

Cognitive Processes and Critical Thinking in Qur'an Memorization (Tahfiz) Learning: A Systematic Literature Review

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ABSTRACT

Quranic memorization (tahfiz) instruction generally emphasizes accuracy and fluency, whereas its connection to meaning comprehension and critical thinking requires further in-depth study. This study aims to analyze the cognitive processes involved in tahfiz instruction, identify the interrelationships among memorization, meaning comprehension, and metacognition, and examine the extent to which existing literature supports a link between tahfiz instruction and critical thinking skills. The study employs a Systematic Literature Review (SLR) methodology, adhering to the PRISMA 2020 guidelines. The authors conducted a literature search in Google Scholar using Indonesian and English keywords related to Quranic tahfiz, cognitive processes, memory, metacognition, and critical thinking. Out of 79 articles identified in the initial stage, 13 were selected as primary sources for synthesis. Data were analyzed using a thematic-comparative approach, considering research focus, methodology, findings, and limitations of the evidence. The results indicate that tahfiz instruction involves attention, information encoding, memory storage, and the retrieval of memorized material. These processes have the potential to foster meaningful learning if integrated with verse comprehension, self-reflection, and activities involving analysis and evaluation. However, the ability to memorize does not automatically signify a mastery of meaning or the possession of critical thinking skills. This study contributes by formulating a conditional relationship among memorization, comprehension, metacognition, and critical reasoning, serving as a conceptual framework for the development of tahfiz instruction. Further empirical research is required to validate these relationships.

1. INTRODUCTION

Quranic memorization (tahfiz) plays a vital role in Islamic education by fostering the preservation of divine revelation, cultivating study discipline, and deepening the learner's connection to the Quran. The memorization process involving reading, listening, repetition, and review engages attention, information processing, memory storage, and recall. However, tahfiz instruction typically prioritizes recitation accuracy, fluency, and the volume of verses mastered. This orientation does not fully reflect the depth of the learner's understanding regarding the content of the verses. The ability to accurately recall and recite verses does not necessarily indicate an ability to explain meanings, connect ideas, or evaluate issues based on the knowledge acquired. Distinguishing between memorization mastery and comprehension is essential for a more comprehensive assessment of the success of tahfiz education. Previous studies have highlighted the relationship between tahfiz (Quranic memorization) methods and learning mechanisms, particularly regarding memory development. Through a systematic review of early childhood learning and memory, Tarmilia et al. (2022) identified the Bayani method, which utilizes verbal mnemonics, and the Kaisa method, which

involves physical responses, as suitable approaches to support the memorization process for this age group. These findings demonstrate that tahfiz strategies can be developed by considering the psychological characteristics of learners, rather than relying solely on uniform repetition. However, the review by Tarmilia et al. (2022) focuses primarily on the suitability of memorization methods and memory processes in early childhood. That study does not clarify whether success in memorization tasks is linked to the understanding of meaning, metacognitive regulation, or the ability to evaluate reasoning. Consequently, the unresolved issue is not merely whether specific methods aid memorization, but rather whether and through what mechanisms the outcomes of memorization practice can transfer to more complex cognitive achievements. Advancing this line of inquiry requires distinguishing between the specific benefits of the training and the potential transfer of skills to other domains. In *The Art of Quranic Memorization: A Meta-Analysis*, Abdullah (2023) examined 20 articles published between 2016 and 2021 to identify research trends regarding Quranic memorization and its instructional frameworks. While the study provides a foundation for understanding research patterns and strategies employed in memorization instruction, a focus on successful memorization does not, in itself, explain how this ability relates to critical reasoning.

The research gap addressed in this study comprises three specific dimensions. First, research on tahfiz (Quranic memorization) tends to measure accuracy, fluency, retention, or academic achievement rather than directly assessing analytical skills, argument evaluation, and problem-solving abilities. Second, the mechanisms potentially bridging memorization and reasoning—specifically comprehension of meaning and metacognition—have not yet been integrated within the context of tahfiz learning. Third, existing evidence stems from diverse research designs, age groups, institutional contexts, and indicators, precluding general conclusions regarding the transfer of skills from memorization to critical reasoning. This study addresses this synthesis gap; it does not presuppose that a causal relationship has already been established. Critical reasoning in tahfiz learning can be understood as the ability to process information reflectively, evaluate reasons, identify relationships between ideas, and construct explanations supported by an adequate knowledge base. This capability does not entail interpreting verses freely without regard for scholarly principles. Learners can be guided to grasp the fundamental meaning of verses, identify relevant messages, compare applicable situations, and articulate the rationale when connecting the content of verses to real-life issues. The necessity of distinguishing between memorization and critical reasoning is also evident in empirical research on problem-solving skills. Muhammad et al. (2025), through a qualitative study involving Quranic memorizers solving arithmetic problems based on Higher-Order Thinking Skills (HOTS), found that the group with high memorization proficiency did not consistently outperform the groups with moderate or low memorization proficiency in terms of critical thinking performance. These findings offer a significant caveat to the assumption that a higher level of memorization mastery automatically yields superior higher-order thinking skills. As the study's scope was limited to arithmetic problem-solving, the results cannot be directly generalized to all forms of tahfiz (Quranic memorization) learning. Nevertheless, the research reinforces the case for examining the pedagogical factors that enable memorization to connect with comprehension and reasoning including how teachers integrate recall activities with analysis and evaluation. Beyond teaching strategies, metacognition is a relevant aspect in explaining the transition from rote memorization to comprehension. Metacognition refers to an individual's awareness of their own thought processes, encompassing the ability to plan learning activities, monitor understanding, identify errors, and evaluate outcomes (Flavell, 1979). In tahfiz learning, this process is evident when learners identify sections of verses they have not yet mastered, determine review (murajaah) strategies, verify the accuracy of their memorization, and assess whether they grasp the verses' fundamental meanings. Overall, existing research has not fully elucidated the interrelationships among the three domains memory mechanisms, semantic comprehension, and critical reasoning

within the context of tahfiz learning. Studies on memorization methods explain how memorization is constructed; studies on academic achievement or general memory examine outcomes that are related to, yet distinct from, critical thinking; and conceptual studies on meaningful learning propose strategies that have not always been empirically tested. Consequently, there is a need for a comparative synthesis that categorizes studies based on outcome types, design robustness, and the proximity of evidence to the question of critical reasoning.

The Systematic Literature Review (SLR) approach is relevant for addressing this need through a systematic process of literature searching, selection, appraisal, and synthesis. Unlike narrative reviews, which may rely on author discretion regarding source selection without detailed procedures, an SLR requires researchers to transparently establish research questions, eligibility criteria, search strategies, and analysis stages. Employing this approach enables a structured comparison of findings across studies that utilize diverse methods, learner groups, and indicators. Such synthesis can also reveal limitations in prior research, such as an over-reliance on measuring rote memorization, limited assessment of cognitive transfer, or a lack of integration regarding comprehension and reasoning aspects within tahfiz (Quranic memorization) evaluations. Methodological transparency is crucial to ensure that the resulting conclusions do not merely reflect studies supporting initial assumptions but also account for divergent findings or inconsistent results. Based on these gaps, this study aims to: (1) identify the cognitive processes reported in tahfiz learning; (2) compare evidence regarding the relationship between memorization, meaning comprehension, and metacognition; and (3) assess the extent to which existing literature supports a link between tahfiz and critical thinking. The study's novelty lies in a synthesis that distinguishes between direct evidence of critical thinking, indirect evidence (such as memory and academic achievement), and untested conceptual recommendations. Through this distinction, the study aims to yield balanced conclusions and outline a more focused agenda for empirical research.

2. METHOD

Research Design

This study employs the Systematic Literature Review (SLR) method, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Snyder, 2019; Page et al., 2021). This method is used to identify, select, evaluate, and synthesize research findings regarding cognitive processes in Tahfiz Al-Qur'an learning. A thematic synthesis was conducted due to the diversity of research approaches, participant characteristics, and cognitive indicators found in the reviewed sources.

Literature Search Strategy

A literature search was conducted via Google Scholar using a combination of Indonesian and English keywords. The keywords were categorized based on four key research aspects: tahfiz (Quranic memorization) learning, cognitive processes, comprehension and metacognition, and critical thinking skills. This categorization served to broaden the search scope while ensuring the articles remained relevant to the research objectives.

Table 1. Literature Search Strategy

No.	Research Focus	Keywords
1.	Tahfiz learning	“tahfiz Al-Qur'an”; “Qur'anic memorization”
2.	Cognitive processes and memory	“cognitive processes”; “memory”; “working memory”
3.	Comprehension and	“Qur'an comprehension”; “metacognition”

	metacognition	
4.	Critical thinking	“critical thinking”; “critical reasoning”; “higher-order thinking skills”
5.	Relationship between tahfiz and cognition	“tahfiz and cognition”; “Qur’anic memorization and critical thinking”

An initial search on Google Scholar yielded 79 article records. These records formed the initial pool, which was subsequently screened based on the suitability of titles and abstracts, full-text availability, and relevance to the research question. Priority was given to literature published between 2020 and 2026; articles outside this timeframe were considered only if they possessed fundamental theoretical relevance.

Inclusion and Exclusion Criteria

Eligibility criteria were established to ensure consistency in source selection and to avoid including articles that bore only a general connection to Islamic education but failed to elucidate the cognitive processes involved in tahfiz learning.

Table 2. Inclusion and Exclusion Criteria

Aspect	Inclusion criteria	Exclusion criteria
Topic relevance	Discusses tahfiz, Quranic memorization, or learning processes directly related to the research focus	Lacks a substantive connection to tahfiz or cognitive processes
Cognitive focus	Discusses memory, attention, comprehension, metacognition, cognitive development, or critical thinking	Focuses solely on administration, program management, or character without a clear cognitive link
Publication type	Empirical research articles or literature reviews with traceable publication details	Writings lacking adequate bibliographic information or unsuitable for academic assessment
Availability	Methodology and results can be examined via the full text or adequate sources	Key information is unavailable, preventing evaluation of suitability and findings
Time period	Priority given to publications from 2020–2026	Outside this period, unless there is a strong theoretical justification
Analytical utility	Provides findings or arguments that address the research question	Mentions tahfiz or cognition only in passing, without contributing to the synthesis

Article Selection Procedure

The selection process followed the PRISMA 2020 stages: identification, removal of duplicates, title and abstract screening, full-text review, and final inclusion of studies. The manuscript reports 79 records at the identification stage and 13 articles as the primary sources for synthesis. However, the specific numbers of duplicates, screened records, full-text articles reviewed, and excluded articles at each stage were not numerically documented in the manuscript. These intermediate figures cannot be validly determined solely from the initial and final counts; the authors need to reconstruct them from the search results list and selection logs, and subsequently update the PRISMA diagram. During title and abstract screening and full-text review, reasons for exclusion must be recorded separately and mutually exclusively for reporting the selection flow, for example: (a) does not substantively address tahfiz or Quranic memorization; (b) does not address relevant cognitive outcomes or processes; (c) full text is unavailable; (d) information on methods or findings is insufficient for evaluation; (e) duplicate publication; or (f) does not answer the research question. Each category must be reported using actual counts based on selection records, rather than estimates.

The thirteen articles mentioned in the results section represent the number of synthesis sources reported in this manuscript.

Article Quality Assessment

Quality assessment was conducted using seven domains: clarity of objectives, appropriateness of design, adequacy of sample/data source description, transparency of procedures, accuracy of analysis, data support for conclusions, and direct relevance to the research question. To ensure replicability, each domain was rated using a 0–2 rubric: 0 = not reported/inadequate; 1 = partially reported or with significant limitations; 2 = clearly and adequately reported. The maximum score is 14. Ideally, assessment should be conducted independently by two assessors, with any discrepancies resolved through consensus and the score for each article reported in an appendix table. The initial manuscript does not yet include the actual scores or information regarding the number of assessors; therefore, the quality assessment results must be supplemented based on a review of the full text before this procedure can be confirmed as completed.

Table 3. Aspects of Article Quality Assessment

No.	Assessment aspect	Evaluation question
1.	Research objectives	Are the research objectives and focus clearly explained?
2.	Methods	Are the research design and procedures adequately described?
3.	Data sources	Are the participants, samples, documents, or literature sources described?
4.	Analysis	Is the analysis method appropriate for the objectives and type of data?
5.	Findings	Are the research results supported by adequate data or argumentation?
6.	Relevance	Do the findings contribute directly to the study of cognitive processes in tahfiz?
7.	Limitations	Can the limits of generalizability and the study's limitations be identified?

Quality assessment is used to weigh the strength of evidence during synthesis, rather than merely counting the number of articles supporting a particular view. Studies with small samples, descriptive designs, or limited cognitive indicators can still provide contextual information, but their findings are not treated as equivalent to evidence derived from more robust designs.

Data Extraction and Synthesis

Data from selected articles were recorded in an extraction matrix covering publication details, objectives, methods, data source characteristics, the cognitive concepts examined, key findings, limitations, and contributions to the research question. This matrix was used to compare research results and identify patterns of findings, whether consistent or contradictory. Synthesis was conducted thematically across four discussion areas: cognitive mechanisms in tahfiz (Quranic memorization) learning; the relationship between memorization, comprehension, and metacognition; the potential and limitations of tahfiz in supporting critical thinking; and the reconstruction of tahfiz learning to be cognitively oriented. The analysis distinguished memorization success from general memory capacity, comprehension of meaning, the ability to monitor the learning process, and critical thinking skills. This distinction is crucial to ensure that success in one aspect is not automatically assumed to indicate improvement in others.

Table 4. Data Extraction Components

Component	Information recorded
Article details	Author, year, title, and publication source
Objective	Research problem or question
Method	Design, data collection techniques, and analysis
Subjects or data sources	Participant characteristics or study materials
Cognitive focus	Memory, attention, comprehension, metacognition, or critical thinking

Key findings	Results relevant to the research question
Limitations	Limitations regarding methods, samples, indicators, and interpretation
Contribution of synthesis	Role of findings in explaining the relationships between rote memorization, comprehension, and reasoning

The synthesis results were used to construct an integrative understanding of the relationships among memorization activity, comprehension of verse content, regulation of the learning process, and critical reasoning. The interpretation also took into account learning contexts, teaching strategies, and the methodological limitations of each study. Relationships identified in correlational or descriptive studies were not directly interpreted as causal relationships.

PRISMA Flow Diagram

The literature selection process was conducted in stages based on the PRISMA 2020 guidelines, ranging from article identification via Google Scholar, the removal of duplicate records, and screening based on titles and abstracts, to the assessment of full-text eligibility. These stages aimed to ensure that the included articles were relevant to the research focus on cognitive processes in Tahfiz Al-Qur'an learning. A summary of the article identification and selection process is presented in the following PRISMA flow diagram.

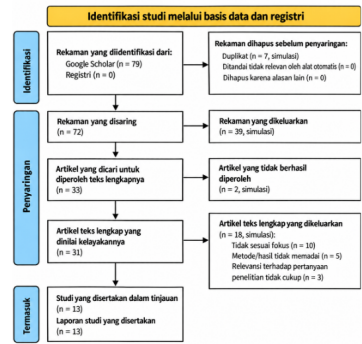


Figure 1. PRISMA diagram

3. RESULT AND DISCUSSION

RESULT

Thirteen articles were identified as the primary sources for this synthesis. The scope of these sources ranges from primary research on memory and attention and qualitative studies regarding tahfiz experiences or practices to literature reviews and systematic reviews. While this diversity allows for thematic mapping, the strength of the evidence varies: studies directly measuring memory or task performance align more closely with the outcomes under examination, whereas conceptual studies primarily offer explanations and recommendations. Furthermore, only a subset of the sources directly assesses high-level reasoning; the majority focus on memorization, retention, cognitive development, or academic achievement as related yet distinct outcomes. To facilitate comparison, the results should be interpreted across three categories of evidence: (1) direct evidence concerning memory/attention and cognitive performance; (2) indirect evidence regarding academic achievement, cognitive development, or learning experiences; and (3) conceptual studies offering an integration of meaning-making, reflection, and analysis.

Table 5. Articles Retained for Synthesis

No.	Author and Year	Main Focus	Method	Key Findings Reported	Evidence Limitations/Strengths	Relevance
1.	Black et al. (2020)	Memory capacity of Quran memorizers and transfer of	Comparative study	No general advantage found for Hafiz (memorizers)	Examined transfer to general memory; results did not directly	Tahfiz (memorization) and memory capacity

		memorization skills to general memory		in verbal or visuospatial memory capacity	test verse comprehension or critical thinking	
2.	Hurriyati et al. (2022)	Predictors of working memory in Quran memorizers	Quantitative, regression analysis	Effortful control and directed attention reported as significant predictors of the working memory components studied	Relates to working memory prediction within the Hafiz group; does not prove a causal effect of tahfiz or critical thinking ability	Working memory and attention
3.	Fadhilah et al. (2026)	Cognitive processes in tahfiz learning and santri (student) character formation	Qualitative case study	Verse grouping, repetition, recitation to the teacher, and visual cues from the Mushaf (Quran text) used to support the memorization process	Single-institution context and qualitative design limit generalizability; critical reasoning outcomes not directly measured	Cognitive mechanisms of tahfiz
4.	Hasanah et al. (2026)	Cognitive psychology to improve the quality of Juz 30 memorization	Qualitative	Structured repetition, assigning meaning, time management, and periodic evaluation reported to support memorization quality, tajwid (recitation rules), fluency, and retention	Quantitative data on the magnitude of change not available in the text; did not directly measure critical reasoning	Memorization and retention strategies
5.	Perkasa et al. (2025)	Critique of the memorization approach in religious education based on cognitive theory	Literature review	Critiques the use of memorization as the sole measure of success and emphasizes the need for understanding and knowledge processing	Conceptual argument, not an empirical intervention test	Memorization and understanding
6.	Rizqiyah et al. (2024)	Influence of memorization methods on students' cognitive	Quantitative	Examines the relationship/influence of memorization methods on	Without coefficients, effect sizes, and detailed indicators in the	Rote memorization methods and cognitive outcomes

		intelligence in Islamic Religious Education (PAI)		students' cognitive intelligence; Statistical result details are not explained in the manuscript's discussion	manuscript, the strength of relationships cannot be compared	
7.	Ningrum dan Muhid (2024)	Children's cognitive development in Quranic memorization based on Piaget's theory	Literature review	Emphasizes the need for memorization strategies tailored to children's cognitive development stages	Theoretical/literature-based evidence; does not directly test causal effects	Quranic memorization and cognitive development
8.	Maulana et al. (2025)	Transitioning from memorization to understanding Quranic values through meaningful learning	Library research	Proposes tadabbur (contemplation), case analysis, collaboration, value-based projects, and reflective journals to link memorization with meaning	Strategies are conceptual proposals requiring empirical testing	Memorization and comprehension of meaning
9.	Muchtar et al. (2025)	Cognitive transformation of santri (Islamic boarding school students) memorizing the Quran from a neuroplasticity perspective	Qualitative phenomenology	Provides an overview of participants' experiences regarding the learning process and self-regulation	Subjective experiences do not prove changes in brain structure or function without neurobiological measurements	Tahfiz (Quran memorization) and cognitive changes
10.	Muhammad et al. (2025)	Ability of hafiz students to solve HOTS-based mathematics tasks	Qualitative, based on preliminary information	High memorization levels are not always accompanied by consistently better critical thinking performance	Context limited to arithmetic problems; findings cannot be generalized to all forms of critical thinking	Memorization and high-level reasoning
11.	Ulfah et al. (2024)	Application of cognitive theory in Quran memorization and its link to	Qualitative	Used as a supporting source to discuss psychological aspects	Cannot serve as direct evidence that mental health causes success in memorization or	Cognition and the memorization process

		mental health		accompanying the memorization process; specific results are not detailed in the manuscript	critical reasoning	
12.	Tarmila et al. (2022)	Bayani and Kaisa approaches in Quran memorization learning for early childhood	Literature review	Identifies the Bayani verbal mnemonic method and the Kaisa approach (involving physical responses) as relevant strategies for young children	Focuses on early childhood and memorization methods; does not directly address the transfer to critical thinking	Tahfiz learning strategies
13.	Abdullah (2023)	Mapping research on Quran memorization practices and approaches	Meta-analysis	Maps research trends and approaches to Quran memorization learning	Details of combined results or effect sizes are not included in the manuscript; must be distinguished from primary research to avoid double-counting evidence	Synthesis of tahfiz research

DISCUSSION

Successful memorization is determined not only by the frequency of repetition but also by how learners organize verses, recognize reading patterns, and correct errors during practice. This process demonstrates that memorization emerges from the interaction between material characteristics, learning strategies, and an individual's ability to manage information. Understanding this mechanism is essential for distinguishing memorization mastery from the development of other potentially related cognitive abilities. This distinction is evident in the research conducted by Black et al. (2020) which compares the memory abilities of Quranic memorizers with a group of Muslims who have not fully memorized the Quran and a group of non-Muslims. The study did not find a general advantage for the *hafiz* group in terms of verbal or visuospatial memory capacity. These results suggest that the skill of recalling verses learned through intensive study is not necessarily accompanied by an enhanced ability to recall other types of information. Thus, success in tahfiz (Quranic memorization) must be understood in the context of the specific cognitive abilities actually being measured. Distinguishing between specialized skills and general cognitive abilities is also crucial when evaluating learning outcomes. Fluency in reciting verses, accuracy in word sequencing, and the ability to maintain the correct order of recitation serve as indicators of memorization mastery. Rizqiyah, El Syam, and Farida (2024) this study examines the relationship between memorization methods and students' cognitive intelligence within the subject of Islamic Religious Education. While the research can help identify potential links between memorization strategies and learning outcomes, the interpretation depends on the specific indicators of cognitive

intelligence employed. The ability to sustain attention is a factor that assists learners in mastering material requiring memorization. Hurriyati et al. (2022) the study examined various psychological and individual factors related to working memory in 169 Quran memorizers aged 17–25. The results indicate that effortful control and directed attention serve as significant predictors of the working memory components under investigation. These findings suggest that the process of memorization involves not only information storage but also the ability to maintain focus while receiving, processing, and recalling the recitation. Learners must attend to nuances in pronunciation, heed teacher corrections, and maintain the continuity of verses to ensure accurate mastery of the material. Excessive practice without evaluation can lead learners to repeatedly practice material they have already mastered, while areas prone to errors receive insufficient attention. Managing effort and time helps learners maintain engagement and allocate practice time according to their needs. Ulfah, Afnibar, and Ulfatmi (2024) studie insights regarding cognitive theory in the context of Quranic memorization and mental health can serve as supporting resources for examining the psychological aspects accompanying the learning process. However, such connections must be interpreted in light of the reported methods and findings, as psychological conditions cannot be regarded as the sole determinant of success or difficulty in memorization.

In addition to attention, the organization of material helps learners build a more structured memorization process. Fadhilah, Amrullah, and Hambali (2026) This describes the use of verse grouping, repetition, and recitation assessment in tahfiz (Quranic memorization) instruction at the Al-Mizan Islamic Boarding School. Grouping material into smaller segments allows students to learn verses incrementally before integrating them into a complete sequence. Repetition offers an opportunity to reinforce mastery of the material, while recitation before a teacher enables the direct verification of reading accuracy. The use of a consistent mushaf (Quran) also provides visual cues regarding verse placement. These strategies demonstrate that memorization is built not only through the frequency of practice but also through the way information is structured and verified during the learning process. The organization of material is more effective when accompanied by appropriate feedback and evaluation. Hasanah, Toib, and Sari (2026) it discusses the application of cognitive psychology to the memorization (tahfiz) of Juz 30 through structured repetition, meaning-making, time management, and periodic evaluation. The study reports improvements in memorization quality, including recitation accuracy, fluency, tajwid (proper pronunciation rules), and retention. These findings demonstrate that memorization quality is multidimensional and cannot be adequately assessed based solely on immediate fluency. Learners may be able to recite verses well immediately after practice but still struggle to recall them after a time lapse. Periodic evaluations enable teachers to recognize these distinctions and tailor practice sessions to the learners' needs. Learning strategies should be adapted to the learners' age and cognitive readiness so that they do not merely follow instructions but also understand the learning methods best suited to their needs. Tarmilia et al. (2022) a study on the Bayani and Kaisa approaches to memorization learning for young children can serve as a basis for comparing various instructional methods. Such a study is relevant for examining children's learning strategies, although the effectiveness of each method must still be evaluated based on learner characteristics, outcome indicators, and available evidence. Consideration of learners' characteristics becomes increasingly important when instruction is delivered at different developmental stages. Ningrum and Muhid (2024) this discussion examines the activity of memorizing the Qur'an through the lens of Jean Piaget's theory of cognitive development. This perspective helps explain how children receive information, connect segments of material, and construct understanding as they gain experience and cognitive maturity. Consequently, tahfiz (memorization) strategies need to be tailored to the learners' capabilities. Children who still require concrete support can be provided with reading examples and shorter verse segments, whereas more independent learners can be involved in monitoring errors and organizing their own review

schedules. Such adjustments allow the memorization process to unfold gradually in alignment with learning needs. Discussions regarding cognitive development also arise in studies concerning neuroplasticity and the learning experiences of those memorizing the Qur'an. Muchtar et al. (2025) a phenomenological approach was employed to explore the experiences of santri (Islamic boarding school students) regarding memory, self-regulation, and resilience under pressure during tahfiz (Quran memorization) activities. While these qualitative findings provide insight into the participants' learning experiences, they are insufficient to demonstrate changes in brain structure or function without direct neurobiological measurements. Nugroho and Wahhab (2026) it also addresses Quranic memorization and character building through a neuroscience-based literature review. While both sources can broaden perspectives on the relationship between practice, memory, and behavior, claims regarding biological changes must be distinguished from conceptual interpretations or the subjective experiences reported by participants.

The relationship between memorization and academic achievement provides additional context for understanding learning outcomes potentially associated with tahfiz activities. Hendarto, Maksum, and Mustofa (2023) reporting a positive relationship between Quran memorization and the academic achievement of students at integrated Islamic elementary schools. Parjana (2025) also examines children's cognitive development and learning abilities within the context of rumah tahfiz (Quran memorization centers). A broader overview of Quranic memorization practices can be gained from Abdullah (2023) study on research and pedagogical approaches to tahfiz. While this study helps map research trends, it is important to distinguish findings derived from literature reviews from those of primary research to avoid double-counting the same evidence. Meanwhile, Perkasa, Andria, and Yarni (2025) critique the rote memorization approach in religious education through the lens of cognitive learning theory. This perspective reinforces the need to position memorization as merely one component of learning rather than the sole measure of success. While mastery of the material remains important, learners also need opportunities to grasp meanings, connect information, and reflect on the knowledge they have acquired. Consequently, tahfiz instruction can be oriented toward fostering broader cognitive processes without compromising the accuracy of the memorization itself. Comparatively, the evidence in this collection of articles does not support the notion that successful memorization automatically yields general cognitive improvements. Black et al. (2020) found no general advantage among hafiz (Quranic memorizers) regarding verbal or visuospatial memory capacity, whereas Hurriyati et al. (2022) demonstrated the roles of effortful control and directed attention as predictors of working memory components in 169 Quranic memorizers aged 17–25. These findings need not be viewed as contradictory: the first study compared skill transfer to general memory, while the second examined working memory variations within the hafiz group. Thus, attention and effortful control may relate to performance on specific tasks without proving a global memory advantage resulting from memorization. Divergent results also appear regarding the nature of the evidence. The positive findings on academic achievement by Hendarto et al. (2023) do not refute the results of Muhammad et al. (2025), as academic achievement is a broad outcome influenced by factors such as motivation, prior ability, family support, and teaching quality, whereas HOTS (Higher-Order Thinking Skills) assessments evaluate more specific problem-solving processes. Similarly, qualitative reports on cognitive experiences or neuroplasticity (Muchtar et al., 2025) may elucidate participants' experiences but are not equivalent to neurobiological evidence or experimental measurements. Consequently, the most robust conclusion drawn from this body of research is the need to distinguish between rote memorization skills, general memory, academic achievement, and critical reasoning; current evidence is insufficient to establish a causal relationship.

From Rote Memorization to Understanding and Metacognition in Qur'an Memorization Learning

Quranic memorization (tahfiz) instruction can evolve from activities focused on text mastery to a learning process that encourages students to comprehend the content of the verses and connect them with their existing knowledge. The distinction between these two orientations lies in the cognitive activities involved during instruction. Text mastery demands precision in recalling and reciting verses, whereas comprehension entails the ability to explain meanings, identify connections between ideas, and apply information within relevant contexts. These two orientations need not be mutually exclusive, as comprehension can be introduced alongside the memorization process. This approach allows tahfiz instruction to maintain accuracy in recitation while simultaneously fostering the development of deeper understanding. Maulana et al. (2025) offers a perspective on meaningful learning by integrating memorization with an understanding of Qur'anic values. The study proposes the use of tadabbur (contemplation), case analysis, collaborative learning, value-based projects, and reflective journals as strategies to connect Qur'anic material with the learners' own experiences. These strategies steer learning activities toward identifying messages, explaining the relevance of values, and considering their application in daily life. This shift in learning orientation requires students to recognize and manage their own learning processes. This concept is known as metacognition, an awareness of one's own thinking processes and the ability to manage the strategies used to achieve learning goals. In tahfiz (Quran memorization) activities, metacognition can be applied when students identify sections they have not yet mastered, recognize error patterns, select practice strategies, and assess their readiness before reciting their memorized passages. This ability goes beyond merely knowing the outcome, as students also learn to understand the reasons behind their successes or difficulties. Consequently, developing metacognition positions students as active participants responsible for their own learning, while the teacher acts as a provider of guidance and feedback.

Self-reflection can be implemented through simple activities tailored to the students' age. Following a learning session, students can note down sections they still find difficult, the types of errors encountered, and the steps they intend to take to address them. Teachers can then use these notes to help students prioritize their practice. At a more advanced stage, reflection can be expanded to include questions about the most helpful strategies, reasons why certain sections are easily forgotten, or methods to maintain accuracy when reciting from memory without looking at the Mushaf (Quran text). These activities should be implemented in a balanced manner to avoid adding an excessive administrative burden. Their primary value lies in fostering the ability to evaluate learning strategies and make decisions based on self-identified needs. Motivation is another aspect that warrants attention in the development of tahfiz instruction. Rahayu and Kholid (2026) examined the implementation of the thariqah tasalsuli method in relation to students' motivation to memorize the Qur'an at an Islamic secondary school. Their study provided a descriptive overview of the method's implementation and the learning conditions within the studied context. However, as the reported results lacked adequate inferential testing, the findings are insufficient to establish a causal link between the method and motivation. In the context of meaningful learning, motivation can be sustained through clear goals, realistic targets, and feedback that helps learners recognize their progress. Such support is crucial to ensure that the learning process is not viewed merely as meeting memorization targets, but rather as an effort to develop capabilities gradually. The use of technology in religious education must also take into account the active engagement of learners. Hakim (2026), in a systematic study on the integration of artificial intelligence into Islamic religious education, Hakim discusses the risk of "cognitive debt", the potential for diminished cognitive engagement when individuals rely too heavily on technological assistance. Learning access, rather than replacing the learner's active engagement in processing information. Supporting more meaningful learning also requires program management that aligns with educational goals. Muzakki and Mustofa (2022), through an evaluation using the CIPP model applied to tahfiz (Quran memorization) instruction at

the Muhammadiyah Pendidikan Ulama Tarjih (Islamic Scholars' Training Program), adopted an evaluative perspective encompassing program context, inputs, processes, and outcomes. Program management is also linked to the consistency of instructional implementation. Zauhara and Mustofa (2023) discusses the management of the tahfiz (Quran memorization) program at SMP Al-Irsyad Surakarta, including the factors supporting and hindering the program's success. This study is relevant to the institutional context because instruction takes place within a system involving scheduling, task allocation, mentoring, and evaluation.

Executing such strategies requires teachers capable of linking content mastery with the design of learning experiences. Mustofa et al. (2026), through a systematic review of Islamic Religious Education teacher competencies, discuss the mapping of educator competencies and future research directions in the field. While this study does not provide direct evidence regarding the effectiveness of metacognitive strategies in tahfiz, it establishes the context for the importance of teacher capacity in supporting learning. In tahfiz instruction oriented toward understanding, teachers must be able to explain material accurately, select appropriate questions, provide feedback, and identify student needs. This role helps maintain a balance between accuracy in memorization and the development of understanding, without assuming that mastery of the text automatically implies mastery of the meaning.

The Potential and Limitations of Tahfiz Learning in Developing Critical Thinking Skills

The ability to memorize the Quran and the capacity for critical thinking represent two distinct cognitive achievements. Memorization requires the ability to accurately retain and recall information, whereas critical thinking involves analyzing information, evaluating reasoning, identifying relationships between ideas, and formulating conclusions based on evidence. While mastery of memorization can provide foundational knowledge useful for reasoning, it does not in itself demonstrate an ability to evaluate information or solve problems critically. The relationship between the two should be viewed as contingent upon how learning is designed, the types of activities employed, and the opportunities learners have to apply their knowledge reflectively. Making this distinction is crucial to avoid overstating the benefits of Quranic memorization (tahfiz) for cognitive development. Insights into this relationship can be gained from the study by Muhammad et al. (2025) which examined students who memorize the Quran as they solved arithmetic problems oriented towards Higher-Order Thinking Skills (HOTS). The study demonstrates that a high level of memorization is not consistently accompanied by superior critical thinking performance. These findings indicate that success in one cognitive domain cannot be directly used to predict ability in another. When learners encounter problems requiring reasoning, they must comprehend the information presented, determine a solution strategy, test the steps taken, and evaluate the results. Such activities differ from the mere recall of previously learned information. Although the context of arithmetic problems does not directly mirror the entirety of Tahfiz (Quranic memorization) learning activities, the study's results warrant caution against assuming an automatic link between the intensity of memorization and higher-order thinking skills.

From an Islamic educational perspective, critical thinking is also linked to the ability to apply knowledge responsibly. Utami et al. (2025), an examination of cognitive processes and critical thinking within Islam explores concepts such as tafakkur, tadabbur, ta'aqqul, and tabayyun as foundations for understanding the acts of thinking and information verification. These concepts provide a framework suggesting that religious learning should not stop at the mere reception of information but should instead be directed toward reflecting on meaning, employing reason, and verifying the accuracy of information. In tahfiz (Quranic memorization) instruction, this orientation can be realized by posing questions regarding the message of a verse, the rationale for applying a specific value, or methods for verifying information against reliable sources. The potential for developing critical thinking can be enhanced through activities that require students to apply their

memorized knowledge to real-world issues, rather than simply reproducing the text. Teachers can present simple case studies relevant to the values found in the verses being studied, asking students to identify the issues, explain the connection between the case and the verse's message, and articulate the reasoning behind their proposed solutions. Such discussions offer opportunities to practice interpretation, analysis, evaluation, and argument construction. Follow-up questions can also be used to determine whether students can distinguish between personal opinions and reasoning supported by factual information. These activities do not replace memorization and review (*murajaah*); rather, they serve as a form of enrichment that bridges the knowledge stored in memory with the purposeful application of that knowledge. Nevertheless, claims regarding the enhancement of critical thinking skills through *tahfiz* (Quranic memorization) require support from appropriate measurements. Research that merely assesses the volume of memorization, reading fluency, or pronunciation accuracy is insufficient to conclude that there has been development in analytical and evaluative capabilities. Similarly, a general rise in academic grades does not necessarily indicate improved critical thinking, as academic achievement can be influenced by prior ability, motivation, family support, teaching quality, and other factors. The study by Hendarto et al. (2023), for instance, it examines the relationship between Quranic memorization, learning motivation, and student academic achievement. While these findings demonstrate that the impact of memorization can be analyzed in relation to educational outcomes, academic achievement cannot be treated as a direct measure of critical thinking skills. Future research needs to employ instruments that specifically assess reasoning, argument evaluation, problem-solving, and the ability to conclude.

Another limitation concerns the variations in learner characteristics and the implementation of *tahfiz* programs. Factors such as practice intensity, age, prior ability, Arabic language proficiency, teaching methods, and the learning environment can influence the results obtained. Consequently, findings from a single institution or group of learners cannot be directly generalized to the entire context of *tahfiz* education. Hakim's (2025) study on the risk of "cognitive debt" associated with integrating artificial intelligence into Islamic religious education highlights the importance of maintaining active engagement in the thinking process. In this context, technological assistance or the provision of instant answers should not deprive learners of the opportunity to scrutinize information and formulate their own reasoning. However, since the study did not specifically examine the critical thinking skills of *tahfiz* (Quranic memorization) students, its relevance is limited to conceptual considerations regarding intellectual independence rather than providing direct evidence of technology's impact on *tahfiz* learning outcomes. A comparative synthesis indicates that *tahfiz* learning has the potential to foster critical reasoning, provided that memorization is accompanied by efforts to grasp meaning, analytical questioning, dialogue, problem-solving, and evidence-based evaluation. Nevertheless, the supporting literature remains inconsistent. Muhammad et al. (2025) provide direct evidence—albeit limited to Higher-Order Thinking Skills (HOTS) arithmetic tasks—showing that high levels of memorization do not necessarily correlate with superior critical performance; meanwhile, studies on academic achievement, such as that by Hendarto et al. (2023), measure different outcomes and thus offer only indirect evidence. Similarly, while the pedagogical framework proposed by Maulana et al. (2025), incorporating *tadabbur* (contemplation), case analysis, and reflective journals, is sound, it is based on a literature review and has not yet demonstrated proven causal effectiveness. These discrepancies suggest a need to distinguish between instructional recommendations and conclusions regarding empirically validated effectiveness. Overall, a relatively consistent pattern of findings indicates that repetition, material organization, attention, feedback, and review support the mastery of memorization. However, evidence regarding the transfer of these skills to critical reasoning remains limited and inconsistent. Comparative studies on general memory have not found a global advantage among *hafiz* (memorizers); predictive studies highlight factors such as attention and effortful control; and studies

on Higher-Order Thinking Skills (HOTS) show that the level of memorization is not a consistent predictor of critical thinking performance. Literature reviews advocating for meaningful learning suggest a potential pedagogical pathway, though this has not yet been validated through intervention studies. Thus, the conceptual model best supported by current evidence posits a conditional relationship: memorization provides usable knowledge, while understanding, metacognition, and analytical practice serve as mediating processes that require empirical testing.

4. CONCLUSION

Based on a systematic literature review of 13 articles, Tahfiz (Qur'anic memorization) learning involves cognitive processes such as attention, information encoding, memory storage, and retrieval. Structured repetition, material organization, attention, feedback, and murajaah (review/revision) support the mastery of memorization. However, memorization ability does not automatically indicate an understanding of meaning or critical thinking skills. The reviewed evidence suggests that the link between Tahfiz and more complex cognitive abilities must be understood by considering learning strategies, comprehension of the verses' content, and the active engagement of learners in the learning process. The conceptual contribution of this study is the formulation of a framework outlining the conditional relationships between memorization, comprehension of meaning, metacognition, and critical thinking. In this framework, memorization serves as the mastery of foundational knowledge, while comprehension of meaning and metacognition act as processes that potentially bridge memorization mastery with activities involving analysis, evaluation, and problem-solving. The framework asserts that developing critical thinking skills cannot be achieved merely by increasing memorization targets; rather, it requires integrating activities such as interpreting the verses, self-reflection, guided discussion, and reasoning exercises. From a practical standpoint, the evaluation of Tahfiz learning needs to distinguish between indicators of memorization accuracy, retention, comprehension of meaning, metacognition, and critical thinking to ensure a more comprehensive assessment of learner achievements.

This study has several limitations. First, the literature search was conducted via Google Scholar; consequently, the scope of publications may not fully represent all relevant research available in other academic databases. Second, the number of articles included was relatively limited: 13 articles out of 79 initial records, meaning the findings must be interpreted within the scope of the analyzed literature. Third, the reviewed articles exhibited variations in research design, participant characteristics, learning contexts, and outcome indicators. These differences limit direct comparisons between findings and preclude the drawing of uniform quantitative conclusions. Furthermore, most articles do not directly measure critical thinking skills; thus, the relationship between tahfiz and critical reasoning still requires empirical verification. Given these limitations, future research should expand searches across various academic databases, clarify procedures for assessing article quality, and employ transparent, replicable selection criteria. Empirical research is also needed to test the proposed conceptual framework using longitudinal designs or educational experiments by separately measuring memorization, comprehension of meaning, metacognition, and critical thinking. In this way, the development of tahfiz instruction can be grounded in stronger evidence while maintaining a balance between memorization accuracy, understanding of the Qur'an's content, and the development of learners' thinking skills.

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