

iREAD 2 Midterm Study Results

All Children Reading in Ghana



Students participating in the iREAD 2 midterm assessment, Asuboi Primary School in Ghana (July 2013).

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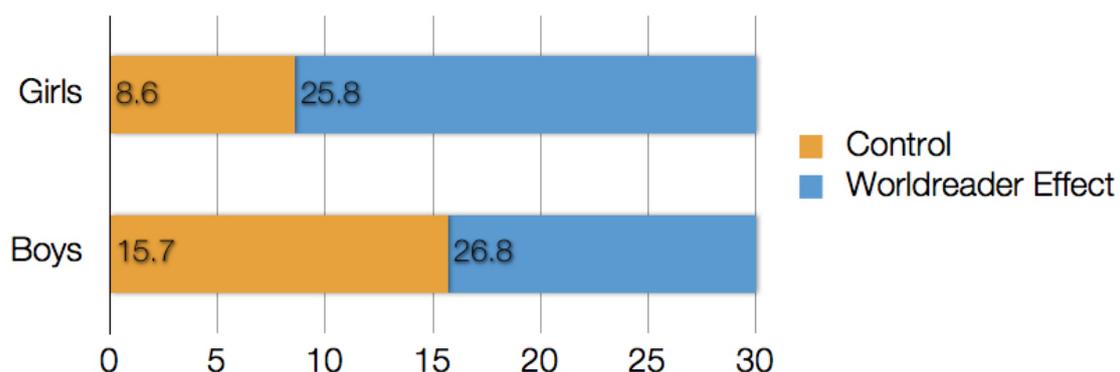
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Executive Summary

Worldreader's iREAD 2 project, funded by an All Children Reading grant from USAID, World Vision and AusAid, aims to improve early grade reading skills for students in selected P1 - P3 classrooms in Ghana. The project's midterm evaluation, carried out in July 2013, uncovered preliminary progress towards meeting those goals. After 5 months of program implementation a significant positive treatment effect on students was found on seven of nine sub-tests. Additional findings include:

Significant improvements in mother tongue oral reading fluency and listening comprehension: After just five months, students with access to Worldreader programs learned to read, on average, 5.3 words per minute faster in Twi than students in the control schools. In addition, students in Worldreader's programs improved 30% faster on listening comprehension than the control group, meaning they are not only learning to read faster, but also to integrate and understand material they hear. These gains, however, have yet to translate into significant improvements in reading comprehension, due to the fact that students are still reading at a relatively slow rate.

Narrowing of the gender gap: Girls and boys in Worldreader's programs improved the same amount in terms of oral reading fluency in Twi, whereas girls in control schools improved only half as much as boys (see figure below).



Important gains in foundational English reading skills: Worldreader students improved over 50% more on both letter sound knowledge and invented word decoding in English than students in the control schools.

Each student in the iREAD 2 program receives an e-reader featuring roughly 140 titles (15% of which are textbooks, and 85% of which are age- and grade-appropriate storybooks), in addition to teacher capacity building and extracurricular (“Out of Classroom Experience” (OCE)) activities focused on reading. These successes are driven by the integrated approach of the program. Based on midterm and ongoing feedback, the project team has modified teacher training materials, provided additional teacher resources, and updated devices with more books. The final assessment will be conducted at the conclusion of the 2013-2014 school year (July 2014).

Background

Building on the demonstrated successes of the iREAD Ghana Study 2011-2012 (iREAD 1), Worldreader began the iREAD Ghana Study 2012-2014 (iREAD 2) during the 2012-2013 school year. The program grew out of an identified need to focus on early grade primary school students, due to the critical nature of this time for developing students' foundational reading skills. This program is funded by an All Children Reading grant from USAID, World Vision and AusAid.

iREAD 2 aims to improve literacy skills among Ghanaian students in grades P1- P3 by providing convenient, immediate access to a wide range of culturally relevant teaching and learning materials through e-reader technology. iREAD 2 has deployed low-cost, connected e-readers to 574 students in four under-resourced public schools in Ghana's Ayensuano and Suhum Districts. Each student in the program receives an e-reader featuring roughly 140 titles (15% of which are textbooks, and 85% of which are age- and grade-appropriate storybooks). Other features of the program include teacher capacity building on phonics-based literacy and activity-based learning (in partnership with the Olinga Foundation for Human Development), and extracurricular ("Out of Classroom Experience," or OCE) activities focused on reading. In addition, Worldreader has established School Management Committees (SMCs) comprised of parents, teachers, school representatives, and local dignitaries in each community to oversee the implementation of the projects.

To assess the impact of iREAD 2 on the four selected schools, the study is also following four control schools in the same districts. These schools have not received e-readers, teacher training or additional OCE resources.

Methodology

Following up on the baseline assessment conducted in January 2013, the Worldreader team carried out a midterm assessment for iREAD 2 in July 2013¹. The midterm was conducted to measure progress over the first six months of program implementation. A final assessment will be carried out at the close of the program, in July 2014.

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¹ The baseline assessment report is available at www.worldreader.org/learnings/.

The midterm evaluation utilized the Early Grade Reading Assessment (EGRA) method on a sample of 249 students from the eight primary schools selected for the study (four control and four treatment schools).² Students were randomly selected within each grade, and assessments were carried out in both Akuapem-Twi and English for all students w. The sample had a margin of error of +/- 5.62 at a confidence level of 95%. Figure 1 demonstrates the grade and gender breakdown of the student sample.

Figure 1: Student Sample, by Treatment-Control pair, Grade and Gender

	Pair One	Pair Two	Pair Three	Pair Four	Total
Treatment	Amanase Presby Primary B	Marfokrom Anglican D/A	Asuboi Methodist Primary	Suhum D/A Stream "C"	
P1	10	10	10	10	40
P2	11	9	11	10	41
P3	10	10	10	10	40
Girls	18	19	13	11	61
Boys	13	10	18	19	60
TOTAL	31	29	31	30	121
Control	Okorase Presby Primary M/E	Otoase D/A Primary	Okroase MA (DA) Exp Primary	Suhum Methodist Primary A	
P1	10	10	10	10	40
P2	10	10	9	10	39
P3	10	9	10	10	39
Girls	15	18	15	17	65
Boys	15	11	14	13	53
TOTAL	30	29	29	30	118

² For more details on EGRA, see www.eddataglobal.org.

To minimize the possibilities of student memorization of sub-test components, the project team randomized and re-ordered letters and words from the letter sound knowledge and invented/familiar word decoding sections of the baseline assessment, and selected new passages that were of comparable difficulty for the oral reading fluency, and reading and listening comprehension sub-tests.

While the baseline assessment was conducted using traditional paper tests, Worldreader utilized Tangerine, a mobile EGRA administration tool developed by RTI International, for the midterm. Tangerine is a web-based application used to design electronic versions of EGRA and later collect data on touch screen tablets without an Internet connection. Tangerine saves all data on the tablets until they are in range of a wifi network, when data can be uploaded to Tangerine's cloud, and later downloaded in an Excel file. The advantages of using this tool for data collection included:

- Significant reduction in time required for data input, cleaning and processing (a reduction from approximately three months to three weeks).
- Less room for data input error.
- Elimination of ambiguity due to handwriting discrepancies.

In addition, the team collected information through student focus groups and teacher interviews. The student focus groups were used to qualitatively assess students' attitudes towards reading and changes in their reading habits, and were held with 9 pupils at each school. Teacher interviews were conducted with all teachers in P1-P3 classrooms, at treatment schools only.³

Limitations and Concerns

The baseline assessment revealed discrepancies in the pairing of treatment and control schools, with students at treatment schools scoring higher than those at control schools in nearly every EGRA sub-test. The Worldreader team attributes this to the pairing criteria used to determine groups.

³ It is important to note one other change in reporting between the baseline assessment to the midterm. In the case of the later, all scores, except where noted, have been scaled to 100 for the sake of comparison (including average scores from the baseline). For this reason the baseline report and the midterm report may present different baseline numbers, though they represent the same relative scores. In addition, reading comprehension and oral reading fluency scores were combined on English sub-tests for more ease in reporting.

To address these issues, this report primarily uses the difference-in-differences method to compare point improvements between the baseline and midterm periods, rather than absolute scores or percentage changes. Improvements will be reported in the main body of the report, however absolute scores can be found in the report's [appendices](#).

It should also be noted that the change in data collection from paper to the electronic method may have some influences on the actual data collected. For example, whereas enumerators might have been more likely to discontinue exams for students performing poorly during the baseline, Tangerine required enumerators to at least start each section of the assessment, making discontinuation more difficult. This may have some effect on the improvements we see for reading comprehension and listening comprehension, which take place at the end of each assessment. Some gains on these sections might be attributed to the reduction of erroneous discontinuations from baseline to midterm. However, at this point, it is difficult, if not impossible to uncover false discontinuations from the baseline assessment. Moreover, the heightened efficiency resulting from the shift in data collection method should equally influence treatment and control groups, since Tangerine was used for all students sampled.

Finally, the project team found reporting and note taking for focus groups to be lacking in detail, which made deriving overall trends from the qualitative information collected difficult. This lack of detail is likely due to the limited amount of time allocated towards focus groups at the enumerator training, in addition to the fact that all enumerators were provided with the same focus group training, when in reality only a few actually administered the groups. In the future, Worldreader plans to provide more intensive training to focus group facilitators, in order to better address these issues.

|| Findings

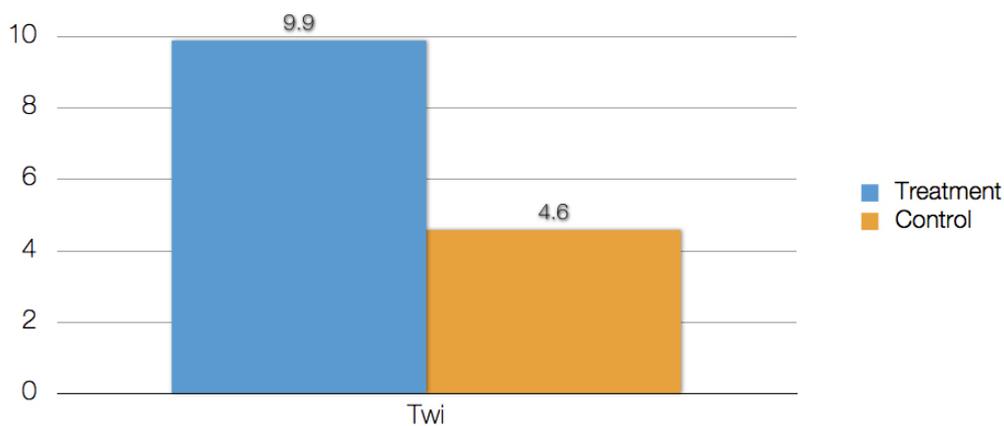
Analysis of the midterm data reveals three preliminary positive outcomes from the iREAD 2 project. These include: 1) significant gains in higher order reading skills in Twi, 2) improvement in lower order reading skills in English, and, 3) the narrowing of an existing gender gap. The following sections outline these results and other important findings.

Twi

Overall, the data reveals significant gains in higher order reading skills in Akuapem-Twi, which is the mother tongue of the majority of students in both treatment and control schools, and the primary medium of instruction in these schools until grade 4. Correct Words per Minute (CWPM) serves as a good measure of overall progress, and as Figure 2 shows, students with access to Worldreader programs learned to read 5.3 words per minute faster on average, compared to students in the control group.

These gains in Twi are not surprising, considering iREAD 2's focus on teacher training on Twi phonics, the fact that students don't fully transition to English until grade 4, and the relevant local language reading materials provided on the e-readers.

Figure 2: Improvements in Average Words Correctly Read Per Minute, Twi

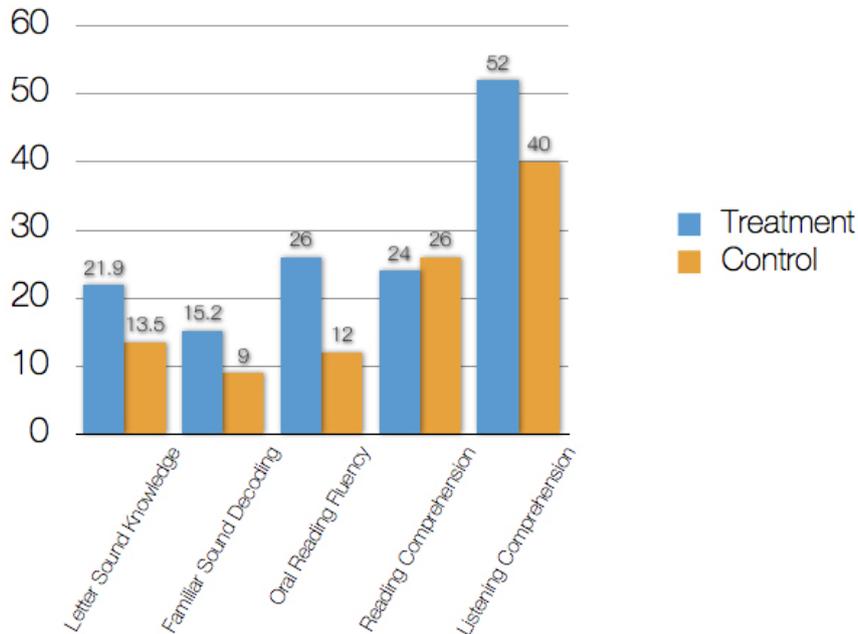


* "Improvements" measured as average additional words correctly read per minute.

** Words per minute is calculated using average oral reading fluency scores, not scaled to 100.

Broadening our analysis to other EGRA sub-tests, we see that improvements varied, however in four out of five sub-tests, students at treatment schools improved more than students at control schools (see Figure 3). The exception is reading comprehension in Twi, where the control group outperformed the treatment group slightly (2 points).

Figure 3: Baseline to Midterm Improvements in Average Sub-test Scores, Twi



*All gains in Figures 2 and 3 are measured as additional points scored (out of 100)

Despite gains in reading fluency, the midterm assessment did not register significant improvements in reading comprehension within the treatment group. While the data shows that students at treatment schools have vastly improved on this sub-test, they are still reading fewer correct words per minute (CWPM) than is necessary to comprehend what they are reading.

According to the Global Partnership for Education, “to understand a simple passage given the capacity of short-term memory, average students should read a minimum of 45-60 words per minute.”⁴ At the time of the midterm assessment, students were, on average, reading at a rate of 26 CWPM.⁵ This is considerably faster than the control group (11.7), and represents a significant gain from 16.3 CWPM in the baseline. However it is still below generally accepted standards of fluency.

⁴ [Global Partnership for Education \(2011\), Working Paper on Reading Fluency](#).

⁵ CWPM is calculated by converting raw Oral Reading Fluency scores to average words read per minute. CWPM numbers differ from scores and improvements reported as “oral reading fluency” numbers in other tables and charts, as these are scaled to 100 for the sake of comparison to other sub-tests. WCPM numbers are not scaled to 100.

The data contained in this report is consistent with these findings. The average reading comprehension score for treatment school students who read at a rate of 40 or more CWPM was 98%, whereas the average reading comprehension score for students who read at a rate of 39 or fewer CWPM was just 33%. These trends hold true for students at control schools as well, however far fewer control school students could read at a rate above 40 CWPM (only 17 students versus 47 at treatment schools). This demonstrates that more students in Worldreader’s programs are crossing the fluency threshold necessary for comprehension, however it also shows that the program must continue focusing on improving students’ oral reading fluency in Twi, in order to see more gains in reading comprehension.

Listening comprehension is another sub-test where significant gains are observable. The Worldreader team partially attributes these gains (at both treatment and control schools) to more enumerator training on assessment discontinuation and electronic data collection, however these benefits should affect both control and treatment schools equally.⁶ As such, it is interesting to note that treatment students improved, on average, 30% more than control students in this area. This implies that students are learning to better integrate and absorb what they are hearing. The Worldreader team attributes these gains to two factors in particular: listening comprehension activities within the OCE curriculum, and activity-based teacher training, which includes guidance on reading to students.

In terms of average improvements disaggregated by grade, Figure 4 demonstrates that P2 and P3 students drove the higher average improvements we observe in the treatment group overall. The largest per-grade improvements in the treatment schools were seen in P3 students for listening comprehension (a 47.6 point improvement), reading comprehension (44 points) and oral reading fluency (52.2 points).

⁶ A number of assessments were discontinued before the listening comprehension section was administered during the baseline, due to students’ inability to complete previous sections, which actually have little to no bearing on students’ ability to complete the listening comprehension section.

Figure 4: Improvements in Baseline to Midterm Scores, Twi, Disaggregated by Grade

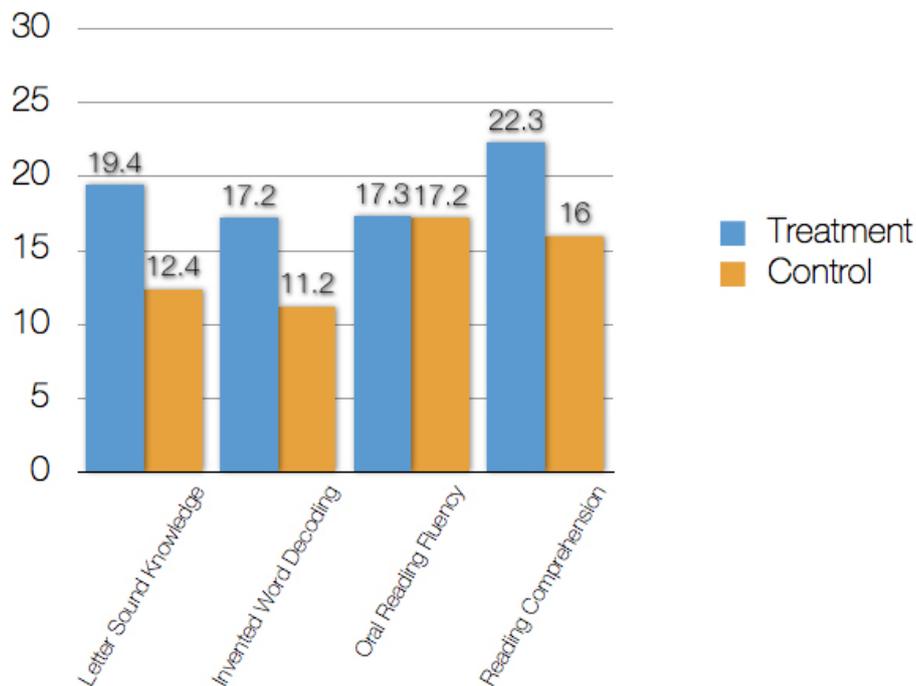
Twi	P1		P2		P3		Overall	
	T	C	T	C	T	C	T	C
Letter Sound Knowledge	19.1	12.1	26.8	15.7	20.3	15.0	21.9	13.5
Familiar Word Decoding	9.4	5.8	21.6	10.2	15.6	14.2	15.2	9.0
Oral Reading Fluency	18.7	2.0	29.2	16.3	52.2	27.5	26.4	12.1
Reading Comprehension	6.0	20.0	20.0	32.0	44.0	30.0	24.0	26.0
Listening Comprehension	45.5	54.0	58.5	75.0	47.6	15.0	52.0	40.0

These numbers generally follow an anticipated pattern: P3 students drive improvements in the higher order reading skill sub-tests, while P2 students are driving improvements among lower order reading skills. P1 students also made notable improvements, however progress among this grade varied and followed a less linear pattern. Considering that P1 students are generally just getting used to being in school, this is not surprising. The Worldreader team looks forward to tracking the progress of these students as they move to P2 in the 2013-2014 school year.

ENGLISH

As Figure 5 demonstrates, the treatment group outperformed the control group by six to seven points on three of four subtests. On more basic English reading skills (letter sound knowledge and invented word decoding), Worldreader students improved over 50% more than students at control schools. Put another way, this data shows that, in terms of basic English skill acquisition, 6 months in Worldreader's programs is equivalent to 9 months in a school without Worldreader's programs.

Figure 5: Baseline to Midterm Improvements in Average Sub-test Scores, English



As Figure 6 demonstrates, treatment students improved at a faster rate than students at control schools in every grade and every sub-test, with the exception of P-3 students on Oral Reading Fluency. In terms of improvements on more basic English skills, we see that P2 are driving overall gains in these sub-tests, with students improving 23.1 and 25.8 points, respectively.

Figure 6: Improvements in Baseline to Midterm Scores, English, Disaggregated by Grade

English	P1		P2		P3		Overall	
	T	C	T	C	T	C	T	C
Letter Sound Knowledge	18.1	13.6	23.1	12.0	17.9	14.0	19.4	12.4
Invented Word Decoding	12.0	10.4	25.8	12.0	14.4	7.1	17.2	11.2
Oral Reading Fluency	18.9	15.6	20.2	19.3	14.6	20.1	17.3	17.2
Reading Comprehension	8.0	0.65	25.0	3.0	26.0	23.0	22.3	16.0

While the information collected does not paint a perfectly linear picture in terms of English language learning outcomes, it does help us draw some important conclusions about the teaching methods used. In English, the treatment effect was generally greater with lower order reading skills. Worldreader staff has observed a number of schools where students can read fluently in Twi but are still uncomfortable when asked to read basic stories in English, because they have had less exposure to reading English. With more exposure to English over P2 and P3, Worldreader expects these higher order English skills to improve more. Moreover, it will be particularly interesting to see how P3 students progress as they transition to P4 in the 2013- 2014 school year, where English becomes the full time medium of instruction. P2 and P3 students did make notable improvements on English reading comprehension, 25 and 26 points, respectively, which is equivalent to correctly answering approximately one additional comprehension question.

GENDER DYNAMICS

Figure 7 demonstrates the treatment effect (i.e. the average additional points scored on the assessment as a result of the treatment) for boys and girls on the Twi assessment. As these figures show, the effects of the treatment on girls when it comes to oral reading fluency in Twi is more significant than boys (17.2 and 11.15, respectively). The treatment effect for girls in letter sound knowledge also is bigger, and is significantly larger for boys in terms of listening comprehension.

Figure 7: Treatment Effect (average additional points scored by Treatment school students), Twi, Disaggregated

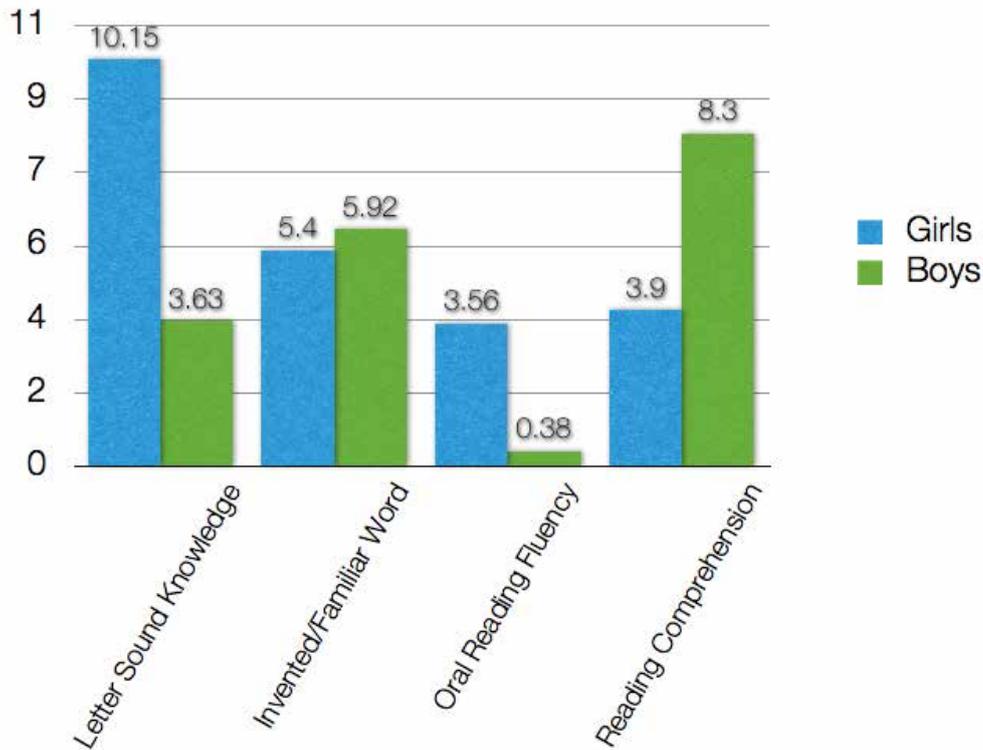
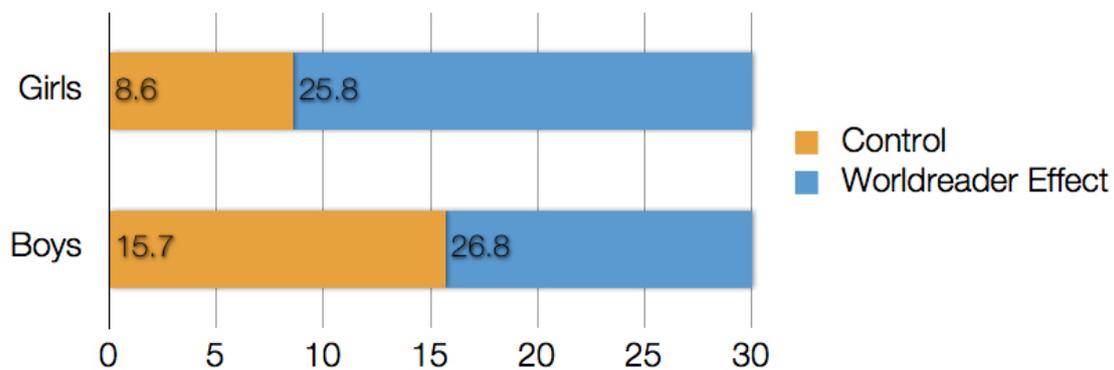


Figure 7 also demonstrates that the smaller average improvement in Twi reading comprehension among treatment students was driven by boys in treatment schools improving less than boys in control schools (although absolute scores in reading comprehension were higher for treatment schools than control schools for both the baseline and the midterm).⁷

⁷ It is important to note that these figures demonstrate the treatment effect (improvements in scores among treatment schools compared to improvements among control schools), not the absolute scores.

While the above data paints a mixed picture in terms of gender disaggregated improvements per sub-test, Figure 8 below provides an illuminating visual of the status quo in control schools. As the graph shows, this situation is one where boys are improving on key indicators twice as fast as girls, with boys advancing 15.7 points on Twi oral reading fluency and girls only improving 8.6 points. That is, in control schools, for every point a boy improves, a girl only improves half a point.

Figure 8: Improvements in Twi Oral Reading Fluency, Disaggregated by Gender



This observation supports existing research on gender dynamics in Ghanaian schools. One such study found, “in the absence of gender sensitive teaching skills, teachers may not seriously consider the participation and contribution of all students, in particular girls, in situations where stereotypical views and discriminatory practices are not often challenged. In most schools, [...] teachers were reported as being discriminatory towards girls.”⁸

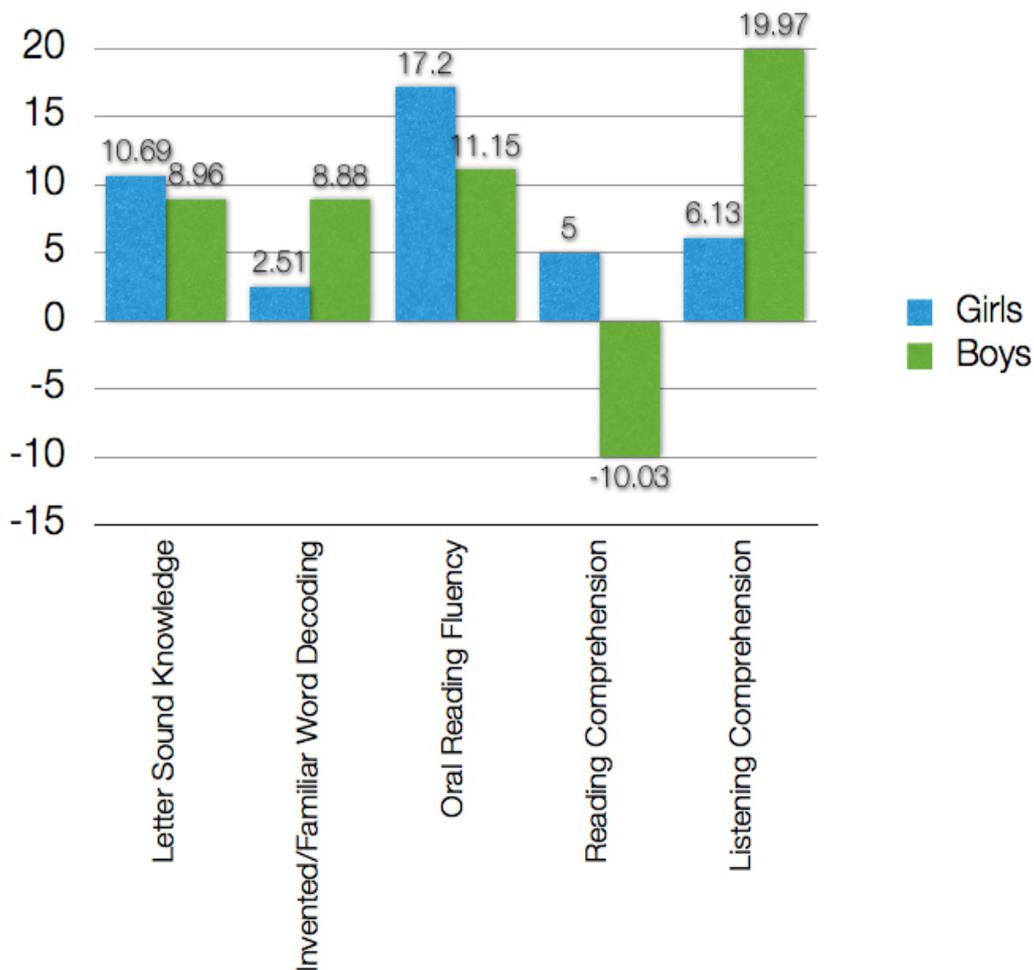
Such biases have repercussions on student performance (particularly for girls). However the iREAD 2 midterm data shows the achievement gap closing when it comes to gains among boys and girls in the treatment group, with girls improving nearly 26 points and boys 27 points. While boys outperform girls in control schools (and we can logically predict this gap would

⁸ [VSO International](#)

only grow over time), girls in iREAD 2 schools are keeping pace on this important skill. This points to the utility of the e-reader serves as an equal opportunity learning device. Boys and girls may be treated differently in class, resulting in different levels of access to the teacher (and through the teacher, to knowledge). But with the introduction of the e-reader, all students have equal access to knowledge, which helps counteract in-classroom gender biases.

Figure 9 demonstrates that the treatment effect on boys is significantly higher for reading comprehension in English, yet as demonstrated above, boys appeared to improve less quickly on reading comprehension in Twi, which drives down the overall average figures we see in this sub-test. We also see that the effect of the treatment on girls’ oral reading fluency in English follows a similar trend to the Twi scores.

Figure 9: Treatment Effect (average additional points scored by Treatment school students), English, Disaggregated by Gender



QUALITATIVE FINDINGS

Student focus groups uncovered additional project results, including increases in the reading of supplementary materials and storybooks, reading outside of school, and reading for pleasure among students at treatment schools. Nearly every Worldreader student interviewed indicated he/she was reading “a lot” more and better at the time of the interview (compared to the start of the school year), whereas the majority of control school students felt they were reading about the same amount and slightly better.

One concerning finding is the fact that some students at treatment schools reported being discouraged by teachers from taking the e-readers home and sharing them with family. An indirect goal of the project is to increase the target communities’ access to books, so this is somewhat troubling. Additionally, Worldreader has observed (in previous projects) that time outside of school with the e-reader is very important for students’ skill development. With additional teacher training Worldreader hopes to change this messaging.

Teacher focus groups provided Worldreader staff with important feedback on the progress of the program. Overall, teachers felt trainings were relevant and helpful (both trainings on the e-reader and phonics-based literacy instruction). All noted that their students are now reading more with the e-reader program than they were previously.

Teachers also mentioned, however, that the amount of time required for students to become proficient with the e-reader was considerable, particularly for P1 students, and that even six months into the program, a number of students were still struggling with basic operation of the device. Worldreader staff has noted this feedback and will use the remainder of the program to pilot potential solutions in student and teacher device training.

Additionally, the focus groups found that the degree of teacher engagement varied by school. Those teachers who regularly used paper textbooks in their classrooms prior to the Worldreader intervention were generally more motivated to learn about and use the e-readers in their classrooms. Teachers who had not used textbooks frequently prior to the program found the e-readers to be cumbersome, particularly learning the new skills required to operate the devices and coach children in using them. These teachers (approximately 25% of those interviewed) suggested extra incentives should be provided to teachers who learn to use the e-readers, while the other teachers did not mention this as a concern.

Finally, at the time of publication, the Worldreader team uncovered some other interesting results in conjunction with the start of the 2013 – 2014 school year. A number of schools are reporting increases in student enrollment, which they attribute to parents wanting to send their children to schools with the e-reader programs. This result was unanticipated, and Worldreader is working with the schools to address this influx of new students.

|| Conclusions and Next Steps

While the results demonstrated in the midterm sample assessment are preliminary, they represent important early successes for iREAD 2. These successes are driven by the integrated approach of the program; the e-readers provide a wealth of age - and grade-appropriate content, while teacher training, the integration of phonics-based teaching methods, and OCE activities that make reading fun and interactive engage both students and teachers in these materials. Additionally, the establishment of School Management committees (SMCs) at each project site helps the program run smoothly on a day-to-day basis.

The relatively larger gains in lower order English skills and higher order Twi skills point to the effects of the intervention's focus on Twi fluency and phonics. Additionally, the narrowing of the gap between girls and boys points to the utility of the e-reader as an equal opportunity learning device. Boys and girls may be treated differently in class, resulting in different levels of access to the teacher (and through the teacher, to knowledge). With the introduction of the e-reader, both boys and girls have equal access to knowledge, which helps counteract in-classroom gender dynamics that tend to favor boys.

The process of conducting the midterm also served as an important pilot in preparation for the project's final assessment, which will be conducted again using EGRA and Tangerine, with the entire group of 1,000 students in the treatment and control schools. By using the lessons learned from conducting the midterm assessment on a smaller sample of students, Worldreader will be able to refine assessment processes for the final evaluation, such as providing more focus group-specific training for enumerators and making small changes to data collection tools.

Based on midterm and ongoing feedback, the project team has modified teacher training materials, provided additional teacher resources, and updated devices with more books. At the time of publication, e-readers have been re-distributed (with additional books) to intervention schools, and the project has just begun its second year of implementation. Devices will stay with the same cohort of students, meaning they will be in P2 – P4 classrooms for the 2013-2014 school year. The Worldreader team is excited, in particular, to explore the effects of the iREAD 2 intervention on students transitioning from P3 to P4, when the curriculum fully switches the language of instruction to English only. The final assessment of this and other results will be conducted at the conclusion of the 2013-2014 school year (July 2014).

Appendices

Appendix 1: Average Raw Scores and Baseline to Midterm Improvements, Twi, by Grade

P1						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	16.6	5.6	35.7	17.7	19.1	12.1
Invented Word Decoding	9.8	2.6	19.2	8.4	9.4	5.8
Oral Reading Fluency	6.9	2.3	25.6	8.2	18.7	5.9
Reading Comprehension	28.0	2.0	34.0	22.0	6.0	20.0
Listening Comprehension	4.0	0	49.5	54.0	45.5	54.0
P2						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	24.5	10.5	51.3	26.2	26.8	15.7
Invented Word Decoding	26	11.6	47.6	21.8	21.6	10.2
Oral Reading Fluency	20.3	5.1	49.5	21.4	29.2	16.3
Reading Comprehension	38.0	6.0	58.0	38.0	20.0	32.0
Listening Comprehension	12	0	70.5	75	58.5	75.0
P3						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	30.4	16.1	50.7	31.1	20.3	15
Invented Word Decoding	33.4	18.8	49	33	15.6	14.2
Oral Reading Fluency	23.7	11.2	75.9	38.7	52.2	27.5
Reading Comprehension	40.0	26.0	84.0	56.0	44.0	30.0
Listening Comprehension	30.4	16.1	78	56.9	47.6	15.0
Overall						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	24.1	11.5	46.0	25.0	21.9	13.5
Invented Word Decoding	23.6	12.0	38.8	21.0	15.2	9
Oral Reading Fluency	24.0	10.4	50.4	22.5	26.4	12.1
Reading Comprehension	34.0	12.0	58.0	38.0	24.0	26.0
Listening Comprehension	14.0	22.0	66.0	62.0	52.0	40.0

*All scores are out of 100

Appendix 2: Average Raw Scores and Baseline to Midterm Improvements, English, by Grade

P1						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	12.9	5.8	31	19.4	18.1	13.6
Invented Word Decoding	5.8	1.6	17.8	12	12	10.4
Oral Reading Fluency	4.0	0.6	22.9	16.2	18.9	15.6
Reading Comprehension	2	1.6	0.1	2.25	8.1	0.65
P2						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	22.5	13.8	45.6	25.8	23.1	12
Invented Word Decoding	17.8	7.8	43.6	19.8	25.8	12
Oral Reading Fluency	19.8	9.1	40.0	28.4	20.2	19.3
Reading Comprehension	14	1.4	39	4.8	25	3.4
P3						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	27.6	18.1	45.5	32.1	17.9	14
Invented Word Decoding	26.2	7.4	40.6	14.5	14.4	7.1
Oral Reading Fluency	31.5	16.2	46.1	36.3	14.6	20.1
Reading Comprehension	23	15	49	38	26	23
Overall						
	Baseline		Midterm		Δ	
	T	C	T	C	T	C
Letter Sound Knowledge	21.4	13.2	40.8	25.6	19.4	12.4
Invented Word Decoding	17	8.8	34.2	20	17.2	11.2
Oral Reading Fluency	19.0	9.5	36.3	26.7	17.3	17.2
Reading Comprehension	13.7	8	36	24	22.3	16

*All scores are out of 100.