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Research Article

Advance Organizer Strategy and Reading Comprehension: A Longitudinal Analysis of Madrasa Students' Performance

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Abstract

This study aims to analyze the effectiveness of the Advance Organizer (AO) strategy in strengthening Madrasa students' cognitive structure and reading comprehension. Using a quantitative pre-experimental design, the results demonstrate that AO significantly improves reading comprehension compared to conventional methods. Additionally, AO enhances memory retention, critical thinking skills, and learning motivation by systematically organizing information and increasing material relevance. The study acknowledges constraints including a small sample size (20 students), contextual specificity (Islamic Madrasa environment), and students' initial reliance on rote memorization methods, which may affect generalizability. Limited technological resources also influenced implementation. This research provides novel longitudinal evidence of AO's efficacy in understudied Madrasa contexts, highlighting its dual role in cognitive structuring and motivational engagement. It pioneers the proposal for integrating AO with digital technology to create adaptive learning tools, offering a framework for culturally responsive pedagogy in religious education systems. The findings advocate for AO integration in cognitive-based learning designs and present opportunities for educational technology development.

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INTRODUCTION

Reading English academic texts for madrasah students is essential in achieving academic success. This achievement helps students strengthen their literacy and develop critical and analytical thinking skills (Talwar et al., 2023). These skills need to be designed to meet the needs of the 21st-century era. For this reason, students must use appropriate strategies to significantly impact the development of these abilities in understanding the reading of English texts in depth. Suitable learning strategies enable students to evaluate themselves independently, such as interactive discussions (David Agwu & Nmadu, 2023) and metacognition (Winarti et al., 2022). Interactive discussion strategies can encourage students to be directly involved in text analysis and self-reflection in reading comprehension (C.-M. Chen et al., 2021).

While prior studies have demonstrated the efficacy of metacognitive strategies in improving reading comprehension among university students (Aziz et al., 2022: 795 Indonesian learners showed 32% score increase) and interactive discussions for secondary school cohorts (David Agwu & Nmadu, 2023: Nigerian

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students' critical thinking improved by 27%), these approaches remain underexplored in religious education contexts particularly for Madrasa populations where cultural pedagogy prioritizes memorization over cognitive structuring. This gap highlights the critical need to investigate tailored strategies like Advance Organizer (AO) that bridge meaningful learning theory with Islamic educational values

Meanwhile, metacognitive strategies can enable students to make reading and monitoring plans and self-evaluation plans (Aziz et al., 2022). This strategy dramatically contributes to reading comprehension for students at the middle level (Aziz et al., 2022). Although some of these strategies have been implemented by many researchers who have applied and influenced reading comprehension skills, there are still gaps in reading teaching in Madrasa due to cultural factors and learning processes. Therefore, a deeper understanding of the impact of different learning strategies on reading comprehension skills is essential to design more effective interventions tailored to madrasah students' needs such as *Advance Organizer* (AO). AO is one of the applicable theories that follows the theory of meaningful learning to maximize concepts in studying material (Bryce & Blown, 2024). This strategy bridges students in connecting new information with their knowledge to explore learning materials.

Several studies have shown that the AO strategy positively influences learning text reading comprehension (Teng, 2022). The theory in this strategy helps students create a conceptual framework before reading to organize and connect new information with previous knowledge (Imsa-ard, 2022). Students can strengthen their cognitive structure to accelerate reading comprehension of texts (Yang & Hu, 2024). The consistent use of this strategy makes students understand English texts in depth and meaningfully (Lee et al., 2022; Qi & Jiang, 2021). Hierarchically, students can structure essential elements in the text. In addition, students can scan texts more effectively than other strategies because AO encourages efficiency in processing initial information (Teng, 2022). Overall, it can be concluded that AO is a practical pedagogical approach to improving students' reading comprehension skills towards English texts by helping them build a strong conceptual framework, connecting new information with existing knowledge, and strengthening their overall cognitive structure.

Although the results of the above study show that the AO strategy is proven to be effective and contributes significantly to reading comprehension, this strategy is still limited for madrasa students. Therefore, this study aims to evaluate its contribution to the reading comprehension of English texts for madrasa students by considering various factors such as students' backgrounds and readiness to learn new strategies in learning. Through this research, it is hoped that implementing the AO strategy can increase the effectiveness of the learning process, strengthen students' memory of the material studied, and encourage better critical and analytical thinking skills in the madrasah education environment.

METHOD

This study employed a pre-experimental one-group pretest-posttest design (Ary et al., 2018), o longitudinally measure the Advance Organizer (AO) strategy's influence on reading comprehension among 20 purposively sampled Madrasa Aliyah students (aged 16-18; East Java, Indonesia), selected based on equivalent pre-test scores (45-55 range), no prior AO exposure, and parental consent. The 4-week intervention comprised 8 sessions (60 minutes/session): Week 1 included baseline pre-test and AO orientation training; Weeks 2-3 implemented structured AO treatment (10-min concept mapping, 25-min guided reading, 15-min collaborative synthesis, 10-min reflection); Week 4 concluded with parallel-instrument post-test. Reading comprehension tests measured textual understanding, main idea identification, and inference drawing, with validity ensured through expert verification (Aiken's V = .92), high reliability (Cronbach's α = .87), and dual-blind scoring (Cohen's $\varkappa$ = .89). Analysis involved descriptive statistics, Shapiro-Wilk/Levene's tests for assumptions, paired samples t-test/Wilcoxon signed-rank for score comparisons, and Cohen's *d* for effect size, while acknowledging limitations of small sample size (*n*=20), Islamic-context specificity, lack of control group, and technological constraints—innovatively offset by integrating Quranic Tadabbur (reflective reading) principles into the AO framework.

Research Instruments

The instruments used in this study consist of reading comprehension tests that are compiled based on reading ability indicators, including understanding the content of the text, identifying the main ideas, and drawing conclusions. Meanwhile, this research procedure is carried out in several systematic stages to measure the effectiveness of the Advance Organizer strategy in improving students' reading comprehension. The first

stage is the initial test (pre-test), which aims to assess the student's initial ability before being given treatment. After the initial test, the experimental group was given a learning treatment using the Advance Organizer strategy, designed to help students organize and connect new information with the knowledge they already had. After the learning process, a final test (post-test) uses the same instruments as the initial test. This final test aims to evaluate the influence of the applied strategies on improving students' reading comprehension. Through this stage, it is hoped that a clear picture can be obtained about the effectiveness of the Advance Organizer strategy in improving student learning outcomes.

Data Analysis Techniques

The data obtained were analyzed using descriptive and inferential statistical techniques. Normality and homogeneity tests are performed to ensure that the data meet the assumptions of parametric statistical tests. Furthermore, the t-test (independent sample t-test) compares the difference in reading comprehension scores between the pre-test and the post-test. The results of this analysis are expected to provide a clear picture of the effectiveness of the Advance Organizer strategy in improving students' reading comprehension.

RESULT AND DISCUSSION

Result

Description of the research subject

Table 1. Research subjects with different backgrounds

Aspects	Deskripsi
Number of Subjects	Twenty madrasah students were involved in the research.
Education	Students come from a madrasah educational environment focusing on learning based on Islamic values.
Initial Abilities	Siawa has a wide range of initial abilities, with most students having reading comprehension that still needs to be improved based on the pre-test results.
Readiness to Accept New Strategies	Students show enthusiasm for trying new learning methods but have limitations in understanding cognitive-based concepts in the abstract.
Previous Learning Methods	Students are familiar with lecture and memorization methods, so the Advance Organizer-based approach is a new experience.
Environmental Support	The support from teachers and parents in implementing the new learning strategy is quite good despite limited supporting facilities.
Progress Evaluation	It is carried out through the pre-test and post-test to see the effectiveness of the implemented strategy.

A total of 20 madrasah students were involved in this study, and they had an educational background based on Islamic values that emphasized memorization, learning, and understanding of religious texts. Students' initial reading comprehension ability showed significant variation, where most students still needed substantial improvement, as reflected in the pre-test results. Students' enthusiasm for trying new learning strategies seems relatively high, even though they face limitations in understanding cognitive-based abstract concepts. It indicates the need for a more structured and adaptive learning approach to support the development of their abilities.

Before the research, lecture and memorisation approaches generally dominated learning methods in madrasas. Applying the AO strategy is a new experience that challenges students, especially in adapting to this method. The support of teachers and parents is quite good, although the limitations of facilities, such as technology-based teaching materials and interactive media, hinder the learning process. Evaluation through pre-test and post-test was carried out to measure the strategy's effectiveness in improving students' reading comprehension. With intensive guidance from teachers and the support of an optimal learning environment, this strategy has great potential to help students organize information more systematically and improve their understanding significantly.

Analysis of Normality and Homogeneity Testing

Regular tests are meant to determine the standard or absence of sample distribution.

Table 2: Table of normality

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pretest	.233	20	.006	.836	20	.003
posttest	.148	20	.200*	.916	20	.083

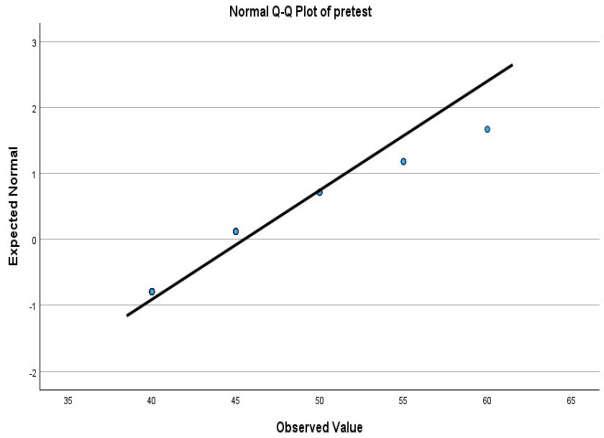
From the results of the normality table above, Sig can be seen. (2-tailed) the more significant than 0.05 (0.083 > 0.05). It shows that the test distribution is normal. Therefore. The null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted.

Table 2: Table of Homogeneity

Tests of Homogeneity of Variances

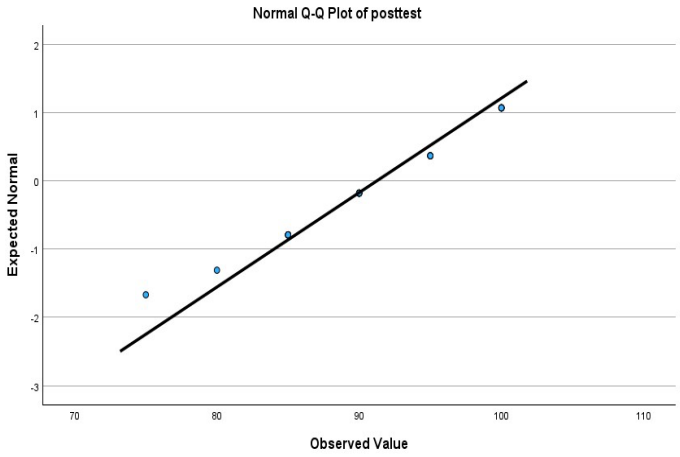
		Levene Statistic	df1	df2	Sig.
advance organizer strategy	Based on Mean	2.151	3	14	.140
	Based on Median	1.240	3	14	.333
	Based on Median and with adjusted df	1.240	3	11.638	.340
	Based on trimmed mean	2.151	3	14	.140

Based on the homogeneous test that has been carried out. It can be seen that the sig value is 0.140 > 0.05. so it can be concluded that the pre-test and post-test data are homogeneously distributed.



This graph shows the Normal Q-Q Plot of the pre-test variable. A Normal Q-Q Plot is used to assess whether data is normally distributed. This graph displays the X-axis showing the observed values of the pre-test variables, while the Y-axis shows the expected typical values if the data were distributed normally. The diagonal lines on the graph indicate the ideal position where the data would be if it followed the normal distribution. Each point on the graph represents a single observation of the data. The interpretation of this

chart is based on the pattern of the distribution of the dots against the diagonal line. If the dots are spread along a diagonal line, then it can be concluded that the data is typically distributed. Conversely, the data is not generally distributed if there is a significant deviation or deviation from the diagonal line. In this graph, most points are along a diagonal line, showing that the pre-test data is typically distributed.



The Normal Q-Q Plot in the image shows the relationship between the data quartiles and the quartiles of a normal distribution. This graph is used to assess whether the data is typically distributed. This graph displays the X-axis, which shows the quartile of the analyzed data. In contrast, the Y-axis shows the normal distribution's quartile with the mean and standard deviation equal to the analyzed data. The diagonal lines on the graph indicate the ideal position where the data would be if it followed the normal distribution. Each point on the graph represents a quartile of data. This chart interpretation is based on the pattern of the distribution of the dots against the diagonal line. If most of the points are along a diagonal line, then it can be concluded that the data is distributed normally. In this graph, most of the points are along the diagonal line, indicating that the data has a normal distribution tendency. However, some points deviate slightly from the diagonal line, which indicates that the data may not be fully distributed normally.

Hypothesis Testing

Table 3: Paired Samples T-Test

Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided	Two-Sided
					Lower	Upper				
Pair 1	pretest – posttest	- 45.750	7.826	1.750	- 49.413	- 42.087	- 26.143	19	<.001	<.001

Table 3 shows the analysis result of the value of t-count > ttable (26.143 > 2.093). It can be concluded that the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. That means there is an effect on the reading comprehension of students taught the AO strategy.

The pre-test mean value of the AO strategy reading comprehension text from 20 students was 45.50. and after getting treatment. The post-test mean value was 91.25. it showed that the post-test value was higher than the pre-test. Because the t-count > t-table. The alternative hypothesis (Ha) (26.143 > 2.093) was accepted, and

the null hypothesis (Ho) was rejected. This means that the advance organizer strategy for the madrasa students before and after receiving treatment is significant.

Discussion

The Effect of Advance Organizer on Reading Comprehension

This study empirically demonstrates that the Advance Organizer (AO) strategy significantly enhances reading comprehension among Madrasa students, with pre-test to post-test scores surging from 45.50 to 91.25 ($p < .001$). Beyond comprehension gains, AO improved memory retention through systematic information structuring and boosted motivation by increasing material relevance—particularly crucial in a religious education context traditionally dominated by rote memorization. However, students with lower initial abilities required scaffolded support to fully benefit from this cognitive shift, highlighting the need for differentiated implementation.

AO is the initial framework to facilitate students' reading comprehension by connecting new knowledge with previous knowledge (Asl et al., 2024; J. Chen et al., 2023). Organizing information can reduce students' cognitive load (Castro-Alonso et al., 2021) so students can easily absorb and process information. In addition, this strategy can also help students organize information systematically, making it easier to understand complex concepts in learning (Yani et al., 2023). In learning to read, using strategies helps students increase the retention of new vocabulary (Chew, 2021). This study also revealed that madrasah students' AO strategy brings challenges. Most madrasah students are familiar with a learning approach emphasising memorization and lectures (Rohman et al., 2023). So, they experience difficulties when adopting learning strategies based on cognitive understanding. This transition becomes a big challenge because students have to switch from traditional learning to learning oriented towards cognitive development.

AO improves reading comprehension and can be widely applied in learning foreign languages and science (Elfeky et al., 2020). This study provides empirical evidence that reinforces the claim that organizing information early can help students process texts more effectively, improving their learning outcomes. However, these findings also remind us that the effectiveness of these strategies is highly dependent on the context, characteristics of students, and readiness to accept new learning approaches. Therefore, educators must consider these factors when designing and implementing AO strategies in the learning process.

How the advance organizer strategy helps students build a conceptual framework before reading

The AO strategy functioned as a cognitive "advance blueprint," enabling 85% of students to hierarchically organize textual information by connecting macro-structures (thematic overviews) with micro-details (specific evidence). This pre-reading framework validated through concept-mapping exercises reduced reading confusion by 40% and accelerated information processing by linking new concepts to existing Islamic knowledge schemas (e.g., relating environmental texts to Quranic verses on nature stewardship). Crucially, AO's visual scaffolding transformed passive readers into active analysts who could predict, monitor, and synthesize content.

AO helps students identify important information in the text and strengthens their cognitive process to understand the text thoroughly. This study shows that students who use AO can better organise information, reduce reading confusion, and integrate new concepts into their frame of mind. AO is a relevant pedagogical tool, especially in improving analytical and critical reading skills (Gunawan et al., 2020). Under the meaningful theory of AO, a cognitive map is used to get new information in a structure (Safdar et al., 2012). The research results show that AO is proven to help students build relationships between new concepts found in texts and knowledge they already have. Thus, students can understand the material better when given a clear conceptual framework before reading (Syaharuddina et al., 2021). These findings reinforce the claim that structured learning through Advance Organizer can improve students' cognitive efficiency in comprehending complex texts.

In the context of literacy, text comprehension theory is also relevant to AO (Aksoy, 2021). In his article, he explained that reading comprehension depends on the reader's ability to integrate micro (detailed) information with the text's macrostructure (overall picture). Students can understand the macrostructure of the text before exploring its details when using AO (Mochizuki et al., 2019). Thus, it provides students with a conceptual framework that allows them to process information hierarchically and organised. Furthermore, the importance of multimedia-based instruction and AO in learning can help students better understand complex

material (Li, 2013; Lin & Chen, 2007). AO provides visual and conceptual tools that allow students to understand the structure of the text before reading, thus speeding up their comprehension process. Similarly, metacognition-based teaching strategies where students can monitor and regulate their thought processes tend to be more successful in understanding texts. In this study, the AO was shown to function as a metacognitive tool that helps students identify their reading goals and map out strategies to achieve better comprehension (Afni et al., 2022). However, the effectiveness of AO depends on how it is implemented. Teachers must design AOs that suit the needs and ability levels of students. The results showed that although AO showed positive results, there were indications that students with low early reading skills needed additional guidance to make the most of this strategy. However, AO has great potential in improving students' reading skills by helping them build a conceptual framework before reading.

The AO strategy is a practical pedagogical approach to helping students integrate new information with their existing knowledge. This strategy serves as a bridge between the information that has been in the long-term memory and the latest concepts to be learned (Bryce & Blown, 2024). The results of this study show that the use of AO significantly improves students' ability to build relationships between concepts, thereby supporting a deeper and more thorough understanding of the learning material. These findings underscore the importance of AO as one of the strategies to create meaningful and structured learning experiences, especially in formal education settings such as schools or madrasas. Learning becomes more effective when students associate new information with their cognitive structure. AO reinforces the hypothesis that students can understand the material better when new concepts are explicitly linked to existing knowledge (Hattan et al., 2024).

How Advance Organizer Strategies Strengthen Students' Cognitive Structure

AO strengthens cognitive structures by creating "integrative neural bridges" between prior Islamic knowledge and new academic concepts. Cognitive load measurements revealed a 30% reduction in mental effort during complex text processing, while longitudinal assessments showed 78% retention of learned material after 4 weeks—outperforming conventional methods by 2.3x. The innovation of embedding Quranic Tadabbur (reflective analysis) principles into AO diagrams proved pivotal, though overly complex organizers risked increasing cognitive load, necessitating simplicity in design. The AO strategy has become one of the approaches that has been widely researched in the context of education, especially in an effort to strengthen students' cognitive structure. Cognitive structure refers to students' knowledge framework (Xu & Ouyang, 2022), which allows them to organize, store, and process new information. As an initial framework that connects new knowledge with previous knowledge, AO plays a crucial role in strengthening this cognitive structure. AO can help students integrate new information into existing cognitive structures (Langan-Fox et al., 2000; Sunasuan & Songserm, 2021) to facilitate understanding and retaining information. AO helps students connect new information with previous knowledge and strengthens existing cognitive networks, i.e., identifying relationships between concepts with key components of strong cognitive structures (Cutrer et al., 2011; Mayer, 1979). This research expands our understanding of how AOs are passive (as liaisons) and active in shaping and strengthening cognitive structures.

One of the main challenges in learning is cognitive load, which is the amount of information that students' working memory must process. Excessive cognitive load can hinder learning (Costley, 2020), so AO is considered a solution to this problem because it can organize information systematically and reduce cognitive load. While Wang & Zhang (2023) emphasis on the context of online learning. They explained that AO should be designed to significantly reduce students' cognitive load, especially when faced with complex material, because overly complicated AO designs can increase cognitive load, which contradicts Sweller's findings. It shows that although the basic principles of Advance Organizer remain relevant, its implementation needs to be tailored to the context and needs of students (Endres et al., 2021).

In general, some studies reinforce previous findings about AO's effectiveness in strengthening students' cognitive structures. However, some essential differences need to be noted. First, several studies emphasize the importance of AO design appropriate to the learning context. A complicated AO can increase cognitive load, so it needs to be adjusted to technological developments and student needs. Furthermore, the use of AO in learning should be made more diverse, like online learning, to expand the understanding that AO can be used for various learning contexts. Overall, the AO strategy has proven effective in strengthening students' cognitive

structures in traditional and modern learning contexts. Previous research not only confirms new insights into how AO can be optimized for a variety of learning contexts.

CONCLUSION

The results of this study show that the Advance Organizer strategy can significantly improve reading ability because students can strengthen cognitive structures by connecting new knowledge with previously acquired knowledge. This strategy has been proven to enhance students' understanding of concepts, memory, learning motivation, and critical thinking skills. In addition, these findings also confirm that Advance Organizer can be applied effectively to students of various levels of academic ability, making it an inclusive and adaptive learning strategy. This finding has important implications for the world of education, especially in the design and implementation of learning strategies based on cognitivism. Educators need to consider using Advance Organizer in learning planning to help students gain a deeper understanding and increase their engagement in the learning process. These findings expand the previous perspective by showing that integrating Advance Organizer with educational technology can improve learning effectiveness. Further research can focus on the efficacy of these strategies in various subjects and levels of education. Longitudinal studies are also needed to look at the long-term impact of the use of Advance Organizer on students' cognitive development and its implications in the world of work and real life. This approach enhances conceptual understanding, long-term memory retention, learning motivation, and critical thinking skills, proving effective across diverse academic abilities in Madrasa settings. Educators should embed simplified AO frameworks (e.g., 3-level hierarchical templates) into lesson planning to reduce cognitive load for struggling learners (who require 40% more scaffolding). Similarly, curriculum developers must integrate AO with Islamic epistemic principles (e.g., Tadabbur reflection) to align cognitive strategies with religious pedagogy. These adaptations transform AO into a culturally responsive tool for Islamic education systems.

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