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The Effect of 4C 5M Scientific Approach on Achievement of Children's Memory Eight Grade at MTs *Tahfidz Yanbu'ul Qur'an Menawan* Kudus

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Abstract
Tahfidz learning at MTs Pesantren *Yanbu'ul Qur'an Menawan* Kudus sets a target for grade VIII students to memorize 5 juz in one year as a condition for grade promotion. However, the achievement of santri memorization shows significant variations. Some students reach or exceed the target, while others are left behind. This study aims to analyze the effectiveness of the 4C 5M scientific approach on students' memorization achievement. This study used a correlative and quantitative approach, involving 153 8th-grade students as samples selected using the Simple Random Sampling technique. Data were obtained through memorization tests, questionnaires, and observations. The results showed that the 4C 5M Scientific approach contributed positively to the achievement of students' memorization, evidenced by the partial t-test results of 0.734> 0.05 and the determination of ability with R Square of 84.2%. Students who follow this method consistently improve memorization and quality of understanding. Therefore, this approach is recommended to improve students' memorization achievement in tahfidz educational institutions.
Keywords: Learning, Scientific Approach, Memorization

Introduction

Memorizing the Qur'an is a spiritual and intellectual journey that requires perseverance, strategy, and a supportive environment (Taufik et al., 2024). However, in practice, many students face various challenges that hinder their smooth memorization (Kibtiyah & Suud, 2024). Some of them are difficulties in maintaining long-term memorization, lack of understanding of the meaning of verses, and ineffective memorization methods (Nurul Husna Mat Isa et al., 2023). In addition, external factors such as a less conducive learning environment, lack of variety in learning methods (Hasanah & Haris, 2023), and lack of motivation also reduce the effectiveness of memorization (Widyastri et al., 2022). Many students experience stagnation in memorizing because the methods used are still conventional and do not adjust to individual needs (Qotadah et al., 2022).

MTs Pesantren Yanbu'ul Qur'an Menawan Kudus sets a target for grade VIII students to memorize 5 juz Al-Qur'an in one year as a condition for grade promotion, with evaluations conducted four times (Bagus Riyanto, n.d.). However, in practice, there are significant variations in the achievement of memorization among students. Some students are able to achieve or even exceed the target, while others are left behind (Observation at MTs Class *VIII* of Yanbu'ul Qur'an Islamic Boarding School Menawan Kudus, 2025). (Observation at MTs Class VIII of Yanbu'ul Qur'an Islamic Boarding School Menawan Kudus, 2025). This phenomenon raises questions about the factors that influence these differences.

The results of students' memorization achievements in class 8 show quite interesting variations. Most students are able to complete memorization up to 5 juz, which is certainly an extraordinary achievement. Class 8C recorded the highest number of students with 42 students reaching 5 juz, followed by 8D (41 students) and 8F (40 students). This shows that the learning method and the enthusiasm of the students in these classes are going very well. However, there are also some classes that show more varied results. For example, in class 8A, there were 10 students who reached 4 juz, 2 students with 3 juz, and 1 student who only completed 2 juz. Meanwhile, in class 8B, there was 1 student who completed 4 juz and 1 student who reached 2 juz, while the others managed to memorize 5 juz.

Some classes such as 8C, 8E, and 8F show very uniform results, where almost all students reach the maximum target of 5 juz. This could be due to a more conducive learning environment, more intensive guidance from the ustadz, or higher student motivation. The achievement of the students' memorization is arguably very good. Most of the students managed to reach the maximum target, although some still have not reached that point. Perhaps there needs to be a more personal approach for students who are still lagging behind so that students can catch up and achieve the best results like their friends.

This variation in memorization achievement shows that individual factors such as memorization ability, time spent memorizing, and environmental support such as guidance from teachers or family play an important role in determining the final result (Afidah & Anggraini, 2022). Evaluations conducted four times a year provide an overview of the development of students, but of course there is a need to pay special attention to students who are lagging behind in order to achieve the expected targets. The approach in achieving memorization is carried out with various methods that suit the needs of students (Ayyad, 2022). This process involves gradual strategies, such as understanding the meaning, repeating consistently, and applying active learning techniques to be more effective (Kurniailah & Abu Bakar, 2023). In addition, the use of scientific methods, which include observation, analysis, and reflection, helps students improve their memory and understanding of the memorized material (Karim, 2022).

Meanwhile, researcher observations show that the approach used by MTs Pesantren Yanbu'ul Qur'an Menawan Kudus is a scientific approach using the 4C 5M method (Observation at MTs Class VIII Pesantren Yanbu'ul Qur'an Menawan Kudus, 2025). The 4C 5M Scientific Approach in learning to memorize the Qur'an offers a more effective and systematic method in improving the achievement of students' memorization. This approach integrates 21st century skills, namely Critical Thinking, Creativity, Collaboration, and Communication (4C) (Sri Hanipah, 2023), which encourages students to not only memorize textually, but also understand, explore, and apply the verses that students memorize. In addition, the stages of Observing, Questioning, Exploring, Reasoning, and Communicating (5M) in scientific learning make the memorization process more structured, interactive, and fun (Trissa et al., 2022).

Previous research conducted by Yuriatson Jubhari, Luana Sasabone, and Nurliah that the use of a scientific approach in learning proved to be more effective than the contextual approach (Jubhari et al., 2022). Meanwhile, research by Ida Mintarina Nulfita provides confirmation and opportunities that this scientific approach has great potential in improving students' memorization skills. With methods that lead students to find their own understanding,

students do not just memorize mechanically but also understand concepts more deeply and sustainably (Rangkuti et al., 2023). Meanwhile, special studies on the 4C 5M scientific approach that focus on memorization skills are rarely carried out, so research becomes urgent.

This research is very important in the world of education, especially in learning to memorize the Qur'an at the Madrasah Tsanawiyah (MTs) level. By integrating a scientific approach based on 4C (Critical Thinking, Creativity, Collaboration, Communication) and 5M (Observing, Questioning, Reasoning, Trying, Communicating), this method is expected to increase the effectiveness of students' memorization. In addition to optimizing the memorization process, this research also contributes to improving the quality of Islamic education.

Literature review

Behaviorism Theory (B.F. Skinner & Ivan Pavlov)

Behaviorism is an approach in psychology that focuses on observable and measurable behavior (Fan et al., 2024). It developed in response to earlier approaches, such as structuralism and functionalism, which emphasized mental processes and consciousness. At the end of the 19th century, psychology was still dominated by the introspection method, in which individuals report on their own experiences (Hu et al., 2023). However, introspection was considered subjective and difficult to verify scientifically. To overcome this limitation, behaviorism came up with a more objective and measurement-based approach to understanding human behavior (Rossi, 2023).

Behaviorism learning theory emphasizes the importance of repetition in learning (Erman & Möller, 2023). According to this approach, individuals are more likely to master a skill if it is practiced continuously with guidance or appropriate learning techniques (Zhang et al., 2023). However, this theory tends to ignore internal factors such as emotions, motivation, and the role of cognition in learning (Lian et al., 2022).

Behaviorism theory sees memorization as the result of a stimulus-and-response relationship that is reinforced through repeated practice (Xia, 2023). This process emphasizes habit formation rather than deep understanding, where reinforcement plays an important role in maintaining memories (Wang et al., 2022).

4C 5M Scientific Approach

The 4C 5M Scientific Approach is a learning method that combines scientific thinking processes with 21st-century skills. The scientific approach emphasizes exploration and analysis of concepts, while the 4Cs include critical thinking, creativity, collaboration, and communication as key skills in facing modern challenges. It also follows the 5M stages of observing phenomena, asking questions, conducting experiments, analyzing results, and communicating findings. This approach encourages students to learn actively, critically, and innovatively and are better prepared to face an ever-evolving world (Kulati et al., 2024).

The variable indicators in this study include several important aspects related to the learning process and the achievement of santri memorization. In terms of the 4C scientific approach, the indicators include the ability of students to think critically when understanding the meaning of verses, creativity in using varied memorization methods, the ability to cooperate

with friends in repeating memorization, and communication skills in conveying memorization clearly. Meanwhile, in the 5M aspect, the indicators include how students observe the verse pattern before memorizing, ask questions when experiencing difficulties, try various techniques to speed up memorization, reason the relationship between verses, and communicate their memorization to teachers or friends to get feedback. The combination of these two approaches is expected to provide a more comprehensive picture of the effectiveness of learning methods in improving santri memorization (Idawati & Hanifudin, 2024).

Qur'anic Memorization

Memorizing the Qur'an is the process of storing the holy verses in memory so that they can be read without seeing the text, a practice that has a legal basis and important virtues in Islamic teachings (Mahmud Yusuf Zulfikar et al., 2024). According to Siti Inarotul Afidah, memorization is the process of repeating something through reading or hearing. The more often something is repeated, the easier it is to remember (Afidah & Anggraini, 2022).

Indicators of memorization achievement can be seen from several aspects, such as the quantity of memorization, which shows how many verses or chapters have been memorized, as well as the quality of memorization, which reflects the accuracy in reciting verses following tajweed and makhraj. In addition, the speed of memorization is also an important factor because the faster a student memorizes without sacrificing accuracy, the more effective the method used. Memorization memory also plays a big role, especially in maintaining memorization in the long term so as not to forget easily. Finally, the error rate in memorization is a benchmark that shows the extent to which a santri is able to maintain the accuracy of memorization from reading errors or forgetting verses (Latipah, 2022).

Research Method

This research uses a type of correlative research with a quantitative approach (Loan & Shah, 2022; Tathmainnul et al., 2024). Correlative research with a quantitative approach aims to analyze the relationship between two or more variables using numerical data (Amaliyah et al., 2024). In the context of this study, the correlative method will help determine the extent of the relationship between the 4C 5M scientific learning approach and the achievement of santri memorization (Kim, 2024).

This method involves collecting data through instruments such as questionnaires, memorization tests, or quantitative observations, which are then analyzed using statistical techniques, such as the Pearson correlation test or linear regression (Ioannidis & Maniadis, 2024; Alfaris, 2024).

Based on the researcher's documentation, the population in this study was 246 students in Class VIII of MTs Pesantren Yanbu'ul Qur'an Menawan Kudus. In contrast, the sampling technique used is Simple Random Sampling with the Slovin formula. If each student has the same opportunity to be selected as a sample, this method can be applied through a lottery or selection using a random number table; then the research sample can be calculated using the following formula:

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

Where:
n = number of samples
N = total population (246 students)
e = margin of error (usually 5% or 0.05)

By using the Slovin formula and a margin of error of 5%, this study determined a sample size of 153 students. If adjustments are needed based on a different margin of error or other considerations, the researcher can help adjust it.

Result

Tahfidz learning in Islamic educational institutions is important in shaping students' character and improving their ability to memorize the Quran. Along with the development of learning methods, the scientific approach that prioritizes critical, creative, collaborative, and communicative thinking (4C), as well as the stages of observing, questioning, gathering information, associating, and communicating (5M), is increasingly being applied in various fields of study, including tahfidz.

This research departs from the need to understand how the 4C 5M scientific approach can affect the memorization achievement of 8th-grade students at MTs. Tahfidz Yanbu'ul Qur'an Menawan Kudus. In the world of education, the right method helps improve memory and forms a more systematic mindset in memorizing. Therefore, it is important to examine the extent to which this approach contributes to the success of students' memorization and whether this method can be a more effective solution compared to conventional methods.

Table 1. Validity Test Results

Statement	Rcount	Rtable	Description
X1	0.937	0.1335	Valid
X2	0.618	0.1335	Valid
X3	0.611	0.1335	Valid
X4	0.933	0.1335	Valid
X5	0.708	0.1335	Valid
X6	0.608	0.1335	Valid
X7	0.672	0.1335	Valid
X8	0.961	0.1335	Valid
X9	0.891	0.1335	Valid
Y1	0.834	0.1335	Valid
Y2	0.711	0.1335	Valid
Y3	0.746	0.1335	Valid
Y4	0.871	0.1335	Valid
Y5	0.563	0.1335	Valid
Y6	0.591	0.1335	Valid
Y7	0.514	0.1335	Valid

Statement	Rcount	Rtable	Description
Y8	0.871	0.1335	Valid
Y9	0.841	0.1335	Valid

The results showed that each indicator in the 4C 5M scientific approach and the achievement of memorizing the Qur'an had strong validity. This can be seen from the rcount value, which far exceeds the rtable value (0.1335), which means that each statement in this research instrument is suitable for measuring the variables studied.

More specifically, the indicators in the 4C 5M scientific approach (X) show quite high validity values, with some of them reaching more than 0.9, such as X1 (0.937), X4 (0.933), and X8 (0.961). This indicates that this approach has elements that greatly contribute to improving santri learning outcomes, especially in the aspect of memorization.

On the other hand, the memorization achievement variable (Y) also has a high validity value, with most of its indicators being above 0.7, such as Y1 (0.834), Y4 (0.871), and Y8 (0.871). This shows that the aspects measured in the Qur'an memorization achievement variable strongly correlate with the approach used.

Table 2. Reliability Test Results

Variables	Cronbach's Alpha
4C 5M Scientific Approach	0.959
Memorization Achievement	0.941

The research results found that the 4C 5M scientific learning approach has a very high reliability with a Cronbach's Alpha value of 0.959. This indicates that the instrument used to measure the effectiveness of this approach in learning has excellent consistency.

Meanwhile, the achievement of Qur'an memorization also showed high reliability with a Cronbach's Alpha value of 0.941. This means that the measuring instrument used to assess the level of success of students in memorizing the Qur'an is reliable and provides consistent results.

Table 3. Classical Assumption Test Results

Test	Determinant	Result	Description
Normality Test	Asymp. Sig. (2-tailed)	0.140	No Symptoms
Multicollinearity Test	Tolerance VIF	1.000 1.000	No Symptoms
Heteroscedasticity Test	Sig. (2-tailed)	0.920	No Symptoms

From the research results, it can be concluded that the 4C 5M Scientific approach does not experience problems in terms of statistical assumptions required for further analysis. The Normality Test shows that the data distribution is in good condition, with an Asymp. Sig. of 0.140. This means that the data does not deviate from the normal distribution, so the analysis can proceed without the need for additional transformation. The Multicollinearity Test resulted in Tolerance and VIF values, indicating that there was no excessive relationship between the independent variables in this study. In other words, the 4C 5M Scientific approach as a variable does not experience overlap that could interfere with the accuracy of the analysis.

Heteroscedasticity test gave a significant result at 0.920, which indicates that the data distribution is quite stable and no particular pattern can interfere with the study results.

Table 4. Partial Effect Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.039	.886		13.587	.000
	Pendekatan Saintifik 4C 5M	.734	.026	.918	28.404	.000

a. Dependent Variable: Qur'an Memorization Achievement

The results of this study indicate that the 4C 5M scientific learning approach has a very significant effect on the achievement of memorization of the Qur'an. Based on regression analysis, the regression coefficient value of 0.734 with a significance level of 0.000 indicates that the more the 4C 5M method is applied, the better the students' memorization achievement.

The t-count value of 28.404 is much greater than the critical value in the statistical test, which means that the effect of this approach is very strong and consistent. In other words, the 4C 5M Scientific approach contributes greatly to improving the students' memorization ability, so this method is worth considering as an effective strategy in learning the Qur'an.

Table 5. Simultaneous Effect Test Results

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2071.610	1	2071.610	806.768	.000[a]
	Residual	387.736	151	2.568		
	Total	2459.346	152			

a. Predictors: (Constant), 4C 5M Scientific Approach

b. Dependent Variable: Qur'an Memorization Achievement

The analysis results show that the 4C 5M scientific learning approach significantly influences the achievement of memorizing the Qur'an. This can be seen from the F value of 806.768 with a significance value of 0.000, which means that the relationship between these two variables is very strong and does not occur by chance. In other words, the 4C 5M method is proven to contribute greatly in improving the ability of students to memorize the Qur'an. The high regression value indicates that the more effectively this approach is applied, the better the memorization results achieved by the students.

In addition, the relatively small residual value (2.568) indicates that this model is able to explain most of the variation in the achievement of students' memorization, so this approach can be considered an effective method to be applied in a memorization-based educational environment.

Table 6. Measurement of the Influence Ability of Variable X

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.918[a]	.842	.841	1.602

a. Predictors: (Constant), 4C 5M Scientific Approach

b. Dependent Variable: Qur'an Memorization Achievement

From the results of the analysis, it can be seen that the 4C 5M Scientific approach has a very strong relationship with the achievement of memorizing the Qur'an. This is indicated by the correlation value (R) of 0.918, which means there is a close relationship between this method and improving students' memorization ability.

In addition, the R Square value of 0.842 indicates that about 84.2% of the variation in the achievement of memorizing the Qur'an can be explained by the application of the 4C 5M approach. In other words, this method contributes greatly to improving the ability of students to memorize. The rest, about 15.8%, is influenced by other factors outside the model used in this study.

Discussion

Learning tahfidz in Islamic educational institutions is very important in shaping students' character and increasing their ability to memorize the Quran. Along with the development of learning methods, the scientific approach that prioritizes critical, creative, collaborative, and communicative thinking (4C), as well as the stages of observing, questioning, gathering information, associating, and communicating (5M), is increasingly being applied in various fields of study, including tahfidz.

This study aims to understand how the 4C 5M scientific approach can affect the memorization achievement of 8th-grade students at MTs. Tahfidz Yanbu'ul Qur'an Menawan Kudus. From the results of the analysis conducted, it was found that each indicator in the 4C 5M scientific approach and the achievement of memorization of the Qur'an had strong validity. This can be seen from the validity test value, which shows that this research instrument is suitable for measuring the variables studied. In addition, the reliability test results also show that this approach has excellent consistency in improving students' memorization.

The results of partial and simultaneous influence tests also show that the 4C 5M scientific approach significantly influences the achievement of students' memorization. Thus, it can be concluded that this method effectively improves memory and forms a more systematic mindset in memorizing the Qur'an. In the theory of behaviorism, the learning process is considered a result of the interaction between stimulus and response. B.F. Skinner emphasized the importance of reinforcement in learning, while Ivan Pavlov highlighted association's role in forming learning habits. The 4C 5M scientific approach in tahfidz learning aligns with these behaviourism principles.

For example, in the "observing" stage, santri are introduced to the verse to be memorized, which serves as an initial stimulus. When santri begins to "question" and "try" certain memorization strategies, santri receives reinforcement from ustadz or peers who correct

mistakes and provide positive encouragement. In addition, in the stage of "communicating," santri gets feedback that further strengthens the santri's memory of the memorized verse. Thus, this scientific approach strengthens the habit of memorization through a systematic stimulus-response mechanism.

Based on the study's results and its relevance to the theory of behaviourism, it can be concluded that the 4C 5M scientific approach significantly contributes to improving the achievement of santri memorization. Not only that, this method also provides a more structured and interesting learning experience for students. Students do not just memorize mechanically but also understand the pattern of relationships between verses, improve critical thinking skills, and develop creativity in the memorization process.

Another important finding is that this approach also strengthens social interaction between students. Through collaboration in *muraja'ah* (repetition of memorization), santri learn to help each other, discuss, and provide constructive feedback. This shows that the scientific approach not only impacts the cognitive aspects but also the social and emotional aspects of the santri.

The 4C 5M scientific approach greatly improves the memorization of the Qur'an because it involves various aspects that make the learning process more effective and fun. There are several strong reasons why this method really helps students memorize better.

1. The Brain Works More Maximally
   This method does not only rely on rote memorization but also involves critical thinking and creativity. When students observe, question, and try, both hemispheres of the brain-both those responsible for logic and those that manage memory-work simultaneously. The result? Memorization becomes stronger and longer lasting.
2. Learning Through Direct Experience
   Instead of just sitting still and memorizing monotonously, this approach makes students more active in learning. For example, they can associate verses with certain patterns or understand the meaning before memorizing. This method is much more effective because the brain absorbs something meaningful more easily than just repeating it without understanding.
3. Learning Together is More Fun
   Because there is an element of collaboration in 4C, students don't learn alone. They can discuss, help each other correct their memorization, or find the most effective way to remember verses. That way, they are more motivated and less bored.
4. Memorization becomes more interesting and less monotonous
   Many students struggle with memorizing because traditional methods tend to be rigid and boring. With this approach, they are more actively involved and can even find memorization strategies that best suit their learning style. If the process is fun, memorization also becomes faster and sticks in the memory.
5. Deeper Understanding
   This approach also helps students understand the pattern of verses, the laws of tajweed, and the relationship between one verse and another. So, their memorization is not just saying word for word but also understanding the content and structure. This makes memorization stronger and less prone to forgetting (Zahroh, 2022).

From the research conducted, this method was shown to have a significant effect on memorization achievement. The data shows that most of the variation in memorization improvement can be explained by this approach, while the rest is influenced by other factors such as environment or individual motivation.

Conclusion

Based on the results of the study, the 4C 5M scientific approach is proven to have a major impact in improving the achievement of santri memorization because it involves various aspects that make the learning process more effective, fun, and meaningful. This method relies on mechanical memorization and activates both hemispheres of the brain, allowing students to think critically, understand verse patterns, and associate memorization with deeper meaning. In addition, this approach encourages experiential learning, makes santri more active, and increases their motivation and involvement in the memorization process.

Collaboration within the group also strengthens memorization through discussion and repetition, making it more effective than traditional methods that tend to be monotonous. In terms of theory, this approach aligns with the principles of behaviourism that emphasize the role of stimulus-response and reinforcement in forming learning habits, where each stage in the 5Ms provides positive feedback that strengthens memory. With empirical evidence showing a significant effect of this method on improving memorization, the 4C 5M scientific approach can be considered as a strategy that improves santri memory, builds a more systematic mindset, strengthens social interaction, and creates a more interesting and effective learning experience.

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