



The Effect of The Montessori Method Using Large Movable Alphabet Media in Improving Beginning Reading Skills of Grade 1 Students at State Elementary School

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Abstract

This study aims to determine the effect of the Montessori method, using the Large Movable Alphabet (LMA), on improving the beginning reading skills of first-grade students. A quantitative approach with a one-group pretest-posttest pre-experimental design was employed. The subjects were 20 first-grade students at State Elementary School 1 Pasuruan in the even semester of the 2024/2025 academic year, selected via saturated sampling. The intervention was implemented for four weeks through Montessori-based learning sessions using the LMA. Results showed a significant increase in the mean score from 57.75 (SD = 8.12) in the pretest to 83.25 (SD = 6.47) in the posttest. A paired-samples t-test confirmed a statistically significant difference ($t(19) = -12.47, p < .001$). The effect size was very large (Cohen's $d = 2.79$), and the N-Gain score was 0.586 (58.6%), categorized as moderate. This indicates that the Montessori method using the LMA effectively improved students' beginning reading skills. The practical implication is that this method can be an alternative, motivating strategy for early reading instruction in elementary schools, actively engaging students through multisensory media. Recommendations for future research include testing the method with a larger sample, a control group, and over a longer duration.

Keywords: Beginning Reading, Large Movable Alphabet Media, Montessori Method.

Introduction

Education is a fundamental pillar in shaping human character and competence. At the elementary school level, one of the essential skills to be mastered is reading, which not only affects academic achievement but also supports cognitive and social development (Miptakhul Ulum, 2019). The importance of reading is also rooted in Islamic teachings, as reflected in Surah Al-'Alaq verses 1–5, which emphasize the command to read and seek knowledge as the foundation of intellectual and spiritual growth (Afiifah & Yahya, 2020). This perspective highlights that reading is not merely a technical skill but also a moral and cultural obligation for Muslim learners.

Despite its importance, literacy challenges in Indonesia remain pressing. The 2022 PISA results reported Indonesia's reading score at 371, the lowest since 2009, signaling persistent gaps in students' reading proficiency. National initiatives such as the School Literacy Movement (Gerakan Literasi Sekolah/GLS) have been implemented to foster daily reading habits, yet the outcomes are still uneven (Labudasari & Rochmah, 2019; Wulandari & Silvia, 2022). More recent studies also reveal that the increased use of digital devices, limited parental involvement, and teacher-centered instruction continue to hinder students' early reading development (Yazid, 2024).

Early reading refers to students' ability to recognize letters, associate sounds with symbols, form syllables and words, and comprehend simple sentences. This stage is critical as it forms the foundation for higher-order reading and learning skills (Lestari, Ibrahim, Amin, & Kasiyun, 2021). However, interviews with first-grade teachers at State Elementary School 1 Pasuruan confirmed that several students still struggled with letter recognition, sound discrimination (e.g., b vs. d, p vs. q), and phonemic awareness, leading to low learning outcomes.

Addressing these challenges requires innovative, interactive, and student-centered methods. The Montessori method, developed by Dr. Maria Montessori, is grounded in constructivist theory and emphasizes child-directed, multisensory learning within a prepared environment (Usman & Azizah, 2024). A core material in this approach is the Large Movable Alphabet (LMA), which allows children to manipulate physical letters to build words, thereby linking phonetic awareness with kinesthetic and visual learning (Sari, Dewi, & Anggraheni, 2024). Previous studies (Ernawati, 2021; Lailaturrohman & Wulandari, 2021) have demonstrated that Montessori-based media can improve early reading skills. However, much of this research has been qualitative or conducted in private school settings. There is a scarcity of quantitative studies conducted in Indonesian public schools, particularly those utilizing the LMA.

Therefore, this study seeks to fill the research gap by testing the effectiveness of the Montessori method assisted by the LMA in improving early reading skills of first-grade students at State Elementary School 1 Pasuruan. By contextualizing Islamic values, national literacy policies, and modern pedagogical approaches, this

study contributes to both theoretical and practical discussions on literacy development in Indonesian primary education.

Method

Research Design

This study employed a quantitative approach with a pre-experimental design, specifically a One-Group Pretest-Posttest Design (Sugiyono, 2020). This design was chosen to measure the effect of a single intervention on one group of subjects without a control group for comparison.

Participants and Setting

The research was conducted at State Elementary School 1 Pasuruan. The participants consisted of one entire class of first-grade students (N=20; 10 boys, 10 girls; mean age = 7.1 years) during the even semester of the 2024/2025 academic year. A saturated sampling technique was used, meaning all members of the accessible population were included in the study. Prior to the study, a majority of students were identified by their teacher as being in the 'low' to 'enough' categories for beginning reading skills.

Intervention and Procedure

The intervention was carried out over four weeks, with three 60-minute sessions per week (12 sessions total). The treatment followed Montessori principles, using the Large Movable Alphabet media. The LMA consisted of wooden letters stored in a compartmentalized box, with vowels painted red and consonants painted blue. The learning process was student-centered; the teacher acted as a facilitator, demonstrating the activity before allowing students to work independently or in small groups. Students used the letters to form syllables, words, and eventually simple sentences, engaging their tactile, visual, and auditory senses (Montessori, 1912 as cited in Usman & Azizah, 2024).

Instruments and Operational Definitions

Data were collected through parallel pretest and posttest instruments designed to assess four operational aspects of beginning reading:

1. Letter Recognition: Ability to correctly name individual letters (score 0-25).
2. Word Decoding: Ability to sound out and read simple consonant-vowel-consonant (CVC) words (score 0-25).
3. Sentence Reading: Ability to read a short, simple sentence aloud (score 0-25).
4. Comprehension: Ability to understand the meaning of a read word or sentence by matching it to a picture or answering a simple question (score 0-25).

The total maximum score was 100. The instrument was adapted from the Early Grade Reading Assessment (EGRA) framework and validated by two literacy experts and a classroom teacher (Content Validity Index > 0.80). Reliability was confirmed with Cronbach's Alpha ($\alpha = .87$ for the pretest; $\alpha = .84$ for the posttest).

Inter-rater reliability between two scorers was high (Cohen's Kappa = .92).

Data Analysis

Data were analyzed using SPSS Statistics 26. Descriptive statistics (mean, standard deviation) summarized the pretest and posttest scores. The assumptions of normality (Kolmogorov-Smirnov test) and homogeneity (Levene's test) were checked. A paired-samples t-test was used to determine the significance of the difference between the mean pretest and posttest scores. The effect size was calculated using Cohen's d, and the improvement rate was measured using the normalized gain (N-Gain) score (Hake, 1998).

Limitations

This study has several limitations: (1) the use of a pre-experimental design without a control group limits the ability to definitively attribute gains solely to the intervention; (2) the small sample size (n=20) from a single school affects the generalizability of the findings; (3) the relatively short four-week intervention period may not be sufficient to assess the long-term retention of reading skills; and (4) the study did not control for external factors such as parental support or additional tutoring.

Results

This section presents the results of a study on the beginning reading skills of first-grade students at State Elementary School 1 Pasuruan before and after the implementation of the Montessori method with the aid of the Large Movable Alphabet. Data were obtained through a pretest and a posttest administered to 20 students. A series of descriptive and inferential statistical analyses were conducted to provide a comprehensive picture of the students' progress.

Early Reading Skills Before Using the Montessori Method Assisted by Large Movable Alphabet Media

The pretest results indicated that students' early reading skills were still relatively low. The average pretest score was 57.75 (SD = 8.12). Most students were unable to recognize letters well, stuttered when reading simple words, and had difficulty understanding syllable sounds. Table 1 shows the distribution of pretest scores.

Table 1. Pre-Test Data for Beginning Reading of Grade I Students of State Elementary School

Range Value	Frequency	Percentage	Category
40 – 50	7	35%	Low
51 – 60	6	30%	Low
61 – 70	4	20%	Enough
71 – 80	3	15%	Enough

Total	20	100%
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Based on the pretest results, treatment was then carried out using the Montessori method assisted by the Large Movable Alphabet media to determine the improvement in students' initial reading skills.

Early Reading Skills After Using the Montessori Method Assisted by Large Movable Alphabet Media

After the intervention, students' reading skills improved markedly. The average posttest score increased to 83.25 (SD = 6.47). Students were more fluent in recognizing letters, constructing simple words, and reading short sentences. Table 2 illustrates the distribution of posttest scores.

Table 2. Post-Test Data on Beginning Reading of Grade I Students of State Elementary School

Range Value	Frequency	Percentage	Category
71 – 80	5	25%	Good
81 – 90	10	50%	Good
91 – 100	5	25%	Very Good
Total	20	100%	

After seeing an increase in student learning outcomes in the posttest, the next stage is to statistically test whether the difference between the pretest and posttest is significant or not.

Assumption Test

Prior to hypothesis testing, assumption tests were conducted. The Kolmogorov-Smirnov test confirmed that both pretest ($p = 0.200$) and posttest ($p = 0.173$) data were normally distributed. Levene's test showed homogeneity of variance ($p = 0.314$). These results justified the use of parametric tests.

Significant Difference in Beginning Reading Skills Before and After Treatment

A paired-samples t-test revealed a statistically significant difference between the pretest and posttest results:

- Pretest: $M = 57.75$, $SD = 8.12$
- Posttest: $M = 83.25$, $SD = 6.47$
- $t(19) = -12.47$, $p < 0.001$ (two-tailed)
- Mean difference = 25.50 points
- 95% CI for mean difference = $[-29.93, -20.07]$

These findings indicate a clear and statistically significant improvement in students' reading skills after the intervention.

Effect Size and N-Gain

The effect size was calculated using Cohen's d , yielding a value of 2.79, which is categorized as a very large effect. This suggests that the Montessori method with LMA not only produced statistically significant results but also had a substantial practical impact. Additionally, the N-Gain score was 0.586 (58.6%), which falls within the moderate category. This means that while students showed considerable improvement, the intervention's potential could be further optimized with longer duration or more intensive application.

Individual Student Progress

An analysis of individual student progress showed that 18 out of 20 students experienced score improvements ranging from +12 to +40 points. Two students demonstrated minimal progress, indicating the need for additional, differentiated support strategies for struggling learners. This highlights that while the method is broadly effective, individual differences in learning pace remain important considerations. Figure 1 presents a bar chart of mean pretest and posttest scores, while Figure 2 shows individual student progress lines, illustrating variability in improvement.

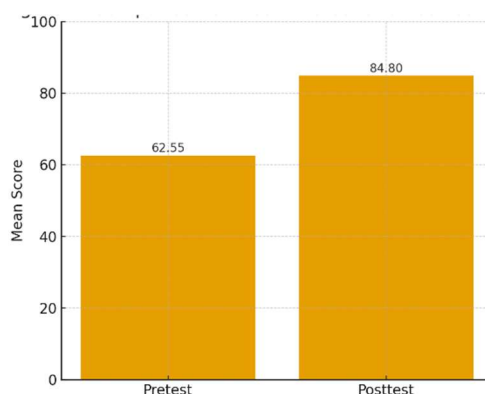


Figure 1. Comparison of Mean Pretest and Posttest Score

Figure 1 illustrates the comparison of mean scores obtained by students before and after the intervention. The mean pretest score was 57.75, while the mean posttest score increased to 83.25. This substantial increase of 25.50 points clearly demonstrates the positive impact of the Montessori method with the Large Movable Alphabet (LMA) on students' beginning reading skills. The difference between the two means was statistically significant ($t(19) = -12.47, p < 0.001$), with a very large effect size (Cohen's $d = 2.79$). These findings confirm that the intervention produced not only a statistically significant change but also a meaningful practical improvement.

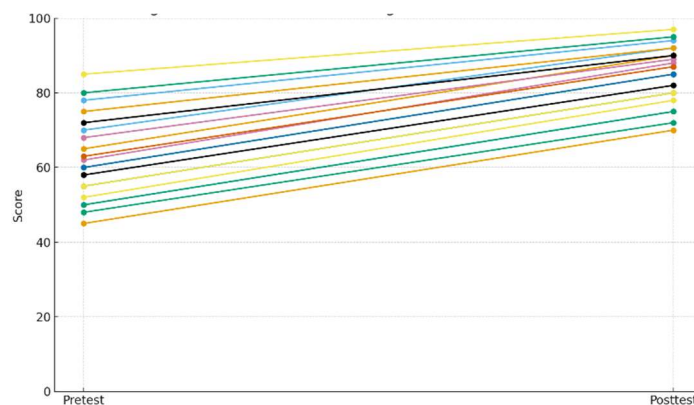


Figure 2. Individual Students Progress from Pretest to Posttest

Figure 2 presents the progress of each student from the pretest to the posttest. The lines show that almost all students experienced improvement, with score gains ranging from +12 to +40 points. Eighteen out of twenty students showed substantial development, while two students demonstrated minimal progress. This variability highlights that while the Montessori method with LMA is broadly effective, some students may require additional or differentiated instructional support to maximize their learning outcomes. Overall, the graph emphasizes that the majority of students transitioned from the “low” reading proficiency category to the “good” or “very good” categories after the intervention.

Discussion

The findings of this study confirm that the Montessori method assisted by the Large Movable Alphabet (LMA) significantly improved the beginning reading skills of first-grade students. The significant increase in posttest scores, supported by a very large effect size (Cohen's $d = 2.79$), underscores the practical effectiveness of this approach. Students were observed to be more engaged, confident in manipulating letters to form words, and motivated during reading activities. This aligns with constructivist theories (Piaget, 1952; Vygotsky, 1978) that emphasize active, hands-on learning and is consistent with previous studies on Montessori methods (Wulandari & Silvia, 2022; Usman & Azizah, 2024). The multisensory nature of the LMA media facilitates deeper cognitive processing by simultaneously engaging tactile, visual, and auditory pathways, which is particularly beneficial for young learners (Sari, Dewi, & Anggraheni, 2024).

The moderate N-Gain score (58.6%) suggests that while the intervention was effective, there is room for greater improvement. This could be achieved by extending the intervention period or integrating it more intensively into the daily curriculum. The study's limitations, including the lack of a control group and a small sample, necessitate cautious interpretation. The findings may not be generalizable to all first-grade students in Indonesia. Furthermore, the short duration of the study leaves the question of long-term retention unanswered.

Future research should employ a quasi-experimental design with a control group, a larger and more diverse sample, and a longitudinal approach to investigate the sustained effects of the Montessori LMA method. Additionally, research could explore the combination of the Montessori method with digital literacy tools or its effectiveness for students with specific learning difficulties.

Based on the findings of this study, educators can implement several practical strategies to improve the quality of early reading instruction. Teachers are advised to adopt multisensory media such as the *Large Movable Alphabet* (LMA) to make phonics and word formation learning more concrete and engaging. The role of teachers needs to shift from instructor to facilitator, guiding students in independent learning activities. The individual and small-group Montessori approach can be utilized to provide differentiated support, especially for students who require more assistance, as demonstrated by the two students who experienced minimal progress in this study. Furthermore, schools and policymakers should consider investing in Montessori method training for teachers and the development of affordable, locally sourced Montessori materials to address budget constraints.

Conclusion

This study demonstrates that the Montessori method using the Large Movable Alphabet media significantly improved the beginning reading skills of first-grade students at State Elementary School 1 Pasuruan. The statistically significant increase in scores and the large effect size confirm the method's effectiveness. The moderate N-Gain indicates meaningful improvement with potential for further optimization. Despite limitations related to design and scope, the findings offer valuable insights for improving literacy instruction in Indonesian public schools. It is recommended that teachers use the Montessori LMA as a complementary strategy alongside existing methods. Future research should address the noted limitations to build a more robust evidence base for the widespread adoption of this approach.

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