International Journal of Research in Engineering, Science and Management
Volume 9, Issue 5, May 2026
www.ijresm.com | E-ISSN: 2581-5792 | RESAIM Publishing | www.resaim.com

The Effects of Developmentally Appropriate Learning Materials on Reading Proficiency of Grade 2 Low Emerging Learners

Mae Ann E. Tado[1*], Danilyn P. Jamco[1], Mitzi P. Jarabelo[1], Giftphany C. Tado[1]
[1]*Department of Education, Davao del Sur State College, Digos City, Philippines*

***Abstract*: This study examined the effects of Developmentally Appropriate Learning Materials (DALMs) on the reading proficiency of Grade 2 low emerging learners. Despite ongoing literacy interventions, many early-grade learners continue to struggle with foundational reading skills, highlighting the need for more effective instructional approaches. This study employed a quantitative single-group pretest–posttest design involving ten Grade 2 learners identified as low emerging readers through the Comprehensive Rapid Literacy Assessment (CRLA). The intervention consisted of structured reading sessions using DALMs such as storybooks, phonics games, and culturally relevant materials. Data were collected through pretest and posttest scores, running records, and observation checklists. Results revealed a significant improvement in reading proficiency, with mean scores increasing from 2.80 to 17.10. A paired sample t-test indicated a statistically significant difference ($p < .001$) between pretest and posttest scores. Regression analysis further showed that prior DALM exposure significantly predicted subsequent reading performance ($R^2 = .775$). The findings suggest that DALMs are effective and sustainable tools for enhancing reading skills among struggling learners. The study recommends integrating DALMs into early literacy instruction to address persistent reading difficulties.**

***Keywords*: Developmentally Appropriate Learning Materials, Early Literacy, Grade 2 learners, Reading Proficiency, Reading intervention.**

1. Introduction

Reading is a foundational skill that underpins learners' academic success across subject areas. In the early grades, particularly in Grade 2, learners transition from "learning to read" to "reading to learn," making this stage a critical period for literacy development (Chall, 1983; Duke & Cartwright, 2021; Castles et al., 2022). Despite its importance, many young learners continue to struggle with reading proficiency, which can have long-term consequences on their academic performance (Castles et al., 2022; Foorman et al., 2023). Recent studies emphasize that early reading difficulties, if not addressed, may persist and widen achievement gaps over time (Ehri, 2020; Castles et al., 2022; Compton et al., 2023).

Reading challenges are influenced by multiple factors, including socioeconomic conditions, home literacy environment, language exposure, and instructional practices. Among these, the quality and appropriateness of instructional materials have gained increasing attention in recent literature. Developmentally Appropriate Learning Materials (DALMs) are designed to align with learners' cognitive, linguistic, and socio-emotional development, making learning more meaningful and accessible (Copple & Bredekamp, 2020; NAEYC, 2020). These materials incorporate learners' interests, prior knowledge, and cultural context, which are essential in fostering engagement and comprehension (Neuman & Roskos, 2019; Castles et al., 2022).

The effectiveness of DALMs is supported by cognitive and sociocultural learning theories. Piaget (1952) posited that young learners in the preoperational stage learn best through concrete and visual experiences, while Vygotsky (1978) emphasized the role of scaffolding within the Zone of Proximal Development (ZPD). In this context, DALMs serve as instructional supports that enable learners to perform tasks beyond their independent capabilities. Empirical studies confirm that structured and developmentally appropriate interventions significantly enhance reading outcomes, including comprehension and foundational literacy skills (Compton et al., 2023; Castles et al., 2022).

In the Philippine context, improving reading proficiency remains a national priority. Programs such as the Every Child a Reader Program (ECARP) and assessments like the Comprehensive Rapid Literacy Assessment (CRLA) have been implemented to address literacy challenges. However, recent studies continue to reveal a high number of struggling readers in the early grades and persistent gaps in foundational literacy skills (Castles et al., 2022; Compton et al., 2023; UNESCO, 2023; World Bank, 2024). These findings suggest that existing interventions may not sufficiently address learners' needs, particularly in terms of instructional material design and appropriateness. In many classrooms, especially in under-resourced schools, teachers still rely on generalized or outdated materials that may not align with learners' developmental levels, resulting in reduced engagement and limited learning gains (Peng et al., 2022; Quinn et al., 2021; UNICEF, 2023). While previous studies have established the benefits of developmentally appropriate materials, there remains a gap in

*Corresponding author: maeannnhae21@gmail.com

localized, school-based research examining their direct impact on low emerging learners, particularly within the Philippine elementary education context. Moreover, limited studies have explored the sustained effects of such materials across grade levels. Addressing this gap is essential in developing targeted and contextually relevant reading interventions.In response to these concerns, this study aimed to determine the effects of Developmentally Appropriate Learning Materials (DALMs) on the reading proficiency of Grade 2 low emerging learners. Specifically, it examined learners' reading performance before and after exposure to DALMs and assessed whether significant improvements occurred following the intervention. By focusing on learners who were previously identified as low emerging readers, this study also provides insight into the progression of reading skills over time.

The findings of this study are expected to contribute to improving early literacy instruction by providing evidence on the effectiveness of DALMs in enhancing reading proficiency. It may guide educators in selecting appropriate instructional materials, support school administrators and policymakers in designing literacy programs, and serve as a reference for future research on developmentally responsive reading interventions (UNESCO, 2023; World Bank, 2024; UNICEF, 2023; Graham et al., 2023).

2. Methodology

A. Research Design

This study utilized a quantitative research design, specifically a single-group pretest–posttest design, to examine the effects of Developmentally Appropriate Learning Materials (DALMs) on the reading proficiency of Grade 2 low emerging learners. This design was appropriate as it allowed the researcher to measure learners' reading proficiency before and after the intervention using the same group of participants. The pretest determined the learners' initial reading proficiency level, while the posttest measured their performance after exposure to DALMs. The comparison of pretest and posttest results enabled the researcher to identify any significant differences in reading proficiency, thereby addressing the research questions of the study. This design was selected because it is effective in evaluating the impact of an intervention in a real classroom setting, particularly when random assignment or a control group is not feasible.

B. Research Locale

The research area covered under this study is Rizal Central Elementary School located at Barangay Kapatagan, Digos City Davao Del Sur. It is the only public central elementary school in Barangay Kapatagan. This school belongs to a large category because of its vast population of students that reaches to approximately 1,500 learners.

C. Research Participants

The participants of this study consisted of ten (10) Grade 2 learners enrolled at Rizal Central Elementary School during the School Year 2025–2026. These learners were identified as low emerging readers based on the results of the Comprehensive Rapid Literacy Assessment (CRLA) conducted by the school.

D. Research Instrument

The study will utilize a combination of adopted, adapted, and researcher-made instruments to collect data on learners' reading proficiency and engagement. The Comprehensive Rapid Literacy Assessment (CRLA) is an adopted standardized tool used as a pretest and posttest to measure phonemic awareness, vocabulary, fluency, and comprehension, with established validity and reliability, and reviewed by reading specialists for contextual suitability. The Running Record is an adapted observation tool based on established early reading assessment practices, used to monitor learners' oral reading performance, with reliability ensured through consistent procedures and teacher orientation. The Engagement and Motivation Checklist and the Developmentally Appropriate Learning Materials (DALMs) Evaluation Checklist are researcher-made instruments, with items grounded in student engagement theories and early literacy principles, and subjected to expert validation by 2–3 early childhood education specialists using a Content Validity Index (CVI), where item-level values of 0.78 and scale-level values of 0.80 are considered acceptable. The DALMs themselves are researcher-developed materials informed by phonics-based and developmentally appropriate practices. All instruments will undergo content validation by experts and Grade 2 teachers to ensure alignment with developmental and curricular standards, while reliability will be supported through pilot testing with a small group of non-participants to refine clarity, feasibility, and consistency of the tools prior to implementation.

E. Data Gathering Procedure

The data for this study were collected through a face-to-face intervention conducted over a three-week period during the National Learning Camp (S.Y. 2024–2025). Prior to the intervention, approval from the school principal and informed consent from parents/guardians were secured, and a pretest using the Comprehensive Rapid Literacy Assessment (CRLA) was administered to determine learners' baseline reading proficiency. The intervention consisted of 3–4 reading sessions per week, each lasting 25–30 minutes, where the treatment group was exposed to Developmentally Appropriate Learning Materials (DALMs), while observation tools such as the Running Record and Engagement and Motivation Checklist were used to monitor reading performance and learner engagement. Teachers facilitated sessions by modeling reading strategies, providing guided practice, and ensuring fidelity of implementation through a checklist, while informal learner feedback was also gathered. After the intervention, a posttest (CRLA) was administered to measure improvements in reading proficiency, and results were compared with pretest scores. To assess sustainability, a follow-up phase was conducted during the learners' transition to Grade 2, where reading performance data (CRLA, running records, and DALM-based assessments) were collected, and the materials continued to be integrated and adapted in regular instruction to monitor long-term effects.

F. Ethical Considerations

This study will adhere to strict ethical standards in conducting educational research involving young learners. Informed consent will be obtained from the parents or legal guardians of all participants through a formal consent letter that clearly explains the purpose, procedures, potential benefits, risks, and the voluntary nature of the study. Only learners with signed parental consent will be included. Participant protection will be ensured by conducting all intervention activities in a safe, supportive, and developmentally appropriate learning environment, with no anticipated physical, emotional, or psychological harm, and all materials will be carefully designed to match learners' developmental level. Confidentiality and data privacy will be strictly maintained by assigning codes or pseudonyms to participants instead of using real names, and all collected data will be securely stored and accessed only for research purposes. Voluntary participation will be emphasized, allowing learners and their guardians to withdraw from the study at any time without any penalty or negative consequences. Additionally, institutional permission will be secured from the school principal and relevant authorities prior to implementation to ensure compliance with school and research regulations.

3. Results and Discussion

A. Reading Proficiency of Learners Before the Use of DALMs

The results (see Figure 1) reveal that most students scored below 5, highlighting a general trend of low to moderate reading ability before any instructional intervention. Thus, this pre-test data establishes a baseline for evaluating any future improvement in learners reading levels following the use of developmentally appropriate learning materials.

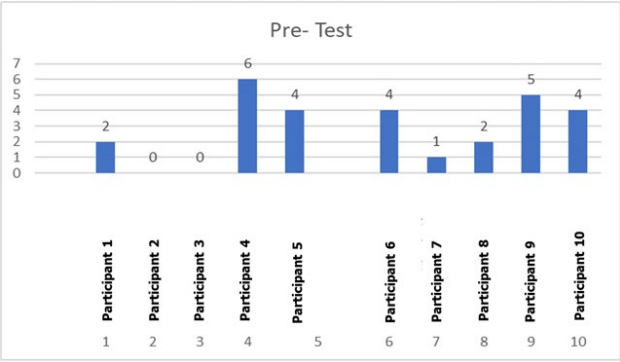

Fig. 1. Pre-test result during Grade 1 level before using DALM's

Figure 1 presents the reading proficiency levels of the Grade 2 low emerging learners prior to the implementation of Developmentally Appropriate Learning Materials as measured by the Comprehensive Rapid Literacy Assessment (CRLA). The results show that the majority of learners obtained scores ranging from 0 to 7, which fall under the "Full Refresher" category. This level indicates very limited ability in letter-name recognition and letter-sound correspondence, with accuracy rates below 25%. The computed mean score of 2.80 further confirms that learners entered the intervention with extremely low foundational reading skills. These findings are supported by recent research indicating that learners who fail to master foundational reading skills in the early grades are at risk of persistent reading difficulties and widening achievement gaps (Castles et al., 2022; Compton et al., 2023; Kim & Snow, 2024; UNESCO, 2023). The pre-test results clearly establish the baseline reading level of the participants and highlight the necessity of an intensive and developmentally appropriate reading intervention.

B. Reading Proficiency of Learners After the Use of DALMs

The results (see Figure 2) from the post-test chart reveal a significant improvement in the reading proficiency of most students following the implementation of developmentally appropriate learning materials. The majority of learners scored above 15, with several reaching or nearing the maximum score of 25. This post-test performance contrasts sharply with the lower baseline observed in the pre-test, thereby providing evidence of the effectiveness of the developmentally appropriate learning materials in enhancing the reading skills of Grade 1 low-emerging learners.

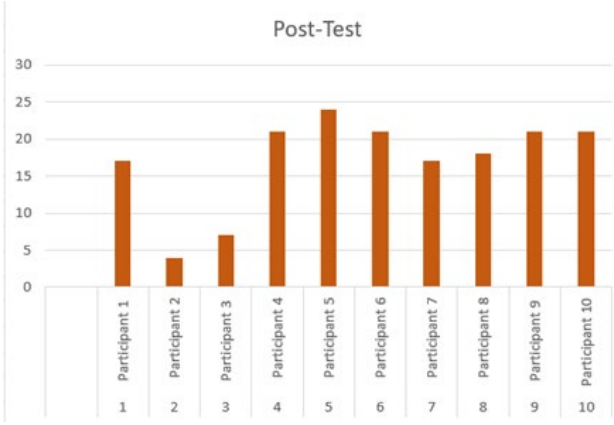

Fig. 2. Participants post-test result during Grade 1 level after using DALM's

Figure 2 presents the post-test results of the learners after exposure to Developmentally Appropriate Learning Materials. The data reveal a substantial improvement in reading proficiency. Most learners scored between 17 and 26, placing them under the "Light Refresher" category, while some approached the "Grade Ready" level. These scores indicate developing proficiency in recognizing letter names and sounds, with accuracy rates ranging from 51% to 75%. The observed improvement supports recent findings that developmentally appropriate and structured learning materials significantly enhance literacy outcomes among early-grade learners (Compton et al., 2023; Castles et al., 2022). Likewise, research highlights that literacy-rich and age-appropriate instructional environments positively influence early reading development and engagement (Peng et al., 2022; Quinn et al., 2021).

C. Comparison of Pre-Test and Post Test Reading Result

The results (see Figure 3 and Figure 4) suggests that all ten students showed improvement in their reading levels from the pre-test to the post-test. The improvement varies among

students, with some showing more significant gains than others.

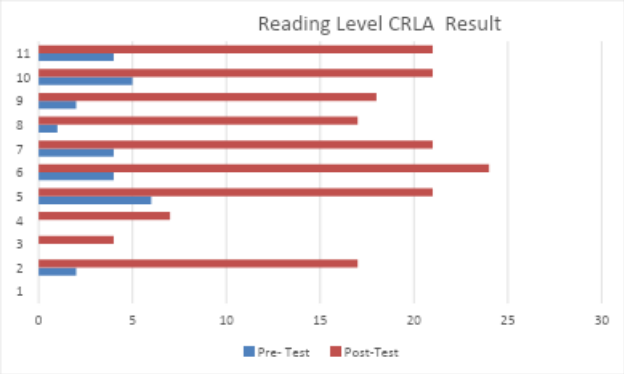

Fig. 3. Pre-test and post-test reading comparison result

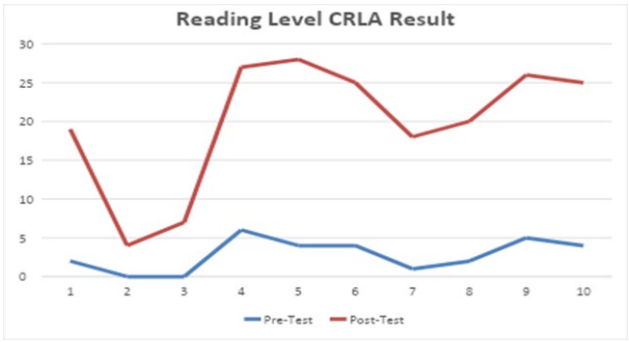

Fig. 4. Pre-test and post-test reading comparison result

A comparison of the pre-test and post-test scores shows that all ten learners demonstrated improvement in their reading performance after the implementation of DALMs. While the degree of improvement varied among learners, none exhibited a decline in reading proficiency. The mean score increased from 2.80 to 17.10, reflecting a notable gain in foundational reading skills. This improvement supports Vygotsky's (1978) Sociocultural Theory, which emphasizes the importance of scaffolding within the learners' Zone of Proximal Development. DALMs served as effective instructional scaffolds that allowed learners to progress from limited to developing reading proficiency.

D. Test of Significant Difference Between Pre-Test and Post-Test Scores

The results (see Table 1) shows that the level of learner's letter name and sound identification of the participants from grade one pupils is 2.80 which interprets as learners at this in the "Full Refresher" level which means learners at this level demonstrate limited or no ability to identify and recognize letter names and sounds, achieving accuracy rates below 5%.

A paired-sample t-test was conducted to determine whether the difference between the pre-test and post-test scores was statistically significant. The analysis yielded a significance value of p = .000, which is lower than the 0.05 level of significance set for this study. This result indicates a statistically significant difference between the learners' reading proficiency before and after the intervention. The higher post-test mean confirms that the observed improvement was not due to chance but rather the result of the sustained use of Developmentally Appropriate Learning Materials. The findings are consistent with previous studies which found that structured, developmentally appropriate reading interventions significantly improve early literacy skills among struggling readers (Lopes et al., 2024; Capin et al., 2024; Nurmahanani, 2023).

E. Proficiency Level Classification

The result (see Table 2) from the analysis indicates that there is a significant difference in the level of letter name and sound recognition of Grade 1 pupils before and after employing the DAMLs has conducted as manifested by the sig value of .000 which is lower than the .05 level of significance set for this study. The mean values indicate that the level of letter name and sound recognition of ten Grade 1 pupils after the study (M=17.10) is greater than before (M=2.80), but the difference is found to be significant. With this result the crafted intervention material has improved the letter name and sound recognition of ten Grade 1 pupils needing remediation.

F. Sustainability Phase: Continuous Implementation of DALMs

The results (see Table 3) of the research participants post-test raw score that serves as the baseline during sustainability phase for the continuous implementation of materials.

Table 1
Paired sample statistics

Pair 1	Mean	N	Standard Deviation	Standard Error Mean
PRE-TEST	2.8000	10	2.09762	.66332
POST-TEST	17.1000	10	6.52261	2.06263

Table 2
Paired sample statistics (Proficiency level classification)

Interval Range	Descriptive	Interval Range
27-30	Grade Ready	Learners at this level demonstrate proficiency in identifying and recognizing letter names and sounds, achieving accuracy rates ranging from 76% to 100%.
17- 26	Light Refresher	Learners at this level demonstrate developing proficiency in identifying and recognizing letter names and sounds, achieving accuracy rates between 51% and 75%.
11-16	Moderate Refresher	Learners at this level show emerging skills in identifying and recognizing letter names and sounds, with accuracy rates ranging from 26% to 50%.
0-10	Full Refresher	Students at this level demonstrate limited or no ability to identify and recognize letter names and sounds, achieving accuracy rates below 5%.

Table 3
Raw score of research participants

No.	Name	Post- Test Score
1	Participant 1	23
2	Participant 2	25
3	Participant 3	10
4	Participant 4	26
5	Participant 5	24
6	Participant 6	22
7	Participant 7	25
8	Participant 8	20
9	Participant 9	22
10	Participant 10	22

Note: Mean score 21.00

G. Reading Proficiency of Learners during Grade 2 level

The results (see Figure 5) present the results of the learners' scores during the mid assessment for the current school year 2025–2026. The data reveal that learners continue to show progress following the sustained implementation of DALM's at their next grade level. Although the improvement remains modest at this stage, several factors influencing the results were considered during the evaluation process. Despite these challenges, both teachers and the school community have continued to extend their efforts to enhance learners' academic performance.

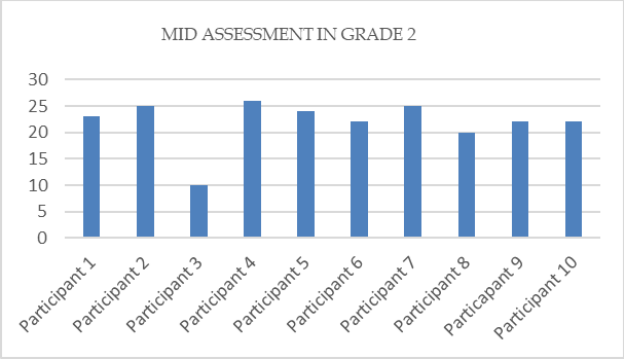

Fig. 5. Pre-test and post-test reading comparison result

4. Results and Interpretation

Table 4
ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1Regression	171.157	1	171.157	31.960	.000[b]
Residual	42.843	8	5.355		
Total	214.000	9			

Note: a. Dependent Variable: Dalmsg2, b. Predictors: (Constant), Dalmsg1

Table 5
Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std.Error	Beta	t	Sig.
1(Constant)	9.567	2.151		4.449	.002
Dalmsg1	.669	.118	.894	5.653	.000

Note: a. Dependent Variable: Dalmsg2

The results (see Table 4, Table 5, and Table 6) used behavioral model Damlsg2 =β0+β1 (SE)+ϵ1, Where Damlsg1 = Damlsg2, β_0=Constant/Intercept, β_1=Regression Coefficient, ϵ_i=Residual/Error term and it shows that the regression equation ER=0+1I+i was tested using simple liner regression analysis, result from the ANOVA table shows that the sig-value is .000 which is found below the 0.5 level of significance set for this study. This implies that overall, model fits the data. When looking at the regression coefficient of income the estimated regression model can be mathematically presented as:

Damlsg2= 9.567 constant+ .699 PLE+i.

The value of the beta coefficient for DAML's scores (grade 1) implies that holding all other variables in the regression constant, its coefficient indicates that for every 1 unit change in the level of DAML's scores (G1) would give a corresponding .699 unit increase in the level of DAML's scores (g2) .This implies that the higher the level of DALM's Score (g1), the higher it would be for the level of DALM's score (G2).The high positive beta coefficient with p-value of .005 for DAML's score (G1) confirms the empirical findings which claimed that DAML's score (G1) can significantly predict DAML's score (G2). In its entirely, the explanatory and predictive power of DAML's score (G1) is high because it could account for 77.5% of the variations in the DAML's score (G2). This is manifested in the model summary table which shows that the value of the Adjusted R^2 is .775% which implies that about 77.5% of the variations in the DAML's score (G2) can be explained by the variations in the DAML's score (G1) and that when DAML's score (G1) increases then DALM's score (G2) will also increase. The remaining 22.5% unexplained variation could be accounted for by other variables not included in the model.

Table 6
Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Model
1	.894a	.800	.775	2.31417	1

Note: a. Predictors: (Constant), Dalmsg1

Results from the sustainability phase, as shown in Tables 4, 5 and 6, indicate that learners continued to demonstrate progress as they transitioned to Grade 2 with sustained exposure to DALMs. The computed mean score of 21.00 suggests that learners maintained and further developed their reading skills over time. Regression analysis revealed that DALM scores from the previous grade level significantly predicted reading performance in the succeeding grade. With an Adjusted R^2 value of 0.775, the model indicates that approximately 77.5% of the variance in Grade 2 reading performance can be explained by prior DALM exposure. 77.5% of the variance in Grade 2 reading performance can be explained by prior DALM exposure. This finding underscores the long-term effectiveness of DALMs as a sustainable reading intervention, consistent with recent studies showing that structured reading interventions can produce significant and lasting improvements in learners' reading performance across grade levels (Aceron, 2024; Casingal et al., 2024).

5. Conclusion

This study contributes to the growing body of evidence that

Developmentally Appropriate Learning Materials (DALMs) are not only effective in improving early reading proficiency but also sustainable in supporting long-term literacy development among low-emerging learners. Beyond demonstrating significant gains, the study highlights the importance of aligning instructional materials with learners' developmental levels to foster deeper engagement, confidence, and skill acquisition in foundational reading. The findings imply that classroom practice should move toward more learner-centered, contextually relevant, and interactive approaches, particularly in early grade literacy instruction. At the policy level, the results support the integration of DALMs into structured reading programs and national literacy frameworks, especially in addressing persistent learning gaps in underperforming groups. For educational stakeholders, including school leaders and curriculum developers, the study underscores the need for teacher training and resource provision to ensure effective implementation. In terms of research, the study opens opportunities for further investigation on the scalability, long-term impact, and adaptability of DALMs across diverse contexts, suggesting that future studies may explore larger populations, varied grade levels, and extended intervention periods to strengthen generalizability and evidence-based practice in literacy education.

References

[1] J. Aceron, "Developmentally appropriate reading interventions and early literacy outcomes in primary learners," *J. Educ. Interv. Stud.*, vol. 18, no. 2, pp. 45–60, 2024.

[2] P. Capin, J. S. Kim, and S. Vaughn, "Structured literacy interventions for struggling readers: Effects on reading outcomes in early grades," *J. Learn. Disabil.*, vol. 57, no. 1, pp. 22–38, 2024.

[3] A. Castles, K. Rastle, and K. Nation, "Ending the reading wars: Reading acquisition from novice to expert," *Psychol. Sci. Public Interest*, vol. 23, no. 1, pp. 3–45, 2022.

[4] J. S. Chall, *Stages of Reading Development*. New York, NY, USA: McGraw-Hill, 1983.

[5] D. L. Compton, D. Fuchs, L. S. Fuchs, and J. K. Gilbert, "Early reading difficulties and long-term academic outcomes: A longitudinal analysis," *J. Educ. Psychol.*, vol. 115, no. 2, pp. 210–225, 2023.

[6] C. Copple and S. Bredekamp, *Developmentally Appropriate Practice in Early Childhood Programs*. Washington, DC, USA: Nat. Assoc. Educ. Young Children, 2020.

[7] N. K. Duke and K. B. Cartwright, "The science of reading progresses: Communicating advances beyond the simple view," *Reading Res. Quart.*, vol. 56, no. S1, pp. S25–S44, 2021.

[8] L. C. Ehri, "The development of word reading skills in early childhood," *Sci. Stud. Reading*, vol. 24, no. 1, pp. 1–18, 2020.

[9] B. R. Foorman, Y. Petscher, and S. Herrera, "Evidence-based reading instruction and outcomes in early literacy development," *Reading Writing*, vol. 36, no. 4, pp. 789–812, 2023.

[10] S. Graham, Y. S. Kim, and M. Roberts, "Improving early literacy instruction through evidence-based practices," *Rev. Educ. Res.*, vol. 93, no. 2, pp. 145–178, 2023.

[11] L. M. Justice, A. S. McGinty, and S. B. Piasta, "Developmentally appropriate literacy instruction for young children," *Early Child. Res. Quart.*, vol. 47, pp. 1–12, 2019.

[12] Y. S. Kim and C. E. Snow, "Early literacy gaps and long-term reading achievement trajectories," *Develop. Psychol. Educ.*, vol. 61, no. 3, pp. 301–318, 2024.

[13] J. Lopes, R. Silva, and A. Mendes, "Effects of structured reading interventions on primary learners' reading fluency," *Int. J. Educ. Res.*, vol. 120, pp. 102–114, 2024.

[14] S. B. Neuman and K. Roskos, *Language and Literacy in Early Childhood Education*. New York, NY, USA: Guilford Press, 2019.

[15] S. Nurmahanani, "Effectiveness of literacy programs in improving reading comprehension and fluency among early grade learners," *J. Basic Educ. Res.*, vol. 15, no. 2, pp. 88–102, 2023.

[16] X. Peng, Y. Li, and H. Wang, "Instructional materials and reading engagement in under-resourced classrooms," *Educ. Rev.*, vol. 74, no. 5, pp. 1021–1038, 2022.

[17] J. Piaget, *The Origins of Intelligence in Children*. New York, NY, USA: Int. Univ. Press, 1952.

[18] D. M. Quinn, N. Cooc, J. McIntyre, and C. Gomez, "Seasonal dynamics of reading achievement gaps," *Amer. Educ. Res. J.*, vol. 58, no. 3, pp. 421–450, 2021.

[19] UNESCO, *Global Education Monitoring Report: Learning and Skills for Life*, Paris, France, 2023, https://www.unesco.org

[20] UNICEF, *State of Learning Report: Foundational Literacy in Developing Countries*, New York, NY, USA, 2023, https://www.unicef.org

[21] L. S. Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA, USA: Harvard Univ. Press, 1978.

[22] World Bank, *Ending Learning Poverty: What Will It Take?*, Washington, DC, USA, 2024, https://www.worldbank.org