

Beyond Neuropedagogy: Integrating Cognitive Learning Processes and Islamic Epistemology in Qur'anic Memorization Education

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Abstract

Qur'anic memorization education in Islamic boarding schools extends beyond the acquisition and retention of textual information, encompassing cognitive, pedagogical, and spiritual dimensions. This study aims to examine how cognitive learning processes and Islamic epistemology are manifested in the implementation of progressive five-juz tasmī' in Qur'anic boarding schools. Employing a qualitative multisite case-study design, data were collected through observation, interviews, and documentation and analyzed using within-site and cross-site analysis. The findings indicate that progressive tasmī' organizes memorization through cumulative repetition, bil ghaib retrieval, continuous evaluation, teacher guidance, and gradual mastery from 1–5 to 1–30 juz. These practices reflect cognitive learning processes associated with spaced repetition, retrieval practice, active engagement, and memory consolidation. However, the findings also demonstrate that neuropedagogical perspectives alone cannot fully explain the spiritual purpose of memorization, lifelong responsibility for preserving the Qur'an, teacher–student relationships, and sanad as a mechanism of scholarly transmission. The study implies that integrating cognitive learning principles with Islamic epistemology can provide a more comprehensive framework for understanding effective, meaningful, and sustainable Qur'anic memorization education.

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INTRODUCTION

Qur'anic memorization is frequently known as a process of storing and recalling a large amount of textual information. In pesantren-based Qur'anic education, however, memorization is not simply an individual cognitive activity (Nurhayati, 2025; Onia, 2025; Sutrisno, 2025). The ability to recite the Qur'an fluently without looking at the mushaf, to maintain the accuracy of pronunciation and *tajwid*, to repeatedly submit memorization to a teacher, and eventually to receive sanad indicates that Qur'anic memorization encompasses cognitive, pedagogical, spiritual, and epistemological dimensions (Veronika, 2024; Zain & Mustofa, 2024). This complexity becomes particularly visible in learning systems that require santri to repeatedly recite previously memorized portions before progressing to new material. Therefore, the pedagogical challenge in *tahfiẓh* education is not merely how students acquire new memorization but also how previously memorized material can remain accessible and accurate over time.

This challenge is particularly visible when students are required to demonstrate a large amount of memorization without looking at the mushaf. At PPTQ As-Sa'adah Malang and Wilayah Zaid bin Tsabit Putri PP Nurul Jadid Paiton Probolinggo, the practice of *tasmī'* is

organized cumulatively through five-juz stages, beginning with 1–5 juz and continuing to 1–10, 1–15, 1–20, 1–25, and the final stage involves reading 30 juz *bil ghaib* in a single session.

Previous studies have discussed Qur'anic memorization through several perspectives. Research on *tasmi'* has highlighted its role in maintaining memorization quality, while studies of *tikrar*, *muroja'ah*, and *tasmi'* have emphasized the importance of systematic repetition in Qur'anic memorization (Romziana et al., 2021). Other studies have examined the relationship between neuroscience and Qur'anic memorization, including research on neurolinguistic programming and Qur'anic memorization as well as studies connecting neuroscience with the Siyaq memorization method (Nahar et al., 2023). Research by Bramesta (Edo Bramesta, 2024) also examined the implementation of neuroscience theory in addressing difficulties in maintaining Qur'anic memorization through *tasmi'*. These studies demonstrate growing scholarly interest in the relationship between memorization practices and cognitive or neuroscientific perspectives. However, studies that examine a pesantren-developed cumulative *tasmi'* system across two institutional contexts while simultaneously analyzing its alignment and limitations through neuropedagogy remain limited.

The present study therefore positions neuropedagogy not as the original theoretical foundation used by the pesantren to design the *tasmi'* system, but as an analytical perspective for understanding an existing educational practice. The five-juz *tasmi'* system developed within the tradition of pesantren education, while neuropedagogy provides a contemporary perspective for examining how repeated recall, attention, active engagement, feedback, and memory consolidation operate within that practice (Christina & Indra, 2025; Gilman Mawardi Nurul Khoirunnisa, Fauziah Habibilah, 2025; Khomairotusshiyama et al., 2023; Mulyadi Mulyadi Mar'atun Sholihah, Sahrizal Vahlevi, 2025; Wadi et al., 2023; Yoeliyanto et al., 2025). This distinction is important because integrating Islamic educational practice with contemporary science should not imply that traditional pesantren practices were originally designed according to modern neuroscience.

The cognitive dimension of such practices can be illuminated through contemporary research on learning and memory. The forgetting curve introduced by Ebbinghaus demonstrates that learned information becomes increasingly vulnerable to forgetting without subsequent reinforcement (Murre & Dros, 2015). Later research has shown that distributed or spaced practice can produce stronger long-term retention than massed practice (Cepeda et al., 2006)(Cepeda et al., 2008), while retrieval practice strengthens learning by requiring learners to actively reconstruct previously learned information rather than merely rereading it (Wiklund-Hörnqvist et al., 2022). Neuropedagogy extends this discussion by bringing neuroscience, cognitive psychology, and educational theory into dialogue in order to understand how learning relates to cognitive and neural processes (Friedman et al., 2025). From this perspective, the progressive *tasmi'* system appears to contain several learning processes that are consistent with contemporary cognitive accounts: repeated recall, cumulative review, active engagement, feedback, and gradual consolidation.

Nevertheless, explaining Qur'anic memorization entirely through cognitive and neurological mechanisms creates an important conceptual limitation. A santri does not memorize the Qur'an merely because repeated retrieval strengthens memory traces. The Qur'an is memorized within an Islamic worldview in which learning is connected to worship, adab, responsibility, teacher authority, and the continuity of knowledge. In the two research sites, the completion of 30-juz *tasmi'* is connected not only to the quality of memorization but also to a continuing responsibility to preserve the memorization and, in particular contexts, to the acquisition of sanad. At PPTQ As-Sa'adah, the caregiver explicitly associates sanad with scholarly legitimacy and the competence to become a Qur'anic teacher. At Wilayah Zaid bin Tsabit, sanad forms part of the final stages following a series of 30-juz recitations. These findings indicate that the educational meaning of Qur'anic memorization cannot be reduced to the functioning of memory.

This issue exposes a gap in existing discussions. Research concerning Qur'anic memorization has frequently focused on methods, repetition, memorization strategies, or the difficulties of maintaining memorization, while neuroscience-informed education tends to examine

learning through cognitive, emotional, and neural mechanisms. Such perspectives are valuable, but they leave insufficient space for the epistemological question of how knowledge is understood and transmitted within Islamic educational traditions. The distinction is important because neuropedagogy primarily addresses questions concerning the processes of learning, whereas Islamic epistemology addresses questions concerning the source, authority, transmission, purpose, and ethical meaning of knowledge. In Qur'anic education, these dimensions are not necessarily competing explanations. Rather, they may operate at different levels of understanding. Cognitive learning processes can explain how memorized knowledge becomes stable and retrievable, while Islamic epistemology can explain why the knowledge is pursued, how it is transmitted through teachers, and why sanad and adab remain important components of Qur'anic learning.

Therefore, this study moves beyond neuropedagogy rather than rejecting neuropedagogy. The purpose is to examine how cognitive learning processes are embedded within an existing pesantren practice of progressive *tasmi'* and how those processes interact with the epistemological foundations of Islamic Qur'anic education. The unit of analysis is the educational practice of progressive five-juz *tasmi'* at PPTQ As-Sa'adah Malang and Wilayah Zaid bin Tsabit Putri PP Nurul Jadid Paiton Probolinggo. The study asks how the practice organizes cognitive learning processes, what educational and contextual factors sustain or constrain it, and what its implications reveal about the relationship between cognitive learning and Islamic epistemology. The central argument is that a comprehensive understanding of Qur'anic memorization education requires a complementary framework: cognitive processes explain the durability of memorization, whereas Islamic epistemology gives the memorization its educational, spiritual, ethical, and transmissional meaning.

RESEARCH METHOD

This study employed a qualitative approach with a multisite case-study design. The research was conducted at two Qur'anic educational settings, namely PPTQ As-Sa'adah Malang and Wilayah Zaid bin Tsabit Putri, PP Nurul Jadid Paiton Probolinggo. The two sites were selected because both implement progressive *tasmi'* through five-juz intervals while maintaining different institutional and contextual characteristics. PPTQ As-Sa'adah places substantial responsibility for Qur'anic guidance under the direct supervision of the caregiver, whereas Wilayah Zaid bin Tsabit operates through a more distributed system of *ustaz/ustazah* guidance and institutional halaqah.

The researcher served as the primary instrument of the study and participated in the collection, interpretation, and comparison of field data. Participants included caregivers, Qur'anic teachers, and santri who had direct experience with the implementation of progressive *tasmi'*. Data were collected through participant observation, semi-structured interviews, and documentation. Observation focused on the stages of *tasmi'*, teacher-student interaction, recitation procedures, evaluation, and activities supporting memorization. Interviews explored the background of the system, learning practices, perceived benefits and obstacles, the meaning of maintaining memorization, and the role of teachers and sanad. Documentation was used to complement observational and interview data.

Data analysis followed the qualitative data analysis model of Miles, Huberman, and Saldaña, involving data reduction, data display, and conclusion drawing and verification (Matthew B Miles, 2014). Data collection was conducted through participant observation, semi-structured interviews, and documentation. Observation focused on the implementation of individual and cumulative *tasmi'*, teacher-student interaction, evaluation procedures, and supporting activities related to memorization maintenance. Interviews explored the background of the method, experiences of teachers and students, evaluation procedures, supporting and inhibiting factors, and perceived implications for memorization quality. Documentation included schedules, assessment forms, activity records, and other materials related to *tahfizh* implementation. Data from both sites were first organized according to the main research focuses and then compared to identify recurring patterns, contextual differences, and cross-site syntheses. Trustworthiness was addressed

through source and technique triangulation, member checking, systematic documentation of the research process, and detailed contextual description. These procedures were intended to strengthen credibility, dependability, confirmability, and transferability.

RESULT

Progressive *Tasmi'* as a Cognitive Learning Process

At both sites, santri are required to complete individual or per-juz *tasmi'* before entering the next cumulative stage. After reaching five juz, santri are required to recite juz 1–5 in one session before continuing to the sixth juz. The same principle is repeated at 1–10, 1–15, 1–20, 1–25, and finally 1–30 juz. Thus, the system does not allow the accumulation of new memorization to proceed independently from the maintenance of previously memorized material.

The practice creates a recurring cycle of new memorization and cumulative recall. Rather than treating memorization as a linear process in which completed material is left behind, the system repeatedly brings earlier portions back into active use. The final 30-juz *tasmi'* therefore represents the culmination of a series of cumulative recitations rather than an isolated final examination.

The two sites share this basic structure, although their implementation differs. At PPTQ As-Sa'adah, the system developed partly from reflection on the limitations of the previous semester examination system, particularly the difficulty some santri experienced when eventually facing the 30-juz final *tasmi'*. At Wilayah Zaid bin Tsabit, the five-juz system emerged in relation to the evaluation of the previous *tahfizh* test system. In both settings, therefore, progressive *tasmi'* developed as an institutional response to the need for stronger continuity of memorization.

Bil ghaib Recitation and Active Recall

Tasmi' bil ghaib requires santri to reproduce memorized Qur'anic passages without depending on the written text. The process is not limited to identifying familiar verses but requires the santri to produce the memorized sequence independently and continuously.

At PPTQ As-Sa'adah, the final 30-juz *tasmi'* is conducted in two principal stages: first before the caregiver and subsequently before the wider santri community. At Wilayah Zaid bin Tsabit, the process is more extensive, involving recitation at the kiai's maqbarah, at the pesantren, at the santri's home with family, and individual reinforcement through continuous recitation for 41 days. Although the number and setting of stages differ, both institutions place emphasis on comprehensive mastery rather than fragmented recall.

Teacher Guidance, Feedback, and Learning Conditions

Progressive *tasmi'* is not implemented as independent memorization alone. At PPTQ As-Sa'adah, the caregiver has a central role in supervising and evaluating memorization. At Wilayah Zaid bin Tsabit, supervision is distributed through *ustaz/ustazah* and halaqah structures. In both settings, the teacher functions not only as an examiner but also as a source of correction, direction, and accountability.

The observations indicate that evaluation covers fluency, pronunciation, *tajwid*, makhraj, and continuity between verses. This makes *tasmi'* simultaneously a retrieval activity and a corrective pedagogical process. The presence of a knowledgeable listener also distinguishes the practice from solitary repetition because the santri receives external confirmation and correction.

However, implementation is affected by practical constraints. The most prominent internal factors include laziness, psychological condition, and consistency in *muroja'ah*. External and institutional constraints include limited numbers of listeners, differences in assessment standards, academic workload, environmental conditions, distractions from mobile phones, and the multiple roles carried by santri. At Wilayah Zaid bin Tsabit, the hot physical environment and the combination of Qur'anic, academic, and organizational responsibilities also influence the experience of memorization.

Consistent Use the Mushaf

An interesting finding at PPTQ As-Sa'adah is the recommendation that students use the same mushaf throughout their memorization. Students perceived that maintaining the same mushaf helped them remember the position of verses on particular pages. Students are discouraged from changing their mushaf because consistent use of the same mushaf is considered to support the reinforcement of memorization. In addition, students are encouraged to use a mushaf with a standardized division of 20 pages per juz, allowing the position of verses on each page to become an integral part of the memorization process. This consistency in mushaf use serves as a supporting strategy that helps students more easily recall the location of verses during *muroja'ah* and *tasmi'*.

Spiritual Practice in Memorization

Both institutions incorporate Qur'anic recitation into religious practices beyond formal *tasmi'*. PPTQ As-Sa'adah, for example, incorporates *Tarawih bil Hifẓhi* and *Taqwiyatul Hifẓhi*, while Wilayah Zaid bin Tsabit implements *Taqwiyatul Hifẓhi*. These activities create opportunities for santri to retrieve and maintain memorization within worship-oriented contexts.

The findings also indicate a change in santri's understanding of what it means to succeed in *tahfiẓh*. Santri increasingly understand that completing 30 juz does not mark the end of the process. Instead, memorization must continue to be maintained. At PPTQ As-Sa'adah, this appears as an understanding of memorization as a lifelong responsibility. At Wilayah Zaid bin Tsabit, santri similarly recognize that khatam is not the endpoint of *tahfiẓh*.

This shift is important because it extends the meaning of "quality" beyond the quantity of memorized juz. Quality is associated with fluency, durability, readiness to recite, and the willingness to continue maintaining the Qur'an.

Sanad and Scholarly Transmission

The presence of sanad as a dimension that extends beyond cognitive mastery. Both sites connect completion of the 30-juz process with the acquisition of Qur'anic sanad, although the procedures differ. PPTQ As-Sa'adah uses two principal stages in the final process, whereas Wilayah Zaid bin Tsabit employs four stages involving the *maqbarah*, pesantren, home/family setting, and individual 41-day reinforcement. Despite these differences, both systems place the completion of memorization within a wider chain of Qur'anic learning.

Sanad as important for demonstrating that the Qur'an has been learned through a clear scholarly pathway and for establishing the competence of those who will later teach the Qur'an. This finding indicates that the educational outcome is not merely an individual possessing a large body of memorized text. The santri becomes part of an ongoing process of transmission.

DISCUSSION

Beyond Neuropedagogy: Understanding Qur'anic Education

The central contribution of this study lies in recognizing both the explanatory strength and the epistemological boundary of neuropedagogy. Neuropedagogy is valuable because it provides a bridge between neuroscience, cognitive psychology, and educational practice. Contemporary work in this field emphasizes the importance of repetition, neural consolidation, emotion–cognition interaction, and the translation of cognitive mechanisms into pedagogical strategies (Friedman et al., 2025). The progressive *tasmi'* system observed in this study provides a concrete educational practice through which these processes can be understood.

The five-juz progression is consistent with the principle of distributed learning. Instead of requiring santri to memorize and immediately move forward, the system repeatedly returns them to previously learned material. This corresponds with the broader evidence that spacing learning episodes can enhance long-term retention (Cepeda et al., 2006) (Cepeda et al., 2008). The forgetting curve provides an additional interpretive lens: without reinforcement, previously learned

information becomes increasingly susceptible to forgetting (Murre & Dros, 2015). Progressive *tasmi'* responds to this vulnerability by institutionalizing repeated encounters with earlier memorization.

Tasmi' bil ghaib component further demonstrates the importance of retrieval. When santri recite the Qur'an without looking at the mushaf, they are required to retrieve previously encoded information without direct textual support. This process can be interpreted through the concept of retrieval practice. Reading without looking at the mushaf requires santri to actively reconstruct the memorized sequence. Research on retrieval practice similarly emphasizes the value of actively recalling previously learned information for subsequent retention (Wiklund-Hörnqvist et al., 2022). Thus, the empirical findings strengthen the interpretation that progressive *tasmi'* contains cognitively meaningful learning processes.

However, stopping at this interpretation would reproduce the limitation that motivates the title Beyond Neuropedagogy. The cognitive explanation tells us why repeated retrieval and distributed practice may support retention, but it does not tell us what the memorized Qur'an means within the learner's religious and educational world. The same act of reciting the Qur'an may be cognitively described as retrieval, but for a santri it may simultaneously be worship, obedience, responsibility, and participation in a scholarly tradition. These meanings cannot be inferred merely from neural or cognitive mechanisms.

Cognitive Processes and Islamic Epistemology as Complementary Levels

The findings suggest that cognitive learning processes and Islamic epistemology should not be positioned as mutually exclusive frameworks. Instead, they answer different but complementary questions.

Cognitive learning processes primarily address how memorization is acquired, strengthened, maintained, and recalled. Spaced repetition explains the temporal organization of review. Retrieval explains the active reconstruction of memorized material. Attention and active engagement explain the learner's participation. Feedback explains how errors are identified and corrected. Consolidation provides a framework for understanding the gradual strengthening of long-term memory.

Islamic epistemology, in contrast, addresses why the knowledge is pursued, from whom it is received, how it is transmitted, and what makes that transmission legitimate. In the context of Qur'anic education, these questions are represented by worship, adab, teacher authority, musyafahah, sanad, and the continuing responsibility to preserve and transmit the Qur'an.

This distinction can be conceptualized as a movement from memory durability toward knowledge legitimacy and meaning. A memorization may be neurologically strong and behaviorally fluent, but this alone does not establish that the person has participated in the traditional chain of Qur'anic transmission. Conversely, sanad without actual mastery of the Qur'an would also be insufficient. The findings therefore suggest a complementary relationship: cognitive mastery provides the capacity to preserve and recall the text, while Islamic epistemology situates that mastery within a legitimate educational and religious tradition.

The Method's Sequential Stages

One of the main findings of the study indicates that a key characteristic of the memorization method employing *tasmi'* at five-juz intervals lies in its gradual system of memorization reinforcement. The practice of *tasmi'* is organized cumulatively through five-juz stages, beginning with 1–5 juz and continuing to 1–10, 1–15, 1–20, 1–25, and the final stage involves reading 30 juz *bil ghaib* in a single session.

This pattern is consistent with Hermann Ebbinghaus's forgetting curve, which suggests that learned information gradually declines in retention without periodic retrieval or repetition (Murre & Dros, 2015). The implementation of *tasmi'* at five-juz intervals can therefore be understood as a form of spaced repetition that helps maintain previously memorized Qur'anic

material. This finding also corresponds with Cepeda spacing effect, which demonstrates that distributed practice generally produces better long-term retention than massed practice (Cepeda et al., 2006).

However, the *Tasmi' bil ghaib* repetition pattern only partially corresponds to the modern concept of optimal spacing. Cepeda argue that the optimal interval between learning sessions depends on the desired retention period: although the absolute optimal gap increases as the test delay becomes longer, the optimal gap as a proportion of the retention interval becomes smaller (Cepeda et al., 2008). Thus, effective spacing is not a fixed pattern but should be adjusted according to the intended retention period and learning conditions.

In this respect, the five-juz *tasmi'* sequence demonstrates conceptual alignment with spaced repetition through progressive cumulative review from five to thirty juz. Nevertheless, its repetition intervals are primarily determined by curricular milestones rather than by individual estimates of forgetting or memory retention. The pattern therefore represents a pedagogically structured form of spacing rather than a psychologically optimized spacing schedule. At Wilayah Zaid bin Tsabit, for example, the approximately two-month period provided for strengthening memorization before progressing to the next stage creates an opportunity for memory consolidation, but does not explicitly account for individual differences in retention. Conversely, PPTQ As-Sa'adah demonstrates a more adaptive pattern because progression depends on the santri's demonstrated readiness and memorization quality. Even so, its practice does not employ empirical measurement of individual optimal intervals. Thus, both sites reflect the principle of spaced repetition, while differing in their degree of adaptiveness: Zaid bin Tsabit relies more strongly on curriculum-based intervals, whereas As-Sa'adah incorporates performance-based readiness. Neither, however, fully implements the individualized optimal-spacing model proposed in contemporary spacing-effect research.

Tasmi' bil ghaib

A key characteristic of the five-juz *tasmi'* memorization method is the gradual implementation of *Tasmi' bil ghaib*, progressing from one juz to thirty juz. This practice can be understood as a form of retrieval practice, as santri are required to actively retrieve previously memorized Qur'anic verses from long-term memory without relying on the mushaf. Beyond serving as an assessment of memorization quality, repeated retrieval may strengthen long-term retention and facilitate more stable access to memorized information (Wiklund-Hörnqvist et al., 2022). This finding is consistent with Romziana who identified *tikrar*, *muroja'ah*, and *tasmi'* as interconnected practices for strengthening Qur'anic memorization, although their study did not examine these practices through the mechanisms of memory (Romziana et al., 2021).

The findings can further be interpreted through the framework of working memory. Given its limited capacity and susceptibility to interference (Oberauer et al., 2016) (Wilhelm et al., 2013), working memory cannot simultaneously maintain the entire body of thirty-juz memorization. However, the concept of Long-Term Working Memory proposed by Ericsson and Kintsch suggests that extensive practice enables individuals to efficiently access organized information stored in long-term memory (Ericsson & Kintsch, 1995). Thus, the ability of santri at both research sites to recite thirty juz *bil ghaib* suggests that repeated and cumulative *tasmi'* facilitates the consolidation of memorized material and more efficient retrieval from long-term memory. Rather than challenging the limited capacity of working memory, these findings illustrate how structured repetition and retrieval practices can support efficient access to information stored in long-term memory.

The Teacher as More Than a Cognitive Scaffolder

From a cognitive-pedagogical perspective, the teacher provides feedback, correction, scaffolding, and external monitoring. Vygotsky's scaffolding theory explains that learners can achieve higher levels of competence through temporary assistance from more knowledgeable

individuals, enabling them to accomplish tasks that they are not yet able to perform independently (Van Der Stuyf, 2002). This is consistent with educational theories emphasizing guided participation and the role of instructional support.

Yet the teacher in Qur'anic education performs a broader function. *tahfizh* teachers function simultaneously as *murabbi* (value educators), *mu'allim* (knowledge transmitters), and *musyrif* (process mentors), spiritual guidance and scholarly tradition. The sanad findings demonstrate that the relationship cannot be reduced to a technical mechanism for improving memory accuracy. The teacher represents a link in a chain of transmission.

This is particularly important because Qur'anic knowledge is not treated simply as decontextualized information. The process of learning through direct recitation and correction establishes a relationship between the learner and a recognized transmitter. Thus, the teacher occupies two simultaneously important positions: pedagogical facilitator and epistemological transmitter.

However, the findings indicate that teachers in Qur'anic *tahfizh* education fulfill broader academic, emotional, and spiritual roles. Beyond providing corrective feedback, *tahfizh* teachers serve as spiritual mentors and links in the transmission of Qur'anic knowledge. Thus, their role extends beyond what can be fully explained by Vygotsky's scaffolding theory and the feedback framework examined by Kazlauskiene and Barabanova.

Visual-Spatial Representation and Consistent Use of the Mushaf

An interesting finding at PPTQ As-Sa'adah that santri use the same mushaf throughout the memorization process. Santri reported that maintaining a consistent mushaf helped them recall the approximate position of verses on particular pages. From a cognitive perspective, consistent visual and spatial cues can support the encoding and retrieval of learned information by providing contextual references for recalling previously memorized material. In the context of Qur'anic memorization, familiarity with a particular mushaf may therefore help santri orient themselves when retrieving verses, particularly during *tasmi' bil ghaib*. The ability to recall where a verse is located on a familiar page does not necessarily mean that the page itself constitutes the memorized information; rather, the visual-spatial characteristics of the mushaf may serve as retrieval cues that facilitate access to the corresponding verbal information.

This practice can be interpreted through Baddeley's working-memory framework, particularly the visuospatial sketchpad, which is involved in processing visual and spatial information (Baddeley, 2020). The consistent visual appearance of the mushaf may provide students with spatial cues concerning the location of verses, page structures, and textual arrangements.

However, the findings do not establish that using the same mushaf directly causes better memorization. Rather, they indicate that santri perceive consistency in the mushaf as helpful in recalling the location and sequence of memorized verses. This distinction is important because the primary strength of the finding lies in its identification of a naturally occurring memorization practice within the pesantren, rather than in demonstrating a causal effect. The practice may therefore be viewed as a contextual support mechanism that complements repetition, *muroja'ah*, and *tasmi'* in the development of long-term Qur'anic memorization.

From "Completing Memorization" to "Maintaining Knowledge"

Another important finding is the change in santri's orientation toward memorization. The progressive system shifts the educational goal from merely adding new juz toward continuously maintaining previous memorization. This finding can be interpreted cognitively as a mechanism for combating forgetting. However, the participants' descriptions reveal a deeper transformation: maintaining the Qur'an becomes a continuing responsibility.

This finding creates an important bridge between cognitive learning and Islamic educational values. The requirement to repeatedly return to earlier memorization is pedagogically

functional, but its meaning is reinforced by the Islamic concept of *istiqamah*. The Qur'anic memorizer is not understood as someone who has simply completed a curriculum. Rather, memorization remains a lifelong practice of maintenance.

The resulting educational orientation can therefore be described as from acquisition to stewardship. Acquisition concerns obtaining the memorized text. Stewardship concerns maintaining, reciting, embodying, and eventually transmitting it. Neuropedagogy can illuminate the first dimension and important parts of the second, but Islamic epistemology is necessary to explain why stewardship is regarded as an enduring responsibility.

Spirituality as an Irreducible Educational Dimension

The spiritual activities found at both sites further demonstrate why a purely neuropedagogical account is insufficient. *Tarawih bil Hifẓhi* and *Taqwiyatul Hifẓhi* are not merely additional opportunities for repetition. They embed retrieval within worship.

From a cognitive perspective, these practices create additional retrieval opportunities. From an Islamic educational perspective, however, their meaning is different: Qur'anic recitation becomes an act of worship and spiritual discipline. Two learners may perform the same observable behavior, reciting memorized Qur'anic verses, while attaching different meanings to that behavior. A cognitive description can identify attention, recall, motivation, and memory processes, but it cannot by itself determine whether the activity is understood as worship, obligation, devotion, or scholarly responsibility.

This does not mean that spirituality should be treated as an alternative to cognitive science. Rather, spirituality represents a level of educational meaning that cognitive science alone does not exhaust. The contribution of this study is therefore not to replace neuropedagogy with Islamic epistemology, but to demonstrate that Qur'anic education requires an analytical framework broad enough to accommodate both.

Regeneration of Qur'anic Knowledge

The findings indicate that memorization through five-juz *tasmi'* stages contributes not only to individual achievement but also to the regeneration of Qur'anic knowledge within the pesantren tradition. Students who complete the 30-juz *tasmi' bil ghaib* may receive an *ijazah sanad* that connects them to a continuous chain of Qur'anic transmission extending back to the Prophet Muhammad SAW. This process helps prepare qualified learners who may continue the teaching tradition across generations.

However, neuropedagogy alone cannot fully explain this process of knowledge regeneration. While neuropedagogy explains how repetition, retrieval, and learning environments support memory and cognitive development, the transmission of Qur'anic knowledge involves broader socio-religious dimensions, including teacher–student relationships, exemplary conduct, scholarly legitimacy, pesantren culture, and the continuity of teaching traditions.

This distinction is reflected in the Islamic concept of *isnad*, in which the validity of knowledge is connected not only to its content but also to the continuity of its transmission. Abdullah and Rahman explain that *sanad* provides a framework for understanding the relationships among transmitters, transmission chains, and the development of knowledge within the Islamic tradition. This principle is also reflected in the statement attributed to Abdullah ibn al-Mubarak: “*Al-isnad min al-din, walaulal isnadul laqolal man sya a ma sya a*” (Sanad is part of religion, if there were no sanad, everyone would say whatever they wished), emphasizing the importance of a continuous and accountable chain of transmission (Abdullah & Rahman, 2025).

In Qur'anic education, this transmission is maintained through direct teacher–student interaction (*musyafahah*), which helps preserve accurate pronunciation, *tajwid*, recitation practices, and proper conduct toward the Qur'an. Thus, strong memorization does not automatically make a student a legitimate transmitter of Qur'anic knowledge; validation and transmission through a qualified teacher remain essential.

Thus, neuropedagogy explains **how Qur'anic knowledge is learned and retained**, whereas Islamic epistemology, particularly through *sanad*, explains **how knowledge is received, validated, transmitted, and inherited across generations**. The regeneration of Qur'anic knowledge therefore extends beyond cognitive processes into the epistemological and socio-religious dimensions of Islamic education.

Toward an Integrated Framework of Qur'anic Memorization Education

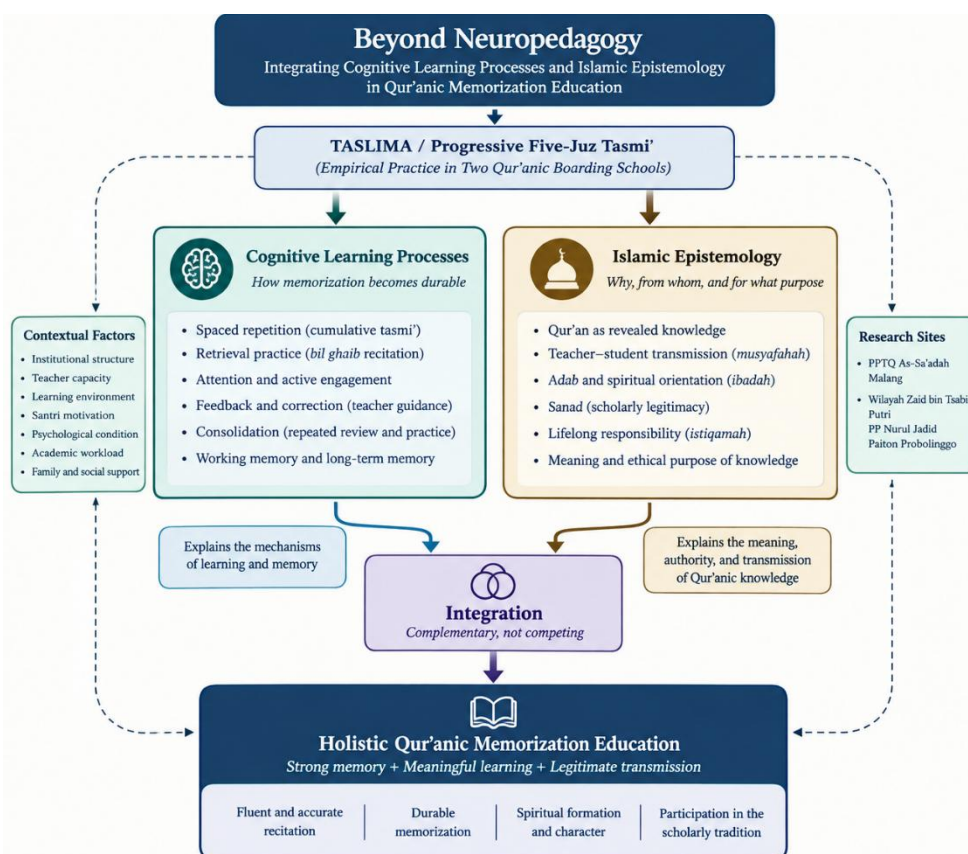


Figure 1. Integrated Framework of Qur'anic Memorization Education

The cross-site findings suggest an integrated understanding of Qur'anic memorization education in which progressive five-juz *tasmi'* operates through two complementary dimensions: cognitive learning processes and Islamic epistemology. The first explains how memorization becomes durable through repeated retrieval, cumulative review, feedback, and consolidation, while the second explains the religious, ethical, and epistemological meanings underlying the acquisition, transmission, and preservation of Qur'anic knowledge. These two dimensions emerge from the implementation of progressive *tasmi'* at PPTQ As-Sa'adah Malang and Wilayah Zaid bin Tsabit Putri, PP Nurul Jadid Paiton Probolinggo, and together provide the basis for understanding Qur'anic memorization as a holistic educational process.

The first dimension, cognitive learning processes, explains how Qur'anic memorization becomes durable. The progressive *tasmi'* system involves cumulative repetition, *tasmi' bil ghaib* as retrieval practice, attention and active engagement, teacher feedback and correction, repeated review, and the interaction between working memory and long-term memory. These processes help explain how memorized Qur'anic material is repeatedly accessed, reinforced, and maintained over time. The framework therefore does not regard *tasmi'* merely as an assessment procedure, but as an educational practice that continuously engages processes related to learning and memory.

The second dimension, Islamic epistemology, addresses questions that cannot be fully

explained through cognitive mechanisms alone. It concerns the Qur'an as revealed knowledge, teacher–student transmission through *musyafahah*, adab and spiritual orientation, sanad as scholarly legitimacy, lifelong responsibility (*istiqamah*), and the meaning and ethical purpose of knowledge. These dimensions situate memorization within the religious and scholarly tradition of Qur'anic education. As the study indicates, Qur'anic memorization is not limited to retaining textual information but also involves responsibility for preserving and transmitting the knowledge through legitimate educational relationships.

The framework therefore presents cognitive learning processes and Islamic epistemology as complementary rather than competing perspectives. Cognitive processes explain how memorization becomes stable, retrievable, and durable, whereas Islamic epistemology explains why the Qur'an is memorized, from whom it is learned, how it is transmitted, and what makes the learning meaningful and legitimate. This complementary relationship represents the central argument of the study: moving beyond neuropedagogy does not mean rejecting cognitive or neuroscience-informed explanations, but placing them within a broader framework of Qur'anic education.

The framework also incorporates contextual factors and the research sites as elements surrounding the educational process. Institutional structure, teacher capacity, learning environment, santri motivation, psychological condition, academic workload, and family or social support may influence how the progressive *tasmi'* system is implemented. The two research sites provide distinct institutional contexts in which the same basic five-juz progression is practiced through different organizational arrangements.

The integration of these dimensions leads to Holistic Qur'anic Memorization Education, characterized by four interconnected outcomes: fluent and accurate recitation, durable memorization, spiritual formation and character, and participation in the scholarly tradition. Thus, Qur'anic mastery is understood not merely as the quantity of memorized juz, but as the ability to maintain accurate and fluent recitation, sustain memorization over time, develop a continuing spiritual responsibility toward the Qur'an, and participate in its legitimate transmission.

In this sense, the framework synthesizes the central contribution of the study: cognitive learning processes provide an explanation of memorization durability, while Islamic epistemology provides its educational, spiritual, ethical, and transmissional meaning.

CONCLUSION

The dialogue between the empirical findings and neuropedagogical perspectives demonstrates that Qur'anic memorization (*tahfiẓh*) practices at PPTQ As-Sa'adah Malang and the Zaid bin Tsabit Girls' Area of PP Nurul Jadid Paiton Probolinggo are closely aligned with several cognitive principles underlying effective learning. The implementation of progressive *tasmi'* at five-juz intervals provides a structured process through which memorized materials are repeatedly retrieved and reinforced over time. The practice of *tasmi' bil ghaib* across 30 juz further illustrates intensive retrieval, while students' active participation throughout the memorization and recitation process reflects sustained learner engagement. Other observed practices also indicate the involvement of cognitive processes related to attention, memory, and information processing, including the use of visual-spatial representations that can be associated with the visuo-spatial sketchpad. These findings suggest that the effectiveness of the memorization practices observed in both sites can be meaningfully interpreted through the lens of neuropedagogy.

However, the empirical findings also reveal that neuropedagogy, while providing a substantial account of the cognitive mechanisms involved in *tahfiẓh* learning, does not fully encompass the educational reality of Qur'anic memorization within the pesantren context. The learning process extends beyond attention, memory, emotion, motivation, and other cognitive mechanisms associated with brain functioning. Students' memorization of the Qur'an is simultaneously embedded in spiritual purposes, religious commitment, worship, and experiences of closeness to Allah. Over time, memorization is not merely retained as information in long-term

memory but becomes incorporated into the students' identity, religious orientation, and responsibility toward the Qur'an. These dimensions indicate that the meaning of Qur'anic memorization cannot be reduced to the neurological and cognitive processes through which information is encoded, retained, and retrieved.

This limitation becomes even more evident in the process of Qur'anic knowledge regeneration observed through the implementation of five-juz progressive *tasmi'*. The attainment of *mutqin* memorization is not positioned merely as an individual cognitive achievement. Rather, it forms part of a broader educational process through which students are prepared to preserve, embody, and eventually transmit Qur'anic knowledge to others. Students who develop into prospective Qur'anic teachers represent not simply successful learners who have acquired long-term memory retention, but participants in an ongoing chain of Islamic knowledge transmission. In this context, the teacher and student relationship carries epistemological significance because knowledge is transmitted through guidance, exemplary practice, authorization, and continuity of scholarly tradition.

This finding points to an important conceptual boundary of neuropedagogy. Neuropedagogy is useful for explaining how memorization can be supported through cognitive and neurobiological processes, but it does not by itself adequately explain why the Qur'an is memorized, what meaning the memorization carries for the learner, or how Qur'anic knowledge is situated within a continuous Islamic scholarly tradition. These questions require an epistemological framework capable of accounting for the spiritual, ethical, relational, and transmissive dimensions of learning.

Accordingly, the findings support a perspective that moves beyond neuropedagogy without rejecting its contribution. Rather than positioning cognitive learning processes and Islamic epistemology as competing explanatory frameworks, this study identifies them as complementary dimensions of Qur'anic memorization education. Neuropedagogy contributes an explanation of the cognitive processes that support retention and retrieval, whereas Islamic epistemology provides a framework for understanding the purpose, meaning, values, and continuity of Qur'anic knowledge. The integration of these dimensions offers a more comprehensive understanding of *tahfiẓh* education: one that recognizes memorization not merely as the storage and retrieval of information, but as a process of cognitive development, spiritual formation, and intergenerational transmission of Islamic knowledge.

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