



AniBooks for Early Grade Reading



Implementation Partner



Project Summary and Impact

Final Report, June 2018.

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1. Executive Summary

AniBooks are animated stories for children, with the narration appearing on-screen as Same Language Subtitles (SLS).¹ Every word is highlighted in perfect timing with the audio narration, thus strengthening reading skills, automatically and subconsciously.

SLS is a pedagogically sound and proven technique to reinforce reading skills and is the recipient of several international awards. SLS has been implemented widely on film song-based TV programs in India, in 10 languages (see www.planetread.org). This is the first study to explore the impact of regular AniBook exposure in schools, on the early reading skills of children from low-income backgrounds.

Our project “AniBooks for Early Grade Reading” builds on two established findings: 1) the world over, children like to watch cartoons. That is well-known to most parents. 2) Much less known is a well-researched conclusion that a viewer who watches video content with subtitles, will try to read along inescapably and automatically, assuming a passing familiarity with the text.

The main goal of our project was to integrate AniBooks into the schools and lives of children from very low-income backgrounds in Grades 1-4, or ages 6-10, to support the development of reading skills, and evaluate its impact.

The main stages of our project were:

- 1) We produced 40 levelled AniBooks in Hindi, 10 each for Grades 1-4 along with learning activities for all 40 AniBooks.
- 2) In close discussion with a local NGO (Society for All Round Development, SARD) we worked out the modalities of an AniBook intervention, to be implemented in 5 Treatment Group (TG) schools and NOT to be implemented in 5 Control Group (CG) schools.
- 3) As preparation, we conducted a baseline Early Grade Reading Assessment (EGRA) of children in Grades 1-4, in 14 schools, and then whittled the group of schools down to 5 in TG and 5 in CG, such that TG and CG would be similar in reading performance on the EGRA.
- 4) The AniBook intervention and implementation was closely monitored in TG schools, over a period of 7 months, to ensure that it was implemented as planned.
- 5) An endline impact evaluation of reading skills, using the exact same EGRA, was conducted in the 5 TG and 5 CG group of schools, with as many of the same students as was possible to reach in Grades 1-4. We were able to administer the endline EGRA to 70% of those tested at the baseline.

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Major Project Milestones:

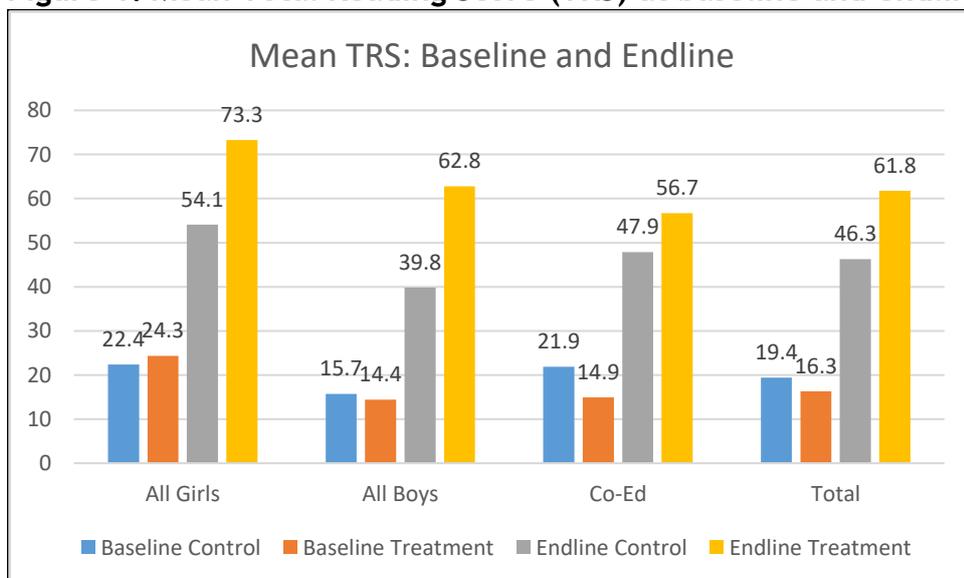
July 2016	Agreement signed between CKS and PlanetRead
April 2017	Completed production of 30 new AniBooks and selected 10 existing ones for the project.
July 2017	Agreement signed between SARD and PlanetRead for direct implementation
July/Aug 2017	Baseline EGRA conducted in 14 schools; selected 5 TG and 5 CG schools
Sep 2017	Commencement of PlanetRead's AniBook intervention in TG schools
Feb/Mar 2018	Academic year ends and PlanetRead's AniBook intervention completes 7 months
Mar 2018	Endline EGRA conducted in 5 TG and 5 CG schools

Summary of findings

Based on the baseline data, we were able to select CG and TG of schools that were comparable overall and in sub-groups of All-Girl, All-Boy and Co-Ed schools. The mean CG scores were marginally better than TG at the baseline.

Although TG started slightly behind at the baseline (BL), by the endline (EL), its reading scores surpassed CG's, substantially. TG's mean reading score went up from 16.3 (BL) to 61.8 (EL), an improvement of 45.5 points; CG's score went up from 19.4 (BL) to 46.3 (EL), an improvement of 26.9 points (Figure 1). The difference in group means was highly statistically significant.

Figure 1: Mean Total Reading Score (TRS) at baseline and endline



In other words, the mean improvement of 26.9 points in CG can be attributed to schooling. The mean improvement of 45.5 points in TG can be attributed to: a) 26.9 points from schooling and b) 18.6 points from regular AniBook viewing. The

AniBook intervention contributed 69.1% of an entire school year's contribution to reading.

The AniBook intervention contributed notably toward starting many more children on the path to reading, i.e., from a zero total reading score at the baseline to greater than zero by the endline. In CG, 35.2% scored zero at BL and by EL, 17.4% still scored zero. Thus, school got roughly half (50.6%) the absolute non-readers started on the path to reading. In TG, 40.4% scored zero at BL and by EL, 6.5% were still at zero reading score, relatively fewer than in CG. School plus the AniBook intervention got 83.9%, or a far greater proportion of the absolute non-readers on the path to reading. The AniBook intervention by itself, thus, contributed to 33.3% additional absolute non-readers started on the path to reading, that schooling alone might not have (Table 7).

We also found statistically significant evidence of the AniBook intervention's contribution to reading comprehension scores. TG's mean comprehension score went up from 0.1 (BL) to 1.0 (EL). For CG, it went up from 0.1 (BL) to 0.6 (EL). In TG, a 0.5 improvement can be attributed to schooling and 0.4 improvement to AniBooks.

At the baseline, 97.3% children scored zero on comprehension. By the endline, it was slightly better, at 83.6% scoring zero (Table 8), or, 13.7% more children demonstrated some comprehension skills. TG went from 98.1% scoring zero on comprehension at the baseline to 74.1% scoring zero at the endline, or, 24% more children demonstrated comprehension skills. AniBooks nudged 10.3% more children from zero toward some demonstratable comprehension skills.

In all gender-based subgroups in CG and TG, the mean reading improvement was much greater in TG, and the mean differences statistically significant for all three subgroups. In the All-Girls schools, school improved the reading score by 31.7 points and schools + AniBooks improved it by 49 points. The AniBook intervention's contribution of 17.3 additional points is equivalent to 54.6% of what could be expected from school but no AniBooks.

The All-Boys schools showed even more remarkable improvement from AniBooks. CG (school only) improved by 24 points whereas TG (school + AniBooks) improved 48.4. AniBooks can be said to have contributed as much as a school years' worth of reading skill improvement in the All-Boys school.

In the Co-Ed schools, CG improved by 25.9 points and TG improved by 41.7 points, or 61% more improvement due to the AniBooks. Boys in CG improved by 20.7 points and in TG improved by 39.9 points, a difference of 19.2 points due to AniBooks. Girls in CG improved by 31.2 points and in TG improved by 43.7 points, a difference of 12.5 points.

The impact of our 7-month AniBook intervention on reading showed up most noticeably in Grade 2 (57.1% more due to AniBooks) and Grade 3 (159.5% more); see Figure 4. TG mean scores were also higher than CG for Grade 1 (40.7% more)

and Grade 4 (30.8% more), but unlike Grades 2-3, these were not statistically significant.

Overall, we found strong and statistically significant evidence of the contribution that an AniBook-based intervention can make to early reading, in low-resource schools. The intervention itself was relatively inexpensive and is scalable.

2. Implementation

Our first task was to identify a suitable implementation partner organization that already had a presence in Hindi-medium schools serving low-income children. Based on our initial research and the list of organizations we got from the READ Alliance team, we reached out to Society for All Round Development (SARD), an NGO based out of New Delhi.

We had a meeting with Sudhir Bhatnagar, CEO SARD on 31st May, 2017 when Brij Kothari (Director, PlanetRead) discussed about working with SARD to implement the entire project over a year, including the need to conduct the baseline study, AniBook implementation and endline study.

Following that meeting with SARD, the PlanetRead team comprising of Nirav Shah, Hema Jadhvani, Ketan Deshmukh and Vijay Shinalkar visited SARD in New Delhi from 19th-23rd June, 2017.

The PlanetRead team conducted pilots with the AniBooks and spoke to the SARD team on how the baseline EGRA had to be conducted and also planned steps for the implementation of AniBooks. SARD assigned one Program Head, Ms. Anviti Singh and 4 teachers to oversee the entire project implementation, in the schools where SARD already had a valued presence.

As the schools reopened only in the beginning of July, we waited till the end of the month for the attendance to stabilize.

For the baseline study, we went to a total of 14 government schools in the outskirts of West Delhi district of NCR, New Delhi. In every school we picked one section by taking the one that had the highest number of students in Grades 1-4. In all we covered 1651 children, across the 14 schools, in 5 days.

As soon as the baseline data was gathered, we went to the following 6 potential TG schools:

1. Raghuv eer Nagar (Morning), Girls only
2. Raghuv eer Nagar (Evening), Boys only
3. Janakpuri C1 (Morning), Girls only
4. Janakpuri C1 (Evening), Boys only
5. Subhas Nagar (General), Co-Ed
6. Vikash Puri B-Block (General), Co-Ed



The potential TG schools at this stage were identified based on SARD's internal data on reading performance and not on our own baseline data. This was necessary due to several pragmatic reasons: the imminent beginning of the school year, the time that would be needed to collect, prepare and analyze the baseline data, the need to have a good number of months for the intervention and, finally, the endline that had to be completed before the exam period began in April, 2018.

Our goal was to select 5 schools in TG and 5 in CG so that the mean reading scores were well-matched at the baseline, for the All-Boys, All-Girls and Co-Ed schools. This was more easily achieved by conducting the baseline in a larger number of schools in TG and CG, seeing the mean scores, and then selecting the 5 CG and 5 TG schools that matched well. Hence, we ended up conducting the baseline in 6 TG schools (it was costly to start with more because a TV had to be installed) and 8 CG schools to give us greater flexibility to select 5 matching CG and 5 TG.

A TV was installed in all 6 TG schools because the AniBook intervention had to begin immediately, and could not wait for the baseline data entry and analysis to be completed and the final 5 TG schools to be selected. The baseline EGRA was implemented in 8 potential CG schools. The baseline data analysis helped us narrow down to 5 TG and 5 CG schools that matched best on reading performance at the baseline. As the baseline report documents, it so happened that several CG schools were found to be relatively better performing than the TG schools, at the baseline and were therefore dropped from the study.

Our target classes were Grades 1-4. We randomly chose one section in each Grade and set up an LED TV in each of the 6 TG schools. One school that did not match well with the CG schools was dropped from the study, but, continued to have the AniBook intervention.

AniBook Intervention

All the 40 AniBooks were added onto pen drives and given to the teachers in TG schools. We made sure to get a separate classroom for our project and we decorated it with related activities. We prepared some sample activities that could be used by the teachers as Teacher Learning Material (TLM) and trained the

teachers on how the AniBooks could be shown in the class. We conducted a survey of the schools using ASER's School Observation sheet (Appendix D).

The AniBook intervention was tracked online & offline. The teachers used their attendance registers and other calendars to follow and keep track of the AniBook intervention plan. The teachers also used a simple online tracking sheet to keep track of the use of AniBooks shown, to be shown and the children in attendance for every session.



School:
Janakpuri C1

Class: 2nd
Standard

The PlanetRead team was in regular contact with the teachers in all TG schools about their classroom experiences and to make sure that the children were given the scheduled exposure to the pre-decided AniBooks.

Challenges faced

While the program implementation went well overall, there were a couple of instances where we had some difficulties. The first was all about getting the Principals of the schools to understand and support our program. Although most potential TG and CG schools were eager to partner in the project, there were a couple of schools where the Principals were not very supportive so we had to change those schools. The SARD team was extremely helpful in identifying schools interested in participating in our year-long project.

The next challenge was when one of the SARD teachers left her job due to personal commitments. We had to quickly find a replacement and make sure that the new person could maintain the project's continuity in that school.

AniBook reception

We were very happy to see that all the teachers and students who were part of our program really enjoyed the AniBook content. It was encouraging to see that teachers and students from other classes and sections in the school, not in TG, also wanted to be a part of program. A common feedback we received from teachers in all the TG schools, was to increase the number of AniBooks for each class and also the duration of the entire project.

3. Baseline: School selection

The academic year began in early July 2017. After detailed discussions and planning with SARD's team, on July 19, 2017, we signed an MoU with SARD (Appendix A) for conducting the baseline study, AniBook intervention and endline. We waited until the end of the month for the attendance to stabilize. Starting July 31, 2017, the PlanetRead team visited SARD's office in New Delhi to shortlist the schools, visit the sites, select CG and TG schools, and initiate the baseline of children's reading skills.

The baseline data helped us determine the 10 schools to be included in the study, 5 in CG and 5 in TG. All the 'Good readers,' defined as those students scoring 31 or above on the story reading test (Q5) - the most difficult exercise in the EGRA with a maximum possible score of 65 - were dropped from the study because: a) we wanted to know the impact of AniBooks on weak readers, and b) the EGRA tool was not appropriate to capture improvement among good readers who were already scoring high in the baseline EGRA. The list of selected schools, the mean Total Reading Score (TRS)² and the number of qualifying weak-readers for each CG and TG school, is presented in Table 1. However, as expected, we were unable to retest all of them at the endline, conducted after 7 months.

Table 1: Selected schools and qualifying weak-readers, at baseline

Control Group				Treatment Group			
Schools	TRS (Baseline)			Schools	TRS (Baseline)		
	Mean	Std Dev	N		Mean	Std Dev	N
Dabri (Morning)	18.9	27.9	79	Janakpuri C1 (Morning)	20.1	30.5	83
Dwarka (Morning)	19.8	28.5	68	Janakpuri C1 (Evening)	12.7	19.5	96
Dwarka (Evening)	16.7	29.8	98	Raghuveer Nagar (Evening)	13.9	23.0	85
Dabri (Evening)	10.1	17.8	92	Subhas Nagar (General)	13.5	24.2	122
Janakpuri C-2 (General)	20.3	30.7	106	Vikash Puri B-Block (General)	15.3	29.6	147
Total	17.1	27.6	443	Total	15.0	26.0	533

TRS (max) = 236

² Total Reading Score (TRS) = Q1ToQ5Total = Q1 + Q2 + Q3 + Q4 + Q5.

4. Results: End Line Report

Sample for analysis: Students reached at baseline and endline

At the endline, we were able to reach 298 out of the 443 students in CG and 371 out of the 533 students in TG, a loss of 32.7% and 30.4% respectively (Table 2). In the final sample for analysis, CG's mean TRS at the baseline was 19.4 and TG's mean TRS was 16.3, still comparable.

Table 2: Final sample for analysis, reached at baseline and endline

Control Group					Treatment Group				
Schools	TRS (Baseline)				Schools	TRS (Baseline)			
	Mean	Std Dev	N	Loss		Mean	Std Dev	N	Loss
Dabri (Morning)	23.1	31.8	53	32.9%	Janakpuri C1 (Morning)	24.3	33.9	62	25.3%
Dwarka (Morning)	21.6	29.7	41	39.7%	Janakpuri C1 (Evening)	15.4	21.5	68	29.2%
Dabri (Evening)	19.1	32.7	74	24.5%	Raghuveer Nagar (Evening)	13.5	22.1	78	8.2%
Dwarka (Evening)	11.3	17.8	56	39.1%	Subhas Nagar (General)	12.6	23.2	93	23.8%
Janakpuri C-2 (General)	21.9	31.2	74	30.2%	Vikash Puri B-Block (General)	18.0	32.0	70	52.4%
Total	19.4	29.6	298	32.7%	Total	16.3	26.8	371	30.4%

TRS (max) = 236

In the All Girls school cluster, the loss was 32.2% (Table 3). In the All Boys school cluster, the loss was 25.6% and in the Co-Ed school cluster the loss was 36.8%. Overall, we were unable to retest at the endline, 31.5% of the qualifying weak-reading sample tested at the baseline.

Table 3: Loss from baseline to endline in gender-based school clusters

	Baseline			Endline			Loss
	Control	Treatment	Total	Control	Treatment	Total	
All Girsls Schools	147	83	230	94	62	156	32.2%
All Boys Schools	190	181	371	130	146	276	25.6%
Co-Ed Schoools	106	269	375	74	163	237	36.8%
Total	443	533	976	298	371	669	31.5%

The mean baseline TRS for the 3 gender-based school clusters is given in Table 4.

It shows that in the final sample for analysis, CG and TG were comparable at the baseline for all three gender-based school clusters - all girls, all boys, and co-ed. Overall, the CG sample mean at 19.4 was slightly higher than the TG sample mean at 16.3.

Table 4: Sample for analysis by school clusters: Comparison of CG and TG at baseline

Control Group				Treatment Group			
School cluster	TRS (Baseline)			School cluster	TRS (Baseline)		
	Mean	Std Dev	N		Mean	Std Dev	N
All Girls Schools	22.4	30.7	94	All Girls Schools	24.3	33.9	62
All Boys Schools	15.7	27.5	130	All Boys Schools	14.4	21.8	146
Co-Ed Schools	21.9	31.2	74	Co-Ed Schools	14.9	27.4	163
Total	19.4	29.6	298	Total	16.3	26.8	371

Based on mean TRS at the baseline, the All Girls Schools in CG and TG were very comparable. The same was true for the All Boys schools. In the Co-Ed schools, CG (TRS, 21.9) performed noticeably better than TG (TRS, 14.9).

Dropout sample

What was the baseline reading performance of the children we could not reach at the endline? Table 5 shows that the baseline TRS score for all three school clusters, were comparable. The baseline TRS for CG and TG in the dropout sample is much lower than that for our sample for analysis. Those who dropped out from our sample were generally the weaker of the weak readers. Quite possibly, the dropouts from our study were mostly, either school dropouts or attended irregularly. What is important for the study is that the dropouts in the CG and TG groups, just like in our final sample for analysis, were comparable at the baseline.

Table 5: Dropout sample: Comparison of CG and TG at baseline

Control Group of Schools	TRS(Baseline)			Treatment Group of Schools	TRS (Baseline)		
	Mean	Std Dev	N		Mean	Std Dev	N
All Girls Schools	13.8	22.0	53	All Girls Schools	7.9	9.5	21
All Boys Schools	8.7	17.4	60	All Boys Schools	8.5	17.8	35
Co-Ed Schools	16.3	29.6	32	Co-Ed Schools	13.8	27.2	106
Total	12.2	22.3	145	Total	11.9	23.8	162

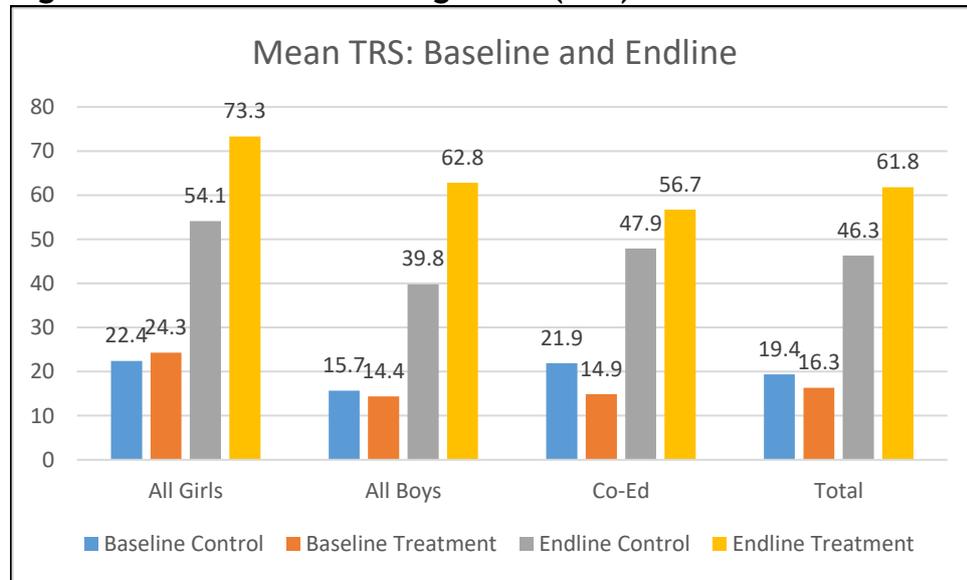
Improvement in Control Group (CG) and Treatment Group (TG)

A comparison of the mean TRS for the gender-based cluster schools, at the baseline (Table 4) and endline (Table 6) is represented in Figure 1.

Table 6: Sample for analysis by school clusters: Comparison of CG and TG at endline

Control Group				Treatment Group			
School cluster	TRS (Endline)			School cluster	TRS (Endline)		
	Mean	Std Dev	N		Mean	Std Dev	N
All Girls Schools	54.1	62.0	94	All Girls Schools	73.3	75.7	62
All Boys Schools	39.8	58.8	130	All Boys Schools	62.8	68.6	146
Co-Ed Schools	47.9	58.4	74	Co-Ed Schools	56.7	60.3	163
Total	46.3	59.8	298	Total	61.8	66.4	371

Figure 1: Mean Total Reading Score (TRS) at baseline and endline



For all school clusters, TRS at baseline in CG and TG (blue & orange) are similar, and if anything, TG was slightly behind overall (except in the All Girls cluster). By the endline, all clusters reached a higher endline TRS but the TG (yellow), in all clusters, advanced considerably more than CG (grey).

Improvement in TG and CG

1) The total improvement in reading, from baseline to endline is defined as:
 Total Reading Improvement (TRI) = TRS (Endline) - TRS (Baseline); TRI max = 236.

2) The improvement in Reading Comprehension (RC), from baseline to endline is defined as: Improvement in Reading Comprehension (IRC) = RC (Endline) - RC (Baseline); IRC max = 6.³

An ANOVA found the mean TRI of CG and TG to be significantly different at $p \leq 0.01$ (Table 7). The mean TRI in CG was 26.9. The mean TRI in TG was 45.5 or 69.1% more. Another measure represented in Table 7 is the percentage of students who could not decode or read anything at all, i.e., not even a letter. At the baseline, the percentage at ‘absolute zero’ was 35.2% in CG and even more, 40.4% in TG. By the endline, this had reversed - 17.4% in CG and much less, 6.5% in TG.

Table 7: Total Reading Improvement (TRI) and percentage at ‘absolute zero’

	N	TRI	Std. Deviation	% Scoring zero on TRS, at Baseline	% Scoring zero on TRS, at Endline	% Moving from zero to some reading
Control Group	298	26.9	45.4	35.2	17.4	17.8
Treatment Group	371	45.5	54.7	40.4	6.5	33.9
Total	669	37.3	51.6			

[TRI, ANOVA $F(1, 667) = 22.19, p = 0.000$]

An ANOVA of Improvement in Reading Comprehension (IRC) also found mean IRC in CG (0.5) to be significantly different at $p \leq 0.01$ than the mean IRC for TG (0.9) (see Table 8). While both the groups were similar on RC at the baseline, 24% more students in TG moved from scoring zero on comprehension to scoring something at least as compared to only 13.7 % in CG doing so.

Table 8: Improvement in Reading Comprehension (IRC) and percentage at ‘absolute zero’

	N	IRC	Std. Deviation	% Scoring zero on RC, at Baseline	% Scoring zero on RC, at Endline	% Moving from zero to some reading comprehension
Control Group	298	0.5	1.4	97.3	83.6	13.7
Treatment Group	371	0.9	1.8	98.1	74.1	24.0
Total	669	0.7	1.7			

[IRC, ANOVA $F(1, 667) = 12.07, p = 0.001$]

Improvement in gender-based school clusters

³ Note that the EGRA we used only had two questions to test reading comprehension, with a maximum score of $3 + 3 = 6$.

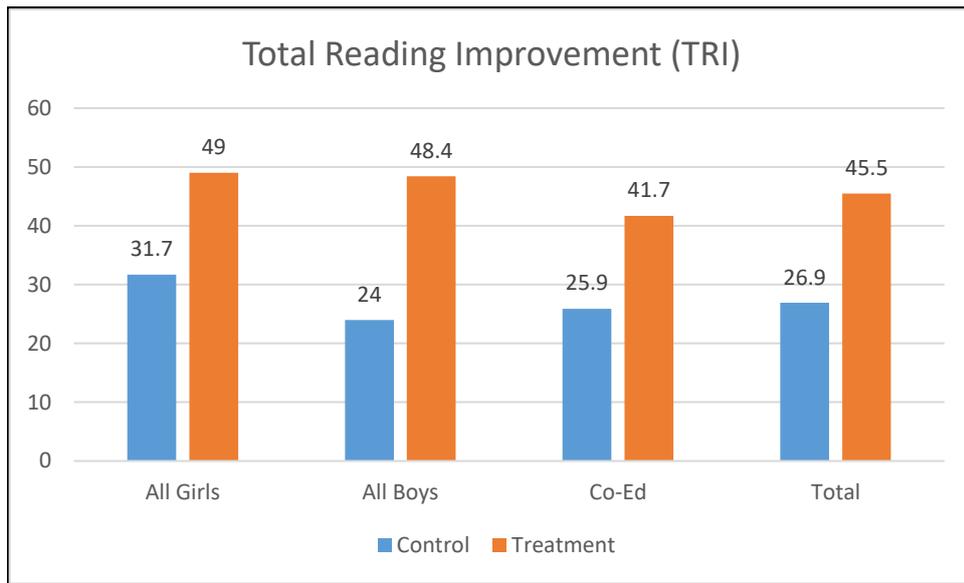
The TRI group means for CG and TG were significantly different in the All Girls (31.7 vs. 49.0, a difference of 17.3), All Boys (24.0 vs. 48.4, a difference of 24.4) and Co-Ed (25.9 vs. 48.5, a difference of 15.8) schools (Table 9; see ANOVA). Across all gender cluster groups, a greater proportion of children in TG, as compared to CG, moved from zero decoding/reading at the baseline to at least some decoding/reading by the endline.

Table 9: Total Reading Improvement (TRI) in gender-based school clusters

All Girl Schools						
	N	TRI	Std. Deviation	% Scoring 0 at Baseline	% Scoring 0 at Endline	% Moving from zero to some reading
Control Group	94	31.7	44.9	25.5	7.4	18.1
Treatment Group	62	49	58.7	29	6.5	22.5
Total	156	38.6	51.4			
TRI, ANOVA [F(1, 154) = 4.29, p = 0.040]						
All Boy Schools						
Control Group	130	24	48	40	27.7	12.3
Treatment Group	146	48.4	59.4	39.7	5.5	34.2
Total	276	36.9	55.6			
TRI, ANOVA [F(1, 274) = 13.79, p = 0.000]						
All Co-Ed Schools						
Control Group	74	25.9	41.3	39.2	12.2	27.0
Treatment Group	163	41.7	48.5	45.4	7.4	38.0
Total	237	36.8	46.8			
TRI, ANOVA [F(1, 235) = 5.89, p = 0.016]						

TRI in CG and TG, overall and in the gender-based school clusters, presented in Tables 7 and 9, is further represented in Figure 2. All the TG schools, whether All Girls, All Boys, or Co-Ed, improved substantially more than their counterparts in CG.

Figure 2: Mean Total Reading Improvement (TRI) at baseline and endline

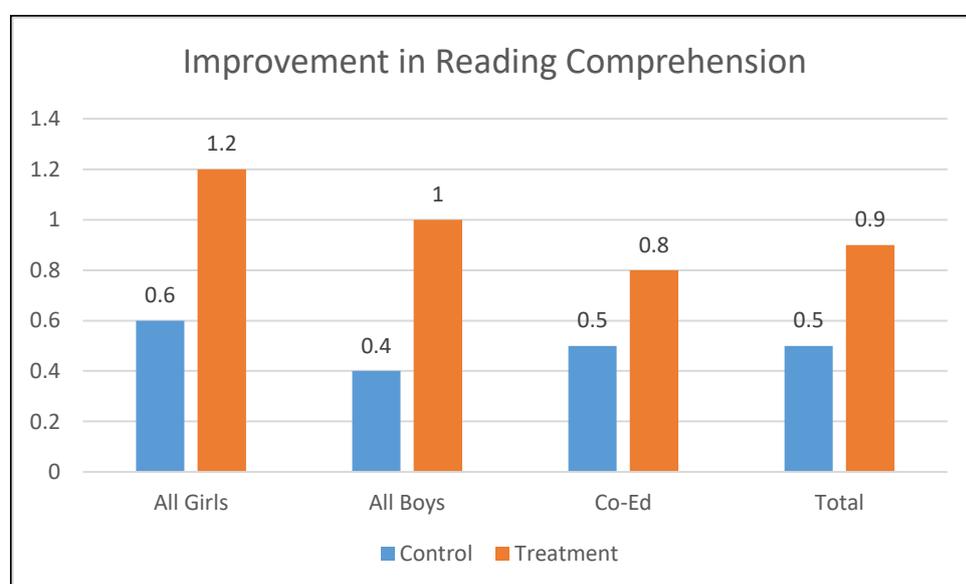


A similar analysis to TRI was conducted for IRC (Tables 8 and 10; Figure 3). The mean IRC in CG and TG was significantly different for All Girls and All Boys schools, but not for Co-Ed schools. The pattern of better reading performance in TG found for TRI (Figure 2) was also found for IRC (Figure 3). In all gender-based school clusters, TG improved substantially more in decoding/reading and reading comprehension.

Table 10: Improvement in Reading Comprehension (IRC) in gender-based school clusters

All Girl Schools						
	N	Improvement in Reading Comprehension (IRC)	Std. Deviation	% Scoring 0 at Baseline	% Scoring 0 at Endline	% Moving up from zero comprehension score
Control Group	94	.6	1.4	98.9	78.7	20.2
Treatment Group	62	1.2	2.1	91.9	64.5	27.4
Total	156	.9	1.7			
IRC, ANOVA [F(1, 154) = 4.29, p = 0.040]						
All Boy Schools						
Control Group	130	.4	1.3	98.5	86.9	11.6
Treatment Group	146	1.0	2.0	100.0	76.0	24.0
Total	276	.7	1.7			
IRC, ANOVA [F(1, 274) = 8.23, p = 0.004]						
All Co-Ed Schools						
Control Group	74	.5	1.5	93.2	83.8	9.4
Treatment Group	163	.8	1.6	98.8	76.1	22.7
Total	237	.7	1.6			
IRC, ANOVA [F(1, 235) = 2.21, p = 0.138]						

Figure 3: Improvement in Reading Comprehension (IRC) at baseline and endline



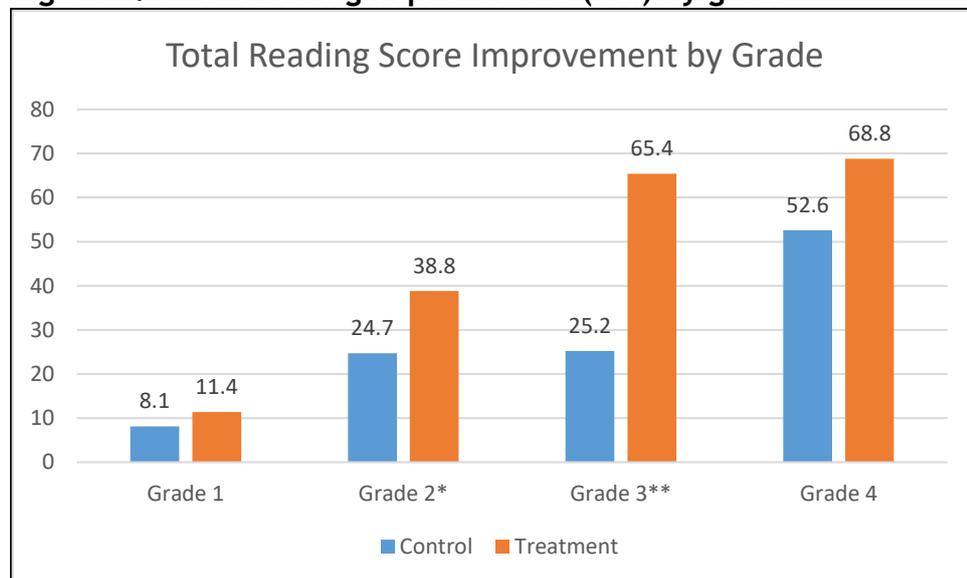
Analysis by grade

Mean TRI for TG was greater than CG in all Grades 1-4 (Table 11). However, an ANOVA showed that the difference in means for TG and CG was significant for Grades 2 and 3 but not Grades 1 and 4. Students in Grade 2, and especially in Grade 3, TG, progressed remarkably further in reading than their counterparts in CG (Figure 4).

Table 11: Total Reading Improvement (TRI) by grade

All Students				
Grade 1				
	N	Total Reading Improvement (TRI)	Std. Deviation	ANOVA
Control	73	8.1	22.7	F(1, 162) = 1.01, p = 0.317
Treatment	91	11.4	19.2	
Total	164	9.9	20.8	
Grade 2				
Control	84	24.7	41.6	F(1, 184) = 5.64, p = 0.019*
Treatment	102	38.8	38.8	
Total	186	32.4	40.6	
Grade 3				
Control	75	25.2	39.8	F(1, 173) = 22.38, p = 0.000**
Treatment	100	65.4	65.1	
Total	175	48.2	59.0	
Grade 4				
Control	66	52.6	61.4	F(1, 142) = 2.41, p = 0.123
Treatment	78	68.8	63.4	
Total	144	61.4	62.8	

Figure 4: Total Reading Improvement (TRI) by grade

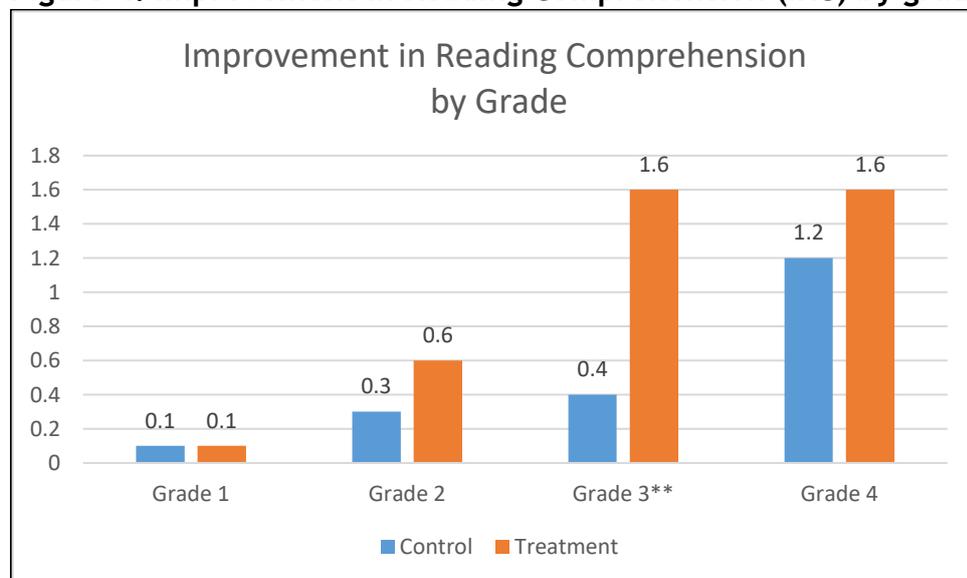


Mean IRC in TG was significantly different than CG, in Grade 3 but not in Grades 1, 2 or 4 (Table 12). However, in Grades 2-4, mean IRC was greater in TG than CG (Figure 5).

Table 12: Improvement in Reading Comprehension (IRC) by grade

All Students				
Grade 1				
	N	Improvement in Reading Comprehension (IRC)	Std. Deviation	ANOVA
Control	73	.1	.7	F(1, 162) = 0.02, p = 0.876
Treatment	91	.1	.6	
Total	164	.1	.7	
Grade 2				
Control	84	.3	1.1	F(1, 184) = 2.22, p = 0.138
Treatment	102	.6	1.4	
Total	186	.5	1.3	
Grade 3				
Control	75	.4	1.1	F(1, 173) = 16.76, p = 0.000**
Treatment	100	1.6	2.3	
Total	175	1.1	1.9	
Grade 4				
Control	66	1.2	2.1	F(1, 142) = 0.82, p = 0.366
Treatment	78	1.6	2.1	
Total	144	1.4	2.1	

Figure 4: Improvement in Reading Comprehension (IRC) by grade



Regression Analysis

The stepwise linear regression analysis we ran, with TRS (endline) as the dependent variable, explains 46.8% of the variation ($R^2 = 0.471$; Adjusted $R^2 = 0.468$). An important covariate was the starting point, i.e., TRS (baseline). The variables in the order of most to least explanatory power are presented in Table 13.

Table 13: Summary of stepwise regression of variables listed in order of explanatory power. Dependent variable: TRS (endline).

		β	t	ΔR^2	Significance
	(Constant)		.074		0.941
1	Total Reading Score, TRS (baseline)	0.526***	17.173	0.383***	0.000
2	School Grade (1-4)	0.282***	8.891	0.055***	0.000
3	TG or not (AniBook-based SLS exposure or not)	0.184***	6.126	0.022***	0.000
4	Number of people in the family	-0.103***	-3.313	0.008***	0.001
5	Sex				NS
6	Belonging to All Girls, All Boys, or Co-Ed School				NS
7	Family owns land or not				NS
8	Type of house (Hut, Semi-Brick, Brick)				NS
9	Family owns car and/or 2-wheeler				NS
10	Access to electricity at home				NS
11	Mobile phone ownership in family				NS
12	Smartphone ownership in family				NS

n = 669. *p <= 0.05; **p <= 0.01; ***p <= 0.001; NS = Not significant.

TRS (baseline) explains 38.3% of the variation in TRS (endline). As one would expect, better reading scores at the baseline were a factor in better reading scores by the endline, but there were other factors too. Given that CG and TG in our case were comparable at the baseline, and if anything, CG was slightly ahead overall, clearly something else was at play. By the endline, TG not only caught up but went substantially ahead in reading. The school grade and regular AniBook viewing, were also statistically significant covariates. This further confirms that regular AniBook exposure did contribute significantly to reading outcomes, even after many other socio-economic covariates listed in Table 13 were controlled for and found not to be significant.

5. Individual students

Soon after our AniBooks program started, we spoke to teachers and identified four children to observe. All four, like most other students in the government schools in our study, are from very poor families (see Table 14 for background details). Their parents are illiterate or have a very basic education and work as laborers or domestic help. The mid-day meal provided by the government is a big incentive for these families to send their children to school.

[Click here to view](#) more photos and small introductory videos of these children. The next page has more information about their background.

Rahul Kumar



Siya Das



Supriya Kumara



Mohammed Yakub



Table 14: Background details of children selected for case study

Name	Rahul Kumar	Siya Das	Supriya Kumari	Mohammed Yakub
Age	8 years	10 years	8 years old	10 years old
Gender	Male	Female	Female	Male
Class	2	4	3	4
School Name & Location	SDMC C1 Janakpuri	SDMC C1 Janakpuri	SDMC C1 Janakpuri	SDMC C1 Janakpuri
Studying in this school since	2017	2016	2015	2015
House address	A-48 Gali no 2 Mahavir enclave 110005	H. N. E53,C1 Chanakya place 40 foot road -110059	A-Z 39E chanakya place gali no 4	H. No 123 street no. 19 sitapuri
Father's Education & Occupation	10 th Pass, Electricity work	10 th Pass, Visa Office	11 th Pass, Servant	Illiterate, electricity work
Mother's Occupation	Illiterate, home maker	10 th Pass, Guard	12 th Pass, Home keeper	Illiterate, home keeper
Siblings	2 brother and no sister	None	2 brother and 1 sister	2 brother and 2 sister
CH_ID	Janakpuri C1 (Evening)2B00	Janakpuri C1 (Morning)3B79	Janakpuri C1 (Morning)3B07	Janakpuri C1 (Evening)4B28

In Table 15 we present the baseline and endline reading scores for all four students. Rahul Kumar was not tested at the endline. He was clearly a very weak reader at the baseline and it would have been interesting had we been able to reach him at the endline.

Interestingly, Siya Das and Supriya Kumari, did very well in reading Q4 (simple sentences) and Q5 (story) at the baseline itself, demonstrating functional reading ability. They maxed the score on both. However, their decoding scores on Q1 (syllables), Q2 (simple words) and Q3 (non-sense words), at the baseline, were not at the maximum possible but were by the endline. This brings into question the assumption one might make in our EGRA that anyone who gets the maximum score on the story reading test (Q5) can be expected to also max on Q1-Q4.

Table 15: Reading performance of case study students at baseline and endline

Name	Rahul Kumar	Siya Das	Supriya Kumari	Mohammed Yakub
Q1 (baseline)	26	31	33	50
Q1 (endline)	Absent	52*	52*	50*
Q2 (baseline)	0	41	47	19
Q2 (endline)	Absent	50*	50*	50*
Q3 (baseline)	0	23	38	19
Q3 (endline)	Absent	50*	50*	44
Q4 (baseline)	0	19*	19*	14
Q4 (endline)	Absent	19*	19*	19*
Q5 (baseline)	0	65*	65*	44
Q5 (endline)	Absent	65*	65*	65*
Comprehension (baseline)	1	3	5	5
Comprehension (endline)	Absent	6*	6*	6*

*Got maximum possible score

Rahul Kumar was unavailable for the endline study as he was travelling. Siya Das, Supriya Kumari and Mohammed Yakub have got the highest score when answering all the questions in the endline. Their teacher, Ms. Akanksha personally tracked their progress and expressed her views in [this video](#).

6. Conclusion

Our findings strongly support the conclusion that regular AniBook viewing and related story activities, accelerate reading skill acquisition measurably and substantially. The evidence for this comes from, both, the present study with a TG and CG group of schools, but also from the video interviews with the teachers who transacted the AniBooks in low-income schools.

In our intervention, the levelled AniBooks and activities were simply given to the teachers on pen drives. The teachers mostly had their own ways of transacting the intervention, except that they were given a schedule for when and which AniBooks had to be shown.

So once the AniBooks are made, the implementation and scale up cost can be made extremely low. Assuming a school already has a TV that can play media files from a pen drive, and many schools do or can easily be equipped to, it's simply a matter of making the AniBooks downloadable or just available on pen drives.

When AniBooks were conceived by BookBox and PlanetRead, the driving motivation was to deliver children's reading at mega scale in any language, to children who just could not afford printed books or did not have easy access to printed books, in the desired languages. Non-English children's books are not easy to find even in Indian languages spoken by tens of millions of people. The AniBook model allows for making existing AniBooks available in any language, at a marginal cost of production in the first language.

Clearly, the teachers in our intervention deserve enormous credit for transacting the AniBooks in ways that resulted in the notable reading gains. For instance, some teachers muted the audio so that the class could try and read aloud and along with the SLS. This form of social and collective reading allowed even the weakest readers to warm up to making an effort, as one of the teachers pointed out.

Practically all the teachers and many students wanted more AniBooks. Ten AniBooks per grade (or reading level), could understandably be a challenge in sustaining interest, over an entire academic year. That the teachers achieved the remarkable reading results they did, even with so few AniBooks per grade/level, is testimony to their creativity in transacting the AniBooks in class. A participant observation or ethnographic study of AniBook transaction would have enriched our study, tremendously.

All the teachers in TG schools, and SARD, have requested and are hoping that the AniBook intervention can continue. PlanetRead is considering leaving the TVs in place so as not to disrupt what we believe is working well. As and when we make new AniBooks in Hindi, we will make them available to the TG schools.

In the TG schools, going forward into the new academic year, it is expected that many more children will now watch the AniBooks. One of our study requirements was to limit the AniBook intervention only to one section in the selected TG school. SARD and PlanetRead would, of course, like to support the expansion of the AniBook intervention to the CG and other schools.

A recent eye-tracking study with AniBooks that we just completed in government schools in Abu Road, Rajasthan, has generated absolutely clear evidence that early-reading children do indeed try and read along, inescapably and automatically, when watching AniBooks. Our present study found strong evidence of reading improvement when children watch AniBooks regularly, further aided by activities. Taken together, these two studies provide strong support for continued production, development and research of the AniBook model.

AniBooks are not just liked by students in low-income government schools in Delhi and Rajasthan, they also garner more than 50,000 views/day on YouTube, globally, and 60% from India.

PlanetRead's vision has been to scale children's reading in India by making AniBooks available on mobile apps and TV. On TV we are aiming to "package" our existing crop of AniBooks into TV programs, in several Indian languages, and then telecasting them on Doordarshan and/or private channels.⁴

⁴ https://www.huffingtonpost.com/entry/a-tv-channel-for-childrens-reading-in-india_us_58c8599ae4b05675ee9c5b23

7. Photos & videos (All photos & videos are for private circulation only, please do not use in public ex. social media without prior permission)



B3 Raghuveer Nagar Grade 2, Savitadi showing PlanetRead AniBooks.



Janakpuri D Block 3



B3 Raghuveer Nagar, Grade 2, Savitadi taking the endline survey



Janakpuri C1_School, Shilpi taking test of Grades 1, endline



Janakpuri C1_School, Akanksha taking Grade 2 test, endline



Janakpuri D Block Akanksha taking test of Grade 4, endline

Class room sessions and end line study:

A collection of photos and video clips from the class rooms in Delhi government schools <https://photos.app.goo.gl/6twXI8vUKICjQS7j2>

Photos and videos from our endline study in Delhi: <https://photos.app.goo.gl/bslLR1vkpkKHwZI32>

Some general photos from the schools where the AniBooks program was conducted in Delhi: <https://photos.app.goo.gl/evqsQZScFmxsZNVN2>

Interviews of SARD team:

Sudhir Bhatnagar, CEO SARD: <https://youtu.be/qwfk6li0IZo>

Anviti Singh, Project Head, SARD: <https://youtu.be/eFqQChEk51Y>

Meena Kumari, Teacher, SARD <https://youtu.be/fdh2glmNwzA>

Akanksha, Teacher, SARD <https://youtu.be/GbCY-P7NScM>

Rajni Sharma, Govt School Teacher: <https://youtu.be/7IQMr-NTlhg>

Videos from Project DRUV, Rajasthan:

Children enjoying PlanetRead's AniBooks via Project DRUV in Rajasthan <https://youtu.be/Kl0Blr3-VGo>

PlanetRead surveyors assessing the reading levels of children who saw AniBooks via DRUV in Rajasthan: <https://youtu.be/GX7P8s7DEwY>

Kailash Sharma, Parent & Teacher talks about PlanetRead's AniBooks on DRUV <https://youtu.be/WJNiBMw2i5I>

Lakshmi, Parent, talks about PlanetRead's AniBooks on DRUV https://youtu.be/1N_aiAreYml

Lucky Sharma, Grade 4 student, talks about PlanetRead's AniBooks on DRUV <https://youtu.be/jhJtjYykrk>