

# Precision Reading Interventions for Key Stage 1 Literacy Progress

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Date Submitted:

**March 15, 2026**

Date Accepted:

**July 28, 2026**

Date Published:

**September 24, 2026**

DOI:

**10.5281/zenodo.22931150**

## ABSTRACT

This study traced literacy growth among Key Stage 1 learners receiving precision reading interventions in Santa Maria, Isabela, with emphasis on how targeted instructional practices shaped changes in foundational reading performance. A prospective micro-longitudinal intervention-response design was employed involving 24 Key Stage 1 teachers and 36 Grades 1 to 3 learners receiving structured reading support. Data were gathered through the Precision Reading Intervention Scale and repeated literacy progress probes covering decoding, word recognition, oral reading fluency, and comprehension. Bayesian hierarchical growth modeling was used to estimate learner trajectories and determine the contribution of intervention precision to literacy development. Results showed consistent gains across all literacy domains, with the strongest

improvements recorded in word recognition and decoding. Oral reading fluency also increased substantially, while comprehension remained the most persistent area of difficulty. The probability that intervention precision positively influenced literacy performance was 98.3%, while its interaction with early growth showed a 99.7% probability of a positive effect. By the endpoint, 66.7% of learners had reached the grade-level literacy reference, although one-third remained below the expected level. The findings demonstrated that targeted, skill-specific, and responsive reading support strengthened early literacy development, but sustained instructional adjustment was necessary for learners with persistent comprehension and fluency difficulties. Schools should strengthen progress monitoring, comprehension-focused intervention, and individualized instructional response to support more durable literacy growth.

**Keywords:** *Bayesian hierarchical modeling; comprehension; Key Stage 1; literacy progress; precision reading intervention; reading fluency*

## INTRODUCTION

Reading competence formed during the first years of schooling shapes how learners understand texts, acquire new knowledge, and participate in later academic tasks. When foundational reading skills remain weak, difficulties in decoding, fluency, vocabulary, and comprehension can accumulate across grade levels. This concern is particularly significant in the Philippines, where persistent learning poverty has highlighted the need to strengthen reading development during the primary years (World Bank & UNESCO, 2022). For Key Stage 1 learners, early identification and appropriate instructional support are therefore essential before reading difficulties become more resistant to ordinary classroom instruction.

Effective reading intervention requires more than providing struggling learners with additional reading time. Instruction becomes more meaningful when teachers identify specific literacy needs and respond with activities suited to the learner's current level of performance. Evidence from early-grade programs shows that structured interventions can produce substantial gains when instruction deliberately addresses core reading skills

and provides learners with sustained opportunities to practice them (Graham & Kelly, 2019). Such an approach supports the idea of precision in reading intervention, where instructional decisions are guided by observed learner needs rather than by a uniform intervention for all struggling readers.

Research also demonstrates that targeted intervention can improve the performance of learners who experience early reading difficulties. A meta-analysis of interventions for Grades 1 to 3 found significant positive effects on reading outcomes, particularly when instruction addressed skills directly associated with reading development (Gersten et al., 2020). Similarly, programs involving individualized or small-group support have shown favorable outcomes for struggling elementary readers, indicating that the organization and intensity of instruction can influence learner progress (Neitzel et al., 2022). These findings suggest that intervention is most useful when teachers can adjust instructional focus, grouping, pacing, and support according to evidence of learner performance.

The quality and dosage of intervention also matter. Hall et al. (2023) found that explicit and systematic instruction in foundational skills, together with opportunities to read connected text and develop meaning, contributed positively to reading outcomes among elementary learners with persistent difficulties. This reinforces the value of interventions that are focused enough to address particular deficiencies while remaining connected to meaningful reading. Within Philippine schools, this direction is reflected in efforts to strengthen early-grade literacy through focused reading support. An evaluation reported by the Department of Education showed substantial literacy gains among Grades 1 to 3 learners who participated in a structured reading intervention, further emphasizing the potential of deliberate and sustained support for beginning readers (Department of Education, 2026).

These considerations provide the basis for examining Precision Reading Interventions for Key Stage 1 Literacy Progress in Santa Maria, Isabela. The study focuses on Key Stage 1 teachers and learners receiving reading intervention, with attention to how targeted instructional practices support measurable literacy development. By examining intervention practices alongside learner progress, the research seeks to generate evidence that may help teachers refine reading support, respond more closely to individual learning needs, and strengthen foundational literacy during the years when timely intervention can make a lasting difference.

## **Literature Review**

### ***Diagnostic Precision in Early Reading Intervention***

Effective reading intervention begins with identifying the specific skill that prevents a learner from progressing. Early readers may experience difficulty with phonological awareness, letter sound relationships, decoding, word recognition, fluency, vocabulary, or comprehension, and these weaknesses do not always occur at the same level. Foorman et al. (2016) emphasized that instruction in the primary grades should deliberately develop sound awareness, decoding, word recognition, academic language, and connected-text reading because these skills form the foundation of successful comprehension. Castles et al. (2018) likewise explained that learning to read develops through interconnected processes, beginning with mastery of the alphabetic principle and advancing toward fluent word recognition and text comprehension. For Key Stage 1 learners receiving intervention, careful diagnosis allows teachers to determine which reading component requires immediate attention and prevents the use of generalized activities that may not address the learner's actual difficulty.

### ***Data-Based Individualization of Reading Support***

Precision reading intervention becomes stronger when instructional decisions are based on evidence of individual learner performance. Filderman et al. (2018) found that reading interventions incorporating data-based decision making produced positive effects for struggling readers, particularly when teachers used performance information to modify instruction rather than maintaining a fixed intervention plan. Espinas and Fuchs (2022) further described data-based individualization as a systematic process in which teachers establish goals, implement an evidence-based intervention, assess learner response, diagnose persistent difficulties, and adjust

instruction accordingly. Possible adjustments may include changes in instructional content, pacing, practice opportunities, grouping, or level of support. This process is highly relevant to Key Stage 1 because learners receiving reading intervention may respond differently even when they initially demonstrate similar difficulties. Precision therefore involves not only selecting an appropriate intervention but also refining it as evidence of learner progress becomes available.

### ***Intensity and Dosage of Reading Intervention***

The amount and organization of instructional support can influence how learners respond to reading intervention. Maki and Hammerschmidt-Snidarich (2022) reported a moderate overall effect of targeted reading fluency interventions and found that intervention duration contributed to total growth, underscoring the importance of sufficient opportunities for guided practice. Intervention intensity, however, should not be interpreted simply as adding more minutes. It may also involve smaller instructional groups, increased frequency of sessions, explicit modeling, corrective feedback, repeated practice, and closer alignment between activities and the learner's identified reading need. Such features are important for Key Stage 1 learners whose difficulties may persist despite regular classroom instruction. A precision approach therefore considers how much support a learner receives and how efficiently that instructional time is used, allowing teachers to strengthen intervention without relying on a uniform dosage for every learner receiving reading assistance.

### ***Progress Monitoring and Instructional Adjustment***

Reading intervention is most useful when learner growth is measured throughout the intervention period rather than only at its beginning and end. Anderson et al. (2020) demonstrated that curriculum-based measurement can provide teachers with continuing information about reading development and can support adaptive instruction for learners with weak reading skills. Their findings showed greater growth during an additional reading intervention phase in areas such as syllable reading, word reading, and sentence-level comprehension. Gesel and Lemons (2020) also described curriculum-based measurement as a systematic approach for monitoring progress and determining when instructional adaptations are necessary. For Key Stage 1 learners, regular monitoring can reveal whether an intervention is producing the expected improvement, whether progress has slowed, or whether a different instructional focus is required. Progress data therefore serve as the link between assessment and instructional action, making reading intervention responsive to actual learner growth rather than dependent solely on teacher impression.

## **METHODS**

### **Research Design**

The research adopted a prospective micro-longitudinal intervention-response design. Instead of comparing literacy performance only before and after intervention, the design followed learner reading development across a concentrated instructional period. Baseline performance was established before intervention monitoring, followed by weekly reading probes and an endpoint assessment. Teacher intervention practices were examined alongside changes in learner decoding, word recognition, oral reading fluency, and comprehension. This arrangement made it possible to determine not only whether literacy performance improved, but also how quickly improvement occurred and whether greater instructional precision corresponded with stronger reading growth.

### **Research Locale**

The research was conducted within the public elementary education setting of Santa Maria, Isabela. The municipality provided an appropriate setting because the investigation centered on Key Stage 1 literacy intervention among learners requiring additional reading support.

### **Participants and Sampling Technique**

The participants comprised 24 Key Stage 1 teachers and 36 Grades 1 to 3 learners receiving reading intervention. The teacher participants were drawn from the documented public elementary teaching population through criterion sampling. Eligibility required direct responsibility for Key Stage 1 instruction and active involvement in providing reading remediation or intervention. The learner group consisted of 12 Grade 1, 12 Grade 2, and 12 Grade 3 learners selected through criterion-stratified sampling from those formally identified for reading support. Learners were included on the basis of documented difficulty in decoding, word recognition, fluency, comprehension, or a combination of these areas. The selected numbers were deliberately kept focused because the study required repeated literacy measurements rather than a one-time survey.

### **Research Instrument**

Two measures were used. The Precision Reading Intervention Scale consisted of 30 items covering diagnostic targeting, skill-specific instruction, instructional pacing, intervention intensity, progress monitoring, and responsive adjustment. Responses were recorded using a five-point scale. Learner literacy progress was measured through a Key Stage 1 Reading Progress Probe, composed of grade-appropriate tasks on decoding, automatic word recognition, oral reading fluency, and short-text comprehension. Oral reading fluency was expressed through correctly read words per minute, while the other components were scored according to predetermined performance criteria.

Five specialists in elementary literacy, reading instruction, educational assessment, and language education evaluated the instruments for relevance, clarity, and alignment with the intended constructs. Content validation yielded an item-level content validity index ranging from .80 to 1.00, with an average I-CVI of .94, while the scale-level content validity index was .93. The instruments were then pilot-tested with 30 participants outside Santa Maria, Isabela, who had characteristics comparable with those of the target respondents. Reliability analysis showed that the Precision Reading Intervention Scale obtained an overall Cronbach's alpha of .91, indicating excellent internal consistency. The six dimensions also produced satisfactory reliability coefficients: diagnostic targeting,  $\alpha = .88$ ; skill-specific instruction,  $\alpha = .90$ ; instructional pacing,  $\alpha = .84$ ; intervention intensity,  $\alpha = .86$ ; progress monitoring,  $\alpha = .89$ ; and responsive adjustment,  $\alpha = .87$ . Item-total correlations ranged from .46 to .78, and no item required deletion because all items contributed positively to the overall reliability of the scale. These results supported the adequacy of the instruments for the main data collection.

### **Data Gathering**

Formal permission was secured from the appropriate education authorities before data collection. After eligible participants were identified, informed consent was obtained from teachers and parents, together with assent from participating learners. The reading probe was initially administered to establish baseline literacy performance. Teachers then continued the prescribed reading interventions while documenting the targeted skill, instructional activity, intervention duration, and learner response. Short reading probes were administered weekly under consistent testing conditions. The final literacy assessment was conducted after the intervention-monitoring period. Teacher responses, intervention records, and learner reading scores were coded and checked before statistical processing.

#### **Data Analysis**

The data were analyzed through Bayesian hierarchical growth modeling, which was selected because the study involved repeated reading observations nested within individual learners and learners receiving instruction from participating teachers. The model estimated each learner's initial reading status and rate of literacy growth while simultaneously determining whether precision in reading intervention predicted differences in growth trajectories. Posterior means and 95% credible intervals were used to describe parameter estimates, while posterior probabilities determined the strength of evidence for positive intervention effects. Weakly informative priors were specified to stabilize estimation without overriding the observed data. Bayesian modeling was particularly suited

to the focused sample because it allowed direct probability statements about intervention effects while accounting for uncertainty and repeated observations (van de Schoot et al., 2021).

### Ethical Considerations

Participation remained voluntary throughout the research. Written consent, parental permission, and learner assent were obtained before data collection, and withdrawal was permitted without academic or professional consequence. Names and school identifiers were excluded from the analytical dataset, learner intervention services were not altered because of participation, and all collected records were securely maintained and reported only in aggregated form.

## RESULTS AND DISCUSSION

Table 1. *Precision Reading Intervention Practices of Key Stage 1 Teachers*

| Intervention Dimension              | Mean | SD   | Interpretation |
|-------------------------------------|------|------|----------------|
| Diagnostic targeting                | 4.22 | 0.41 | High           |
| Skill-specific instruction          | 4.31 | 0.38 | High           |
| Instructional pacing                | 3.96 | 0.44 | High           |
| Intervention intensity              | 3.72 | 0.51 | High           |
| Progress monitoring                 | 4.08 | 0.43 | High           |
| Responsive instructional adjustment | 3.68 | 0.55 | High           |
| Overall                             | 3.99 | 0.39 | High           |

Table 1 presents the level of precision reflected in the reading intervention practices of the participating Key Stage 1 teachers. Skill-specific instruction obtained the highest mean of 4.31, followed by diagnostic targeting at 4.22. These results indicated that teachers generally identified reading difficulties and matched instructional activities with specific literacy needs. However, responsive instructional adjustment recorded the lowest mean of 3.68, while intervention intensity obtained 3.72. The pattern suggested that although intervention activities were generally well targeted, teachers had greater difficulty changing instructional dosage, pacing, or strategy when learners showed limited response. This distinction is important because intensive early reading intervention has been shown to produce positive outcomes among struggling readers, but variation in learner response requires continued instructional adjustment rather than fixed implementation (Wanzek et al., 2018).

Table 2. *Reading Performance of Key Stage 1 Learners Across Three Measurement Points*

| Literacy Component          | Baseline Mean | Midpoint Mean | Endpoint Mean | Mean Gain |
|-----------------------------|---------------|---------------|---------------|-----------|
| Decoding accuracy (%)       | 61.8          | 72.9          | 81.6          | 19.8      |
| Word recognition (%)        | 58.7          | 70.4          | 79.8          | 21.1      |
| Oral reading fluency (CWPM) | 31.6          | 39.8          | 47.9          | 16.3      |
| Reading comprehension (%)   | 54.9          | 62.6          | 68.7          | 13.8      |

Table 2 shows consistent improvement from baseline to endpoint across all four literacy measures. Word recognition produced the largest gain of 21.1 percentage points, followed by decoding accuracy with a gain of 19.8 percentage points. Oral reading fluency also improved by 16.3 correctly read words per minute. Reading comprehension increased from 54.9% to 68.7%, but its improvement was smaller than the gains recorded for word-level skills. The findings indicated that precision intervention was particularly effective in strengthening foundational reading processes, while meaning construction remained comparatively difficult for some learners. This pattern is consistent with intervention evidence showing that explicit reading support often produces stronger

effects on code-based and word-level outcomes than on comprehension, which depends on several additional language and meaning processes (Hall et al., 2023).

The results also revealed an important instructional problem. Improvement in decoding and word recognition did not automatically result in equivalent comprehension development. Some learners became more accurate and fluent readers but continued to experience difficulty identifying main ideas, connecting information, and deriving meaning from short texts. Stevens et al. (2017) similarly found that fluency-oriented approaches can strengthen reading performance, although comprehension development benefits from multicomponent instruction that moves beyond accurate oral reading.

*Table 3. Mean Grade-Adjusted Literacy Growth Across the Monitoring Period*

| Measurement Point | Standardized Literacy Score |
|-------------------|-----------------------------|
| Baseline          | -0.86                       |
| Week 1            | -0.75                       |
| Week 2            | -0.64                       |
| Week 3            | -0.53                       |
| Week 4            | -0.41                       |
| Week 5            | -0.33                       |
| Week 6            | -0.26                       |
| Week 7            | -0.20                       |
| Week 8            | -0.15                       |

*Note.* A score of 0 represented the grade-level reference point. Negative values represented performance below the reference point.

Table 3 presents a steady upward movement in literacy performance throughout the intervention period. The mean standardized score increased from -0.86 at baseline to -0.41 by Week 4 and reached -0.15 by Week 8. The larger change occurred during the first half of the intervention, while growth became more gradual during the later weeks. This indicated that learners initially responded strongly when intervention activities were closely matched with their identified reading deficiencies. As basic weaknesses were reduced, further improvement required increasingly individualized instruction, especially among learners with persistent comprehension and fluency difficulties. Weekly measurement was valuable because it captured changes that would have been hidden if assessment had been limited to baseline and endpoint observations.

*Table 4. Bayesian Estimates of Literacy Growth and Precision Reading Intervention Effects*

| Model Parameter                             | Posterior Mean | 95% Credible Interval | P( $\beta > 0$ ) |
|---------------------------------------------|----------------|-----------------------|------------------|
| Baseline literacy level                     | -0.86          | [-1.03, -0.69]        | .000             |
| Baseline to midpoint growth                 | 0.45           | [0.33, 0.57]          | >.999            |
| Midpoint to endpoint growth                 | 0.27           | [0.16, 0.38]          | >.999            |
| Precision intervention effect               | 0.12           | [0.01, 0.23]          | .983             |
| Precision $\times$ baseline-midpoint growth | 0.10           | [0.03, 0.17]          | .997             |
| Precision $\times$ midpoint-endpoint growth | 0.05           | [-0.01, 0.11]         | .944             |
| Learner-level random intercept SD           | 0.38           | [0.29, 0.49]          |                  |
| Residual SD                                 | 0.21           | [0.18, 0.25]          |                  |

Table 4 provides the central statistical finding of the study. The posterior estimate for baseline-to-midpoint growth was 0.45, with a 95% credible interval from 0.33 to 0.57 and a posterior probability greater than .999 that the growth parameter was positive. Literacy development remained positive during the second half of the

intervention, although the estimated gain declined to 0.27. Thus, the learners continued progressing, but the rate of improvement slowed after the midpoint.

More importantly, intervention precision showed a positive posterior effect of 0.12, with a 98.3% probability that its association with literacy achievement was positive. The interaction between precision intervention and early literacy growth was also supported strongly,  $\beta = 0.10$ , 95% CrI [0.03, 0.17],  $P(\beta > 0) = .997$ . Learners taught by teachers who demonstrated stronger diagnostic targeting, skill matching, monitoring, and instructional adjustment therefore tended to show steeper growth during the first half of the intervention. The later interaction was smaller and its credible interval included zero, suggesting greater uncertainty regarding whether intervention precision continued to differentiate growth at the same strength toward the end of the period.

The learner-level random intercept of 0.38 further showed meaningful differences in initial reading ability that remained even after the intervention variables were considered. This finding reinforced the value of precision intervention because struggling readers cannot be assumed to begin at the same level or respond uniformly to the same instructional activity. Evidence from reading intervention research likewise indicates that learner characteristics and severity of reading difficulty can contribute to differences in response, supporting the need for targeted rather than uniform intervention delivery (Donegan & Wanzek, 2021).

Table 5. *Movement of Learners Toward the Grade-Level Literacy Reference Point*

| Literacy Status               | Baseline n (%) | Midpoint n (%) | Endpoint n (%) |
|-------------------------------|----------------|----------------|----------------|
| Reached grade-level reference | 5 (13.9%)      | 15 (41.7%)     | 24 (66.7%)     |
| Remained below reference      | 31 (86.1%)     | 21 (58.3%)     | 12 (33.3%)     |
| Total                         | 36 (100%)      | 36 (100%)      | 36 (100%)      |

Among the 12 learners who remained below the reference point at endpoint, seven showed their greatest continuing difficulty in comprehension, three remained primarily weak in oral reading fluency, and two demonstrated persistent difficulty across several reading components.

Table 5 shows that the proportion of learners reaching the grade-level literacy reference increased from only 13.9% at baseline to 66.7% at endpoint. This represented a substantial movement toward expected literacy performance. Nevertheless, one-third of the learners remained below the reference point after the intervention period. The result provides a more realistic interpretation of intervention success because improvement did not mean that every struggling reader immediately reached the desired level. The concentration of continuing difficulty in comprehension also supports evidence that meaning-based reading skills may require longer and more intensive instructional support than foundational word-level skills (Donegan & Wanzek, 2021).

Taken together, the findings indicated that precision reading intervention produced meaningful literacy progress among Key Stage 1 learners, particularly in word recognition, decoding, and oral reading fluency. The Bayesian results further showed that stronger precision in intervention delivery was associated with steeper early literacy growth. The main concern was the persistence of comprehension difficulties among a smaller group of learners and the slower rate of improvement during the latter intervention period. This suggests that precision intervention worked best as a responsive process rather than a fixed program. Once initial reading deficiencies were reduced, continued progress depended on increasingly focused instructional adjustments for learners whose reading development remained below the expected trajectory.

## CONCLUSION

The findings established that precision reading interventions contributed to meaningful literacy progress among Key Stage 1 learners, particularly in decoding, word recognition, and oral reading fluency, while comprehension remained the most persistent area of difficulty. Learners exposed to more targeted, skill-specific, and responsive intervention practices demonstrated stronger growth trajectories, although the rate of improvement became slower during the latter phase of intervention and a portion of learners remained below the expected

literacy reference point. These results confirmed that reading intervention was most effective when teachers continuously matched instruction with identified learner needs and adjusted support according to progress data. It is therefore recommended that Key Stage 1 teachers strengthen comprehension-focused activities, intensify progress monitoring, and provide more individualized support for learners who show limited response after initial gains. School leaders should also support regular intervention review, access to appropriate reading materials, and professional development on diagnostic assessment and adaptive reading instruction. Future studies may examine longer intervention periods and include additional learner-level factors that could explain differences in response to precision reading support.

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