

The Implementation of the Brain Rhythm Method in Enhancing the Quality of Quran Memorization

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ABSTRACT

It is crucial to elevate the standards of Quran memorization, especially within madrasah diniyah, where many educators need further capacity development. This study aims to evaluate the effectiveness of the brain rhythm method, a cognitive learning technique that aligns Quranic recitation with specific brainwave patterns to enhance memorization and retention. The study employs a quasi-experimental method with a sample of 72 sixth-grade students from 8 madrasah diniyah in Bandung Regency. Quran memorization tests were used for data collection, assessing accuracy, fluency, and retention over different time intervals. An independent sample t-test study revealed a statistically significant increase in the group utilizing the brain rhythm method's Quran memory quality over the control group, with a significance level of 0.010 ($p < 0.05$). These findings suggest that brain rhythm techniques can enhance learning outcomes in Quran memorization. Practically, Islamic educational institutions could consider incorporating these methods to enhance teaching effectiveness. It would be beneficial to investigate this method's long-term effects and suitability for use in various educational contexts in future research. Additionally, investigating the underlying mechanisms of how brain rhythm synchronization aids memorization could provide deeper insights and potentially lead to further advancements in teaching strategies. This approach may inspire the development of new educational techniques that leverage cognitive science to improve religious education. Moreover, examining the scalability of this method and its integration with modern educational technologies could further enhance its impact. Thus, the brain rhythm method holds significant potential for advancing the field of Islamic education.

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1. INTRODUCTION

The Quran contains values that should be applied in all aspects of life (Kamal, 2017). It is very important to memorize the Quran because by doing it, we can ensure that the Quran is preserved in its purity (H. Haslinda, 2020). As Islamic educational institutions, Madrasahs have demonstrated their effective function in developing human resources. In some Madrasahs, Quranic educational institutions first emerged. This institution teaches students to read, memorize, and understand the Quran as well as other religious subjects. (P. Stiyamulyani, 2018). Education, particularly in madrasah diniyah, is the most important factor in preparing individuals to face competition in the global era. Therefore, efforts to develop human resources (HR) are crucial. The professionalism of school educators, teachers, and other staff members in performing their jobs is evidence that the caliber of human resources is reflected in the caliber of education and can be used to raise educational standards (Suryani, Setiawan, Muhdar, & Oktaviani, 2024).

The *madrasah diniyah* institutions in the Bandung Regency area implement Quran memorization programs. The tahfidz and takrir techniques are typically used to memorize the Quran in madrasahs in Bandung Regency. The tahfidz method involves memorizing new verses or chapters in the Quran. Meanwhile, the takrir method involves repetition of memorization by reciting it to the tahfidz teacher (Ali, Muhdlor, & Zuhdi, 1996). To ensure that memorization remains ingrained in the mind, both approaches are used. The method of memorizing the Quran is specifically necessary to facilitate the improvement of Quranic memorization quality among students.

In the Pangalengan District of Bandung Regency, a prevalent occurrence among madrasah diniyah students is the inadequate application of memorizing techniques. Traditional teaching methods in madrasah diniyah often involve collective recitation, hindering individual engagement with the Quran and comprehension of its teachings (Inten, Aziz, Khambali, & Mulyani, 2021). This collective approach contributes to the failure in achieving optimal memorization targets set by madrasahs. Specifically, the tahfidz method has shown inefficiency in facilitating Quran memorization effectively. Therefore, there is a pressing need for Quran memorization education reform for children in these institutions. One promising approach to address this issue is the introduction of the brain rhythm method. Unlike traditional methods that rely heavily on rote memorization and collective recitation, the brain rhythm method employs principles of neuroscience to optimize memorization and understanding. It engages multiple senses, such as sight, sound, and touch, to create a holistic learning experience. Students are encouraged to use rhythmic movements, visualization techniques, and auditory cues to internalize Quranic verses.

The implementation of the brain rhythm method involves training madrasah diniyah teachers in its principles and techniques. Teachers learn how to create dynamic and interactive learning environments that cater to individual students' needs. They guide students in utilizing rhythmic patterns, mnemonics, and visualization exercises to enhance their memorization skills. This personalized approach fosters a deeper understanding of the Quran and promotes long-term retention of memorized verses. In comparison to conventional approaches, madrasah diniyah students can gain from a more dynamic and productive learning environment by implementing the brain rhythm method. Furthermore, empirically putting the brain rhythm approach to the test on students in madrasahs can shed light on its efficacy and potential for broad use in Quran memorization instruction.

One technique that helps with teaching or memorization of the Quran is the brain rhythm approach. The right brain is used in this method. There are specific activities in the human brain that enable memorization or recall. Memorizing the Quran is an endeavor to improve brain cell utilization, like other bodily sections. When brain power is applied properly and consistently, the required level of intelligence will emerge organically. (Siswanto & Izza, 2018).

The electrical waves generated by structures in the human brain can move, rise, or fall (Prima, 2018). Brain rhythm is the wave or vibration that occurs in brain nerves. Brain rhythm is the activity in all parts of the nervous system generated by specific mechanisms (Buzsaki, Logothetis, & Singer, 2013).

Similar to ocean waves, these brain waves can be big or small, quick or sluggish. (Addante, Yousif, Valencia, Greenwood, & Marino, 2021). The process of memory relies on the synchronization of specific brain rhythm, namely the combination of theta and gamma rhythms. (Robertson, 2009).

When memorizing, students use the brain rhythm method to engage all their senses, including head movement, hand movement, hearing, vision, and thought. This allows them to focus on Quranic recitation. (Iswati, Cahyono, & Anam, 2021). When reciting certain sentences, the pronunciation, whether long or short, is accompanied by the rhythm or tone of the sound. Letter and number codes are utilized to preserve specific sounds in long-term memory (Nugraha, 2019). This is done to help students memorize the Quran and retain memorization for a long time. This method utilizes four types of self-intelligence: visual, auditory, kinesthetic, and spiritual. (Khamid, Munifah, & Rahmawati, 2021).

Previous research on the brain rhythm method focused on its implementation and effectiveness, such as the study conducted by Hidayatusahiro and Baqi investigated the implementation and inhibiting factors of the method at Rumah Tahfidz Assaubari Ponorogo (Hidayatusahiro & Baqi, 2022). The other research conducted by Rusjdy Sjakyakirti Arifin, Busahdiar, and Saviratu Syahdiani studied its impact on Quran memorization at Madrasah Aliyah Sunanul Husna Ciputat. (Arifin, Busahdiar, & Syahdiani, 2022). Another study related to the Implementation of Quran Teaching with Brain Rhythm Method, by Aisyah Maulina and Robie Fanreza, suggested that the method facilitates Quran teaching due to its specific word arrangement (Maulina & Fanreza, 2023). However, these studies did not address the specific mentoring needs of madrasah diniyah teachers in Bandung Regency. This study fills this gap by providing mentoring to madrasah diniyah teachers in Bandung Regency and assessing the effectiveness of the brain rhythm method in improving Quran memorization among their students.

Bandung Regency, as one of the centers of education and religion in Indonesia, has a long tradition of teaching the Quran in various madrasahs. However, in facing the challenges of modern times, educators in Bandung Regency feel the need for new breakthroughs to enhance the quality of learning, especially in Quran memorization. Based on field surveys, the number of madrasahs diniyah teachers in each district in the research area is 350 people, with 50% on average having high school or equivalent education, 20% having junior high school or equivalent education, and 30% having bachelor's degree education. These teachers are spread across all villages, including remote areas where madrasahs are located and where children need them. Meanwhile, the number of children attending each madrasah averages between 150-250 students, divided into 6 classes (Inten, Aziz, Khambali, & Mulyani, 2021). The issue facing madrasah diniyah in the Bandung Regency area is that many teachers require capacity-building in implementing high-quality Quran memorization learning for madrasah diniyah students.

The implementation of the Brain Rhythm Method emerges as a response to this need. This method not only relies on mechanical memorization but also integrates principles of neuroscience into the learning process. This involves the use of techniques such as rhythmic repetition, the use of color and images, and coordinated physical activities, all of which have been proven to enhance retention and understanding of information in the brain.

The application of the Brain Rhythm Method at madrasahs in Bandung Regency is anticipated to expand students' comprehension of the teachings included in the holy book in addition to increasing the efficacy of Quran memorization. This is in line with the vision of Islamic education, which emphasizes not only quantitative aspects (memorization ability) but also qualitative aspects (understanding and implementation of values).

Inspired by the issue's history, this study attempts to find out how well madrasah pupils in the Bandung Regency memorize the Quran and how well they retain it by applying the brain rhythm approach. The primary research question is: "To what extent does the implementation of the brain rhythm method improve the quality and retention of Quran memorization among madrasah students?" Additionally, the study aims to assess any differences in memorization outcomes between students who receive brain rhythm method instruction and those who do not.

2. METHODS

2.1. Research Design

In order to improve the quality of Quran memorization, research was carried out in madrasahs throughout Bandung Regency by mentoring teachers in the application of the brain rhythm approach and evaluating its efficacy on madrasah pupils. Using a sample size of 72 students, This study used a pretest and posttest control group design as part of a quasi-experimental paradigm. In Table 1, the study design is presented.

Table 1. Pretest and Posttest Control Group Design in a Quasi-Experimental Design

Pre-test	Treatment	Post-test
Pre-test scores	Brain Rhythm Method	Post-test scores
Pre-test scores	Tikrar Method	Post-test scores

¹Sources: (Creswell, 2009)

The establishment of two groups—the experimental group and the control group—was the first step in the research for this study. Three steps make up the activities in the control group: preparation, memory exercises involving the Quran, and closure. Table 2 below details the phases and sample activities that the teachers in the control group completed.

Table 2. Stages of Takrir Method

No	Phases	Example activities
1.	Preparation of the Quranic verses to be memorized	The teacher gives the kids the Quranic passages to remember.
2.	Memorizing Quranic verses	The teacher reads the Quranic verses to be memorized, interspersed with repetition from the students regarding the memorized verses.
3.	Closing	Students submit their memorization to the teacher

²Sources: (Sa'dullah, 2017)

In the experimental group, teachers undergo comprehensive training on the implementation of the brain rhythm method. The training covers several key topics, including: (1) Designing Lesson Plans: Teachers learn to create detailed lesson plans tailored to the principles of the brain rhythm method. These plans outline the specific objectives, activities, and assessments for each session; (2) Developing Teaching Materials: Teachers are equipped with strategies for developing engaging and effective teaching materials that align with the brain rhythm method. This includes selecting appropriate Quranic passages, visual aids, and interactive resources to enhance student learning; (3) Planning Instructional Media: Teachers explore various instructional media, such as audio recordings, visual presentations, and digital applications, to encourage the use of the brain rhythm approach in various educational settings; (4) Techniques for Quran Memorization: Teachers learn specific techniques and mnemonic devices to facilitate Quran memorization among students. This includes rhythmic recitation, visualization exercises, and auditory cues to enhance memorization and retention; (5) Evaluation Instruments: Teachers are trained to develop evaluation instruments that accurately assess students' progress in Quran memorization while aligning with the principles of the brain rhythm method. This may involve creating quizzes, oral assessments, and performance tasks that measure memorization accuracy, fluency, and comprehension.

Throughout the training process, teachers receive ongoing support and guidance from experienced educators and specialists in Quranic education. They have opportunities to practice implementing the brain rhythm method in simulated classroom settings and receive feedback on their instructional techniques. This intervention seeks to improve students' comprehension and competency in memorizing the Quran in madrasahs by providing teachers with the necessary information and abilities to apply the brain rhythm approach.

The brain rhythm technique can be applied using many activity phases, as indicated in Table 3.

Table 3. Stages of Brain Rhythm Method Implementation

No	Phases	Example activities	Duration	Frequency
1.	Understanding	Students are given insights or materials about what the Brain Rhythm Method is	One meeting	Once
2.	Introduction to Makharijul Huruf (Articulation Points of Letters)	Introduction to Makharijul Huruf appropriate for the implementation of the brain rhythm method through several terms or symbolic codes of pronunciation of the Arabic alphabet letters that need to be known	Two meetings	Twice a week
3.	Introduction to Tajweed science	Introduction to Tajweed science suitable for the implementation of the brain rhythm method and the recitation of long and short verses in the Quran	Three meetings	Thrice a week
4.	Application of codes	Application of Makharijul Huruf and Tajweed science codes for each student	One meeting	Once
5.	Implementation of Memorization through the Brain Rhythm Method	How to memorize the Quran through the Brain Rhythm Method	Four meetings	Four Times a week
6.	Implementation of S2M Rules	Using the S2M rules (<i>Sabak</i> , <i>Sabki</i> , and <i>Manjil</i>), this stage is the process of smoothing memorization, used when students memorize with the guidance of a teacher or ustadz. <i>Sabak</i> is the memorization newly learned today, <i>sabki</i> is the repetition of memorization learned yesterday and still within the same chapter as <i>sabak</i> , <i>manzil</i> is a combination of both and is a repetition of memorization from the past (long-term).	Ongoing	As needed

³Sources: (Indi, t.t.)

2.2. Sample

The Slovin formula is used in the sample selection process, which employs the purposive sampling method as follows (Sevilla & et.al, 2007):

$$n = \frac{N}{1 + Ne^2}$$

n: The amount of the sample

N: The dimensions of the population

E stands for error margin.

The population in this study is madrasah students throughout Bandung Regency, totaling 252 students from 8 madrasahs. The tolerance set by the researcher is 10%. $n = N / (1 + Ne^2) = 252 / (1 + 252 \times 0,12) = 71,6 = 72$ can be found using the Slovin formula. A sample size of 72 people is required, comprising 36 pupils in the control group and 36 pupils in the experimental group. Demographic information about the sample includes variables such as age, gender, educational background, and the level of involvement in previous religious activities. Additionally, the previous experience of students with Quran memorization will be noted, including whether they have had prior experience with different Quran learning methods.

2.3. Instrument

Data collection in this study uses an assessment rubric for Quran memorization with criteria including *Tajwid/ Fashahah, Al-Ada' (Performance), Jaudah Hifdz (Memorization Mastery), and Adab*. The rubric is assessed by teachers to students during pretest and posttest to collect data on Quran memorization ability. Each criterion is assigned a weight, thus obtaining the highest score of 100. This assessment rubric has undergone adequate validity and reliability testing prior to its use in this research. The rubric's validity has been verified by relevant experts and practitioners in the field of Quranic education. Through pilot testing with a representative sample from the population being studied, its dependability has been evaluated. The findings show a high degree of assessment consistency across many assessors, confirming the validity and precision of the measurement instrument in evaluating students' memorization skills of the Quran. Each criterion has its indicators as outlined in the following table.

Table 4. Rubric for Quran Memorization Assessment in Madrasah Students

No	Criteria	Descriptors	Rating Scale	Weighting	Scores
1	<i>Tajwid/ Fasahah</i>	1.1. <i>Makharijul Huruf</i> 1.2. <i>Nun Sukun</i> 1.3. <i>Mim Sukun</i> 1.4. <i>Nun/ Mim Tasydid</i> 1.5. <i>Mad</i>	4: Tajweed reading errors occur 1-3 times in the tested surah or pages 3: Tajweed reading errors occur 4-6 times in the tested surah or pages 2: Tajweed reading errors occur 7-9 times in the tested surah or pages 1: Tajweed reading errors occur more than 10 times in the tested surah or pages	20	
2	<i>Al Ada'/ Performance</i>	2.1. <i>Cessation and Initiation</i> 2.2. <i>Tartil Harmonization</i> 2.3. <i>Volume of Voice</i>	4: No mistakes in starting and stopping readings, consistent tartil harmonization, clear and loud voice 3: Makes mistakes in starting and stopping readings with assistance and can correct them independently, tartil rhythm is not consistent yet, clear and loud voice 2: Makes mistakes less than 5 times in starting and stopping readings with assistance, there is tartil harmony, but not consistent yet, voice is clear but inconsistent 1: Makes mistakes in starting and stopping readings and is reminded more than 5 times, the rhythm is monotonous, the voice is quiet and barely audible	15	
3	<i>Jaudah Hifdz/ Memorization Mastery</i>	Flows smoothly while still adhering to the rules of Tajweed	4: The memorization is fluent without any reminders 3: The memorization is fluent with reminders and self-correction 2: The memorization is fluent with reminders and notified less than 5 times 1: The memorization is fluent with reminders and notified more than 5 times	50	
4	<i>Adab</i>	4.1. <i>Performing ablution (wudu)</i>	4: All indicators and manners can be demonstrated	15	

No	Criteria	Descriptors	Rating Scale	Weighting	Scores
	4.2.	Reciting the Ta'awudz	3: There are 4 indicators and manners demonstrated		
	4.3.	Reciting the Basmalah except in Surah At-Taubah	2: There are 2-3 indicators and manners demonstrated 1: Less than two indicators are demonstrated from manners		
	4.4.	Devotion			
	4.1.	Prostration of recitation when encountering verses of prostration			

⁴Sources: (Giyanti, Ernawati, & Setiadi, 2021)

The data collection process is carried out in two stages, namely the pretest and posttest stages, using the same rubric. After completing the pretest, both sample groups were assigned the task of memorizing the same chapters, namely Surah An-Naba and An-Nazi'at. In the control group, the takrir method was implemented, while in the experimental class, guidance was provided for memorization using the rhythm of the brain method. Each group was required to submit their memorization twice a week for one month. After the memorization period, students from both groups were retested using the same instruments as in the pretest.

2.4. The Analisis Data

As part of this study's data analysis, the pretest and posttest results for the experimental and control groups will be compared. Statistical techniques such as independent sample t-tests can be used to determine whether there is a significant difference between the posttest results for the two groups. Descriptive statistics can also be used to provide an overview of each group's overall performance. The study's decision-making standards are as follows: If the probability value (p-value) is 0.05 or below ($0.05 \leq p$), the alternative hypothesis (H_a) is accepted and the null hypothesis (H_o) is rejected. On the other hand, If the probability value is greater than or equal to 0.05 ($0.05 > p$), the null hypothesis is accepted and the alternative hypothesis is rejected.

The whole experimental research flowchart that corresponds with the research goal—assessing any differences in memorizing results between cohorts that received instruction in the brain rhythm approach and those that did not—is provided below.

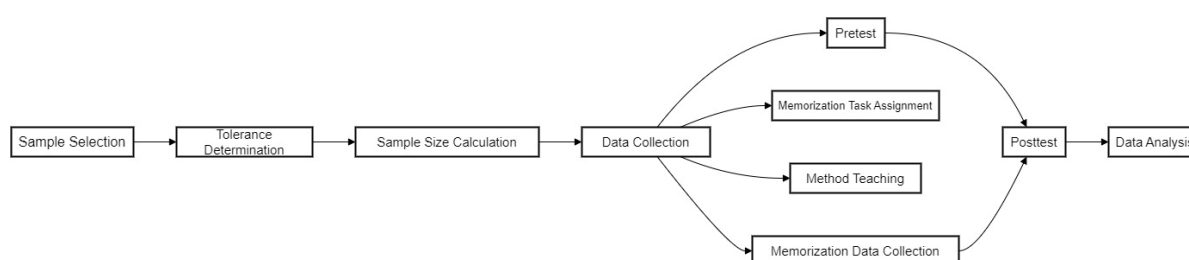


Figure 1. Flowchart of Brain Rhythm Method Research for Enhancing the Quality of Quran Memorization

3. FINDINGS AND DISCUSSION

3.1. Findings

Before the study is carried out, instructions on how to use brain rhythm approach to enhance the quality of Quran memorization for madrasah students were given. Comparable memorization was achieved by memorizing the whole surahs, guaranteeing that the data supplied with the model produced outcomes that were also comparable. Treatment was administered using two distinct teaching strategies: one group received instruction using the brain rhythm technique, and another group received instruction using the *takrir* method. Both approaches were used to perform learning in accordance with their distinct stages. At the conclusion of the course, a memorization test was administered to determine whether the improvement in learning outcomes between the *takrir* technique and the brain rhythm approach had a greater impact on pupils' memory of the Quran in terms of quality.

3.1.1. The Results of the Descriptive Analysis of Experiment and Control Groups

Two different teaching methods were used to provide treatment: the *takrir* method was used for one group, and the brain rhythm method was used for another group. Learning was conducted by utilizing both methods according to their respective stages. A memorizing test was given to students at the end of the therapy to ascertain whether the difference in learning outcomes between the brain rhythm approach and the *takrir* method had a bigger impact on the quality of Quran memorization.

Table 5. Descriptive Analysis Outcomes for the Test and Reference Groups

	Descriptive Statistic				
	n	Minimal	Highest	Average	Std. Deviation
Results of the experimental group's pretest	36	40	95	70,61	12,997
Results of the experimental group's posttest	36	45	98	76,17	12,867
Results of the control group's pretest	36	40	90	63,94	13,210
Results of the control group's posttest	36	50	98	71,47	13,079

Table 5 shows that the experimental group had a mean score of 70.61 on the pre-test and 76.17 on the post-test. The pre-test average score for the control group is 63.94, and the post-test average score is 71.47. The quality of the students' memorizing of the Quran has improved using both teaching techniques, as seen by the mean scores, which are distinct from those in the control and experimental groups. The findings indicate a noteworthy variation between the two groups.

3.1.2. Normality and Homogeneity Test Result

Prior to conducting the independent sample t-test, the researcher performed tests to assess normality and homogeneity. The Shapiro-Wilk method is used for normality tests to see if the data has a normal distribution. The Test Homogeneity of Variance method is used for homogeneity tests to see if the variance between groups is the same. The researcher uses the independent sample t-test if the data satisfies the homogeneity and normalcy criteria. The normal test results are shown in the table below.

Table 6. Shapiro-Wilk Method Results for Normality Tests

Group	Statistic	Df	Sig.
Results of the experimental group's pretest	.959	36	.207
Results of the experimental group's posttest	.942	36	.060
Results of the control group's pretest	.963	36	.265
Results of the control group's posttest	.944	36	.069

The purpose of conducting normality tests was to assess the distribution of data in each group before analyzing the results. Table 6 presents the normality test results, indicating that the data meet the assumption of normality. Each group's pre- and post-test statistics are provided, together with the Shapiro-Wilk statistic, degrees of freedom (Df), and significant level (Sig.). Data with a normal distribution are indicated by significance values larger than 0.05. On the other hand, non-normally distributed data are indicated by significance values less than 0.05. In Table 6, The pre-test results for the experimental group indicate significance values of 0.207 and 0.060 for the post-test, respectively, whereas the pre-test for the control group results indicate 0.265 and 0.069 for the post-test. As a result, it is believed that the data distribution is normal. Homogeneity tests also use variance homogeneity tests to assess the degree of variable comparability between the experimental and control groups. If the significance value is greater than 0.05, the data is considered homogeneous; if it is less than 0.05, the data is considered non-homogeneous. The homogeneity test results for the pre- and post-tests are shown in the following table.

Table 7. Homogeneity of Variance Test for Pre-Test

		Levene Statistic	df1	df2	Sig.
Pretest results	Derived from the mean	.004	1	70	.951
	Derived from the median	.085	1	70	.771
	Derived from the Median and with adjusted df	.085	1	67.404	.771
	Derived from the trimmed mean	.007	1	70	.934

Table 8. Test of Post-Test Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Posttest results	Derived from the mean	.165	1	70	.685
	Derived from the median	.124	1	70	.726
	Derived from the Median and with adjusted df	.124	1	69.556	.726
	Derived from the trimmed mean	.175	1	70	.677

The homogeneity test results displayed in Tables 7 and 8 indicate that the pre- and post-test data variances in the experimental and control groups are homogeneous. Because they assess the consistency of score variability between groups, these tests are significant. Based on a mean of 0.951 ($0.951 > 0.05$), Table 7 displays the homogeneity significant value for the pre-test. A similar result for the post-test is shown in Table 8, where the mean is 0.685 ($0.685 > 0.05$).

3.1.3. Independent Sample T-Test Test Results Post-Test Experiment-Control Group

The results of the homogeneity and normality tests show that the data are homogeneous and normally distributed, allowing the independent samples t-test to be run as shown in Table 9. Based on the findings of the independent samples t-test analysis displayed in Table 9, the study hypothesis is tested. Testing a theory is one technique to find out if it is accepted or rejected. The hypothesis proposed in this research is as follows:

Ho: The use of the brain rhythm method does not significantly influence the improvement of students' memorization quality of the Quran.

Ha: The use of the brain rhythm method significantly influences the improvement of students' memorization quality of the Quran.

Rejecting the null hypothesis (Ho) would imply that the brain rhythm method has a significant impact on enhancing students' memorization quality of the Quran. This finding would have important educational implications, suggesting that incorporating the brain rhythm method into Quran memorization practices can lead to tangible improvements in learning outcomes among students. It may inspire educators to adopt innovative teaching methods rooted in cognitive science principles to enhance religious education effectively.

Table 9. Results of the Independent Samples t-test

		Levene's Equality of Variances Test		t-test for mean equality						
		F	Sig.	t	df	Sig. (2- tailed)	Average Differen	Standard Error Disparity	95% Difference Confidence Interval	
									Lower	Upper
N_Gain Score	Assumed equal variances	20.465	.000	-2.663	70	.010	-11.000	4.130	-19.237	-2.763
	It is not assumed that equal variances exist.			-2.663	36.243	.011	-11.000	4.130	-19.374	-2.626

To test the hypothesis, the researcher used the output data from SPSS 23 for Windows. The criteria requirements were tested using the significant coefficient (Sig). Stated differently, H_0 is accepted if the significance value is greater than 0.05 and rejected if it is less than 0.05. According to Table 6, the Independent Sample t-test findings for the hypothesis Sig demonstrate Sig. The two-tailed value is 0.010. This implies that H_a is accepted whereas H_0 is denied. With Sig. (2-tailed) at 0.011 ($0.011 < 0.05$), the equal variance table's result is unquestionably almost same, indicating that H_0 is rejected and H_a is accepted. This result suggests that using the rhythm strategy greatly improves students' Qur'anic memory quality.

3.2. Discussion

The study's population consists of 252 madrasah students from 8 madrasahs located throughout Bandung Regency. The researcher has specified a tolerance of 10%. To evaluate how well the brain rhythm approach improves students' memorizing of the Quran, a sample size of 72 students is needed, there are 36 students in both the experimental and control groups.. This number is determined by applying the Slovin formula. Both groups endured the learning process with the task of memorizing the same chapters, namely Surah An-Naba and An-Nazi'at, but with different methodologies to implement this research in enhancing the quality of Quran memory. For a month, each group had to turn in their memorization twice a week. Using the identical instruments from the pretest, students from both groups took another exam after the memory interval had passed. Three phases of the study were carried out: the pretest, the therapy, and the posttest. Following the completion of the pretest, each group (experimental and control) got therapy. Various treatments were given to each group.

To pique the interest and enthusiasm of the students, the study presented the brain rhythm method to the experimental group. The teacher began by defining the brain rhythm method and providing strategies for memorizing and utilizing the Quran. In the subsequent phases, the instructor presented the principles of Quranic recitation that correspond with the application of the brain rhythm technique, as well as makharijul huruf, which are the Arabic letter articulation points. Students were given tasks in the fourth level that required them to apply the science of tajwid and the articulation points of the Arabic letters to Surah An-Naba and An-Naziat. The instructor then inspired students by giving them assignments to remember Surah An-Naba and An-Naziat with strategies suitable for applying the brain rhythm method.

At the last phase, the teacher provided guidance to improve the quality of Quranic memorization among students using the S2M method (*Sabak, Sabki, and Manjil*). This stage is the process of refining memorization, used when students memorize with the guidance of the teacher. *Sabak* refers to the

newly memorized portion for the day, *Sabki* involves the repetition of the memorization from the previous day still within the same chapter as *Sabak*, while *Manjil* combines both and represents the repetition of memorization from a while ago. In the control group, the activities consist of three stages: preparation, Quranic memorization activities, and closure. During the Quranic memorization activity, students are tasked with memorizing Surah An-Naba' and An-Naziat using the appropriate techniques corresponding to the implementation of the Takrir method.

After the different treatments were given to each group, the students completed a post-test to memorize the assigned surah using the same rubric for assessing Quranic memorization, which includes criteria such as *Tajwid/ Fashahah*, *Al-Ada'* (Performance), *Jaudah Hifdz* (Memorization Mastery), and *Adab*. Teachers can use the rubric as a guide to evaluate students during pre- and post-tests to get information about their memorization skills of the Quran. The pre- and post-test data is utilized to compare the experimental and control groups. In the pre-test analysis, the experimental group had an average (mean) score of 70.61, which increased to 76.17 in the post-test. Conversely, the control group's average (mean) score increased from 63.94 in the pre-test to 71.47 in the post-test. The results of the analysis indicate a disparity between the post-test scores of the experimental and control groups. Considering the statistical significance, it can be inferred that the brain rhythm approach is more effective than the takrir method.

This study aligns with Oflaz's findings, suggesting that optimizing the right brain enhances various cognitive abilities, including shape recognition, comprehension of geometric properties, holistic processing, understanding metaphors, and emotional expression (Oflaz, 2011). Additionally, it supports Addante et al.'s view that audiovisual stimuli can boost memorization capacity (Addante, Yousif, Valencia, Greenwood, & Marino, 2021). Furthermore, the findings reinforce Hidayatusahir and Baqi's conclusion that the brain rhythm method improves Quranic memorization quality (Hidayatusahiro & Baqi, 2022). Similarly, Lestari's study underscores the effectiveness of the brain rhythm method in minimizing errors and enhancing Quranic memorization quality under the guidance of Quran teachers (Lestari, 2019).

In Quranic memorization education, it's important to pay attention and collaborate with parents to assist children in reading, writing, and memorizing the Quran effectively (Inten, Aziz, Mulyani, & Nurhakim, 2023). Memorizing the Quran is part of preserving the Quran itself. Indeed, the Quran, being the word of God, contains profound implications that humanity should delve into (Ulfah, Assingkily, & Kamala, 2019). In order to express gratitude to Allah Subhanahu wa Ta'ala for His creation, Muslims are permitted to engage in the study and memorization of the Quran, serving as a foundational guide for living. (Aziz, Inten, Mulyani, & Qur'ani, 2023).

Madrasah teachers can guarantee that students acquire the Quran memorizing in a high-quality manner by focusing on the following factors: First and foremost, educators need to comprehend the broad principles or the sequence of events in a teaching method—specifically, the brain rhythm method—before implementing it. Secondly, teachers need to master the Quranic memorization that will be tested to students, including aspects of makharijul huruf and tajwid rules. Thirdly, active student participation is crucial in Quranic memorization learning. Fourthly, when implementing Quranic memorization teaching methods, there needs to be an effort to internalize the values contained in Quranic memorization and relate them to daily life. As a result, the Brain Rhythm Method's adoption at Madrasah diniyah is a wise move toward enhancing students' intellectual and spiritual ties to the Quran and training them to lead society as responsible, tolerant individuals. Fifthly, in applying authentic assessment, teachers must be able to develop rubrics for assessing Quranic memorization. The results of the research indicate that these five factors, especially the implementation of the brain rhythm method, can help children improve the quality of Quranic memorization because this method utilizes the right brain, ensuring long-term Quranic memorization. Consequently, educators in religious schools (madrasah diniyah) can utilize the outcomes of this research to develop engaging, captivating, and targeted programs for Quranic memorization.

The brain rhythm method is a technique utilized to enhance the quality of Quranic memorization by integrating elements of neuroscience with religious education. Neuroscience in education involves understanding how the human brain functions and how learning occurs at a neurobiological level. An application of this theory involves integrating neuroscience discoveries into educational practices to improve learning outcomes (Nursa & Suyadi, 2020). For instance, educators may implement strategies that leverage brain-compatible learning techniques, such as incorporating multisensory activities or utilizing spaced repetition methods, to optimize Quranic memorization in the classroom.

The following are the primary findings of this research: Understanding neurological principles holds the potential to enrich teaching methodologies by incorporating an understanding of brain functionality. The utilization of supportive learning technologies and the implementation of personalized approaches tailored to the individual needs of students have demonstrated an enhancement in learning outcomes. Moreover, accentuating the emotional and cognitive aspects of students has proven to augment the efficacy of instructional techniques.

Considering the aforementioned findings, the following specific areas for future research are proposed: (1) Investigating the enduring effects of incorporating neurological principles into pedagogical frameworks; (2) Exploring the diverse impacts of various supportive learning technologies on student engagement and knowledge retention; (3) Examining the scalability of personalized teaching methodologies to accommodate larger classroom environments; (4) Investigating the efficacy of educator training programs focusing on emotional intelligence in enhancing student academic performance; (5) Exploring interdisciplinary collaborations between neuroscientists and educators to pioneer novel instructional strategies.

4. CONCLUSION

The initial mean score for the experimental group in the pre-test was 70.61, while the control group scored 63.94. Both groups showed identical normality test results for the pre-test, with values of 0.236, and for the post-test, the values were 0.060 and 0.069, respectively. Descriptive analysis tests were conducted for data analysis. Homogeneity testing was performed using SPSS 23 for Windows to ensure prerequisites. The results indicated homogeneous data variances for both the pre- and post-tests in both the experimental and control groups, with significant values of 0.685 (> 0.05) for the post-test and 0.951 (> 0.05) for the pre-test. A two-tailed significant value of $0.010 < 0.05$ was observed. The experimental and control groups exhibited differing levels of Quran memorization learning outcomes. Post-treatment, the average score for the experimental group was 76.17, compared to 71.47 for the control group.

The implementation of the Brain Rhythm Method in Madrasah Diniyah in Bandung Regency has markedly enhanced the quality of Quranic memorization. By incorporating neuroscience principles such as brain plasticity, multisensory learning, and spaced repetition into religious education, students not only memorize more efficiently but also achieve a deeper comprehension of the Quran. This method enriches both their memorization skills and their internalization of Quranic values in daily life. Consequently, the use of the Brain Rhythm Method in Madrasah Diniyah fortifies students' spiritual and intellectual connections with the Quran and equips them for leadership roles in society. Moreover, this approach could be adapted for other subjects, such as language learning, by improving vocabulary retention, or in science and mathematics, where it could aid students in grasping complex concepts through rhythmic patterns and visual cues. This broader application has the potential to enhance student engagement, retention, and academic performance across various educational disciplines.

For future research, a longitudinal study could be designed to assess the long-term effects of the Brain Rhythm Method on students' memorization and comprehension abilities. Key areas of exploration might include cognitive development metrics, retention rates over several years, and comparative analyses with other memorization techniques. Additionally, the study could examine the

method's impact on students' religious practices and psychosocial well-being, offering a comprehensive understanding of its broader influence on madrasah students.

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