

Determinants of Oral Reading Fluency among Learners in Kenya's Early Grades



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ABSTRACT

Kenya's primary-school reading crisis has been documented by a decade of donor- and NGO-funded early-grade reading interventions, each closed out with an end-of-project EGRA evaluation. This article synthesises the reported statistical findings of fifteen such Kenyan end-of-project evaluations (2014–2024) alongside twelve peer-reviewed studies to examine how oral reading fluency among Grade 1 and Grade 3 learners relates to gender, age, pre-school attendance, grade repetition, home and parental background, and teacher instructional practice. The synthesis finds that teacher practice coaching, structured lesson guides, print exposure, and read-aloud instruction are the characteristics most consistently and strongly associated with ORF gains across projects, and that their effects interact with, and in several cases outweigh, fixed child characteristics such as gender. Home and parental background remain comparatively under-measured in Kenyan endline evaluations relative to child- and teacher-level variables. Implications for evaluation design and policy are discussed.

Keywords: Determinants, Oral Reading, Fluency, Early Grade, Learners.



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1. INTRODUCTION

Kenya's primary education system has expanded access dramatically since the introduction of Free Primary Education in 2003, yet participation has not translated into commensurate gains in foundational literacy (Piper, Zuilkowski, & Mugenda, 2014). Citizen-led household assessments have repeatedly shown that a substantial share of children who complete several years of primary schooling cannot read a simple Grade 2-level story in English or Kiswahili (Uwezo, 2016; Usawa Agenda, 2023). Oral reading fluency (ORF) is correct words read per minute (CWPM), combined with accuracy, and has become the dominant metric for tracking this problem because it correlates strongly with reading comprehension and predicts later academic achievement (Piper & Zuilkowski, 2015; Platas, Perry, Piper, Sitabkhan, & Ketterlin-Geller, 2022).

Over the past decade, Kenya has been a proving ground for early-grade reading and numeracy interventions, most delivered as time-bound donor- or NGO-funded projects: the Primary Math and Reading Initiative (PRIMR), Tusome, the Kenya GPE Primary Education Development Project (PRIEDE), the Girls' Education Challenge (GEC) portfolio, the Health and Literacy Intervention (HALI), Literacy Boost, Bridge International Academies, the Developing Readers Study, Read-Aloud Now (RANA), and Wasichana Wetu Wafaulu (WWW), among others. Each closed with an end-of-project (endline) evaluation that re-administered an Early Grade Reading Assessment (EGRA) and, in several cases, its numeracy counterpart, EGMA, to representative samples of Grade 1–3 learners. Collectively, these fifteen endline reports constitute one of the richer, if fragmented, evidence bases in Sub-Saharan Africa on how ORF varies with who the child is (gender, age, grade-repetition history, pre-school attendance, home and parental background) and what the teacher does in the classroom.

What has been missing is a systematic bringing-together of this evidence. Individual project reports rarely reference one another's disaggregated findings, and academic syntheses tend to treat 'Kenya' as a single data point rather than as a decade-long, multi-project natural experiment. This article addresses that gap by asking: across Kenya's end-of-project EGRA evaluations conducted between 2014 and 2024, how consistently, and through which pathways, are child characteristics and teacher practice associated with oral reading fluency performance among Grade 1 and Grade 3 learners in English and, where reported, Mathematics?

Drawing on the reported statistical findings of fifteen independent end-of-project evaluations and twelve peer-reviewed studies, this article advances the following claim: oral reading fluency among Kenyan Grade 1–3 learners is systematically patterned by a cluster of child-level characteristics gender, pre-school attendance, and grade-repetition history most consistently reported but teacher instructional practice is the single characteristic most strongly and consistently associated with fluency gains across projects, at times outweighing fixed child or household attributes. Where projects deliberately altered teacher practice (coaching, structured lesson guides, print exposure, read-aloud protocols), fluency gains were larger and more consistently statistically significant than where projects manipulated only materials or access without changing instruction.

2. LITERATURE REVIEW

Measurement precedes explanation. Piper and Zuilkowski (2015) compared oral and silent EGRA administration in Kenya and found no significant difference in scores between modes but recommended oral assessment because it alone yields correct-words-per-minute data and permits diagnostic error analysis, the methodological basis on which every report reviewed in this article relies. Piper, Schroeder, and Trudell (2016) extended this by assessing 2,000 Kenyan children in up to three languages, showing that English decoding was often easier than mother-tongue decoding, yet English comprehension lagged behind Kiswahili and mother-tongue comprehension a language-of-instruction effect that complicates any simple reading of 'gender' or 'background' effects unless

language is held constant, a caution this synthesis observes by reporting English and Kiswahili results separately where projects distinguish them.

On intervention effects, Piper, Zuilkowski, and Mugenda (2014) established in a randomised trial that PRIMR's combination of teacher coaching, instructional support, and pupil-book ratios produced statistically significant, if modest, first-year ORF gains, with larger effects in non-formal schools an early signal, corroborated repeatedly in the findings below, that teacher-facing inputs move fluency more reliably than pupil-facing inputs alone. Wawire (2020) traced this further upstream, arguing that Kenyan pre-service teacher-preparation curricula under-equip new teachers with the pedagogical content knowledge specific to early reading instruction, which helps explain why in-service coaching (rather than credentialing) recurs as the active ingredient across the evaluations synthesised here. At the county level, Cherobon and Chepsiror (2022) found that Tusome's reach in Nandi County correlated with improved textbook access and higher Grade 3 reading ability scores, consistent with the national Tusome endline patterns reported below.

Child-characteristic literature outside Kenya offers comparators. Kim (2022), studying Ethiopia's pre-primary expansion, found that preschool participation's association with literacy became positive and significant only after national-scale expansion, with little heterogeneity in gains by gender, urbanity, or parental literacy, suggesting that pre-school effects on later ORF may depend on programme scale and quality more than on fixed child attributes. Ahmed, Qin, and Lietz (2025), examining six Southeast Asian systems, similarly found parental support and preschool experience jointly predictive of reading literacy, reinforcing that home and school inputs interact rather than operate independently. Platas et al. (2022), using Kenyan longitudinal data, showed that school-entry literacy and mathematics skills predicted end-of-Grade-2 achievement even after controlling for socio-economic status, rural/urban residence, and parental literacy, evidence that child-level starting skills carry an independent signal beyond household background alone.

On gender specifically, Fonseca et al. (2023), pooling nineteen USAID-funded EGRA studies across fourteen countries including Kenya, found a consistent early female advantage in oral reading fluency that narrows, but does not reverse, as boys' scores catch up through the fluency distribution a pattern this synthesis observes directly in the RANA and Developing Readers Study findings. Pitchford, Chigeda, and Hubber (2019), working in Malawi with reference to the wider East African evidence, found that interactive technology reduced gender gaps specifically in early mathematics, indicating that the direction and magnitude of gender effects are outcome- and modality-specific rather than uniform across literacy and numeracy.

Finally, on home background, Brew, Atiso, and Osei (2021) found parental education positively associated with children's academic achievement across Sub-Saharan Africa, while Madegwa, Piliyesi, and Katundano (2019), studying Kakamega County, Kenya, found parental socio-economic background significantly associated with academic performance. Both studies, however, concern general academic performance rather than early-grade ORF specifically, a gap that foreshadows one of this article's central findings: Kenyan early-grade endline evaluations measure home and parental background far less consistently than they measure gender or teacher practice.

2. METHODS

3.1 Design

This article uses a narrative evidence-synthesis design. It draws exclusively on the statistical findings already computed and reported within each source evaluation; it does not re-analyse raw microdata, because unit-record datasets for most of the fifteen evaluations are not in the public domain. Where an evaluation reports a significance test, effect size, or percentage-point comparison, that figure is reproduced and attributed; where an evaluation reports only descriptive percentages, this is stated as such rather than treated as inferential evidence. This design choice is a deliberate limitation,

discussed further in Section 6, and distinguishes the article from a primary quantitative study using chi-square or multinomial logistic regression on original survey data.

3.2 Selection Criteria

Reports were eligible for the findings if they met all of the following: (a) implemented in Kenya; (b) an end-of-project or endline evaluation of an early-grade literacy and/or numeracy intervention, rather than a stand-alone baseline or midline report considered in isolation; (c) used an EGRA or EGRA-type oral reading (or, where relevant, EGMA numeracy) assessment among Grade 1–3 learners, or reported findings disaggregated for these grades; (d) publicly documented and dated between 2014 and 2024; and (e) reported at least one child-characteristic or teacher-practice disaggregation of outcomes. Two entries required a documented exception to this last criterion: no independently published, standalone endline evaluation report could be located for a 'World Vision CESSP' project or for Bridge International Academies as an externally verified end-of-project evaluation. For these two rows, the closest available substitutes are used: the World Vision Kenya/Save the Children Literacy Boost baseline-endline design in Kitui and Makueni counties, and Bridge International Academies' own commissioned 2013–14 impact-evaluation report and both are flagged with an asterisk (*) in Tables 4.1 and 4.3 and interpreted with corresponding caution.

Table 3.1:

Data Source

#	Report / Project	Year	Implementing / Evaluating Body	Kenya Location / Scope
1	Are Our Children Learning? State of Education in Kenya	2015	Uwezo Kenya / Twaweza East Africa	National household survey
2	Are Our Children Learning? Uwezo Kenya Sixth Learning Assessment Report	2016	Uwezo Kenya / Twaweza East Africa	National household survey
3	Uwezo National Learning Assessment (2009–2021 trend release)	2021	Uwezo Kenya / Twaweza East Africa	National household survey
4	Foundational Literacy and Numeracy Assessment (FLANA) Report	2023	Usawa Agenda	National household survey
5	Improving Reading Outcomes in Kenya: First-Year Effects of the PRIMR Initiative (endline)	2014	RTI International / USAID–DFID	Central & Nyanza Provinces, 400+ schools
6	Tusome External Evaluation – Midline Report	2017	RTI International / USAID–DFID	National (Tusome programme schools)
7	Tusome External Evaluation – Endline Report	2020	NORC at the University of Chicago / USAID	National, 204 schools
8	Kenya GPE Primary Education Development Project (PRIEDE) – Implementation Status & Results (EGM endline)	2019	World Bank / Ministry of Education	National, Grade 1–3 mathematics
9	Girls' Education Challenge – Step	2017	PwC (Evaluation)	Multi-country incl.

#	Report / Project	Year	Implementing / Evaluating Body	Kenya Location / Scope
	Change Window Endline Evaluation		Manager) / DFID	Kenya projects
10	Health and Literacy Intervention (HALI) Project – cluster-randomised endline	2016	Research consortium (Jukes et al.) / Wellcome Trust	Kwale & Msambweni, coastal Kenya
11	Literacy Boost Kenya – Baseline & Endline Reports*	2013–14	World Vision Kenya / Save the Children	Kalawa & Mutomo ADPs, Makueni/Kitui
12	The Bridge Effect: 2013–14 Impact Evaluation Results (EGRA/EGMA)*	2016	Bridge International Academies (commissioned)	13 counties, Bridge academies vs. neighbouring schools
13	Developing Readers Study – Endline Report	2024	African Population & Health Research Center (APHRC)	15 schools, Kiambu County
14	Read-Aloud Now (RANA) Impact Evaluation	2018	Education Policy & Data Center (EPDC) / USAID	Programme schools, Kenya
15	Wasichana Wetu Wafaulu (WWW) GEC-Transition Endline Evaluation	2023	Education Development Trust / DFID-FCDO	8 ASAL & urban-slum counties

Note: * indicates a substituted or partially independent source (see Section 3.2). Reports are grouped by type in the Findings section: citizen-led national assessments (#1–4), government/donor-scale programme evaluations (#5–10), and NGO/private-sector or targeted-project evaluations (#11–15).

3.3 Analytic Approach

For each report, this synthesis records: (i) which of the six target characteristics (gender, age/grade, pre-school attendance, grade repetition, home/parental background, teacher practice) the report disaggregates outcomes by; (ii) the numerical finding as reported, including any significance test, p-value, effect size in standard deviations, or CWPM difference the original evaluators computed; and (iii) the assessment domain (English, Kiswahili, or Mathematics/EGMA) to which the finding applies. Findings are grouped into three tables of five reports each (Section 4) to keep the source of every reported statistic traceable to a specific project and citation.

3. RESULTS

Across the fifteen reports, gender and teacher practice are the two characteristics most frequently and most precisely disaggregated; pre-school attendance and grade repetition appear in fewer than half of the reports as an explicit ORF disaggregation (more often as a general programme-monitoring indicator); and home/parental background is disaggregated with numerical precision in only one of the fifteen reports at endline (Wasichana Wetu Wafaulu's disability sub-assessment being a partial exception), despite being a stated design objective in at least two others (Literacy Boost Kenya).

Table 4.1:*Citizen-Led National Assessments and PRIMR (Reports #1–5)*

Report (Data Source #)	Characteristic(s) Measured	Reported Numerical Finding
Uwezo 2015 (#1)	Grade / national trend	Baseline reference: only 3 in 10 ($\approx 33\%$) of Class 3 learners nationally could read a Class 2-level story (persisting from the 2011 baseline round).
Uwezo 2016 (#2)	County (Kiambu) benchmark	61% of Class 3 learners in Kiambu County read at Class 2 level in the 2016 round, used as the pre-intervention benchmark in later county studies.
Uwezo 2021 (#3)	10-year national trend, all characteristics pooled	No statistically discernible national-level change in literacy outcomes 2009–2021, despite 25+ literacy interventions operating concurrently indicating that programme-level gains (rows below) have not aggregated to population-level change.
Usawa Agenda FLANA 2023 (#4)	National trend, gender/age disaggregated	Confirms continuation of stagnant national trend; class 3–7 comprehension of a Grade-2 story fell from 39% (2014) to 33% (2018) before FLANA re-baselining, underscoring persistence of the gap this synthesis examines.
PRIMR Endline 2014 (#5)	Teacher practice (coaching + instructional support), grade, language	Treatment schools outperformed control schools by 2.7 correct words per minute (CWPM) in English ($p = .04$) and 1.7 CWPM in Kiswahili ($p = .04$); comprehension gains of 2.7 percentage points (English, $p = .08$) and 5.4 points (Kiswahili, $p = .07$); gains largest in Grade 1 non-formal schools.

Table 4.1 illustrates the central tension this article investigates: national, population-level indicators (Uwezo 2015, 2016, 2021; Usawa Agenda 2023) show near-flat aggregate ORF outcomes across a decade despite dozens of concurrent interventions, while a tightly implemented, teacher-facing randomised intervention (PRIMR) produced statistically significant, if modest, gains within a single school year. This is consistent with the interpretation that project-level teacher-practice effects are real but have not aggregated into system-level change, rather than with the interpretation that teacher-practice effects are illusory.

Table 4.2:*Government- and Donor-Scale Programme Evaluations (Reports #6–10)*

Report (Data Source #)	Characteristic(s) Measured	Reported Numerical Finding
Tusome Midline 2017 (#6)	Lesson coverage / teacher practice, grade	Average number of Tusome lessons completed by teachers rose substantially from the 2016 to 2017 tracking rounds, used as the leading indicator of instructional-practice fidelity linked to subsequent ORF gains.
Tusome Endline 2020 (#7)	Grade, language, fluency-benchmark category	At endline, 13.5% of Grade 1 pupils were classified as fluent English readers and 14% as emergent readers against the Ministry of Education CWPM benchmarks (35 CWPM Grade 1 / 65 CWPM Grade 2); cumulative programme evaluation additionally reported the share of Grade 2 learners reading at grade level rising from 34% to 65% (English) and 37% to 66% (Kiswahili) over the life of the programme.
PRIEDE ISR 2019 (#8)	Teacher training (practice), subject (Mathematics)	109,259 teachers trained in Early Grade Mathematics methodology (against a 120,000 target); the EGMA midline nonetheless recorded a 2.5-percentage-point decline in the 'subtraction' operation among Grade 2 learners, prompting a mid-course revision to the training model illustrating that teacher training volume alone did not guarantee fluency/accuracy gains.
GEC Step Change Window Endline 2017 (#9)	Gender (girls only), fluency (EGRA wpm) and numeracy (EGMA)	Girls' oral reading fluency improved by an average of 16 words per minute from baseline to endline across Step Change Window projects; overall target was a 0.5 standard-deviation combined literacy/numeracy gain, achieved unevenly across projects and sub-groups.
HALI Project Endline (#10)	Teacher practice (print exposure, time-on-reading), grade	Experimentally induced increases in classroom print exposure instructional time spent reading and print displayed in the classroom were associated with statistically significant improvements in both reading fluency and reading comprehension among Class 1 learners in the intervention arm.

Table 4.2 shows a similar pattern at larger scale. Tusome's national rollout more than doubled the share of Grade 2 learners reading at grade level over the life of the programme, tracking closely with rising teacher lesson-completion rates (#6–7) and an association between reported teacher-practice fidelity and ORF outcomes, though the publicly available reports do not isolate the two through formal regression. By contrast, PRIEDE's mathematics component shows that scaling teacher training in volume (#8) did not, by itself, prevent a measured decline in a specific numeracy subtask, reinforcing that the quality and content of teacher practice, not training exposure alone, is the operative variable. HALI (#10) provides the most direct experimental evidence in this group: exogenously increased classroom print exposure, a teacher-practice variable, produced statistically significant gains in fluency and comprehension.

Table 4.3:*NGO, Private-Sector, and Targeted-Project Evaluations (Reports #11–15)*

Report (Data Source #)	Characteristic(s) Measured	Reported Numerical Finding
Literacy Boost Kenya, Kitui/Makueni (#11)*	Home/parental background, gender (baseline design)	Baseline round (944 Grade 2 learners, 51 schools) was explicitly designed to analyse how emergent reading skills vary by student socio-economic and home-literacy background; publicly available materials report the baseline design and sample but do not disclose a matched endline breakdown by characteristic flagged as a data gap rather than a null result.
Bridge International Academies, 'The Bridge Effect' 2013–14 (#12)*	School type (proxy for combined child/home/teacher-practice bundle)	Bridge pupils gained an additional 0.31 standard deviations on EGRA reading/listening-comprehension subtasks relative to matched peers in 38 neighbouring public schools (≈ 64 additional days of learning), and 0.09 SD on EGMA numeracy (≈ 26 days) a programme-commissioned, quasi-experimental estimate, not an independently verified endline.
Developing Readers Study, Kiambu (#13)	Gender, grade (2–3), teacher-practice fidelity	Among identified non-readers, the share unable to read a single correct word per minute fell from 43.3% at baseline to 18.9% at endline over a 13-week structured intervention; girls consistently outperformed boys on syllable- and passage-reading subtasks; 92% of teachers were observed following structured lesson guides with fidelity at endline.
RANA Impact Evaluation (#14)	Gender, teacher practice (read-aloud instruction)	Read-aloud instruction narrowed the baseline gender gap in oral reading fluency from 3.04 CWPM in favour of boys to approximately 1 CWPM in favour of girls; the estimated effect for boys was a modest, statistically non-significant 1.41 CWPM gain, while girls' gains were significant indicating the same teacher practice interacted differently by gender.
WWW GEC-T Endline 2023 (#15)	Gender (girls only), teacher training, disability status	Reports project-wide literacy and numeracy improvement for participating girls attributed to teacher training in foundational-subject pedagogy across 493 primary schools; a companion disability-focused sub-assessment found a strong positive association between basic literacy and numeracy scores among girls with physical, visual, and hearing impairments, with slower literacy-skill acquisition rates for this subgroup relative to non-disabled peers.

Table 4.3 contains the two most granular child-characteristic findings in the entire dataset. The Developing Readers Study (#13) and RANA (#14) both report gender-disaggregated ORF gains under a defined teacher-practice change (structured remedial lesson guides; read-aloud instruction, respectively), and both show that girls benefited more than boys from the same practice change, evidence that teacher practice and gender interact rather than operate as independent, additive

predictors. The Bridge International Academies figures (#12), while informative, come from a programme-commissioned evaluation that bundles school type, teacher practice, and household selection effects together and should not be read as isolating any single characteristic. The Literacy Boost Kenya entry (#11) illustrates a recurring limitation identified in Section 3.2: a report explicitly designed to examine home-background effects on reading, for which no matching endline disaggregation by that characteristic could be in the public domain.

4. DISCUSSION

The findings support three conclusions that connect back to the literature reviewed. First, teacher instructional practice variously operationalised as coaching and instructional support (PRIMR), lesson-guide fidelity (Developing Readers Study, Tusome), print exposure (HALI), or read-aloud protocol (RANA) is the characteristic most consistently associated with statistically significant ORF gains across the fifteen reports, echoing Piper, Zuilkowski, and Mugenda (2014) and Wawire's (2020) argument that pedagogical content knowledge, not access or materials alone, is the binding constraint on Kenyan early reading outcomes.

Second, gender is the child characteristic most frequently and precisely reported, and the direction of the effect is broadly consistent with Fonseca et al.'s (2023) multi-country finding of an early female fluency advantage: girls outperformed boys in the Developing Readers Study and RANA and, by design, benefited more from GEC-funded interventions. However, this synthesis also shows that gender effects are not fixed RANA's finding that the same read-aloud practice narrowed, rather than reversed, an initial boys' advantage in one subtask, and Kim's (2022) finding of limited gender heterogeneity in preschool effects, both caution against treating gender as a uniformly-sized effect independent of the specific instructional practice or outcome measured.

Third, and most consequential for future evaluation design, pre-school attendance, grade repetition, and home/parental background are the least consistently measured characteristics in Kenya's endline evaluation record, despite Platas et al. (2022) and Brew, Atiso, and Osei (2021) showing these variables carry independent predictive weight in Kenyan and regional data respectively. Where reported at all, these characteristics tend to appear in baseline design documents (Literacy Boost Kenya) or programme-monitoring statistics (PRIEDE teacher counts) rather than as endline ORF disaggregations with significance tests. This is a structural gap in the evidence base rather than a substantive null finding, and it limits how confidently this synthesis, or any future one relying on the same public reports, can adjudicate between child-characteristic and teacher-practice explanations using existing secondary data alone.

5. CONCLUSION

The evidence reviewed here supports the claim in its core structure but with an important qualification. Teacher instructional practice is, across all three groupings of reports (national assessments and PRIMR; government/donor-scale programmes; NGO and targeted projects), the characteristic most consistently and most strongly associated with statistically significant oral reading fluency gains among Kenyan Grade 1–3 learners more consistently than any single fixed child characteristic. Gender is the child characteristic most reliably measured and shows a real, if practice-dependent, pattern favouring girls in several projects. Pre-school attendance and grade repetition appear as programme-design considerations more often than as measured ORF predictors at endline, and home/parental background, despite strong justification in the wider literature (Platas et al., 2022; Brew, Atiso, & Osei, 2021) for its inclusion, is the least consistently reported characteristic in Kenya's endline evaluation record.

The qualification, then, is not that child characteristics do not matter, but that Kenya's existing end-of-project evaluation infrastructure is not yet designed to measure most of them with the same rigour it applies to teacher-practice indicators and, to a lesser extent, gender. For the claim to be tested more

definitively, future endline evaluations and any subsequent doctoral or academic analysis drawing on primary survey data, including chi-square tests of association and multinomial logistic regression models predicting fluency-performance categories, should standardise the collection and disaggregated reporting of pre-school attendance, grade-repetition history, and parental education and occupation alongside the gender and teacher-practice indicators already routinely collected. Until then, the most defensible conclusion from the existing Kenyan evidence base is that improving and standardising teacher instructional practice remains the most consistently evidenced lever for raising oral reading fluency in Kenya's early grades, while the role of specific child and household characteristics, though real, is less uniformly documented and therefore less precisely quantifiable from the published record alone.

These findings should be read against clear limitations. The fifteen reports use different assessment languages, grade-level samples, benchmark definitions, and statistical methods (t-tests, ANCOVA, propensity-score-matched multinomial logistic regression, and simple percentage-point comparison all appear across the set), which precludes pooling them into a single meta-analytic effect size. Two of the fifteen sources (#11, #12) are acknowledged substitutions or program-commissioned evaluations rather than fully independent endline reports, and are interpreted accordingly. Finally, because this is a synthesis of already-published statistics rather than a reanalysis of microdata, it cannot itself run the chi-square or multinomial logistic regression tests needed to directly test interaction effects between, say, gender and teacher practice; it can only report where the original evaluators did so.

DECLARATION

Conflict of interest

The authors declare no conflict of interest of any form regarding this work, and is, thus, their (own) original work done independently.

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