2014 - 2015 GHANA TEACHER SUPPORT PROGRAM

Questions? Email us at transparency@pencilsofpromise.org
EXECUTIVE SUMMARY

Pencils of Promise (PoP) is a “for-purpose” organization founded in 2008 to increase access to quality education for primary school students in the developing world. PoP works with rural communities across the globe to build schools and introduce programs that improve educational quality and life outcomes for children, no matter where they were born or what resources they have. In just seven years, PoP has built over 330 schools throughout Ghana, Guatemala, Laos and Nicaragua, providing educational opportunities to more than 33,000 students and establishing itself as a leader amongst innovative global nonprofits working toward sustainable change.

PoP Teacher Support Program Overview

PoP’s Teacher Support (TS) Program was created to improve the literacy rates and academic outcomes of all students. This is achieved by increasing Kindergarten - Primary 6 teacher capacity through several cycles per semester of (a) group workshop instruction on vetted, innovative teaching methods, (b) classroom observations followed by personalized coaching and (c) distribution of support materials and pedagogy. Additionally, every year PoP provides students with learning materials that are age and culturally appropriate.

Ghana 2014 - 2015 Teacher Support Program

In Ghana, during the 2014-2015 school year, we launched pilot and early stage Teacher Support programming to approximately 20% of our Ghanaian schools. Over 70 teachers and 1,700 students benefited from the Teacher Support Program comprised of Teacher Support workshops/coaching sessions, material distribution and a pilot E-reader distribution component. We delivered more than 600 one-on-one Coaching sessions, held 11 workshops and distributed 198 E-Readers across 11 schools.

For more information about our program design and evaluation methods, see Section 3 of the full report.

Program Expenses

During the 2014 - 2015 school year, PoP invested a total of $52,262 on our Teacher Support program in Ghana, including our pilot E-Reader program. Program costs include salaries ($8,463), materials ($15,342), workshops/travel/hospitality ($10,574) and a pro-rata portion of our investment in a new partnership with Worldreader ($17,883).

Key Results

Teacher Support Program (Treatment 1)
Overall, pre-reader students (Primary 1 [P1] & Primary 2 [P2]) in our Treatment 1 groups displayed greater increases in scores than their control peers, particularly in P2 where treatment students outperformed their control peers in all sections of the test.

E-Reader Only Program (Treatment 2)
Early reader students (P4) in our Treatment 2 group saw mixed results when compared to their control peers, outperforming their peers on about half of the test.

“Reader” level students (P4 & P5) in our Treatment 2 group also saw mixed results when compared with their control peers, with P5 students underperforming against their peers in all but 2 sections of the test, and P6 students outperforming their peers on half the test.
Teacher Support + E-Reader Program (Treatment 3)

Overall, early reader students (P3) in our Treatment 3 group saw larger improvements than their control peers across most sections of the test.

In comparison to early reader students (P3) in our Treatment 1 group, Treatment 3 students saw even larger improvements on the majority of the test, indicating that when paired with E-Readers, Teacher Support programming yields higher results.

Return on Investment

As displayed in the table below, the greatest overall return on investment is noticed for the Treatment 3 hybrid intervention group (Teacher Support + E-readers). Students in this group performed better on Phoneme Segmentation and Familiar Word Recognition, albeit with a higher upfront investment. However, our Treatment 1 group (Teacher Support only) saw the greatest ROI for passage comprehension. For this reason, we will continue to focus on the expansion of our Teacher Support program in conjunction with our E-Reader program.

Key Learnings

After one year of a multi-layered program, we have several key learnings that fall into three main buckets: technology integrated approach, randomization in experiment design and program expansion timelines:

- Technology integrated approach: While a program focused on providing only coaching and workshops helps to increase student outcomes, the results are even higher when paired with the use of E-readers

- Randomization in experimental design: Randomizing students at both the pre and post-test (that is, not testing the same students) was found to be unreliable at our sample sizes. We have modified the experiment design for subsequent interventions to randomize only at the pre-test and to test the same students in the post-test

- Program expansion timelines: When expanding programs mid-year we must conduct new baseline (pre) tests not only in the new treatment groups, but also in our control groups in order to account for learning throughout the year. This should also be reflected in data tracking and analysis as a mid-year assessment

To learn more about how these Key Learning have influenced our new program model, please see Section 4 of the full report.
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1. POP MODEL

Pencils of Promise (PoP) is a “for-purpose” organization founded in 2008 to increase access to quality education for primary school students in the developing world. PoP works with rural communities across the globe to build schools and introduce programs that improve educational quality and life outcomes for children, no matter where they were born or what resources they have. In just seven years, PoP has built over 330 schools throughout Ghana, Guatemala, Laos and Nicaragua, providing educational opportunities to more than 33,000 students and establishing itself as a leader amongst innovative global nonprofits working toward sustainable change.

Founded as a school building organization, PoP has evolved into an education organization focused on student outcomes, specifically on achieving basic national language literacy for 90% of students by the time they leave a PoP primary school. To achieve this goal, we couple school builds with Teacher Support, WASH (Water, Sanitation and Hygiene) programming and innovative in-classroom programs that integrate E-readers and tablets into lessons to create a scalable model for a complete, high-quality primary education.

PoP program design and delivery starts with establishing a high-engagement partnership with local governments and ministries of education to identify communities with the deepest educational need. Our Monitoring and Evaluation (M&E) staff conducts rigorous scouting assessments, scored against a rubric of qualifying conditions, before we provide programming. PoP uses this data to design programs that are tailored to local context and supplement the national curriculum, allowing teachers to do their jobs more effectively. Every PoP intervention is measured using a quasi-experimental mixed methodology approach in which PoP relies on early and intermediate qualitative indicators as well as robust quantitative testing to assess program impact. We are committed to data-informed program scale and dedicated to iterating on our work, accounting for local nuances and geographic variables in our program design.

2. POP TEACHER SUPPORT PROGRAM

2.1. Overview and Details

PoP’s Teacher Support (TS) Program was created to improve the literacy rates and academic outcomes of all students. This is achieved by increasing Kindergarten - Primary 6 teacher capacity through several cycles per semester of (a) group workshop instruction on vetted, innovative teaching methods, (b) classroom observations followed by personalized coaching and (c) distribution of support materials and pedagogy. Additionally, every year, PoP provides students with learning materials that are age and culturally appropriate.

2.1.1. Workshops

As part of our Teacher Support Program, teacher workshops are hosted three times per year with content designed for Kindergarten (KG) to Primary 3 (P3) teachers. Workshops focus on ways to integrate new methods into everyday classroom instruction for curriculum provided by the Ghana Education Services (GES)\(^1\).

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\(^1\) Ghana Education Service - Ghanaian national government agency for education
2.1.2. Coaching Sessions

Throughout the school year, PoP TS staff provides KG - P3 teachers with bi-weekly coaching sessions in the form of co-teaching, in-class observations and individualized feedback. The goal of these sessions is to provide continuous support as teachers integrate new methods and materials into their classrooms. These sessions are conducted by PoP TS Specialists and aim to build teacher capacity, leading to improved teaching techniques and more engaging classrooms.

2.1.3. Pilot: E-readers

PoP’s commitment to innovation involves the ongoing testing of pilot programs that serve as complementary components to our core programs. Beginning in 2014, in partnership with Worldreader2, PoP piloted an E-Reader program in order to increase access to reading materials in primary school classrooms. We adopted a 1:1 model, assigning each student a personal E-reader to utilize both in the classroom and at home after school hours. Each E-reader provides students with over 100 age-appropriate books, including a combination of fiction, non-fiction and textbooks. The selection of books ranges from international titles to local stories written by local authors.

3. 2014-2015 GHANA TEACHER SUPPORT PROGRAM

3.1. State of Education in Ghana

Ghana ranks 140th out of 188 nations in the UNDP’s Human Development Index Ranking for 20153, which serves as a measurement of a country’s overall development by relying on a multitude of indicators – one-third of which are related to education. On the NEA — National Education Assessment, a biennial nationally and regionally representative measure of grade Primary 3 (P3) and grade Primary 6 (P6) pupil competency in mathematics and English — just 36% of P3 students achieved minimum literacy competency and 24% achieved proficiency, as defined by the test scoring standards. P6 students passed minimum literacy competency at 79% and proficiency at 35%4.

3.2 Program Delivery

3.2.1. Program Design

The PoP TS Program offers varying components to teachers of different grade levels, clarified in Table 1 on the next page. The components vary as PoP focuses on the foundational skills of literacy in the early grades. The materials and methodology in these grades focus on letters, phonemes and building simple vocabulary. As students learn these skills, our approach and materials shift focus to building student ability to read simple sentences, comprehension and critical thinking skills.

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2 http://www.worldreader.org/
<table>
<thead>
<tr>
<th>Treatment Groups</th>
<th>Grades</th>
<th>Tools</th>
<th>Pedagogy and Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment 1 - Teacher Support Group</strong></td>
<td>KG, P1,</td>
<td>3 TS workshops, coaching sessions 2x/month</td>
<td>Learning games &amp; movement based activities, classroom management strategies, phonics &amp; blending and reading grouping strategies</td>
</tr>
<tr>
<td></td>
<td>P2, P3</td>
<td></td>
<td>Momosign Books for teachers and students⁵;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Library in a Box⁶; Projector or TV; P1-P3 Momosign⁷ Videos;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>End of Term Reading Competition</td>
</tr>
<tr>
<td><strong>Treatment 2 - E-Reader Group (Pilot)</strong></td>
<td>P4, P5,</td>
<td>E-Readers (with E-Reader workshop)</td>
<td>Reading Comprehension, classroom management and engagement strategies &amp; techniques to incorporate the E-Readers into everyday classroom use</td>
</tr>
<tr>
<td></td>
<td>P6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Treatment 3 - Teacher Support &amp; E-Reader Hybrid Group (Pilot)</strong></td>
<td>P3</td>
<td>Both of the above combined</td>
<td>Both of the above combined</td>
</tr>
</tbody>
</table>

* A total of 3 schools received the hybrid program for Primary 3

### 3.2.2 Program Implementation

In Ghana, during the 2014-2015 school year, we launched pilot and early stage Teacher Support programming to approximately 20% of our Ghanaian schools. Over 70 teachers and 2,600 students benefited from the Teacher Support Program comprised of Teacher Support workshops/coaching sessions, material distribution and a pilot E-reader distribution component. We delivered more than 600 one-on-one Coaching sessions, held 11 workshops and distributed 198 E-Readers across 11 schools.

⁵ See [website](#) for more information.
⁶ Box of grade appropriate books delivered to teachers created and curated by PoP Staff.
⁷ See [website](#) for more information.
The TS Program initially began in 3 schools (grades KG - P6) using the program design as displayed in Table 1, with grade P3 placed in the hybrid Treatment 3 group. Due to positive initial qualitative results from the E-Reader pilots, we aimed to expand the full program to 8 new schools at the beginning of the second term. However, due to shipping and customs delays, we were only able to roll out the lower TS program (Treatment 1) in these 8 schools.

### 3.2.3 Program Expenses

During the 2014 - 2015 school year, PoP invested a total of $52,262 on our Teacher Support program in Ghana, including our pilot E-Reader program. Program costs include salaries ($8,463), materials ($15,342), workshops/travel/hospitality ($10,574) and a pro-rata portion of our investment in a new partnership with Worldreader ($17,883).

In 2014, a total of $53,650 was invested in our partnership with Worldreader in order to bring 300 Kindle devices with learning content to Ghana. With a lifetime value of 3 years per E-Reader, we calculate our investment in the 2014-2015 Teacher Support program to be $17,883. A breakdown of costs per beneficiary in each of our treatment programs can be found in Table 2 below. To view a breakdown of our return on investment based on student literacy results, see section 3.5. below.

**Table 2: Cost per Beneficiary**

<table>
<thead>
<tr>
<th>Program</th>
<th>Total Program Cost</th>
<th>Students Benefitted</th>
<th>Cost per Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment 1 - Teacher Support Group</td>
<td>$33,004</td>
<td>1,192</td>
<td>$27.69</td>
</tr>
<tr>
<td>Treatment 2 - E-Reader Group (Pilot)</td>
<td>$8,498</td>
<td>142</td>
<td>$59.85</td>
</tr>
<tr>
<td>Treatment 3 - Teacher Support &amp; E-Reader (Pilot)</td>
<td>$3,305 + $1,375 = $4,680</td>
<td>56</td>
<td>$83.57</td>
</tr>
</tbody>
</table>

### 3.3. Program Evaluation

#### 3.3.1. Evaluation Design

PoP uses a quasi-experimental mixed methodology approach in which we rely on longitudinal, qualitative and quantitative testing to assess program impact. This report focuses on the qualitative aspects of these evaluations. For the Teacher Support program, we use the Early Grade Reading Assessment (EGRA)\(^8\) — an oral student assessment designed by USAID to measure basic foundation skills for literacy acquisition in the early grades.

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\(^8\) More information [here](#).
Random sampling was selected to compare the performance of students in Treatment schools and Control schools. Randomization ensures that the intervention and comparison groups are equivalent with respect to all factors other than whether they received the intervention — the comparison group serves as the “counterfactual” of what gains would have been expected in the absence of the program.

The number of students tested was calculated using a proportional percentage, taking a sample\(^9\) of the entire student population, in both treatment and control schools separately. Sample sizes also take into consideration gender proportions in each class previously calculated using gender enrollment populations.

PoP administers baseline and post intervention tests in order to assess longitudinal changes over the course of a school year. In the 2014-2015 evaluation design, the sample of students tested were not matched between pre and post-tests due to samples size concerns given known patterns of absenteeism and drop-outs. Instead, we analyzed the change in scores in average student performance rather than individual student responses.

3.3.1.1. The EGRA Test

The Early Grade Reading Assessment (EGRA) is an oral student assessment designed by USAID to measure the most basic foundation skills for literacy acquisition in the early grades: recognizing letters of the alphabet, reading simple words, understanding sentences and paragraphs and listening with comprehension. EGRA breaks down literacy into the following sections that build upon each other in difficulty:

- Orientation to Print (Section 1)
- Phonemic Awareness
  - Phoneme Segmentation (Section 2a)
  - Phoneme Identification (Identification of Onset Sounds) (Section 2b)
- Letter Identification (Section 3)
- Familiar Word Recognition (Section 4)
- Passage Reading and Comprehension (Sections 5a and 5b)
- Writing (Section 6)

PoP uses EGRA not only to (one day) compare with global implementers working with similar populations, but also to tailor improvements to our programs. The segmented nature of the assessment allows PoP staff to identify exact areas where our students are underperforming in order to adjust programming components to meet the specific needs of our beneficiaries. PoP is currently working in partnership with other organizations to define standards for every section of the EGRA test.

For more detailed information about each of the sections on the EGRA test, see Appendix I.

\(^9\) considering a 95% Confidence Level and a Confidence Interval of 3.
Pencils of Promise: Ghana 2014-2015 Teacher Support Programs

3.3.2. Evaluation Implementation

In order to administer the one-on-one oral EGRA assessment to over 1,100 Primary 1 through Primary 6 students, Pencils of Promise collaborated with a group of over 30 enumerators already trained in the implementation of international literacy assessments, largely recruited from within the GES. These enumerators then worked with PoP staff during a full day of retraining in EGRA practices to ensure consistent EGRA implementation during testing.

PoP administered baseline and post intervention tests to a total of 11 treatment schools. For control schools, we administered post intervention tests in 8 schools with the intent of using baseline test scores from a combination of 6 treatment schools and 2 controls. This design, however, proved to be flawed when analyzing control school results, as we saw many decreases in scores from beginning to end of year. For this reason, we have removed all but 2 control schools from our analysis. This approach has been verified by an external consultant and though still statistically sound for our 2014-2015 TS Program analysis, will be iterated upon during the next school year. Instead, we plan to administer baseline tests in our control schools and to administer tests to the same students rather than using blind samples (see Section 4: Key Learnings & Upcoming Program).

In all schools, a sample from P1 - P6 was tested, resulting in over 1,100 students tested in both Treatment and Control schools out of a population of 2,700.

3.4 Results

Positive Literacy Impact:

Treatment 1 (Teacher Support only)

- Overall, pre-reader students (P1 & P2) in our Treatment 1 groups displayed greater increases in scores than their control peers, particularly in P2 where treatment students outperformed their control peers in all sections of the test. Most notable results are found on Phoneme Identification, in which P2 treatment students saw improvements 3x greater than their control peers.10

Treatment 3 (Teacher Support + E-Readers)

- Overall, early reader students (P3) in our Treatment 3 group saw larger improvements than their control peers across most sections of the test, particularly on Familiar Word Recognition, in which treatment students saw improvements 6x greater than their control peers.

- In comparison to early reader students (P3) in our Treatment 1 group, Treatment 3 students saw even larger improvements on the majority of the test, indicating that when paired with E-Readers, Teacher Support programming yields higher results. This is especially evident in Familiar Word Recognition, in which Treatment 3 students saw improvements 2.5x greater than Treatment 1.

10 The high increase found here is in part attributed to an abnormal decrease between pre and post tests for control students, an issue addressed by the following year’s evaluation design.
Mixed Literacy Impact:

Treatment 2 (E-Readers only)

- Early reader students (P4) in our Treatment 2 group saw mixed results when compared to their control peers, outperforming their peers on about half of the test. Most notable results are found in Letter Identification, in which treatment students saw improvements 9x greater than their control peers11. However, this is countered by results in Passage Comprehension, in which control students saw improvements 4x greater than the corresponding treatment group.

- “Reader” level students (P5 & P6) in our Treatment 2 group also saw mixed results when compared with their control peers, with P5 students underperforming against their peers in all but 2 sections of the test, and P6 students outperforming their peers on half the test.
  - For P5, most notable results are found in Orientation to Print, in which treatment students saw improvements 11x greater than their control peers. However, this is countered by results in Familiar Word Recognition, in which control students saw improvements 3x higher than the corresponding treatment group.
  - For P6, most notable results are found in Passage Comprehension, in which treatment students saw improvements 2x greater than their control peers12. However, this is also countered by results in Familiar Word Recognition, in which Control students saw improvements 7x higher than the corresponding treatment group.

Qualitative Results:

On qualitative interviews conducted with E-Reader students and teachers, 56% of students reported they did not read after school before receiving E-readers, whereas 99% now use their E-readers at home. Teachers also reported that 100% of students increased their reading ability after E-readers. For more qualitative information, see the results here.

For a more comprehensive analysis of the results by section of the test, refer to Appendix I. For data tables and other charts, refer to Appendix II.

Pages 13 – 16 of this report provide a visual overview the 2014 - 2015 TS Program EGRA results.

3.5 Return on Investment

PoP is committed to identifying interventions that create the most literacy gain for the least cost. We rigorously track program costs, take steps to procure at the lowest price point possible and focus on achieving further cost reductions with programmatic scale. The cost to achieve a single percentage point of literacy gains is our strongest guidepost. When conducting a cost benefit analysis, we look at the 3 key sections from the EGRA test that most identify student literacy across various age groups.

11 See footnote 9.
12 See footnote 9.
As displayed in Table 3 below, the greatest overall return on investment is noticed for the Treatment 3 hybrid intervention group (Teacher Support + E-readers). Students in this group performed better on Phoneme Segmentation and Familiar Word Recognition, albeit with a higher upfront investment. However, our Treatment 1 group (Teacher Support only) saw the greatest ROI for passage comprehension. For this reason, we will continue to focus on the expansion of our Teacher Support program in conjunction with our E-Reader program.

Table 3: ROI

* Net Loss: This indicates a greater score increase seen by control groups than seen by the treatment group in question, resulting in a negative score difference.

4. KEY LEARNINGS & UPCOMING PROGRAM

4.1. How our Key Learnings influenced the 2015-2016 Program Design

Technology integrated approach: Teacher Support, while focused on providing only coaching sessions & workshops, helps to increase/improve student outcomes; however, the program shows higher results when paired with the use of E-readers.

- Increase E-reader integration from 6 schools to 28 schools, serving nearly 3,000 students. In conjunction, implement Teacher Support in at least 50% of E-Reader schools to see improved outcomes.

- Invest in higher quality materials and methodologies for workshops to increase literacy outcomes. Ex.: utilize components of Teacher’s College Reading and Writing Project for Reader’s workshops to structure in-class reading time, ensuring that the E-readers are used to their maximum potential. Teachers are trained in methods such as prediction, story mapping and small group reading to increase comprehension.
Randomization in experimental design: Randomizing students at both the pre and post-test did not give us clear enough insights into the data; some data showed decreases from pre to post. We have modified the experiment design to randomize only at the pre-test and test the same students in the post-test.

Program expansion timelines: When expanding programs mid-year, we must conduct new baseline (pre) tests not only in the new treatment groups, but also in our control groups in order to account for learning throughout the year. This should also be reflected in data tracking and analysis as a mid year assessment.

• We will limit piloting to twice per year: once at the beginning of the school year and once during a 4-6 week window mid-year, testing controls at both times. This will allow us to still run several pilots at once while maintaining the integrity of the data. As with all of our programs and pilots, we will use a mixed-method approach, which will result in qualitative data from a pilot running 4-5 months only.
5. VISUAL RESULTS OVERVIEW

5.1. % Scores by Section - Pre Readers

PoP defines Pre-Readers as students in grades Primary 1 and Primary 2. The key indicator for literacy amongst children of this age is found in their ability to learn phonics, assessed by the "phonemic segmentation" section of the EGRA highlighted below.

The decrease in average scores seen on the charts above and below for the Control group is an example of the issues encountered by not testing the same students in Pre and Post rounds. See Key Learnings for more info.
PoP defines Early-Readers as students in grades Primary 3 and Primary 4. The key indicator for literacy amongst children of this age is found in their ability to read proficiently, assessed by the “Familiar Word Recognition” section of the EGRA highlighted below.

Students in the TS + E-Reader program improved their scores more than both Teacher Support and Control students in almost all sections of the test.
5.3. % Scores by Section - Readers

PoP defines Readers as students in grades Primary 5 and Primary 6. The key indicator for literacy amongst children of this age is found in their ability to comprehend reading material, assessed by the “Passage Comprehension” section of the EGRA highlighted below.

PoP noticed significant gains for one class of 5th grade students in our control group and we are currently assessing teaching methodologies from this high performing teacher.
### 5.4. Difference in Differences - PoP Programs vs. Control

Difference in Differences (DiD) is calculated by comparing the average change over time of Treatment groups versus the average change over time for the Control group. DiDs are expressed in percentage points.

#### Orientation to Print

![Graph showing the comparison of Orientation to Print for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)

#### Phoneme Segmentation

![Graph showing the comparison of Phoneme Segmentation for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)

#### Phoneme Identification

![Graph showing the comparison of Phoneme Identification for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)

#### Letter Identification

![Graph showing the comparison of Letter Identification for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)

#### Familiar Word Recognition

![Graph showing the comparison of Familiar Word Recognition for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)

#### Passage Reading

![Graph showing the comparison of Passage Reading for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)

#### Passage Comprehension

![Graph showing the comparison of Passage Comprehension for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)

#### Writing

![Graph showing the comparison of Writing for Teacher Support and E-Reader between control and treatment groups. Positive DiDs indicate the Treatment group improved more than the Control group, while negative DiDs signify Control improved more.](image)
6. ADDITIONAL INFORMATION

6.1. Appendix

Appendix I
Appendix II
Appendix III

6.2. References


