aids for the demanding task of Qur'an memorization (Hasanah & Haris, 2023).

This research makes a critical contribution by shifting the focus of Qur'an memorization studies from purely pedagogical methods to underlying cognitive mechanisms (Mardatillah et al., 2025). By successfully demonstrating that structured working memory strategies can significantly enhance immediate *Hifẓ* performance and slow the rate of forgetting (Ebbinghaus curve), the study establishes a powerful, evidence-based cognitive-pedagogical link previously missing in the literature. The implication for Islamic education is profound: it validates the integration of cognitive science, specifically the Modal Model of Memory, into traditional *Hifẓ* curricula (Rokhimawan et al., 2025) This provides educators and institutions with actionable, systematic tools (rehearsal, chunking, associative learning) that can be deliberately taught to

students of all backgrounds, thereby increasing retention, reducing frustration, and ultimately ensuring more durable preservation of the Qur'an across diverse learning environments.

CONCLUSION

Based on the results of this study, it is found that strategies such as rehearsing, chunking, and connecting verses significantly improve immediate memorization performance. However, retention declined over time, with a notable decrease in the number of verses memorized when strategies were used inconsistently. Interestingly, the study found that memorization without these strategies led to higher long-term retention than with them, suggesting the need for more consistent application or a re-evaluation of the methods. Moreover, in a similar design to this study, it is recommended that future research employ a control group to compare with the experimental group and achieve a definitive result regarding the cause of the strategies used. The findings also showed that neither gender nor educational background affected the effectiveness of the strategies, and students generally held a positive attitude toward using them. Recommendations include encouraging students, especially those in Islamic Studies, to adopt these strategies, while lecturers should support their refinement. The study also suggests extending these strategies to broader audiences in similar contexts to improve Qur'an memorization.

ACKNOWLEDGMENT

This study was financially supported by the Research and Publishing Center (Puslitpen) of Syarif Hidayatullah State Islamic University Jakarta with the number UN.01/KPA/760/2021.

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