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Every Child in School and Learning Well

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Evidence for Action



Hybrid Learning Endline Evaluation Report

Apr – May, 2018

Hybrid Learning Program Endline Evaluation–Report

April – May, 2018

Hybrid Learning program is running in three states of India, i.e. Uttar Pradesh, Rajasthan and Maharashtra. The four research locations of this program are in Rajasthan. Bassi is in Jaipur-District, Dausa & Sikrai are in Dausa-District along with a control block Rajgarh which is in Alwar-District. These are a part of the Dausa – Evaluation, which is a two-year long impact evaluation study of the Model. It is designed to measure the impact of the Tablet based Digital group learning program on learning levels of children. In this span of two-year long evaluation there will be total 4 assessment focussed visits. This report is the second in the chain of the impact evaluation study, marking the end of year 1 intervention. The past one year comprised of a Census conducted in Mar-May 2017 which was also the Baseline for the ASER test. A Baseline visit in Aug-Sep 2017, which carried out assessments on 4 subjects. Lastly, the Endline visit in Apr-May 2018.

The target grade-group for the study are children from grades 5 to 8. The current instalment to the Dausa-H-learning impact evaluation reports, briefs about the overall design of the evaluation, elaborates the results of the Endline assessment (year 1) and discusses the impact of the yearlong intervention by comparing the results of the Baseline and Endline Assessments.

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Executive Summary:

Pratham has started an initiative named H-Learning/Hybrid Learning Program. In this program, groups of children (in the grades 5th to 8th) are provided with tablets which contain offline video content on English, Math and Science along with some other interesting videos. The aim of the program is to give children independent choice to study with fun, utilizing the interesting videos in the tablet and learning digital skills that will be useful later as well.

The Dausa-H-Learning program runs in 4 locations of Rajasthan thus, constituting the intensive research study of the overall H-Learning Program. The research study is based in 296 villages across the 4 locations of Rajgarh, Sikrai, Bassi and Dausa. The intervention model of the Dausa-H-learning study is cascading in nature which enables to measure the marginal impact of a certain form of intervention. The model can be summarized as:

- **Control villages-** 98 villages from [Rajgarh](#) where there has been no prior Pratham activity forms the Control groups.

There are **three Treatment** groups:

- **Print in community-** 57 villages from [Sikrai](#), where Pratham learning camps were conducted in 2014-15.
- **Digital + Print only in community-** 73 villages from [Bassi](#), where Pratham has not worked previously.
- **Digital + Print in community and school-** 66 villages from [Dausa](#), where Pratham learning camps were conducted in 2014-15.

ASER centre carried out an impact evaluation study in 294 villages of the Dausa-H-learning programme. The Baseline Evaluation was conducted in Aug-Sept 2017 (Year 1) at the onset of the program. This report discusses the Endline Evaluation, carried out in Apr – May 2018 (Year 1).

Broad objective of evaluations: Understanding learning improvements and behaviour in H-Learning Program in a structured way.

Basic statistics

- A total of 294 villages, across all four blocks, have been a part of the Dausa Baseline Assessment.
- Approximately 5400 children have been tracked and tested from these villages in the Endline evaluation, indicating 98% tracking.

ASER Results

- The percentage of children at the Story level on the ASER Reading tool has increased between the two visits. Dausa had the largest proportion of Story level children (83%) as per the Endline visit. However, the largest progress was found in Rajgarh, which depicted a 22% growth from the Baseline proportion of Story level children. A significance test on the impact of intervention showed that the progress in any of the 4 locations on the ASER Reading tool is not attributable to any of the interventions.
- The percentage of children who are at least at the Subtraction level of the ASER Math tool have increased between the two visits. Bassi had (81%) children at least on the Subtraction level, making it the location with the largest proportion of Subtraction (and above) level

children. It is worth noting that the largest progress to the Subtraction level was seen in Bassi. A significance test on the impact of the intervention showed that it is the Digital intervention that had led to a significant progress. The School and Print interventions were nearly ineffective.

- The percentage of children who can read word on the ASER English tool has increased in all 4 locations between the two visits. Bassi had the largest percentage of children (69%) who are at the Word (and above) level on the tool in the Endline evaluation. However, it is worth noting that the gains in Sikrai and Bassi are not very different, thus indicating a positive impact of the Print and the Digital interventions. A significance test on the impact of the intervention upholds the above finding.

Subject wise details of the assessment: Test Mean

a) Math pen and paper assessment

- A total of 5408 children were tested on Math pen and paper assessment in the Endline visit.
- The average score on the assessment from across the blocks was 58%, with Bassi scoring the highest of 62%.
- With regard to the common cohort (N=5392) that was tested in both visits, the average score in each location had increased significantly.
- In the common cohort, children from Bassi scored the highest. They also made the largest progress amongst the 4 locations, indicating a significant and positive impact of the Digital intervention.
- Further, it was seen that children from government schools have made the most progress.

b) Hindi pen and paper assessment

- A total of 5408 children were tested on Hindi pen and paper assessment in the Endline evaluation.
- The average score on Hindi assessment in the Endline visit across the 4 locations was 60% with Bassi scoring the highest at 66%.
- The cohort in the Hindi assessment comprised of 5390 children from the 4 locations. Their average scores had significantly increased between the two visits.
- Within the common cohort as well, the average score of Bassi was the highest. Further, children from Bassi had shown the largest improvement in the scores indicating a significant positive impact of the Digital intervention.
- It was also found that children from government schools gained the most.

c) English oral assessment

- A total of 5400 children were tested on English oral assessment in the Endline visit.
- The average score in English assessment in the Endline visit was 65%, with Bassi scoring the highest at 68%.
- The common cohort comprised of 5394 children from the 4 locations. It was found that while all locations showed a significant increase in the average scores, children from Bassi scored the highest.
- Within the common cohort, the gains in Bassi and Dausa however were not very different indicating the positive impact of Digital intervention, but no additional impact of school intervention.
- Further, the largest progress has been made by children from government schools.

d) Science oral assessment

- A total of 5402 children were tested on Science oral assessment in the Endline visit.
- The average score for grades 5-6 was 53%, with Bassi scoring the highest at 60%. Similarly, for grades 7-8 the average score in Endline visit was 57%, with Bassi scoring the highest at 64%
- The common cohort in the Science assessment comprised of 2680 children from grades 5-6 and 2712 children from grades 7-8.
- Within the common cohort, the average score of Bassi was highest in both grade groups. Further, the gains across the locations in each grade group, was largest in Bassi, indicative of a significant positive impact of Digital intervention.
- For grades 5-6, the School intervention had no additional impact while the gains made by children from Sikrai (Print intervention) were significantly lower than that made by children from Rajgarh (Control).
- For grades 7-8 both Digital and Schools interventions had a significantly positive impact as compared to Print intervention. However, it was the Digital intervention which led to most gains.
- In both grade groups, children from government schools have gained the most.

Conclusion

Children in government schools of Bassi which received Digital intervention at the community level show the largest progress. This indicates to the impact of Digital intervention. Print and School intervention show no additional impact. Print intervention and control show almost equivalent levels.

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The Program (A brief background)

The Dausa-H-Learning program is a two-year impact evaluation study of the H-learning programme of Pratham, running in 3 states of India namely -Uttar Pradesh, Rajasthan and Maharashtra. The evaluation is being conducted in 4 locations in the state of Rajasthan -Dausa, Bassi, Sikrai and Rajgarh. The study spans across 296 villages¹ in these 4 locations. The first year of the intervention² follows a cascading model such that:

- Rajgarh, where in 99 villages are part of the study, is the **control location** and has had no prior Pratham presence.

There are **three treatment** locations:

- Sikrai, with 57 villages, is one of the locations where Pratham conducted Learning camps between 2014-15. This location receives Print intervention at the community level.
- Bassi, with 74 villages, is the second treatment group, where in Pratham has had no prior presence. This treatment group receives Print and Digital intervention at the community level. Digital + Print in community and school: 66 villages in Dausa block, where Pratham Learning Centres (LCs) were run in 2014-15 (Group-3)
- Dausa, with 66 villages is the third treatment group, where Pratham conducted learning camps between 2015-15. This location receives, Print and Digital intervention both at community and school level.

The intervention is based on group and peer learning. In each of the intervention locations, children sit regularly in community (and/or school) in groups of 5 for about an hour. Every two group is provided with a tablet or print material that consist of Science, Math and English content aligned with the state textbooks of grades 5 to 8. Each group spends time watching (reading through) a particular subject topic and discussing the same,

As part of the impact evaluation study, prior to the start of the intervention, a Baseline assessment was conducted in the year 2017. After a yearlong intervention an Endline assessment was conducted in March-April, 2018. This allows to understand the learning improvements post one year's intervention vis-à-vis the control location.

The research questions the impact evaluation aims to answer:

- *Can digital intervention be given to children without a prior program that builds basic foundational skills? Can digital intervention replace the conventional Read India?*
- *Is a program to build foundational competencies important to run before digital intervention? Do we still need Read India along with digital interventions as a pre-cursor?*
- *Is it better to have an intervention with both print and digital content or only a digital intervention is better? Is the digital intervention really worth?*
- *Is it better to have an Intervention both at school and community or only a community intervention better?*

This report is in continuity with the Baseline report. It discusses the Endline results and the impact of the first year of intervention by comparing the Baseline and the Endline results.

¹ For the impact evaluation study, 294 villages were considered, since at the time of sampling, it was found that, two villages from Dausa and Rajgarh each lacked the adequate number of children in grades 5-8 that met the sampling method.

² In year two, Sikrai will also be given digital intervention along with print intervention at the community level.

Endline Assessment – Year 1 Findings

I. Process

1. Assessment design

The assessment design³ for the Endline visit remained same as that of the Baseline visit. Following the exact assessment pattern allowed a clear comparison of the change in learning outcomes of children on select topics (also content of the intervention) between Baseline and Endline. Besides the change in learning outcomes of children in general, the Endline assessment allows a comparison of the degree of change between the treatment and control locations. This in turn allows to study the impact of the intervention. Given that the intervention is incremental in nature amongst the three treatment blocks, the Endline assessment also allows for the comparison of the various interventions.

Table 1. Assessments in Endline visit

Subject	Grades assessed	Mode of assessment
ASER (Reading/Math/English)	5-8	Oral
English	5-8	Oral
Science	5-8	Oral
Math	5-8	Pen and paper
Hindi	5-8	Pen and paper

2. Child Tracking and Testing

The impact evaluation tracked children from 294 of the 296 villages from the 4 research locations. Table 2 below depicts the total villages and the sample size from each research locations.

Table 2. Sample Description

Block	Intervention	No. of villages	Sample size
Rajgarh	Control	98	1680
Sikrai	Print in community	57	1147
Bassi	Digital and Print in community	73	1397
Dausa	Digital and Print in community and school	66	1316
Total		294	5540

Not all children of the sample were tracked and tested. However, approximately 98% were tracked. Table 3 depicts the number of children tested from each location in each grade per subject.

³ Refer Appendix A for Assessment Design and broader framework

Table 3. Number of Children tested

English						Hindi					
Location	Grade				Total	Location	Grade				Total
	5	6	7	8			5	6	7	8	
Rajgarh	395	409	408	415	1627	Rajgarh	396	409	408	417	1630
Sikrai	277	282	282	274	1115	Sikrai	277	282	282	274	1115
Bassi	334	339	349	352	1374	Bassi	334	340	350	353	1377
Dausa	327	323	324	310	1284	Dausa	327	324	324	311	1286
Total	1333	1353	1363	1351	5400	Total	1334	1355	1364	1355	5408
Math						Science					
Location	Grade				Total	Location	Grade				Total
	5	6	7	8			5	6	7	8	
Rajgarh	396	409	408	417	1630	Rajgarh	396	409	408	416	1629
Sikrai	277	282	282	274	1115	Sikrai	277	282	282	274	1115
Bassi	334	340	350	353	1377	Bassi	334	339	349	352	1374
Dausa	327	324	324	311	1286	Dausa	327	323	324	310	1284
Total	1334	1355	1364	1355	5408	Total	1334	1353	1363	1352	5402
Note: 5 children from Rajgarh and 2 children from Sikrai were not tested in any subject; Within each subject also in addition to the 7 from Rajgarh and Sikrai, some more children were not tested due to their unavailability											

Table 4 depicts the number of children tested aggregated by gender in each testing location.

Table 4. Children tested aggregated by gender

Block	boys		girls		Total
	N	% (of total)	N	% (of total)	
Rajgarh	846	52.0	781	48.0	1627
Sikrai	548	49.2	567	50.9	1115
Bassi	734	53.4	640	46.6	1374
Dausa	712	55.5	571	44.5	1284
Total	2840	52.6	2559	47.4	5400

Thus a total of 5400 children were tracked and tested in all subjects of the Endline assessment.

II. Testing

1. ASER Testing:

ASER⁴ Testing was done along with the main subject assessments. For this purpose, the ASER testing tools in Hindi (language) was used for reading. ASER Arithmetic test was used to check the basic arithmetic skills. ASER English test was used to check the basic English reading skills.

Table 5. ASER Reading: Overall Results

Location	Reading levels					
	Beginner	Letter	Word	Paragraph	Story	Total
Rajgarh	0.9	4.8	5.7	15.2	73.4	1622
Sikrai	0.9	4.0	4.4	10.0	80.7	1115
Bassi	0.3	2.8	3.9	11.1	81.9	1378
Dausa	0.9	3.4	4.4	8.3	83.1	1284
Total	0.7	3.8	4.7	11.4	79.4	5399

Over 90% of children were able to read the ASER paragraph (Std 1 level text) or the story (Std 2 level text).

Table 6. ASER Math: Overall Results

Location	Math levels					
	Beginner	NR (1-9)	NR (10-99)	Subtraction	Division	Total
Rajgarh	0.4	6.5	20.7	24.8	47.6	1621
Sikrai	0.6	6.3	17.7	25.1	50.3	1114
Bassi	0.3	4.0	14.4	30.3	51.1	1377
Dausa	0.6	4.1	16.5	25.0	53.8	1284
Total	0.5	5.2	17.5	26.3	50.5	5396

Over 70% children were able solve the Subtraction or Division problems in the ASER Math tool.

Table 7. ASER English: Overall Results

Location	English Levels					
	Beginner	Capital Letter	Small Letter	Word	Sentence	Total
Rajgarh	2.9	3.5	32.1	24.8	36.7	1622
Sikrai	3.2	3.6	31.0	19.3	42.8	1112
Bassi	0.7	2.4	28.0	25.6	43.4	1377
Dausa	2.7	2.5	27.6	20.5	46.8	1281
Total	2.3	3.0	29.8	22.8	42.1	5392

A little over 60% children can read the simple words or sentences of the ASER English tool.

⁴ ASER refers to the standardized assessment tools which is used since 2005 by the organization (ASER Centre – Pratham Education Foundation) for conducting the annual citizen led survey in all rural districts of India. The findings of children's Reading and Arithmetic levels are based on these criterions referenced assessment tools.

2. Subject wise Assessments:

A. Written Assessments

Math

The Math assessment had 10 items and was administered by pen and paper mode. The test was composed of items on Understanding of numbers, Subtraction, Division, Word problems, Geometry and Area Perimeter. The tool had two comparable samples⁵ for testing. A total of 5408 children were tracked and tested on the Math assessment.

Table 8. Math assessment framework

Items	Cognitive Level	Description
mat_q1a	Write numbers from number names	Hundreds
mat_q1b		Thousands
mat_q1c		Lakhs
mat_q2a	Write the biggest number	Three digits
mat_q2b		Four digits
mat_q3a	Subtraction	2 by 2 digit
mat_q3b		3 by 3 digit
mat_q4a	Division	2 by 1 digit
mat_q4b		3 by 1 digit
mat_q5	Subtraction word problem	3 by 3 digit
mat_q6	Division word problem	3 by 1 digit
mat_q7	Choose geometrical shape	Multiple Choice
mat_q8	Perimeter	With the usage of the term “Perimeter”
mat_q9	Choose angle	Multiple choice
mat_q10	Perimeter word problem	Without the usage of the term “Perimeter”

Table 9. Math: Overall results

Location	Average marks	Average marks (in%)
Rajgarh	8.0	53.2
Sikrai	8.6	57.1
Bassi	9.3	62.1
Dausa	8.9	59.3
Overall	8.7	57.9

The average score in Math is 58% in Endline indicating a 5% increase from the Baseline score.

⁵ To understand more details about the assessment tools and its reliability validity coefficients refer to the H Learning Dausa Baseline Year 1 report.

Table 10. Math: Item-wise results aggregated by location

Block	Rajgarh	Sikrai	Bassi	Dausa	Overall
mat_q1a	69.0	72.7	76.8	75.8	73.6
mat_q1b	58.1	63.2	66.2	64.1	62.9
mat_q1c	19.3	23.3	23.7	24.3	22.6
mat_q2a	79.9	83.4	85.6	86.2	83.8
mat_q2b	51.0	54.9	59.3	58.3	55.9
mat_q3a	74.7	78.9	81.3	79.3	78.5
mat_q3b	67.8	71.9	74.1	71.7	71.4
mat_q4a	56.6	59.2	60.3	63.6	59.9
mat_q4b	51.8	55.4	55.3	57.9	55.1
mat_q5	56.9	63.1	63.6	62.8	61.6
mat_q6	34.6	38.7	41.1	40.1	38.6
mat_q7	61.8	64.9	77.6	69.3	68.4
mat_q8	36.4	39.0	54.5	39.9	42.5
mat_q9	41.8	46.1	60.6	50.9	49.9
mat_q10	39.1	41.2	51.3	45.6	44.3

Overall the math tool is one of average difficulty. Writing number names of 6-digit numbers was found to be most difficult, while identifying the largest 3-digit number was the easiest item. Over 70% children can solve the subtractions items (mat_q3a and mat_q3b). Similarly, identifying the correct geometric shape has been solved by 68% children.

Table 11. Math: Item-wise results aggregated by grade

Grade	5	6	7	8	Overall
mat_q1a	69.5	69.0	78.1	77.7	73.6
mat_q1b	56.1	58.4	67.6	69.3	62.9
mat_q1c	14.3	19.9	25.3	31.0	22.6
mat_q2a	78.4	80.6	86.8	89.1	83.7
mat_q2b	50.2	53.7	56.9	62.7	55.9
mat_q3a	74.2	76.8	80.7	82.4	78.5
mat_q3b	65.5	69.2	75.6	75.1	71.4
mat_q4a	53.4	55.8	63.3	67.2	59.9
mat_q4b	49.3	49.8	58.6	62.8	55.1
mat_q5	53.6	57.9	66.2	68.6	61.6
mat_q6	35.7	33.6	41.3	43.8	38.6
mat_q7	60.8	65.4	70.5	76.8	68.4
mat_q8	39.9	41.7	43.5	44.8	42.5
mat_q9	46.5	48.2	51.1	53.6	49.8
mat_q10	38.0	44.6	46.2	48.3	44.3

Table 11, clearly shows a grade based progress in performance across all items in the Math assessment.

Hindi

The Hindi assessment was administered via pen and paper mode and had 14 items. The test required the child to read an informative text and answer the comprehension items based on the former. The test assessed children on understanding of the text and identifying the correct meaning of the terms from the text, classification of terms, writing open ended response to an item and, evaluating and identifying the true and false statements. The assessment was administered at a common location in the village. A total of 5408 children were tracked and tested on the Hindi assessment.

Table 12. Hindi assessment framework

Items	Cognitive level	Description
hin_q1 ⁶ a	Knowledge	Match word with appropriate meaning
hin_q1b		Match word with appropriate meaning
hin_q1c		Match word with appropriate meaning
hin_q1d		Match word with appropriate meaning
hin_q1e		Match word with appropriate meaning
hin_q2 ⁷ a	Understand	Fill in the blanks
hin_q2b		Fill in the blanks
hin_q3 ⁸ a	Understand (Classify)	Categorization of terms basis understanding of text
hin_q3b		Categorization of terms basis understanding of text
hin_q4 ⁹	Apply	Open ended
hin_q5 ¹⁰ a	Evaluate	True False
hin_q5b		True False
hin_q5c		True False
hin_q5d		True False

Table 13. Hindi: Overall results

Location	Average marks	Average marks (in%)
Rajgarh	7.8	55.7
Sikrai	8.1	58.0
Bassi	9.3	66.4
Dausa	8.6	61.2
Overall	8.4	60.3

The average score in the Hindi assessment is 60% and it is about 6% higher than the Baseline score of 54%.

⁶ Question 1 had five sub-parts (a-e), the question was knowledge level item, where in the child was required to match the words with their appropriate meaning.

⁷ Question 2 had two sub-parts (a-b), where in the child was required to complete statements with the appropriate words from the text.

⁸ Question 3 had two sub-parts (a-b) where in the child was to classify various food under vegetarian and non-vegetarian (in sample 1 of the testing tool) and various water sources under surface water and ground water sources. The child could pick terms from the text or based on his knowledge.

⁹ Question 4 was an open-ended item.

¹⁰ Question 5 had four sub-parts (a-d) where in the child was to mark a statement as 'True' or 'False' based on his evaluation of the text.

Table 14. Hindi: Item-wise results aggregated by location

Location	Rajgarh	Sikrai	Bassi	Dausa	Overall
hin_q1a	65.8	72.4	77.9	75.7	72.9
hin_q1b	50.1	56.0	69.6	62.1	59.5
hin_q1c	49.3	52.8	63.8	59.5	56.4
hin_q1d	45.5	52.5	60.0	54.4	53.1
hin_q1e	50.1	53.3	65.4	58.6	56.8
Q1 Overall	52.1	57.4	67.4	62.1	59.7
hin_q2a	72.9	71.5	83.2	77.3	76.2
hin_q2b	46.8	45.7	59.2	52.8	51.1
Q2 Overall	59.9	58.6	71.2	65.0	63.7
hin_q3a	53.6	58.2	68.0	61.5	60.3
hin_q3b	57.1	60.5	69.1	60.6	61.8
Q3 Overall	55.3	59.3	68.6	61.0	61.1
hin_q4	50.3	47.2	50.7	46.8	48.7
hin_q5a	62.5	60.7	64.3	63.4	62.7
hin_q5b	73.7	77.2	78.3	75.9	76.3
hin_q5c	54.1	56.1	61.4	56.8	57.1
hin_q5d	48.3	47.9	58.5	51.2	51.5
Q5 Overall	59.6	60.5	65.6	61.8	61.9

Overall the Hindi tool was found to be of medium difficulty. The apply level item (hin_q4) shows the least percentage of correct respondents at 49%. Location wise comparison shows that children from Bassi and Dausa have performed relatively better than the other two locations.

Table 15. Hindi: Item-wise results aggregated by grade

Grade	5	6	7	8	Overall
hin_q1a	68.1	70.4	75.5	77.7	72.9
hin_q1b	51.4	58.1	63.6	64.6	59.4
hin_q1c	50.4	55.0	58.6	61.4	56.3
hin_q1d	47.1	48.2	58.3	58.6	53.1
hin_q1e	50.0	55.1	61.6	60.7	56.8
Q1 Overall	53.4	57.4	63.5	64.6	59.7
hin_q2a	64.2	73.1	82.8	84.7	76.2
hin_q2b	40.1	46.7	57.6	59.8	51.1
Q2 Overall	52.2	59.9	70.2	72.3	63.6
hin_q3a	54.0	53.0	64.1	70.2	60.3
hin_q3b	52.9	56.5	65.6	72.1	61.8
Q3 Overall	53.4	54.7	64.9	71.1	61.0
hin_q4	34.8	43.7	54.7	61.6	48.7
hin_q5a	58.6	61.9	66.0	64.3	62.7
hin_q5b	71.5	74.0	78.0	81.6	76.3
hin_q5c	54.2	55.9	58.3	59.9	57.1
hin_q5d	50.0	50.3	53.0	52.6	51.5
Q5 Overall	58.6	60.5	63.8	64.6	61.9
Overall	53.3	57.3	64.5	66.9	60.5

Table 16 shows a grade-wise progress in performance across all items.

B. Oral Assessments

English

The English test was an oral assessment that assessed children on competencies to recognize, read, listen and comprehend letters, words and sentences. The tool had two comparable samples for testing. A one-on-one assessment, the test was conducted within the comfort of a child's home. A total of 5400 children were tracked and tested on the English Assessment

Table 16. English assessment framework

Level	Recognize			Read			Listen	Comprehend and tell meaning
Letter	Capital letters		Small letters	Capital letters		Small letters		
Words	2 letter words	3 letter words	4 letter words	2 letter word	3 letter word	4 letter word		Give meaning
Sentences	Sentence recognition			Sentence/paragraph reading			Listening to sentence/paragraph	Answer questions based on the sentence/para
								Read the sentences, fill in the blanks (preposition/ verb/ noun) and tell meaning

Table 17. English: Overall Results

Location	Average marks	Average marks (in%)
Rajgarh	32.6	62.8
Sikrai	33.2	63.9
Bassi	35.2	67.7
Dausa	34.5	66.3
Overall	33.9	65.2

The average percentage score in English during the Endline visit is 65.2%, which is a 5% increase from the Baseline score.

Table 18. English: Item-wise results aggregated by location

Location	Rajgarh	Sikrai	Bassi	Dausa	Overall
eng_cap_rec_1	98.5	98.9	99.3	99.5	99.1
eng_cap_rec_2	97.0	96.6	98.9	97.7	97.5
eng_cap_rec_3	96.9	97.3	99.1	97.7	97.7
eng_cap_rec_4	97.3	96.3	98.7	97.2	97.4
eng_cap_rec_5	96.3	96.5	98.3	97.7	97.2
eng_sml_rec_1	96.9	95.7	98.4	96.9	97.0
eng_sml_rec_2	94.6	94.8	98.3	96.1	95.9
eng_sml_rec_3	95.1	95.4	98.3	96.7	96.4
eng_sml_rec_4	94.8	94.4	97.5	96.5	95.8
eng_sml_rec_5	94.3	95.3	97.4	96.2	95.8
eng_cap_read	96.8	96.4	98.0	97.7	97.2
eng_sml_read	95.2	94.9	97.6	96.8	96.1
eng_word_rec2	88.1	89.8	92.8	91.9	90.6
eng_word_rec3	82.9	84.6	89.2	86.3	85.7
eng_word_rec4	77.8	81.2	85.8	83.6	82.1
eng_word_read2_1	62.3	67.4	68.2	65.2	65.8
eng_word_read2_2	49.0	49.6	54.4	52.2	51.3
eng_word_read3_1	44.7	42.0	50.5	50.5	46.9
eng_word_read3_2	42.2	42.5	51.0	50.6	46.6
eng_word_read4_1	43.6	45.1	51.2	50.2	47.5
eng_word_read4_2	45.6	52.2	51.9	51.2	50.3
eng_sen_rec1	81.1	85.7	87.6	84.4	84.7
eng_sen_rec2	82.8	86.4	87.5	85.1	85.4
eng_sen_read	29.3	32.0	43.0	44.9	37.3
eng_read_ans1	49.3	56.5	58.8	53.0	54.4
eng_read_ans2	22.7	22.9	32.4	28.7	26.7
eng_read_ans3	7.7	3.5	11.6	11.5	8.6
eng_fill_word1	25.2	25.4	32.7	30.6	28.5
eng_fill_word2	19.9	21.3	27.6	23.8	23.2
eng_fill_word3	17.7	19.1	21.8	21.9	20.1
eng_fill_word4	20.3	24.4	23.8	24.5	23.3

It is seen from Table 18 that over 95% of children could recognize letters correctly. Items on word recognition show a steady fall in the percentage of correct respondents from 2 letter to 4 letter words. With regard to sentence recognition, close to 85% are able to recognize the correct sentences. At the reading level, more than 95% children can read letters, while close to 60% children can read 2 letter words, less than 50% can read 3 and 4 letter words. Only 37% can read sentences. As in the Baseline, for all children comprehension skills were assessed on the basis of listening to the paragraph being read. Thus, the 63% children who were unable to read the sentences, were also assessed on comprehension items. It was found that overall, 54% children gave correct response to the direct fact retrieval item (eng_read_ans1). However, the performance dips in the other two comprehension items, such that the inference level item (eng_read_ans3) is found to be extremely difficult with only 8% correct respondents. The last four items in English assessed children on their ability to complete sentences by filling in the appropriate preposition/noun/verb. Less than 30% children were able to give correct responses to these items.

Location-wise comparison shows that Bassi and Dausa are ahead of the other two locations in almost all items.

Table 19. English: Item-wise results aggregated by grade

Grade	5	6	7	8	Overall
eng_cap_rec_1	98.5	99.4	99.0	99.4	99.1
eng_cap_rec_2	96.1	97.5	98.0	98.6	97.5
eng_cap_rec_3	96.0	97.7	98.4	98.7	97.7
eng_cap_rec_4	96.0	97.3	97.9	98.3	97.4
eng_cap_rec_5	96.2	96.7	97.6	98.3	97.2
eng_sml_rec_1	95.5	96.9	97.5	98.1	97.0
eng_sml_rec_2	93.8	95.5	97.0	97.5	95.9
eng_sml_rec_3	94.2	95.5	97.3	98.5	96.4
eng_sml_rec_4	93.9	95.2	96.2	97.9	95.8
eng_sml_rec_5	93.4	95.5	96.8	97.2	95.8
eng_cap_read	96.1	97.4	97.6	97.7	97.2
eng_sml_read	94.3	96.6	96.6	97.1	96.1
eng_word_rec2	85.8	89.8	93.1	93.7	90.6
eng_word_rec3	79.0	84.6	87.8	91.5	85.7
eng_word_rec4	74.1	80.1	85.1	89.0	82.1
eng_word_read2_1	59.5	63.6	67.8	72.1	65.7
eng_word_read2_2	43.3	48.5	55.6	57.7	51.3
eng_word_read3_1	38.9	42.8	50.6	55.3	46.9
eng_word_read3_2	37.9	42.1	51.3	54.9	46.6
eng_word_read4_1	39.3	43.7	51.9	55.2	47.5
eng_word_read4_2	43.5	47.9	52.7	56.8	50.2
eng_sen_rec1	78.4	83.6	86.5	90.2	84.7
eng_sen_rec2	80.0	83.7	88.5	89.5	85.4
eng_sen_read	26.4	33.1	42.9	46.8	37.3
eng_read_ans1	45.2	51.1	59.3	61.7	54.3
eng_read_ans2	19.1	23.9	30.5	33.0	26.6
eng_read_ans3	6.1	7.3	10.2	10.5	8.5
eng_fill_word1	21.2	25.4	29.9	37.5	28.5
eng_fill_word2	18.0	21.0	23.6	30.0	23.1
eng_fill_word3	15.9	18.3	21.8	24.3	20.1
eng_fill_word4	17.3	19.4	26.9	29.3	23.2

Table 19, indicates a grade-wise increase in performance in all items.

Science

The Science assessment was an oral assessment and had 12 items. Two sets of tools were developed for two grades groups; group A comprised of children in grades 5 and 6 and group B comprised of children in grades 7 and 8. The tool for group A was based on topics like water, food, human body, substances and solar system. The tool for group B was based on topics like light, energy, human body, substances, electricity and solar system. Six items, from human body and solar system, were common in the tools for both groups. Items assessed recognition, knowledge and understanding of key concepts from these topics. This was done to maintain the comparability of the tools. The tool was a coloured booklet for the child to look at and answer according to the questions asked by the surveyor.

A total of 2687 children from grades 5-6 and 2715 children from grades 7-8 were tracked and tested on the Science Assessment.

Table 20. Science assessment framework

Items	Cognitive level	Items: grade 5-6	Items: grade 7-8
sci_q1	Recognize	कौनसा जीव पानी में नहीं रहता	कौनसी वस्तु पारदर्शी है
sci_q2	Recognize	कौनसा जीव मांस खाता है	सौर उर्जा कौनसा है
sci_q3	Knowledge	रक्त परिसंचरण तंत्र	रक्त परिसंचरण तंत्र
sci_q4	Understand	पोषक तत्व समूह	प्राकृतिक एवं कृत्रिम प्रकाश स्रोत
sci_q5	Understand	घुलनशील- अघुलनशील	अधिक उर्जा किसमें खर्च हुई
sci_q6	Knowledge	कंकाल तंत्र हड्डियों के नाम	कंकाल तंत्र हड्डियों के नाम
sci_q7	Understand	रक्त स्थान- अनीमिया	रक्त स्थान - प्रकाश मार्ग
sci_q8	Understand	गलती सुधर - पानी बर्फ प्रक्रिया	विद्युत् उर्जा के दो रूप
sci_q9	Understand	पाचन तंत्र रक्त स्थान	पाचन तंत्र रक्त स्थान
sci_q10	Knowledge	सौर मंडल प्र.1	सौर मंडल प्र.1
sci_q11	Understand	सौर मंडल प्र.2	सौर मंडल प्र.2
sci_q12	Understand	सौर मंडल प्र.3	सौर मंडल प्र.3

Table 21. Science: Overall Results

grade 5-6			grade 7-8		
Location	Average marks	Average marks (in%)	Location	Average marks	Average marks (in%)
Rajgarh	5.9	49.4	Rajgarh	6.4	53.3
Sikrai	6.3	52.2	Sikrai	6.3	52.4
Bassi	7.1	59.5	Bassi	7.7	64.3
Dausa	6.6	55.0	Dausa	6.8	57.0
Overall	6.5	53.9	Overall	6.8	56.8

The average scores (as shown in table 21) in Endline for grades 5-6 is 54% and that for grades 7-8 is 57%, indicating an improvement of approximately 8% and 5% improvement from Baseline.

Table 22, below indicates item-wise performance aggregated by location.

Table 22. Science: Item-wise results aggregated by location

Block	Sikrai	Rajgarh	Bassi	Dausa	Overall	Block	Sikrai	Rajgarh	Bassi	Dausa	Overall
Grade	5 and 6	5 and 6	5 and 6	5 and 6	5 and 6	Grade	7 and 8	7 and 8	7 and 8	7 and 8	7 and 8
sci_q1	97.5	97.5	98.2	98.8	98.0	sci_q1	70.9	71	90.3	81	78.3
sci_q2	76.2	83.2	90	83.9	83.3	sci_q2	84.2	87.5	94.3	90.5	89.1
sci_q3	28.1	23.6	33.3	30.5	28.9	sci_q3	37.1	36.8	49.5	45.4	42.2
sci_q4	16.4	18.5	23.3	19.9	19.5	sci_q4	49.5	50.5	65.2	51.8	54.3
sci_q5	67.6	58.6	69.9	66	65.5	sci_q5	31.8	48.6	58.2	44.9	45.9
sci_q6	52.4	43.4	77.4	68.3	60.4	sci_q6	74.1	69.9	86.5	81.1	77.9
sci_q7	35.8	29.7	30.6	37.1	33.3	sci_q7	49.5	44.2	43	49	46.4
sci_q8	87.8	79	89.1	85.7	85.4	sci_q8	38.7	37	55.2	38.5	42.4
sci_q9	8.4	10.8	11.4	13.9	11.1	sci_q9	14.4	16.5	20.5	19.6	17.8
sci_q10	51.3	46.8	70.3	54.2	55.7	sci_q10	50	54.2	72	56.6	58.2
sci_q11	54.8	50.4	57.9	49.4	53.1	sci_q11	63.7	59.3	66.3	57.9	61.8
sci_q12	50.4	50.9	62.4	52.2	54.0	sci_q12	65.5	64.3	71	67.4	67.1

It is seen that the easiest item for grades 5-6 was a recognition level item on identifying animal which did not live in water. For grades 7-8, the easiest item was also a recognize level item requiring identifying the object associated with solar energy. Both grade groups found the anchor item on digestive system most difficult.

Further by location it can be seen that across all items children from Bassi and Dausa better performance.

Table 23. Science: Performance on anchor items by grade

Anchor items	Grade			
	5	6	7	8
sci_q3	27.1	30.2	41.5	42.8
sci_q6	55.3	64.4	77.3	78.0
sci_q9	10.4	12.0	17.8	17.9
sci_q10	52.1	58.7	58.0	59.1
sci_q11	51.1	54.8	61.0	62.4
sci_q12	49.6	58.3	65.7	68.3

Table 23 shows that, with progress in grade performance on each item improves.

Comparison of the Baseline and Endline Year 1 (2017 – 2018)

Findings

This section of the reports discusses the change in learning outcomes, measured by the assessments in the Baseline and Endline visits, in order to understand the impact of the intervention and also to know which of the interventions had a larger impact. The section depicts the change and its direction within an assessment. Further, using the statistical analysis of Difference-in-Difference¹¹, tests the significance of the change thus enabling to identify the impact of the interventions. The Difference-in-Difference analysis follows a cascading structure such that, each comparison tests if the additional input has had a significant impact on the change in the learning outcomes. The section first compares the ASER results followed by that of the Subject-wise assessments.

1. ASER testing

Even though, enhancing Reading levels is not within the purview of the H Learning program yet it has been used as a parameter to indicate progression in children's learning levels over time. The premises being that, children are being offered a conducive learning environment and it might as a by-product enhance their basic Reading English and Arithmetic skills as well. Also, the content focus on Arithmetic and English would help the children in this regard.

ASER reading

A total of 5399 children form the common cohort of children who were tested in both the Baseline and Endline visits. Since, this cohort comprises of children in grades 5 to 8 the expectation was that they should be able read the ASER Story which is a Std.II level text. Table 24, below depicts the percentage of children at and below the Story level during the Baseline and the Endline visits.

Table 24. Comparing ASER reading results

Location	Visit	Below Story (in %)	At Story (in %)
Rajgarh (N=1622)	Endline	26.6	73.4
	Baseline	48.6	51.4
Sikrai (N=1115)	Endline	19.3	80.7
	Baseline	34.4	65.5
Bassi (N=1378)	Endline	18.1	81.9
	Baseline	30.4	69.6
Dausa (N=1284)	Endline	16.9	83.1
	Baseline	36.9	63.1

The table shows that the percentage of children able to read the ASER Story has increased in each block. The largest increase is visible in Rajgarh. This is also because, during the Baseline visit, more than 50% children could read the story and with Rajgarh having the least proportion at the level. This in turn gave Rajgarh relatively larger scope for improvement.

While each location shows an improvement, it is important to see if these improvements can be attributed to a certain intervention. Further, if this change is more prominent in children from a certain grade or school type. The Difference-in-Difference analysis showed that:

- Overall the change in the percentage of children at the story level cannot be attributed to any of the interventions.

¹¹ Refer to the Appendix D for description and tables on the Difference-in-Difference analysis.

- ii. In both grade 5-6 and 7-8, the largest net gain is seen for Rajgarh government school children. The net gain is 28% and 24% respectively.
- iii. Children in Sikrai gain the least in both grade groups.
- iv. In Bassi, the net gain for grade 5-6 is not significantly different from that of Sikrai. For grade 7-8 in Bassi, the net gain among private school children is lesser than that among government school children.
- v. School intervention leads to a larger net gain among government school children in Dausa. These gains are no different from that of private school children.
- vi. Further, the net gain for Rajgarh government school children have been larger than that of Bassi government school children as well as Rajgarh private school children.
- vii. The net gains of Rajgarh government school children and Dausa government school children are not significantly different.

ASER Math

A total of 5396 children form the common cohort of children who were tested in both the Baseline and Endline visits. Since, this cohort comprises of children in grades 5 to 8 the expectation was that they should be able to solve at least the subtraction items on the ASER Math tool. Table 25 below depicts the percentage of children at and below the Subtraction (and above) level during the Baseline and the Endline visits.

Table 25. Comparing ASER math results

Location	Visit	Below Subtraction (in %)	Subtraction & above (in %)
Rajgarh (N=1621)	Endline	27.6	72.4
	Baseline	35	65
Sikrai (N=1114)	Endline	24.6	75.4
	Baseline	33.6	66.4
Bassi (N=1377)	Endline	18.6	81.4
	Baseline	33.4	66.6
Dausa (N=1284)	Endline	21.2	78.8
	Baseline	31.2	68.8

Across all locations there is an increase in the percentage of children who are at and/or above the Subtraction level. It is seen from table 25, that the largest change (here increase) in percentage of children at and/or above Subtraction level is in Bassi followed by Dausa. The Difference-in-Difference analysis shows that:

- i. Digital intervention has the largest positive impact on the change in the percentage of children at and/or above Subtraction level.
- ii. For grade 5-6 and 7-8, the largest net gain is seen for government school children of Bassi. In grade 5-6, these gains are similar for Bassi private school children. However, in grade 7-8, private school children gain less.
- iii. Print intervention has no significant impact, thus, children in Sikrai gain as much as those in Rajgarh.
- iv. Similarly, the additional school intervention in Dausa has similar impact as the digital intervention at the community level in Bassi.
- v. Between Bassi and Rajgarh, the net gain for government school children of grade 5-6 are not different. However, in grade 7-8, Bassi government school children gain more than Rajgarh government school children.

ASER English

A total of 5392 children form the common cohort of children who were tested in both the Baseline and Endline visits. Since, this cohort comprises of children in grades 5 to 8 the expectation was that they should be able to read at least the words in the ASER English tool. Table 26, below depicts the percentage of children at and below the Word (and above) level during the Baseline and the Endline visits.

Table 26. Comparing ASER english results

Location	Visit	Below Word Reading (in %)	Word Reading & above (in %)
Rajgarh (N=1622)	Endline	38.5	61.5
	Baseline	49.3	50.7
Sikrai (N=1112)	Endline	40.8	62.1
	Baseline	52.2	47.8
Bassi (N=1377)	Endline	31	69
	Baseline	46.8	53.2
Dausa (N=1281)	Endline	34.7	67.3
	Baseline	42.8	57.2

The percentage of children who can read the words in the ASER English tool has increased across all blocks. The largest progress has been made in Bassi followed by Sikrai. The Difference-in-Difference analysis shows that:

- Overall both Print and Digital interventions have an equal and significant positive impact on the change in the percentage of children who reach at least the Word level.
- Grade 5-6 children in government schools in Bassi gain the most. Private school children from these grades in Bassi show similar gains.
- For grade 5-6, other interventions have no significant impact.
- Further, for grade 5-6, the gains of government school children in Bassi are significantly larger than that of Rajgarh government school children.
- For grade 7-8, the gains in intervention blocks i.e. Sikrai, Bassi and Dausa, are similar to that of Rajgarh children.

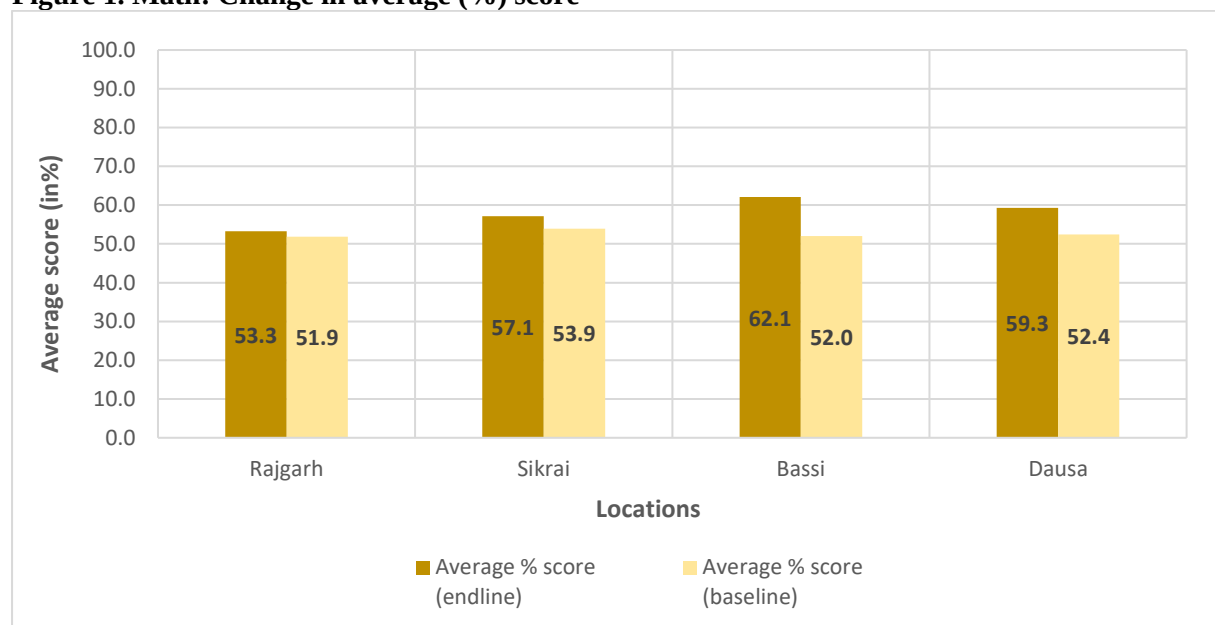
2. Subject-wise Assessments

A. Written Assessments

Math

A total 5392 children form the common cohort that got assessed on the Math tool in both the Baseline and Endline visits. Figure 1, below depicts the average percentage score in Math assessment for each location in the two visits. The chart shows that the average score in each location has increased from Baseline to Endline, and that this change is significant (tested using the T-test). Further, the chart shows that Bassi has the highest score and also has made the largest progress.

Figure 1. Math: Change in average (%) score



The Difference-in-Difference analysis, to compare the change in scores amongst the 4 locations shows that:

- i. Digital intervention has a positive impact.
- ii. Print intervention has a positive impact, albeit, less than the impact of Digital intervention.
- iii. Government school children in Bassi gain the most. For grade 5-6, these gains are similar to those in private schools of the block. For grade 7-6, private school children gain relatively less.
- iv. Print intervention has no impact on either grade groups.
- v. School intervention has a positive impact on grade 5-6 government school children. However, their gains are significantly lesser than that of children in Bassi.
- vi. For grade 7-8, school intervention has no impact.
- vii. Comparing Bassi with Rajgarh shows that, government school children of Bassi gain the largest. In Rajgarh, private school children of grade 5-6 gain more than their counterparts in government schools.

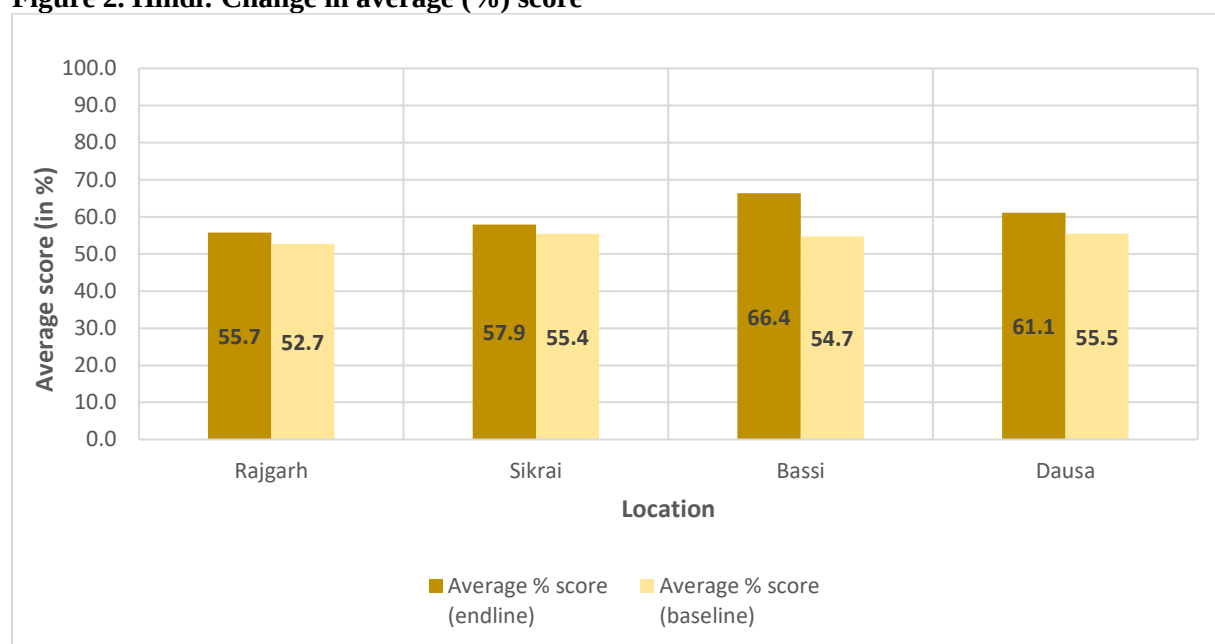
Thus, Digital intervention in Bassi has the most impact. The gains are larger among government school children from the block.

Item-wise change in performance in each location between Baseline and Endline is depicted in the Appendix C.

Hindi

A total 5390 children form the common cohort that got assessed on the Hindi tool in both the Baseline and Endline visits. Figure 2, below depicts the average percentage score in Hindi assessment for each location in the two visits. The chart shows that the average score in each location has increased from Baseline to Endline, and that this change is significant (tested using the T-test). Further, the chart shows that Bassi has the highest score and also has made the largest progress.

Figure 2. Hindi: Change in average (%) score



The Difference-in-Difference analysis, to compare the change in scores amongst the 4 locations shows that:

- i. Digital intervention has had a positive and significant impact on average scores.
- ii. There is no additional impact of the school intervention of Dausa.
- iii. Sikrai, which received the print intervention shows similar progress as Rajgarh, the control location.
- iv. Government school children in Bassi gain the most. For grade 5-6, the gains are similar to that of private school children of Bassi. For grade 7-8, the gains are less for private children.
- v. For grade 5-6, government school children in Dausa, which received the additional school intervention gain significantly less than government school children in Bassi. For grade 7-8, the gains in government school children of Dausa and Bassi are similar.
- vi. For grade 5-6, private schools have no additional impact on children in Dausa and Bassi. This indicates that their gains are similar to the government school children of these blocks.
- vii. Print intervention in Sikrai has no impact.
- viii. Comparing Bassi and Rajgarh shows that, government school children from both grade groups in Bassi gain the most.

Thus, it is seen that Digital intervention in Bassi has the most impact. In Bassi, grade 5-6 children in private and government school children gain equally while, for grade 7-8, it is the government school children who gain the most.

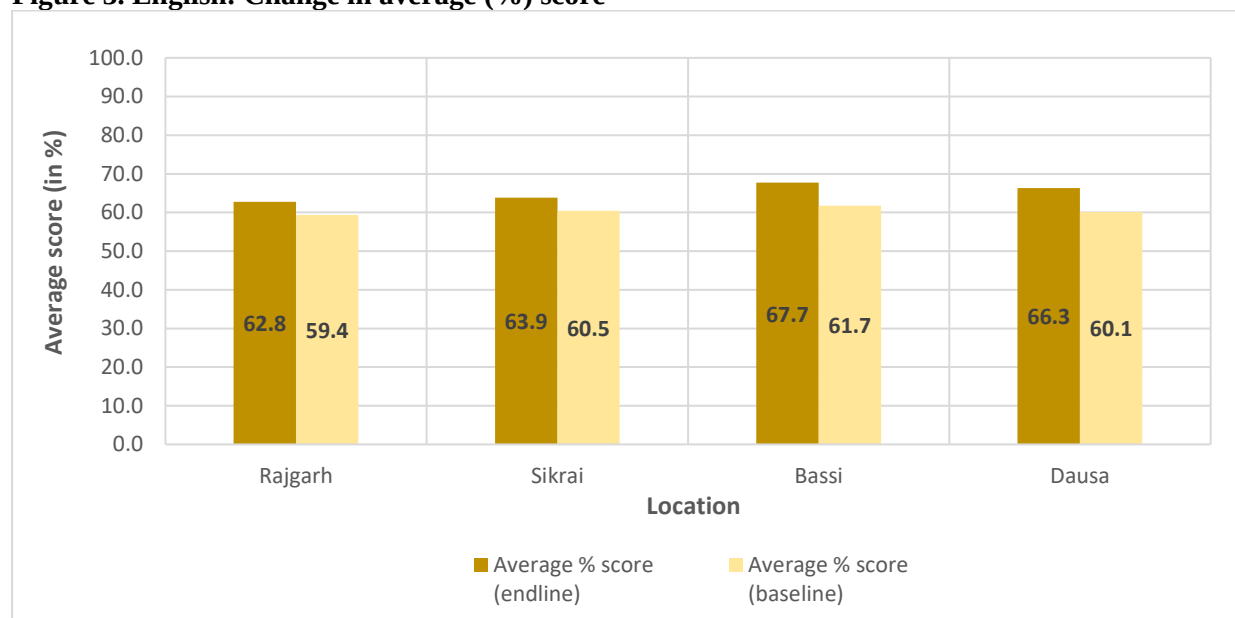
B. Oral Assessments

English

A total 5394 children form the common cohort that got assessed on the English tool in both the Baseline and Endline visits. Figure 3, below depicts the average percentage score in English assessment for each

location in the two visits. The chart shows that the average score in each location has increased from Baseline to Endline, and that this change is significant (tested using the T-test). Further, the chart shows that Bassi has the highest score and also has made the largest progress.

Figure 3. English: Change in average (%) score



The Difference-in-Difference analysis, to compare the change in scores amongst the 4 locations shows that:

- i. Digital intervention has a significant positive impact on the average scores. There is no additional impact of the intervention in schools of Dausa.
- ii. The location that received Print intervention showed similar change as the control location.
- iii. The largest gain is seen for government school children in Bassi. For grade 5-6, the gains are significantly larger than private school children in Bassi. For grade 7-8 in Bassi, children in both government and private schools gain equally.
- iv. Both Print and School interventions in Sikrai and Dausa, show no impact.
- v. A comparison of Digital intervention in Bassi with no intervention in Rajgarh, shows that for grade 5-6, Bassi government school gain more than Bassi private school children and all children of Rajgarh. For grade 7-8 on the other hand, Bassi government school gain more than Rajgarh government school children, but there is no private school effect in either blocks.

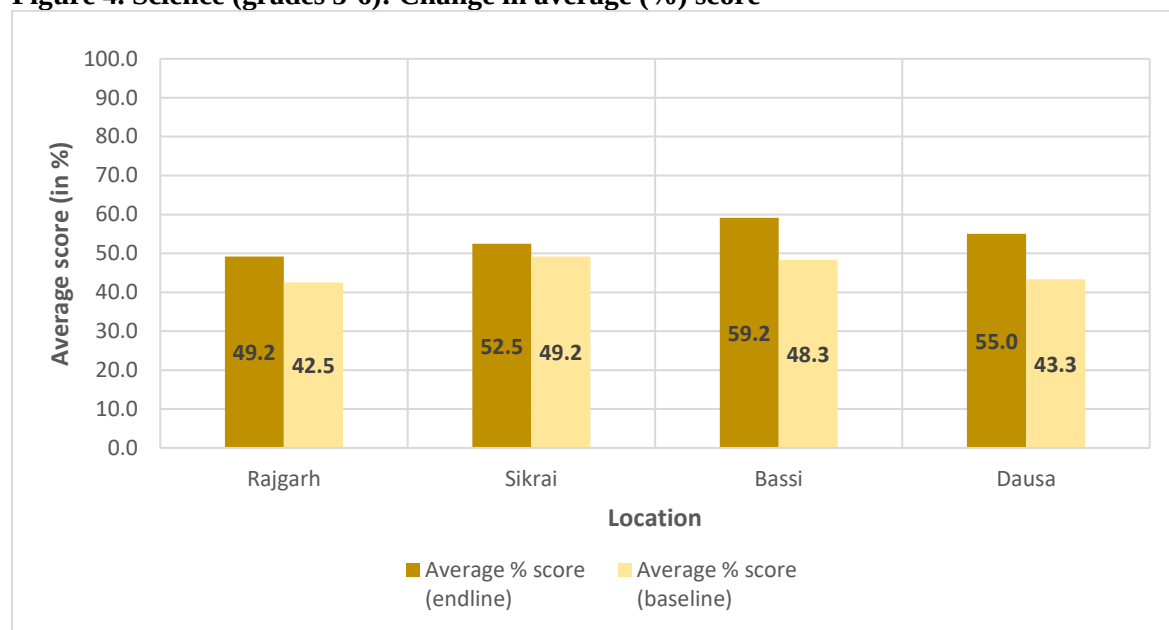
Thus, it seen that across grade groups, the largest gains are seen for Bassi government school children.

Science

The Science assessment administered different tools for grade groups 5-6 and 7-8. The larger framework in terms of competencies assessed were kept common. Further for the purpose of comparison with regard to change in performance between the two visits, a set of 6 anchor items were administered.

A total of 2680 children form the common cohort from grades 5-6 in the Science assessment. Figure 4, below depicts the average (%) scores from each location in the two visits. It is seen that Bassi has the highest score and also has made the largest progress. Sikrai and Dausa seem to show similar progress.

Figure 4. Science (grades 5-6): Change in average (%) score

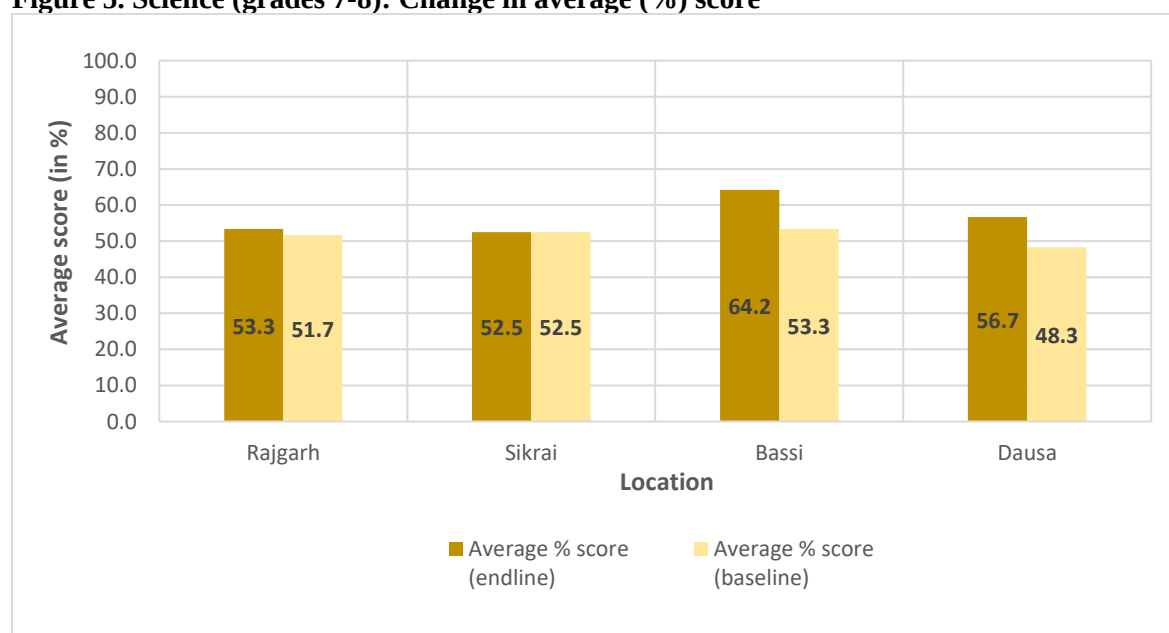


The Difference-in-Difference analysis shows that:

- Digital intervention has a positive impact on the performance of children in the Science assessment.
- School intervention has no additional impact.
- The net gain in Sikrai which received the Print intervention is significantly lower than that of Rajgarh, the control location.
- Bassi government school children show the largest gain and it is not significantly different from the gain made by private school children.
- For grade 5-6, children of Sikrai gain significantly lesser than those from Rajgarh which is the Control location.

In the grade group 7-8, a total of 2712 children form the common cohort that was assessed in both visits. Figure 5, below shows the average scores in the two visits from each location.

Figure 5. Science (grades 7-8): Change in average (%) score



Bassi has the highest average score and also seems to have made the largest progress. The average score of Sikrai remained unchanged between the two visits.

The Difference-in-Difference analysis shows that:

- i. Digital intervention has the largest positive impact. The impact of the school intervention has been relatively less and that of the Print is no different from the Control location.
- ii. Government school children in the location that received Digital intervention have gained the most and it is similar to those in private schools.
- iii. For grade 7-8, children from Sikrai gain equal to that of Rajgarh. Thus Print intervention has had no significant impact.

For both grade groups, it can be concluded that Digital intervention has been most impactful, and the gain is prominent among government school children of the location.

Conclusion

Across the 4 locations of the impact evaluation study, Bassi has shown the highest performance in all assessments, except on the ASER Reading tool. Further, the gains in the performance on each assessment while has been true for all locations, it is Bassi, that has gained the most indicating a significant impact of the Digital intervention. The School intervention has not had any marginal impact on children's learning outcome, and has been more or less equal to the marginal impact of Digital intervention. Print intervention has largely remained ineffective, as in most subjects, the progress made in Sikrai has been equal to (in some cases even lesser) that of Rajgarh, the Control location.

Appendix

Appendix A: Snapshot of the Assessment Framework

Subject	Method of testing	Alignment of assessment	Grade level	Key competencies assessed				
English	Oral	ASER results and H Learning program goals (Conversational English)	Below Grade level 5	Letter recognition and reading	Word Recognition, Reading and Understanding	Sentence Recognition, Reading and Understanding	Sentence completion	
Science		H Learning program goals of the content and textbooks	Grade level 5 to 6 and 7 to 8	Recognition level items	Knowledge Level items	Reading and comprehension Level items		
Hindi	Pen and paper	ASER results and H Learning program goals (informative content)	Grade level 4 to 5	Reading and comprehending an informative text	Picking the right vocabulary,	Filling in the information as words	Open ended writing of answers	Judgment of concept by true or false
Math		ASER results and H Learning program goals of the content	Up to grade level 5	Numbers to Words and Words to numbers	Finding biggest number	Subtraction (number and word problems)	Division (number and word problems)	Geometry and area perimeter

Appendix B: Change in Performance on Assessments between Baseline and Endline

Table B.1. Location-wise progress (retrogress) on ASER Reading tool

Rajgarh							Sikrai						
Overall	Beginner	Letter	Word	Paragraph	Story	Total	Overall	Beginner	Letter	Word	Paragraph	Story	Total
Beginner	33.3	46.7	10.0	6.7	3.3	1.9	Beginner	27.3	36.4	18.2	0.0	18.2	1.0
Letter	4.1	38.5	25.4	23.0	9.0	7.5	Letter	6.9	44.4	22.2	11.1	15.3	6.5
Word	0.0	7.6	21.0	38.9	32.5	9.7	Word	2.9	8.7	29.0	30.4	29.0	6.2
Paragraph	0.0	0.8	3.8	24.4	71.0	29.6	Paragraph	0.0	0.0	3.4	26.6	70.0	20.9
Story	0.0	0.1	0.8	4.6	94.5	51.4	Story	0.0	0.3	0.4	2.9	96.4	65.5
Total	0.9	4.8	5.7	15.2	73.4	1622	Total	0.9	4.0	4.4	10.0	80.7	1115

Bassi							Dausa						
Overall	Beginner	Letter	Word	Paragraph	Story	Total	Overall	Beginner	Letter	Word	Paragraph	Story	Total
Beginner	7.1	35.7	28.6	7.1	21.4	1.0	Beginner	20.0	40.0	0.0	6.7	33.3	1.2
Letter	2.3	16.9	25.8	23.6	31.5	6.5	Letter	10.9	39.1	17.2	10.9	21.9	5.0
Word	1.2	17.3	18.5	22.2	40.7	5.9	Word	0.0	5.9	19.8	28.7	45.5	7.9
Paragraph	0.0	1.3	1.7	23.4	73.6	17.1	Paragraph	0.0	0.7	4.8	16.3	78.2	22.9
Story	0.0	0.1	0.8	6.1	93.0	69.6	Story	0.1	0.6	1.4	2.6	95.3	63.1
Total	0.3	2.8	3.9	11.1	81.9	1378	Total	0.9	3.4	4.4	8.3	83.1	1284

Table B.2. Grade-wise movement on the ASER Reading tool (aggregated by location and school type)

Grade 5-6: % of children at Story level					Grade 7-8: % of children at Story level				
Location-School type	N	Baseline	Endline	Net Change	Location-School type	N	Baseline	Endline	Net Change
Rajgarh govt school	482	29.05	57.26	28.21	Rajgarh govt school	523	54.68	78.2	23.52
Rajgarh pvt school	319	58.62	77.43	18.81	Rajgarh pvt school	295	73.9	87.12	13.22
Sikrai govt school	330	47.88	70	22.12	Sikrai govt school	389	75.06	84.32	9.26
Sikrai pvt school	224	63.84	82.59	18.75	Sikrai pvt school	166	80.72	92.17	11.45
Bassi govt school	404	53.47	71.53	18.06	Bassi govt school	434	72.35	83.41	11.06
Bassi pvt school	265	71.32	84.53	13.21	Bassi pvt school	267	89.14	93.63	4.49
Dausa govt school	368	43.48	70.11	26.63	Dausa govt school	395	67.59	87.34	19.75
Dausa pvt school	282	64.18	86.17	21.99	Dausa pvt school	238	84.87	92.86	7.99

Table B.3. Location-wise progress (retrogress) on ASER Math tool

Rajgarh							Sikrai						
Overall	Beginner	NR (1-9)	NR (10-99)	Subtraction	Division	Total	Overall	Beginner	NR (1-9)	NR (10-99)	Subtraction	Division	Total
Beginner	17.7	52.9	23.5	0.0	5.9	1.1	Beginner	50.0	0.0	0.0	0.0	50.0	0.2
NR (1-9)	2.1	36.3	41.6	14.7	5.3	11.7	NR (1-9)	5.2	50.4	25.2	13.9	5.2	10.3
NR (10-99)	0.0	5.3	43.1	35.1	16.6	22.3	NR (10-99)	0.0	4.3	42.4	30.7	22.6	23.1
Subtraction	0.0	1.8	16.8	39.3	42.2	28.0	Subtraction	0.0	0.4	15.1	43.7	40.9	25.0
Division	0.0	0.0	3.3	11.5	85.1	37.0	Division	0.0	0.0	3.7	13.7	82.7	41.4
Total	0.4	6.5	20.7	24.8	47.6	1621	Total	0.6	6.3	17.7	25.1	50.3	1114

Bassi							Dausa						
Overall	Beginner	NR (1-9)	NR (10-99)	Subtraction	Division	Total	Overall	Beginner	NR (1-9)	NR (10-99)	Subtraction	Division	Total
Beginner	0.0	50.0	12.5	12.5	25.0	0.6	Beginner	33.3	33.3	33.3	0.0	0.0	0.2
NR (1-9)	2.7	22.0	30.0	32.7	12.7	10.9	NR (1-9)	5.2	31.3	34.8	19.1	9.6	9.0
NR (10-99)	0.0	4.0	28.9	44.9	22.3	21.9	NR (10-99)	0.4	4.6	33.9	32.9	28.3	22.0
Subtraction	0.0	1.3	10.9	40.2	47.6	28.5	Subtraction	0.0	0.3	14.9	43.8	41.0	27.2
Division	0.0	0.2	4.2	14.1	81.5	38.1	Division	0.0	0.2	4.3	9.9	85.6	41.6
Total	0.3	4.0	14.4	30.3	51.1	1377	Total	0.6	4.1	16.5	25.0	53.8	1284

Table B.4. Grade-wise movement on the ASER Math tool (aggregated by location and school type)

Grade 5-6: % of children at Subtraction level and above					Grade 7-8: % of children at Subtraction level and above				
Location-School type	N	Baseline	Endline	Net Change	Location-School type	N	Baseline	Endline	Net Change
Rajgarh govt school	481	45.95	59.04	13.09	Rajgarh govt school	523	64.05	72.28	8.23
Rajgarh pvt school	319	77.12	79.94	2.82	Rajgarh pvt school	295	84.07	86.44	2.37
Sikrai govt school	330	52.12	64.24	12.12	Sikrai govt school	389	67.35	74.55	7.2
Sikrai pvt school	223	75.78	84.3	8.52	Sikrai pvt school	166	81.33	87.95	6.62
Bassi govt school	404	52.72	71.53	18.81	Bassi govt school	434	63.36	79.95	16.59
Bassi pvt school	265	73.21	87.17	13.96	Bassi pvt school	266	86.47	92.86	6.39
Dausa govt school	368	51.09	65.49	14.4	Dausa govt school	395	70.63	81.01	10.38
Dausa pvt school	282	74.11	84.4	10.29	Dausa pvt school	238	86.55	89.08	2.53

Table B.5. Location-wise progress (retrogress) on ASER English tool

Rajgarh							Sikrai						
Overall	Beginner	Capital Letter	Small Letter	Word	Sentence	Total	Overall	Beginner	Capital Letter	Small Letter	Word	Sentence	Total
Beginner	31.8	23.6	41.8	1.8	0.9	6.8	Beginner	45.3	28.1	17.2	7.8	1.6	5.8
Capital Letter	2.8	11.0	74.3	10.1	1.8	6.7	Capital Letter	10.0	6.7	75.0	8.3	0.0	5.4
Small Letter	1.2	2.8	54.7	32.0	9.3	35.8	Small Letter	0.2	3.3	52.5	23.9	20.1	41.1
Word	0.3	0.8	16.8	40.6	41.6	24.3	Word	0.0	1.1	19.9	30.9	48.1	16.3
Sentence	0.2	0.0	2.3	10.1	87.4	26.4	Sentence	0.0	0.3	3.7	11.4	84.6	31.5
Total	2.9	3.5	32.1	24.8	36.7	1622	Total	3.2	3.6	31.0	19.3	42.8	1112

Bassi							Dausa						
Overall	Beginner	Capital Letter	Small Letter	Word	Sentence	Total	Overall	Beginner	Capital Letter	Small Letter	Word	Sentence	Total
Beginner	9.5	27.0	50.8	7.9	4.8	4.6	Beginner	38.7	9.7	45.2	6.5	0.0	4.8
Capital Letter	1.5	7.6	66.7	18.2	6.1	4.8	Capital Letter	10.4	9.1	54.6	19.5	6.5	6.0
Small Letter	0.0	1.9	49.4	31.4	17.3	37.5	Small Letter	0.2	3.9	51.5	22.9	21.5	32.0
Word	0.3	0.0	14.9	34.8	50.0	23.4	Word	0.4	1.1	17.7	33.6	47.4	22.1
Sentence	0.2	0.2	1.7	14.9	82.9	29.8	Sentence	0.0	0.0	4.9	12.0	83.1	35.1
Total	0.7	2.4	28.0	25.6	43.4	1377	Total	2.7	2.5	27.6	20.5	46.8	1281

Table B.6. Grade-wise movement on the ASER English tool (aggregated by location and school type)

Grade 5-6: % of children at Word reading level and above					Grade 7-8: % of children at Word reading level and above				
Location-School type	N	Baseline	Endline	Net Change	Location-School type	N	Baseline	Endline	Net Change
Rajgarh govt school	482	29.46	41.29	11.83	Rajgarh govt school	523	50.29	63.67	13.38
Rajgarh pvt school	319	60.82	70.22	9.4	Rajgarh pvt school	295	75.25	81.36	6.11
Sikrai govt school	329	26.44	40.73	14.29	Sikrai govt school	388	51.03	64.95	13.92
Sikrai pvt school	224	54.91	73.21	18.3	Sikrai pvt school	165	73.94	83.64	9.7
Bassi govt school	403	30.52	51.61	21.09	Bassi govt school	434	50.69	65.44	14.75
Bassi pvt school	265	66.04	81.13	15.09	Bassi pvt school	267	79.4	89.89	10.49
Dausa govt school	368	37.5	52.17	14.67	Dausa govt school	394	58.38	67.26	8.88
Dausa pvt school	282	62.77	74.11	11.34	Dausa pvt school	236	79.24	83.05	3.81

Appendix C: Item-wise change in performance

Table C.1. Math

Assessment	Block	Competency	Rajgarh	Difference	Sikrai	Difference	Bassi	Difference	Dausa	Difference	Overall	Difference
BL	mat_q1a	Write from words to numbers	69.1	-0.2	71.8	0.8	68.2	8.6	67.6	8.2	69.1	4.5
EL			69.0		72.7		76.8		75.8		73.6	
BL	mat_q1b		57.5	0.6	58.0	5.3	54.9	11.3	57.7	6.3	57.0	5.9
EL			58.1		63.2		66.2		64.1		62.9	
BL	mat_q1c		20.6	-1.4	21.4	1.9	19.4	4.2	19.8	4.5	20.3	2.4
EL			19.3		23.3		23.7		24.3		22.6	
BL	mat_q2a	Write the biggest number	78.2	1.7	79.5	3.9	79.1	6.5	81.5	4.7	79.5	4.3
EL			79.9		83.4		85.6		86.2		83.8	
BL	mat_q2b		49.1	2.0	50.7	4.2	48.0	11.2	53.0	5.3	50.1	5.8
EL			51.0		54.9		59.3		58.3		55.9	
BL	mat_q3a	Subtraction	75.7	-1.1	78.1	0.9	74.2	7.1	76.2	3.1	76.0	2.6
EL			74.7		78.9		81.3		79.3		78.5	
BL	mat_q3b		67.7	0.1	69.2	2.7	67.0	7.0	70.7	1.0	68.6	2.8
EL			67.8		71.9		74.1		71.7		71.4	
BL	mat_q4a	Division	54.5	2.2	60.7	-1.5	51.1	9.2	57.5	6.1	55.6	4.3
EL			56.6		59.2		60.3		63.6		59.9	
BL	mat_q4b		50.0	1.8	55.0	0.4	48.1	7.2	51.6	6.3	50.9	4.2
EL			51.8		55.4		55.3		57.9		55.1	
BL	mat_q5	Subtraction Word Problem	53.4	3.5	60.8	2.3	54.8	8.8	59.3	3.6	56.7	4.9
EL			56.9		63.1		63.6		62.8		61.6	
BL	mat_q6	Division Word Problem	32.5	2.1	37.1	1.6	29.8	11.3	32.3	7.8	32.7	5.9
EL			34.6		38.7		41.1		40.1		38.6	
BL	mat_q7	Choose Geometrical shape	58.9	2.8	60.3	4.7	62.7	14.9	57.2	12.1	59.7	8.6
EL			61.8		64.9		77.6		69.3		68.4	
BL	mat_q8	Perimeter	32.9	3.5	33.1	5.9	39.4	15.2	31.4	8.5	34.2	8.3
EL			36.4		39.0		54.5		39.9		42.5	
BL	mat_q9	Choose angle	41.5	0.3	35.5	10.6	45.0	15.6	37.2	13.8	40.1	9.7
EL			41.8		46.1		60.6		50.9		49.9	
BL	mat_q10	Perimeter word problem	36.0	3.1	37.5	3.7	38.8	12.5	35.0	10.6	36.8	7.5
EL			39.1		41.2		51.3		45.6		44.3	

Table C.2. Hindi

Assessment	Block	Rajgarh	Difference	Sikrai	Difference	Bassi	Difference	Dausa	Difference	Overall	Difference
BL	hin_q1a	63.7	2.2	65.4	7.0	65.2	12.7	68.5	7.2	65.5	7.4
EL		65.8		72.4		77.9		75.7		72.9	
BL	hin_q1b	49.7	0.4	53.6	2.4	52.4	17.2	51.8	10.4	51.7	7.8
EL		50.1		56.0		69.6		62.1		59.5	
BL	hin_q1c	45.5	3.7	48.8	4.0	48.6	15.3	48.9	10.6	47.8	8.6
EL		49.3		52.8		63.8		59.5		56.4	
BL	hin_q1d	42.1	3.3	46.6	5.8	45.8	14.2	44.8	9.6	44.6	8.5
EL		45.5		52.5		60.0		54.4		53.1	
BL	hin_q1e	44.2	5.9	48.5	4.8	48.7	16.7	45.9	12.7	46.6	10.2
EL		50.1		53.3		65.4		58.6		56.8	
BL	hin_q2a	69.9	3.1	70.9	0.6	73.5	9.7	73.4	3.9	71.8	4.4
EL		72.9		71.5		83.2		77.3		76.2	
BL	hin_q2b	46.4	0.4	48.6	-3.0	49.4	9.8	47.5	5.3	47.9	3.2
EL		46.8		45.7		59.2		52.8		51.1	
BL	hin_q3a	44.4	9.2	49.9	8.3	49.3	18.7	46.8	14.7	47.3	13.0
EL		53.6		58.2		68.0		61.5		60.3	
BL	hin_q3b	45.4	11.7	49.9	10.6	51.4	17.7	49.8	10.8	48.9	12.9
EL		57.1		60.5		69.1		60.6		61.8	
BL	hin_q4	31.4	18.9	42.6	4.6	36.3	14.4	36.6	10.2	36.2	12.6
EL		50.3		47.2		50.7		46.8		48.7	
BL	hin_q5a	62.5	-0.1	60.9	-0.2	61.0	3.3	63.6	-0.2	62.0	0.7
EL		62.5		60.7		64.3		63.4		62.7	
BL	hin_q5b	67.8	5.9	74.6	2.6	71.6	6.7	71.2	4.7	71.0	5.3
EL		73.7		77.2		78.3		75.9		76.3	
BL	hin_q5c	51.6	2.5	49.2	6.9	48.2	13.2	52.6	4.2	50.5	6.6
EL		54.1		56.1		61.4		56.8		57.1	
BL	hin_q5d	48.2	0.1	45.2	2.7	47.2	11.3	52.5	-1.2	48.3	3.2
EL		48.3		47.9		58.5		51.2		51.5	

Table C.3. English *(Table continues on the next page)*

Assessment	Block	Rajgarh	Difference	Sikrai	Difference	Bassi	Difference	Dausa	Difference	Overall	Difference
BL	eng_cap_rec_1	99.1	-0.6	98.3	0.7	98.9	0.5	98.7	0.8	98.8	0.3
EL		98.5		98.9		99.3		99.5		99.1	
BL	eng_cap_rec_2	97.1	-0.1	97.4	-0.8	97.1	1.8	96.0	1.6	96.9	0.6
EL		97.0		96.6		98.9		97.7		97.5	
BL	eng_cap_rec_3	96.6	0.3	97.5	-0.2	96.9	2.1	95.9	1.8	96.7	1.0
EL		96.9		97.3		99.1		97.7		97.7	
BL	eng_cap_rec_4	96.0	1.3	97.1	-0.8	96.1	2.6	95.8	1.4	96.2	1.2
EL		97.3		96.3		98.7		97.2		97.4	
BL	eng_cap_rec_5	95.7	0.5	95.9	0.6	96.0	2.3	95.4	2.3	95.8	1.5
EL		96.3		96.5		98.3		97.7		97.2	
BL	eng_sml_rec_1	96.4	0.5	95.3	0.4	96.5	1.9	95.7	1.2	96.0	1.0
EL		96.9		95.7		98.4		96.9		97.0	
BL	eng_sml_rec_2	95.0	-0.4	95.1	-0.3	95.7	2.6	94.3	1.8	95.0	0.9
EL		94.6		94.8		98.3		96.1		95.9	
BL	eng_sml_rec_3	94.3	0.8	95.0	0.4	94.8	3.6	94.8	1.8	94.7	1.7
EL		95.1		95.4		98.3		96.7		96.4	
BL	eng_sml_rec_4	93.9	0.9	94.0	0.5	94.2	3.3	94.2	2.3	94.1	1.7
EL		94.8		94.4		97.5		96.5		95.8	
BL	eng_sml_rec_5	94.0	0.2	94.2	1.1	94.4	3.0	93.2	3.0	94.0	1.8
EL		94.3		95.3		97.4		96.2		95.8	
BL	eng_cap_read	96.2	0.5	96.9	-0.6	97.0	0.9	96.1	1.6	96.5	0.7
EL		96.8		96.4		98.0		97.7		97.2	
BL	eng_sml_read	95.2	0.0	95.3	-0.4	96.3	1.2	95.0	1.8	95.5	0.7
EL		95.2		94.9		97.6		96.8		96.1	
BL	eng_word_rec2	81.6	6.5	85.9	3.9	84.5	8.3	85.0	6.9	84.0	6.6
EL		88.1		89.8		92.8		91.9		90.6	
BL	eng_word_rec3	77.1	5.8	80.1	4.4	79.2	9.9	79.7	6.6	78.9	6.8
EL		82.9		84.6		89.2		86.3		85.7	
BL	eng_word_rec4	70.4	7.4	73.6	7.6	75.9	9.9	77.5	6.2	74.1	8.0
EL		77.8		81.2		85.8		83.6		82.1	

BL		52.2		59.3		56.5		59.0		56.4	
EL	eng_word_read2_1	62.3	10.1	67.4	8.1	68.2	11.7	65.2	6.2	65.8	9.4
BL		41.0		43.7		43.7		43.9		42.9	
EL	eng_word_read2_2	49.0	8.0	49.6	5.9	54.4	10.8	52.2	8.2	51.3	8.4
BL		37.6		37.4		39.2		39.5		38.4	
EL	eng_word_read3_1	44.7	7.0	42.0	4.6	50.5	11.3	50.5	11.0	46.9	8.5
BL		36.6		36.9		38.7		38.2		37.6	
EL	eng_word_read3_2	42.2	5.6	42.5	5.6	51.0	12.3	50.6	12.4	46.6	9.0
BL		36.5		36.7		37.6		37.4		37.1	
EL	eng_word_read4_1	43.6	7.1	45.1	8.4	51.2	13.6	50.2	12.8	47.5	10.5
BL		35.2		38.5		38.0		42.0		38.2	
EL	eng_word_read4_2	45.6	10.4	52.2	13.7	51.9	13.9	51.2	9.2	50.3	12.0
BL		74.2		74.2		76.5		80.0		76.2	
EL	eng_sen_rec1	81.1	6.9	85.7	11.5	87.6	11.1	84.4	4.5	84.7	8.5
BL		76.8		74.5		80.2		81.3		78.2	
EL	eng_sen_rec2	82.8	6.0	86.4	11.9	87.5	7.3	85.1	3.8	85.4	7.2
BL		29.7		28.9		32.5		28.8		30.0	
EL	eng_sen_read	29.3	-0.4	32.0	3.2	43.0	10.5	44.9	16.2	37.3	7.3
BL		39.8		41.8		46.8		41.7		42.5	
EL	eng_read_ans1	49.3	9.5	56.5	14.7	58.8	12.0	53.0	11.3	54.4	11.9
BL		24.8		29.1		29.2		25.0		26.8	
EL	eng_read_ans2	22.7	-2.1	22.9	-6.2	32.4	3.2	28.7	3.7	26.7	-0.2
BL		9.1		11.0		15.4		7.1		10.6	
EL	eng_read_ans3	7.7	-1.5	3.5	-7.5	11.6	-3.8	11.5	4.4	8.6	-2.1
BL		21.1		21.7		24.2		18.2		21.3	
EL	eng_fill_word1	25.2	4.1	25.4	3.8	32.7	8.5	30.6	12.4	28.5	7.2
BL		16.1		17.4		19.5		13.9		16.7	
EL	eng_fill_word2	19.9	3.9	21.3	3.9	27.6	8.1	23.8	9.9	23.2	6.5
BL		13.8		15.9		18.4		11.8		14.9	
EL	eng_fill_word3	17.7	3.9	19.1	3.1	21.8	3.4	21.9	10.2	20.1	5.2
BL		17.1		16.6		20.2		13.9		17.0	
EL	eng_fill_word4	20.3	3.2	24.4	7.9	23.8	3.6	24.5	10.5	23.3	6.2

Table C.4. Science

Block	Rajgarh			Sikrai			Bassi			Dausa			Overall		
Assessment	EL	BL	Difference	EL	BL	Difference	EL	BL	Difference	EL	BL	Difference	EL	BL	Difference
Grade	5 and 6														
sci_q1	97.5	95.2	2.3	97.5	98.3	-0.8	98.2	97.1	1.1	98.8	96.7	2.1	98	96.8	1.2
sci_q2	83.2	74.6	8.7	76.2	74.7	1.5	90	71.9	18.1	83.9	72.8	11.2	83.3	73.5	9.8
sci_q3	23.6	24.5	-0.9	28.1	25.5	2.6	33.3	26.1	7.2	30.5	18.8	11.7	28.9	23.7	5.2
sci_q4	18.5	17.3	1.2	16.4	21.7	-5.3	23.3	23.5	-0.2	19.9	13.4	6.6	19.5	19	0.6
sci_q5	58.6	51.3	7.3	67.6	57	10.7	69.9	57.7	12.2	66	49	17	65.5	53.7	11.8
sci_q6	43.4	44	-0.6	52.4	52.9	-0.5	77.4	47	30.5	68.3	41.6	26.8	60.4	46.3	14
sci_q7	29.7	27.1	2.7	35.8	34.8	1	30.6	33.4	-2.8	37.1	26.1	11	33.3	30.3	3
sci_q8	79	55	24	87.8	71.2	16.6	89.1	70.9	18.2	85.7	66.7	19	85.4	66	19.5
sci_q9	10.8	8.7	2.1	8.4	17.2	-8.8	11.4	16.6	-5.2	13.9	5.9	8	11.1	12.1	-1
sci_q10	46.8	40	6.8	51.3	48.8	2.6	70.3	51.2	19.2	54.2	51.7	2.5	55.7	47.9	7.8
sci_q11	50.4	35.3	15.2	54.8	44.5	10.3	57.9	37.7	20.2	49.4	42	7.4	53.1	39.9	13.3
sci_q12	50.9	37.5	13.5	50.4	46.8	3.6	62.4	43	19.4	52.2	37.5	14.8	54	41.2	12.8
Overall	49.4	42.5	6.9	52.2	49.4	2.8	59.5	48	11.5	55	43.5	11.5	54	45.9	8.2
Block	Rajgarh			Sikrai			Bassi			Dausa			Overall		
Assessment	EL	BL	Difference	EL	BL	Difference	EL	BL	Difference	EL	BL	Difference	EL	BL	Difference
Grade	7 and 8														
sci_q1	71	70.1	0.9	70.9	72.6	-1.6	90.3	77.5	12.9	81	66	15.1	78.3	71.5	6.8
sci_q2	87.5	89.6	-2.1	84.2	87.4	-3.2	94.3	88	6.3	90.5	86.3	4.3	89.1	87.8	1.3
sci_q3	36.8	38.9	-2.1	37.1	34.6	2.5	49.5	36.1	13.5	45.4	36.7	8.7	42.2	36.6	5.7
sci_q4	50.5	52.3	-1.8	49.5	48.1	1.5	65.2	51.4	13.9	51.8	46.2	5.6	54.3	49.5	4.8
sci_q5	48.6	37.8	10.8	31.8	42.6	-10.8	58.2	51	7.3	44.9	28.2	16.7	45.9	39.9	6
sci_q6	69.9	68.3	1.7	74.1	68.1	6	86.5	71	15.6	81.1	68.3	12.9	77.9	68.9	9
sci_q7	44.2	41.2	3	49.5	42.6	6.9	43	44	-1	49	37.6	11.4	46.4	41.3	5.1
sci_q8	37	42.8	-5.8	38.7	45.8	-7.1	55.2	41.4	13.9	38.5	37.6	0.9	42.4	41.9	0.5
sci_q9	16.5	16.2	0.4	14.4	23.4	-9	20.5	20.7	-0.1	19.6	10	9.6	17.8	17.6	0.2
sci_q10	54.2	50.6	3.7	50	52.1	-2.1	72	54.9	17.1	56.6	53.3	3.4	58.2	52.7	5.5
sci_q11	59.3	51.4	8	63.7	55.3	8.4	66.3	45.6	20.7	57.9	54.3	3.6	61.8	51.6	10.2
sci_q12	64.3	59.8	4.5	65.5	57.5	8	71	55.6	15.4	67.4	55	12.5	67.1	57	10.1
Overall	53.3	51.6	1.8	52.5	52.5	0	64.3	53.1	11.3	57	48.3	8.7	56.8	51.3	5.4

Appendix D: Difference in Difference Analysis

$$\Delta L = \alpha_0 + \alpha_1 \text{ Treatment location} + \alpha_2 \text{ Pvt school} + \alpha_3 (\text{Treatment location} * \text{Pvt school}) \text{ -(eq.1)}$$

Where,

ΔL is the difference in the change in score between baseline and endline between any two locations

$$\text{Treatment location} = \begin{cases} 1 & \text{if location receives an intervention} \\ 0 & \text{if location is Control}^1; \end{cases}$$

$$\text{Pvt school} = \begin{cases} 1 & \text{if school is private} \\ 0 & \text{if school is government;} \end{cases}$$

Treatment location * Pvt school is an interaction variable

How to interpret the results:

- If child is from Control location = α_0 , this is because, the coefficients for treatment location, pvt school and the interaction of treatment location and pvt school will be zero in this case.
 - *It is worth noting that the same coefficient also indicates to the effect of being in government school in the Control location.*
- If child is from Treatment location = $\alpha_0 + \alpha_1$, this is because, the coefficients of pvt school and the interaction term equal zero, leaving only the constant and the coefficient of Treatment location
 - *It is worth noting that the same sum of coefficients indicates the effect of being in a government school in the Treatment location.*
- If child is from a pvt school in Control location = $\alpha_0 + \alpha_2$, this is because, the coefficients for the Treatment location and the interaction terms equal zero.
- If child is from a pvt school in Treatment location = $\alpha_0 + \alpha_1 + \alpha_2 + \alpha_3$

Understanding significance:

- Comparing govt and pvt schools in a Control location: This is the difference between $(\alpha_0 + \alpha_2)$ and α_0 , which is α_2 . If α_2 is significant it indicates that the in the Control location change in score of pvt schools is different from that govt schools. Further, the sign of α_2 indicates the direction of the effect.
- Comparing govt schools of Treatment and Control locations: This is the difference between $(\alpha_0 + \alpha_1)$ and α_0 , which is α_1 . The interpretation remains as above.
- Comparing govt and pvt schools in Treatment location: This is the difference between $(\alpha_0 + \alpha_1 + \alpha_2 + \alpha_3)$ and $(\alpha_0 + \alpha_1)$, which is $(\alpha_2 + \alpha_3)$. Here we look at the significance

¹ The H-learning research project in Dausa, follows a cascading or incremental intervention model, therefore, the consideration of block as Control varies with respect to the intervention that is lesser than that received by the comparison block. The comparisons will be segmented as: Sikrai (Print) vs. Rajgarh (no intervention/Control); Bassi (Digital + Print in community) vs. Sikrai (Print/Control); Dausa (Digital + Print in community and school) vs. Bassi (Digital + Print in community).

and sign of only α_3 because, the additional benefit of being in a pvt school is given by α_3 .

ASER

Table D.1. Net change in % Story readers in ASER Reading			
Grade 5/6			
Variable	Impact of Print (N=1355)	Impact of Digital (N=1223)	Impact of School (N=1319)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	-0.06	-0.04	0.09
Pvt school (α_2)	-0.09	-0.03	-0.05
Treatment and pvt school (α_3)	0.06	-0.01	0.002
Constant (α_0)	0.28	0.22	0.18

Table D.2. Net change % Story readers in ASER Reading			
Grade 7/8			
Variable	Impact of Print (N=1373)	Impact of Digital (N=1256)	Impact of School (N=1334)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	-0.14	0.02	0.09
Pvt school (α_2)	-0.10	0.02	-0.07
Treatment and pvt school (α_3)	0.12	-0.09	-0.05
Constant (α_0)	0.24	0.09	0.11

Example to understand the interpretation of the results:

Refer to table 15, the column ‘Variable’ represents the various explanatory variables of the regression equation (eq.1). Given that the intervention model is cascading in nature, each column after ‘Variable’ indicates the impact of the additional intervention in a location. For eg. the first column after ‘Variable’ shows the impact of Print. Here, we are comparing Sikrai and Rajgarh (Control location). The next columns show the additional impact of Digital. Thus, the comparison is between Bassi and Sikrai. The last column shows the additional impact of school intervention, thus comparing Dausa with Bassi. Each of the columns after ‘Variable’ will be referred to as the Comparative segment. For each comparative segment, the definition of each term in the ‘Variable’ column stands as:

1. Treatment- indicates the additional intervention
2. Pvt school- indicates the effect of pvt school
3. Treatment*Pvt school- is the interactive term, indicating the impact of both the additional intervention and pvt school.
4. Constant- indicates the ‘Control’ group. In a cascading model, the Control group is that group that receives the lower intervention in each comparative segment.

Consider the column representing the ‘Impact of Print’. As stated, this is the comparison of Sikrai with Rajgarh. Here:

1. Constant- is the impact of no-intervention on govt school children of Rajgarh.
2. Treatment- is the additional impact of Print intervention on govt school children of Sikrai.
3. Pvt school- is the additional impact of being in a Pvt school.
4. Treatment*Pvt school- is the additional impact of being in Pvt school of the Treatment location.

The values of each term in the ‘Variable’ column are shown next to it. The sign of the values, indicates the direction of the impact and the highlight represents if it is significant. The darker

the highlight, the larger the significance. No highlight indicates no significance or in other words, the impact if nil.

Thus for Table 15 impact of:

1. **Rajgarh govt school (Constant)**= 0.28, i.e. the net change of Story readers in Rajgarh govt schools between baseline and endline is 28%.
2. **Sikrai govt school (Constant+Treatment)**=0.22, i.e. the net change of Story readers in Sikrai govt schools between baseline and endline is 22%. Further, the coefficient for **treatment** is negative and significant (at 10% confidence level). This indicates that the net gain of Story readers in Sikrai govt schools is significantly less than that of Rajgarh govt schools.
3. **Rajgarh pvt school (Constant + Pvt school)**= 0.19, i.e. the net change of Story readers in Rajgarh pvt schools is 19% between baseline and endline. Since the coefficient for **Pvt school** is negative and significant (at 1% confidence level). This indicates that the net gain for pvt school children is significantly less than that of govt school children in Rajgarh.
4. **Sikrai pvt school (Constant+Treatment+Pvt school+Treatment*Pvt school)**= 0.19 i.e. the net change in Sikrai pvt school is 19% between baseline and endline. Since the interaction terms, **Treatment*Pvt school** is positive but insignificant, this gain is similar to the gain of Sikrai govt school children.

The next adjacent column represents the impact of Digital intervention, i.e. it shows the additional impact of Digital intervention, over and above the Print intervention. Thus, the comparison is between Bassi and Sikrai. **The value of the constant here is 0.22 which is equal to that of Sikrai govt school** in the previous column.

Table D.3. Net change in % Subtraction and above level children in ASER Math			
Grade 5/6			
Variable	Impact of Print (N=1353)	Impact of Digital (N=1222)	Impact of School (N=1319)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	-0.01	0.07	-0.04
Pvt school (α_2)	-0.10	-0.04	-0.05
Treatment and pvt school (α_3)	0.07	-0.01	0.01
Constant (α_0)	0.13	0.12	0.19

Table D.4. Net change in % Subtraction and above level children in ASER Math			
Grade 7/8			
Variable	Impact of Print (N=1373)	Impact of Digital (N=1255)	Impact of School (N=1333)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	-0.01	0.09	-0.06
Pvt school (α_2)	-0.06	-0.01	-0.10
Treatment and pvt school (α_3)	0.05	-0.10	0.02
Constant (α_0)	0.08	0.07	0.17

Table D.5.. Net change in % Word and/or Sentence readers in ASER English			
Grade 5/6			
Variable	Impact of Print (N=1354)	Impact of Digital (N=1221)	Impact of School (N=1318)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	0.02	0.07	-0.06
Pvt school (α_2)	-0.02	0.04	-0.06
Treatment and pvt school (α_3)	0.06	-0.10	0.03
Constant (α_0)	0.12	0.14	0.21

Table D.6. Net change in % Word and/or Sentence readers in ASER English			
Grade 7/8			
Variable	Impact of Print (N=1371)	Impact of Digital (N=1254)	Impact of School (N=1331)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	0.01	0.01	-0.06
Pvt school (α_2)	-0.07	-0.04	-0.04
Treatment and pvt school (α_3)	0.03	0.00	-0.01
Constant (α_0)	0.13	0.14	0.15

Subject Assessments

Table D.7. Net change in Average % score in English			
Grade 5/6			
Variable	Impact of Print (N=1355)	Impact of Digital (N=1222)	Impact of School (N=1315)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	-1.09	5.21	-1.40
Pvt school (α_2)	0.65	2.08	-2.82
Treatment and pvt school (α_3)	1.43	-4.90	2.97
Constant (α_0)	4.28	3.18	8.39

Table D.8. Net gain in Average % score in English			
Grade 7/8			
Variable	Impact of Print (N=1377)	Impact of Digital (N=1253)	Impact of School (N=1332)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	0.44	2.56	-0.15
Pvt school (α_2)	0.40	1.07	-1.14
Treatment and pvt school (α_3)	0.67	-2.21	1.77
Constant (α_0)	2.20	2.64	5.19

Table D.9. Net change in Average % score in Hindi			
Grade 5/6			
Variable	Impact of Print (N=1354)	Impact of Digital (N=1221)	Impact of School (N=1313)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	0.83	10.19	-6.33
Pvt school (α_2)	2.48	-3.57	-4.99
Treatment and pvt school (α_3)	-6.05	-1.42	7.00
Constant (α_0)	3.79	4.62	14.82

Table D.10. Net change in Average % score in Hindi			
Grade 7/8			
Variable	Impact of Print (N=1378)	Impact of Digital (N=1254)	Impact of School (N=1331)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	-0.32	11.28	-9.42
Pvt school (α_2)	-1.56	0.33	-5.85
Treatment and pvt school (α_3)	1.89	-6.18	1.72
Constant (α_0)	1.92	1.60	12.88

Table D.11. Net change in Average % score in Math			
Grade 5/6			
Variable	Impact of Print (N=1353)	Impact of Digital (N=1220)	Impact of School (N=1314)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	3.31	8.93	-4.49
Pvt school (α_2)	3.46	-0.83	-3.34
Treatment and pvt school (α_3)	-4.28	-2.51	4.38
Constant (α_0)	1.00	4.31	13.23

Table D.12. Net change in Average % score in Math			
Grade 7/8			
Variable	Impact of Print (N=1378)	Impact of Digital (N=1254)	Impact of School (N=1331)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	2.43	8.67	-5.13
Pvt school (α_2)	2.03	1.42	-6.68
Treatment and pvt school (α_3)	-0.62	-8.09	3.19
Constant (α_0)	-0.23	2.20	10.87

Table D.13.. Net change in Average % score in Science			
Grade 5/6			
Variable	Impact of Print (N=1335)	Impact of Digital (N=1221)	Impact of School (N=1314)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	-4.02	9.24	0.16
Pvt school (α_2)	-0.33	0.27	-1.76
Treatment and pvt school (α_3)	0.61	-2.03	0.06
Constant (α_0)	6.80	2.78	12.01

Table D.14. Net change in Average % score in Science			
Grade 7/8			
Variable	Impact of Print (N=1376)	Impact of Digital (N=1252)	Impact of School (N=1332)
	Sikrai vs. Rajgarh	Bassi vs. Sikrai	Dausa vs. Bassi
Treatment (α_1)	0.65	13.01	-4.30
Pvt school (α_2)	5.11	-1.20	-5.39
Treatment and pvt school (α_3)	-6.31	-4.19	4.15
Constant (α_0)	-0.30	0.34	13.35

Since, it is seen that Digital intervention has been most impactful. However, since the above analysis has been cascading in nature, it is important to check if the gains made by children in

Bassi has been significantly greater than that made by children in Rajgarh, the Control location. An additional set of difference-in-difference analysis comparing Bassi and Rajgarh are shown below:

Table D.15. ASER

Grade 5-6			
ASER Reading			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	0.18	0.13	0.05
Change in Rajgarh	0.28	0.19	0.09
Difference (give a school type :Bassi vs. Rajgarh)	-0.10	-0.06	
ASER Math			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	0.19	0.14	0.05
Change in Rajgarh	0.13	0.03	0.10
Difference (give a school type :Bassi vs. Rajgarh)	0.06	0.11	
ASER English			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	0.21	0.15	0.06
Change in Rajgarh	0.12	0.09	0.02
Difference (give a school type :Bassi vs. Rajgarh)	0.09	0.06	
<i>Figures highlighted in red indicate that the difference is significant at 5% confidence level</i>			

Grade 7-8			
ASER Reading			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	0.11	0.04	0.07
Change in Rajgarh	0.24	0.13	0.10
Difference (give a school type :Bassi vs. Rajgarh)	-0.12	-0.09	
ASER Math			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	0.17	0.06	0.10
Change in Rajgarh	0.08	0.02	0.06
Difference (give a school type :Bassi vs. Rajgarh)	0.08	0.04	
ASER English			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	0.15	0.10	0.04
Change in Rajgarh	0.13	0.06	0.07
Difference (give a school type :Bassi vs. Rajgarh)	0.01	0.04	
<i>Figures highlighted in red indicate that the difference is significant at 5% confidence level</i>			

Table D.16. Subject Assessments

Grade 5-6			
English			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	8.39	5.57	2.82
Change in Rajgarh	4.28	4.93	-0.65
Difference (give a school type :Bassi vs. Rajgarh)	4.11	0.65	
Hindi			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	14.82	9.82	4.99
Change in Rajgarh	3.79	6.27	-2.48
Difference (give a school type :Bassi vs. Rajgarh)	11.02	3.55	
Math			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	13.23	9.90	3.34
Change in Rajgarh	1.00	16.69	-15.69
Difference (give a school type :Bassi vs. Rajgarh)	12.24	-6.79	
Science			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	12.01	10.26	1.76
Change in Rajgarh	6.80	6.47	0.33
Difference (give a school type :Bassi vs. Rajgarh)	5.21	3.79	
<i>Figures highlighted in red indicate that the difference is significant at 5% confidence level</i>			

Grade 7-8			
English			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	5.19	4.06	1.14
Change in Rajgarh	2.20	2.60	-0.40
Difference (give a school type :Bassi vs. Rajgarh)	3.00	1.46	
Hindi			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	12.88	7.04	5.85
Change in Rajgarh	1.92	0.36	1.56
Difference (give a school type :Bassi vs. Rajgarh)	10.97	6.68	
Math			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	10.87	4.19	6.68
Change in Rajgarh	-0.23	1.81	-2.03
Difference (give a school type :Bassi vs. Rajgarh)	11.10	2.39	
Science			
Location	Change in Govt school	Change in Pvt school	Difference (Give a location :Govt vs. Pvt)
Change in Bassi	13.35	7.96	5.39
Change in Rajgarh	-0.30	4.81	-5.11
Difference (give a school type :Bassi vs. Rajgarh)	13.65	3.15	
Figures highlighted in red indicate that the difference is significant at 5% confidence level			

