ALL CHILDREN READING:
A GRAND CHALLENGE FOR DEVELOPMENT

Baseline Report

Bookshare: Improving Reading Skills Among Primary Students with Low vision or Blindness

Beneficent Technologies, India

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For All Children Reading: A Grand Challenge for Development

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I. Executive Summary

All Children Reading: A Grand Challenge for Development (ACR GCD) adopted the standard Early Grade Reading Assessment (EGRA) tool to systematically assess reading skills across all Round 2 grantees and is adapting the tool according to each grantee's project context. All Children Reading is a partnership between the United States Agency for International Development (USAID), World Vision, and the Australian Government). In India, Beneficent Technologies (Benetech) is piloting a project using their Bookshare platform to offer age-appropriate, high-interest Marathi books in both human-narrated audio and hard-copy braille to students in four schools for children with low vision/ blindness in Maharashtra. It is implemented by Beneficent Technologies (Benetech) with funding from ACR GCD.

To determine the learning levels of students prior to the start of the intervention, a baseline assessment was conducted using the EGRA. The EGRA is an instrument designed to measure foundational literacy skills, which are crucial to children's success in both reading and comprehension. Students with low vision/blindness were assessed using five reading subtasks in the Marathi language and using Bharati braille.

From December 2015 to January 2016, School-to-School International (STS), in collaboration with Benetech, World Vision, and University Research Co., LLC (URC) conducted the EGRA baseline assessment on 66 students with low vision/blindness in three Bookshare project[1] schools.

This baseline report summarizes the methodology and findings from the baseline EGRA assessments and provides recommendations for implementation.

Key Findings

- **The proportion of students reading fluently with comprehension at baseline was 0 percent in Grade 2 and 13 percent in Grade 3**. Examining the subtasks by grade, reveals that Grade 3 students performed better than Grade 2 students in all subtasks, as expected.
- Students had the highest fluency rates in the letter name identification subtask at nearly 42 correct letters per three minutes. They had the highest mean score on listening comprehension subtasks, with 2.5 of 4 questions correctly identified.

The findings suggest several priorities for the Bookshare project:

- **Strengthen letter name identification and syllable identification.** The Bookshare project should support teachers, particularly in the lower grades, in ways that ensure

[1] *Also referred to as the "project" for ease of reference.*

students have a strong grasp of basic skills, such as recognizing shapes and braille letters, before moving into more advanced reading.

- **Emphasize pre-literacy skills for students in Grade 2.** Using the Bookshare technology to build children's phonics foundational skills in braille will be critical to Grade 2 students, as well as struggling Grade 3 students.

Mean fluency rates for all students and the number of zero-score students are reported in Table 1, below, for letter name identification, syllable identification, familiar word reading and oral reading fluency subtasks. Of the timed subtasks, students had the highest subtask level scores in letter name identification fluency.

Table 1. Mean Fluency Rates for Timed Subtasks on EGRA

Subtask	*N*	*Gr. 2*	*Gr. 3*	*All Students*	*Zero scores (n)*
Letter name identification (*correct letter names identified per three minutes*)	66	28.0	50.5	41.5	13
Syllable identification (*correct syllable identified per three minutes*)	66	11.3	24.2	19.1	32
Familiar word reading (*correct words read per three minutes*)	66	10.5	24.5	18.9	30
Oral reading fluency (*correct words per three minutes*)	66	8.3	24.3	18.1	34

For the untimed subtasks, the mean score for reading comprehension was just over one; in other words, the average student answered one out of five questions correctly (note that half of all students did not read far enough into the reading passage to be asked a single comprehension question). With listening comprehension, the mean score was 2.5 questions correct out of four; suggesting that the average student was able to answer up to three out of four items correctly. Note, however, that only half of all students attempted all four items.

II. Introduction

Research has found that giving primary school students access to an abundance of high-interest books and encouragement from trained teachers to read leads to a significant increase in early grade reading skills.[2,3,4] However, in many countries, students with low vision/blindness, or have other print disabilities, face formidable barriers as they pursue their education without access to appropriate materials. Less than 1 percent of printed materials are created in accessible formats such as braille or audio books. Even when a child does receive an accessible text, it is usually provided in only one format—either braille or audio. In countries with several regional languages, such as India, even when children with print disabilities do receive an accessible text, it is the bare minimum needed to participate in classroom activities. Few reading materials, if any, are provided to help strengthen their learning outside the classroom, and they have few opportunities to complement their braille learning with other modes, such as audio.

Benetech, with funding from ACR GCD and support from University Research Co. LLC (URC) and STS is implementing the Bookshare project in four schools in the Indian state of Maharashtra. Bookshare is a pilot project designed to provide students with low vision/blindess with age-appropriate, high-interest books in the Marathi language. The books are in two formats—human-narrated audio and hard-copy Bharati braille.[5] By providing instruction, opportunities for reading, and appropriate reading materials, the Bookshare project seeks to influence student's early reading skills.

The Bookshare project has three components: teacher training, regular visits by a local "Story Uncle" to encourage reading, and independent student reading using the provided materials. The Story Uncle is a Benetech employee that visits the schools weekly to engage the students in 30 minutes of guided reading (one to two times a week depending on the school). For the first component, teachers receive training on literacy instruction and on the materials used by the Bookshare project. Secondly, to expose students to basic braille reading and writing concepts, the Story Uncle uses slate and cube, hand held teaching tools used to for learning to write braille, to teach students the Braille version of words that are already familiar and meaningful to them through spoken language; he also guides the students with the use of DAISY audio players[6] to listen to narrated audio books as they follow along in braille storybooks. During free reading time,

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[2] Brophy, J. *Teaching*. Brussels, Belgium: International Academy of Education; Geneva, Switzerland: International Bureau of Education. Retrieved March 2016 from www.ibe.unesco.org/fileadmin/user_upload/archive/publications/EducationalPracticesSeriesPdf/prac01e.pdf

[3] Neuman, S.B., Celano, D.C., Greco, A.N., & Shue, P. (2001). *Access for all: Closing the book gap for children in early education*. Newark, DE: International Reading Association.

[4] Hoffman, J.V. (2009, March). *Literacy in developing countries* (Report from the Sixth Annual Global Perspectives on Literacy). Newark, DE: International Reading Association.

[5] India uses Bharati Braille, a largely unified braille script for writing the languages of the country. While books are written in Marathi language, the braille code used is called Bharati Braille.

[6] DAISY (Digital Accessible Information System) is a technical standard for digital talking books for people with blindness or have a print disability (e.g. dyslexia). DAISY is an audio substitute for print material, allowing users to search, navigate, place bookmarks, and regulate the speaking speed books found in the digital repository.

the third component, students have the opportunity to practice reading using their books and using the DAISY players.

III. Methodology

The Bookshare project is utilizing the EGRA to measure the influence of the project's interventions on students' reading skills. EGRA is an orally-administered assessment of foundational literacy skills among early grade students.

To measure the influence of the project on reading abilities, the EGRA will be conducted in two phases: a baseline assessment and an endline assessment. A comparison of the baseline and endline assessments will provide a measure of the impact of the intervention on student's reading abilities. The baseline was administered to Grade 2 and 3 students in three schools at the beginning of the academic year in December 2015 – January 2016. The endline assessment is expected to take place in December 2016, measuring change in reading scores among the same students when they are in Grades 3 and 4.

The purpose of this report is to summarize findings from the baseline assessment of reading abilities of students.

Research Questions

The key research question to guide the evaluation is:

1. *How effective is Bookshare's approach toward achieving the goal of increased reading skills among the children with disabilities?*

To answer this question, the reading skills of students with disabilities in the Bookshare project schools have been measured using the EGRA.

Instrument Development

In Maharashtra, the language of instruction is Marathi. **Most students with low vision/blindness in India learn to read using Bharati braille, a largely unified braille script for writing many of the languages in India**. To assess the reading skills of students with low vision/blindness participating in the Bookshare project, the EGRA was adapted into Marathi and then written using Bharati braille. The stimulus was presented to students in Bharati braille.[7]

The EGRA measures both code- and meaning-based skills. Code-based subtasks assess a student's ability to decode language; meaning-based subtasks assess a student's ability to make meaning out of text. Both skills are necessary for fluency and comprehension.

The individual subtasks within the EGRA are based on extensive research that identifies the foundational skills required to read fluently with comprehension, namely

7 Indian schools are more familiar with the Annual Status of Education Report (ASER) survey which provides annual estimates of children's schooling status and basic learning levels for each state and rural district in India.

phonological awareness, alphabetic knowledge, vocabulary, fluency and comprehension.[8] To ensure that the "core" reading skills were captured across all ACR GCD projects, STS, in consultation with a literacy expert, determined that a minimum of four subtasks would be included in all projects: letter identification (names and/or sound knowledges), nonword reading, oral reading fluency and reading comprehension. ACR GCD grantees were encouraged to include other EGRA subtasks as well, depending on the nature of their intervention.

Subtasks administered to students participating in the Bookshare project included timed and untimed subtasks. Timed subtasks included 3-minute assessments of letter name identification and syllable identification, familiar word reading, and oral reading fluency. **While EGRA administration traditionally calls for one-minute fluency rates, literacy and braille experts determined that students with low vision/blindness should have three minutes to read on the timed tests**.[9] Untimed subtasks included oral reading fluency with comprehension and listening comprehension.

Adaptation Process

The Marathi EGRA instrument was developed for students in Grades 2 and 3 during a five-day instrument adaptation workshop. It was then transcribed into Bharati braille (Annex A). The workshop, led by STS facilitators, brought together the following experts:

- a Marathi language expert
- a Bharati braille expert
- two instructional design experts from the Maharashtra State Council for Educational Research and Training (MSCERT)
- two experts in teaching children with low vision/blindness from the Ankur School.
- representatives from Benetech, URC, Sesame Workshop India, USAID/India, and World Vision India

During the EGRA adaptation workshop, the team concurrently developed two versions of both a Marathi print instrument and a braille instrument. The two versions of each instrument were designed so one could be used for the baseline and one for the endline. Parallel versions in print and braille were pretested and piloted to compare whether differences in results were due to format (being in braille) or the level of difficulty (as tested with sighted students).

[8] RTI International and International Rescue Committee. (2011). *Guidance Notes for Planning and Implementing Early Grade Reading Assessments*.

[9] The same adjustment was made in other ACR GCD projects for with low vision/blindness. Upon discussion, the braille and EGRA specialists in India found the change appropriate in this context as well.

As a result of the pre-test and the pilot test, the following changes were made to the EGRA subtasks:

- The syllable identification fluency subtask was added to allow differentiation between the simple names of the letters and many letter combinations found in Marathi. There are 49 letter names (36 consonants and 13 vowels) for a total of 408 letter combinations. In the Marathi language, each vowel + consonant combination has a different syllable sound which is written in a particular and unique way to indicate that the letters are together. These are never taught as letter sounds but are taught as consonant-vowel combinations in a particular sequence. This presents a challenge to the braille reader because consonants and vowels are not written as a combination in braille (as in Marathi) but rather are written separately without a space. The reader is forced to guess if they are together for a particular sound.
- Items on both the letter name identification and syllable identification subtasks were arranged randomly on the grid. However, for the syllable identification subtask, two of the least frequently used combinations were placed lower on the grid because children are not taught those combinations until Grade 3.
- **Non-words were particularly difficult for the participating children. Given the complexity of reading Marathi in braille, it was almost impossible for the students to read non-words because they had to guess which vowels and consonants went together.** Additionally, because of the nature of the Marathi language, reading non-words assesses the same decoding skills as reading syllable identification. For these reasons, the non-word reading subtask was removed and replaced with familiar word reading.
- The listening comprehension subtask was added to obtain additional information on students' ability to comprehend oral text, especially for those students with low literacy levels.
- Stories were revised with simpler, more familiar words, and simpler sentence formations. Listening comprehension questions were revised to form more direct and simpler questions than in the earlier versions.
- The stories were revised to ensure that the level of difficulty for the baseline and endline stories was similar.

The final EGRA assessment included the following six subtasks for both the baseline and the equated endline instruments (Annex B):

1. Letter name identification
2. Syllable identification
3. Familiar word reading
4. Oral reading fluency
5. Reading comprehension
6. Listening comprehension

Institutional Review Board for Human Participants[10]

The Institutional Review Board (IRB) is responsible for ascertaining the acceptability of proposed research in terms of institutional commitments and regulations, applicable laws, standards of professional conduct and practice, and ethical and societal norms. The IRB examines subject recruitment procedures, proposed remuneration, and the informed consent process. The IRB also evaluates the potential risks and benefits to participants outlined in each protocol. The EGRA tool (including both the baseline and endline instruments) was reviewed by URC's IRB and approved on November 5, 2015.

Test Quality

Using data from the baseline administration, the reliability of the subtasks (i.e., how generalizable the results are to the universe of subtasks that measure that ability) was examined by calculating the Cronbach's alpha values for each subtask. The Cronbach alpha[11] value exceeded the threshold value of 0.8 for four of the five relevant subtasks (Table 2); reliability for the oral reading fluency passage is not calculated. For listening comprehension, the one subtask with a Cronbach alpha score below 0.8, the lower value may indicate that the subtask may not generalize to other similar listening comprehension subtasks for this population.

Table 2. Cronbach's Alpha Scores for EGRA Components

Item	Cronbach's Alpha
Letter name identification	0.991
Syllable identification	0.990
Familiar word reading	0.991
Reading comprehension	0.873
Listening comprehension	0.614

Assessor Training

The EGRA assessor training took place from October 12–14, 2015. The two assessors were recruited by URC and the training was led by STS. Since the assessors had been involved in the EGRA adaptation workshop and the pilot, they were familiar with the EGRA administration procedures. The assessors were trained to administer the EGRA on tablets and on paper. At the end of the training, the team compared the two assessor's markings

[10] Following The Protection of Human Subjects in Research Supported by USAID, all ACR GCD projects sought human subjects' approval through a local Internal Review Board (IRB) to ensure there was minimal risk to the students participating in the interventions and associated assessments.

[11] Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. If, in addition to measuring internal consistency, you wish to provide evidence that the scale in question is unidimensional, additional analyses can be performed. Exploratory factor analysis is one method of checking dimensionality. Technically speaking, Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency).

to one another and against the prepared script. The assessors were found to agree in their assessment decisions more than the 90 percent standard threshold used to determine inter-rater reliability (IRR).

Sampling

The sample for this intervention included all students in Grades 2 and 3 at three of the four intervention schools. One school was excluded because it was the pilot test site of the EGRA. A total of 66 students in three schools participated in the EGRA baseline; these same students will participate in the endline at the end of the intervention period. Table 3 shows the baseline sample by grade, age, and gender. Table 4 shows the sample by school and grade:

Table 3. Total Number of Students Assessed by Grade, Gender, and Age

Grade	No. boys	No. girls	Ave. age	Age range	Total
2	11	15	8.5	6 – 11	26
3	21	19	9.5	6 – 15	40
Total	32	34			66

Table 4. Total Number of Students by School and Grade

School	Grade 2	Grade 3	Total
1	7	7	14
2	11	21	32
3	8	12	20
Total	26	40	66

The baseline data were collected between December 14, 2015 and January 12, 2016 at the three schools. Two assessors administered the EGRA. The sessions, averaging 40 minutes, consisted of the introduction, context interview, and the six EGRA subtasks.

Data Cleaning and Analysis

The final analytical sample consisted of 66 students and the data were analyzed using STATA and Excel, which resulted in graphs and frequency tables. Differences between student groups (by gender or school) were not examined for mean score differences or proportions of zero scores because of 1) the small sample size; 2) the confounding of school and gender since all schools were single-sex; and 3) the identifiability of individual schools by gender (two schools were all girls and one was all boys which would render school-level results to be identifiable). Results are presented overall for all students and by grade. Results are presented by grade since differences between the grades may be useful given the uneven age distribution and time in school in both grade levels. Mean scores on each subtask were compared using ANOVA and differences in the proportion

of zero-score students (or non-readers) was compared using the chi-square test for significance.[12] To that end, the purpose of the data presented in this report is to share the overall reading abilities of students participating in the Bookshare project *prior to* the start of the project (i.e., at baseline). At endline, additional data regarding implementation of the intervention and surveys will allow for further disaggregation of the data.

Typically, data are cleaned to exclude outliers. For example, if the time remaining for a timed subtask resulted in a fluency rate that was outside a reasonable range, then that student's fluency rate would not be included in the analyses. In these data, such outliers were not observed and therefore all students tested were included in the analyses.

A description of the analysis completed in each subtask is provided in Table 5.

Table 5. Subtask and Data Analysis Method

Subtask	Analysis
Letter Name Identification	The score for this subtask is the number of letter names a student reads correctly in three minutes, a measure known as Correct Letter Names per Three Minutes (CLNP3M). There are a total of 100 letters presented on the stimulus.
Syllable Identification	The score for this subtask is the number of syllables a student reads correctly in three minutes, a measure known as Correct Syllables identified per Three Minutes (CSP3M). There are a total of 100 syllable combinations presented on the stimulus.
Familiar Word Reading	The score for this subtask is a measure of the number of Correct Familiar Words Read per Three Minutes (CFWP3M). There are a total of 50 words presented on the stimulus.
Oral Reading Fluency (ORF)	The score of this subtask is a measure of the number of Correct Words read per Three Minutes (CWP3M). There are a total of 59 words presented on the stimulus.
Reading Comprehension	This score is a measure of the number of questions answered correctly based on the passage read in the ORF subtask. The student is asked questions corresponding with the number of sentences in the passage s/he was able to read within three minutes. Therefore, this subtask score reports total number of questions answered correctly out of total number attempted. There are a maximum of five questions on this subtask.
Listening Comprehension	This score is a measure of the number of questions answered correctly out of a total of five questions asked. The questions are based on a short passage read aloud to the student.

All timed subtasks follow an auto stop rule. If a student is unable to read any of the items on the first line of the grid the subtask will be automatically stopped and the child will receive a zero score on that subtask.

[12] ANOVA, or Analysis of Variance, is a statistical test comparing the means score or fluency of two groups. The chi-square test is a statistical test comparing proportions of zero-score students that were observed in the data against what was expected.

IV. Results

Letter Name Identification

In the letter name identification subtask, students were presented with a grid of 100 letters and asked to identify them by name—naming as many letters as possible in three minutes. During the baseline, students attempted between 10 and 100 letters in three minutes; the average student attempted approximately 55 letters. In the three minutes allotted for this subtask, the average fluency rate was approximately 42 correct letters per three minutes (CLP3M). **By grade, the average fluency rate in Grade 2 was 28 CLP3M and in Grade 3, nearly 51 CLP3M**. The difference in fluency rates by grade was statistically significant.

The proportion of zero-scores, or students unable to identify a single letter correctly, was also examined. **Overall, roughly 20 percent of the sample (n=13) were unable to identify a single letter correctly.** By grade, the proportion of students unable to identify a syllable sound correctly was comparable (differences were not statistically significant). In other words, almost one out of five students in both Grades 2 and 3 were unable to identify a single letter correctly.

Table 6. Mean Letter Name Identification Fluency

Group	No. of students	Fluency rate (CLP3M)	SD[13]	Proportion zero scores n (%)
By grade				
Grade 2	26	28.0	31.9	5 (19.2%)
Grade 3	40	50.5	46.5	8 (20.0%)
Total	66	41.5	42.5	13 (19.7%)

Syllable Identification

This subtask measures students' understanding of the consonant and vowel blends; in other words, their understanding that specific letter pairings correspond to specific and unique sounds in Marathi. For this subtask, each student was presented with a stimulus of 100 syllable combinations and asked to identify the sounds associated with as many syllables as possible in three minutes.

For syllable identification, students attempted to identify between 10 and 100 syllables; the average student attempted to identify approximately 32 syllables. In the three minutes allotted for this subtask, the average fluency rate was over 19 correct syllables identified per three minute (CSP3M). **By grade, the syllable identification fluency rate for the average Grade 2 student was over 11 CSP3M and for the average Grade 3 student, 24 CSP3M.** The difference in fluency rate by grade was statistically significant.

[13] Standard deviation of a metric describes the amount of variability or spread in the values.

The proportion of zero-scores, overall, was nearly 49 percent of the sample (n=32) for syllable identification. In other words, **half of the students were unable to identify a single syllable correctly**. By grade, the proportion of Grade 2 students unable to identify a syllable correctly was comparable. The differences in proportions of zero scores were not statistically significant. Table 7 shows the mean syllable identification fluency by grade and overall.

Table 7. Syllable Identification Fluency

Group	No. of students	Fluency rate (CSP3M)	SD	Proportion zero scores n (%)
By grade				
Grade 2	26	11.3	19.4	16 (61.5%)
Grade 3	40	24.2	30.1	16 (40.0%)
Total	66	19.1	26.9	32 (48.5%)

Familiar Word Reading

Children's decoding skills can be assessed using reading lists of unrelated words. This measures students reading ability at the word level, which captures both their sight word familiarity and decoding ability. For this subtask, students were presented with 50 one- and two-syllable words and asked to read as many as possible within the allotted time (three minutes).

For familiar word reading, students attempted between 5 and 50 words; the average student attempted approximately 21 familiar words. In the three minutes allotted for this subtask, the average fluency rate was nearly 19 correct familiar words per three minutes (CFWP3M). **By grade, the fluency rate for the average Grade 2 student was almost 11 CFWP3M and for the average Grade 3 student, 25 CFWP3M.** The difference in fluency rate by grade was statistically significant.

The proportion of zero-scores, overall, on familiar word reading fluency was 45 percent of the sample (n=30). In other words, **almost half of the students were unable to correctly identify a single one- or two-syllable word.** By grade, the proportion of students unable to identify a familiar word correctly differed significantly from expected proportions; in Grade 2, nearly 62 percent of students were unable to answer any items correctly, in Grade 3, 35 percent of students were unable to answer any items correctly. Table 8 shows the mean familiar word fluency rate by grade and overall.

Table 8. Familiar Words Attempted and Fluency (out of maximum of 50)

Group	No. of students	Fluency rate (CFWP3M)	SD	Proportion zero scores n (%)
By grade				
Grade 2	26	10.5	18.9	16 (61.5%)
Grade 3	40	24.5	33.7	14 (35.0%)
Total	66	18.9	29.4	30 (45.4%)

Oral Reading Fluency

Oral reading fluency is the ability to read with speed, accuracy, and proper expression. The oral reading fluency (ORF) subtask measured students' ability to read aloud a passage of connected text of 59 words within three minutes.

For oral reading fluency, students attempted to read between 5 and 59 words of the 59-word passage; the average student attempted approximately 22 words. In the three minutes allotted for this subtask, the average fluency rate was 18 correct words per three minutes (CWP3M). **By grade, the fluency rate for the average Grade 2 student was 8 CWP3M and for the average Grade 3 student, 24 CWP3M.** The difference in fluency rate by grade was statistically significant.

The proportion of zero-scores, overall, on ORF was higher than that observed with letter name identification fluency, syllable identification fluency, and familiar word reading fluency. **Specifically, 52 percent of the sample (n=34) were unable to read a single word of the passage.** By grade, the proportion of students unable to read a single word varied significantly by grade. In Grade 2, 69 percent of students were unable to read a word of the passage correctly. In Grade 3, that proportion was 40 percent. Table 9 shows the mean ORF rate by grade and overall.

Table 9. Oral Reading Fluency (out of maximum of 59)

Group	No. of students	Fluency rate (CWP3M)	SD	Proportion zero scores n (%)
By grade				
Grade 2	26	8.3	15.7	18 (69.2%)
Grade 3	40	24.3	33.9	16 (40.0%)
Total	66	18.1	29.2	34 (51.5%)

Reading Comprehension

Reading comprehension is the ability to understand and derive meaning from written text. To measure this skill, students were asked up to five questions based on the oral

reading fluency passage in the previous subtask. Students were asked questions relative to the amount of text they were able to read in the time given. For example, if they only finished the first sentence, they were asked one question pertaining to that sentence. If they read the entire text, they were asked all five questions. Of the five questions, four were literal questions (ones for which the answer can be found explicitly in the text) and one was inferential (where the answer must be inferred using evidence from the text).

For reading comprehension, the proportion of students who read far enough into the text to be asked a question varied. Table 10 shows the proportion of students who attempted that number of questions (out of a total of the five questions) and the proportion that answered that number of questions correctly (note that percentages are not comparable across this table since the proportion of students who answered a specific number of items correctly is based on students who attempted *at least* that number of items).

Results show that **half of all students did not attempt *any* questions** (nearly 52 percent of students did not read far enough in the passage to be asked a single question); on the other hand, **over 15 percent of all students attempted *all five* questions**. When looking at the correct responses, almost two-thirds (approximately 61 percent) of students were unable to answer a single question correctly.[14] Less than 10 percent of students (n=5) were able to answer all five comprehension questions correctly.

Table 10. Proportion of Students Attempting and Correctly Answering 0, 1, 2, 3, 4, and 5 Reading Comprehension Questions

Number of Questions	Attempted		Answered Correctly	
	n	%	N	%
0	34	51.5	40	60.6
1	8	12.1	6	9.1
2	6	9.1	5	7.6
3	3	4.6	7	10.6
4	5	7.6	3	4.6
5	10	15.2	5	7.6
Total	66	100	66	100

On average, students answered 1 question out of 5 reading comprehension question correctly (mean of 1.1 correct).

[14] 60.6 percent of students did not have any correct answers; this represents an additional 9.1 percent of students unable to answer a comprehension question correctly over and above those students who were not asked any questions (51.5 percent). The additional 9.1 percent of students with zero-scores on this subtask represents students who were asked 1, 2, 3, 4 or 5 questions.

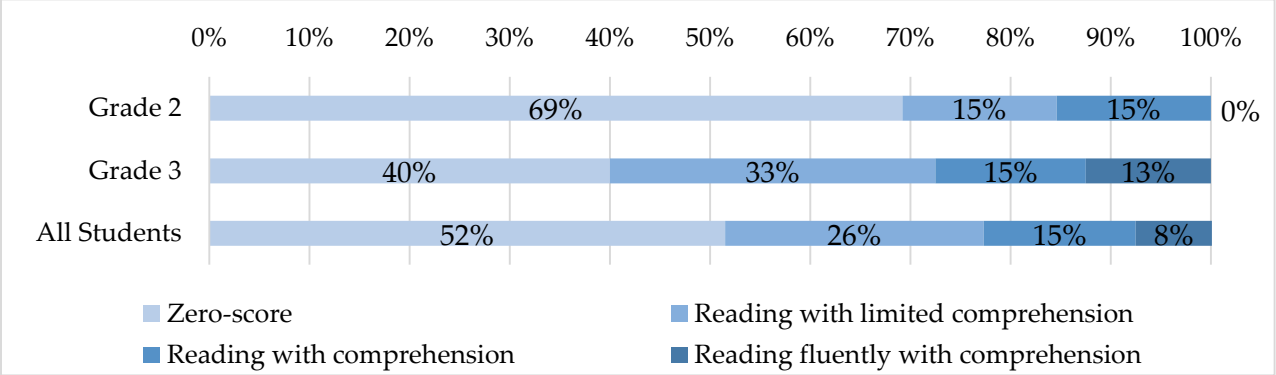
The proportion of zero-scores was highest for the reading comprehension subtask. Specifically, nearly 61 percent of the sample (n=40) were unable to either read any of the text (and therefore weren't asked any comprehension questions) in addition to the students were unable to correctly answer a question posed to them. By grade, the proportion of zero-scores varied significantly when compared to expected proportions. In Grade 2, almost 77 percent of students received zero-scores on this subtask, and in Grade 3, 50 percent received zero scores.

ORF and reading comprehension were examined together to identify the proportion of students who are able to read *with* comprehension.

For students who were able to read at least one word of the reading passage, their comprehension levels were categorized into four groups as follows: students who were able to read at least one word of the passage but were unable to correctly answer 60 percent of the comprehension questions were identified as reading with *limited comprehension*; those who read at least one word and answered 60-80 percent of comprehension questions correctly were identified as reading *with comprehension*, and students who read at least one word and answered more than 80 percent of comprehension questions correctly were identified as reading *fluently with comprehension*.

The results show that the largest proportion—almost half of all students—were reading with limited comprehension at baseline; furthermore, one-fifth of all students were unable to read any of the reading passage (i.e., zero-scores). Figure 1 shows the proportion of students in each reading category by group and for all students.

Figure 1. Proportion of Students at Various Levels of Reading Proficiency



Categories determined as follows: Non-reader= 0 on ORF portion; reading with limited comprehension = less than 60 percent on reading comprehension and more than 0 on ORF; reading with comprehension = between 60-80 percent on reading comprehension; and reading fluently with comprehension = reading comprehension score over 80 percent. N sizes were as follows for zero-scores, readers with limited comprehension, readers with comprehension, and fluent readers with comprehension by grade: Grade 2: 18, 4, 4, 0; Grade 3: 16, 13, 6, 5; overall: 34, 17, 10, 5.

Listening Comprehension

Listening comprehension is a student's ability to comprehend and answer questions about a passage that is read to them. For this subtask, the assessor read a passage of 33 words in length to the student, then asked him/her to respond to four comprehension questions: three literal and one inferential.

The listening comprehension subtask had the highest proportion of students who attempted all items compared with all the subtasks. Table 11 shows the proportion of students who attempted that number of questions (out of a total of the four questions) and the proportion that answered that number of questions correctly (note that percentages are not comparable across this table since the proportion of students who answered a specific number of items correctly is based on students who attempted *at least* that number of items).

Results show that the majority of students attempted *at least one* question (only 1 student did not attempt any items) and more than half of all students (53 percent) attempted *all four* questions. When looking at the correct responses, however, less than 11 percent of students got zero questions correct and one-quarter of all students (24 percent) got all four questions correct.

Table 11. Proportion of Students Attempting and Correctly Answering 0, 1, 2, 3, and 4 Listening Comprehension Questions

Number of Questions	Attempted		Answered Correctly	
	n	%	N	%
0	1	1.5	7	10.6
1	2	3.0	8	12.1
2	10	15.2	15	22.7
3	18	27.3	20	30.3
4	35	53.0	16	24.2
Total	66	100	66	100

On average, students answered approximately three out of four listening comprehension questions correctly (mean of 2.5 correct).

V. Conclusions

The results of this EGRA baseline indicate that the students are not reading quickly enough to gain meaning from the text and they could benefit from a reading intervention. Learning to read always requires skill development and background knowledge, but the students identified to participate in the Bookshare project face additional challenges from the complexity of the Marathi language and Bharati braille. A braille reader who speaks

Marathi is forced to guess the syllable sounds of vowel + consonant combinations which are clearer in the print Marathi than in braille because the print form presents specific representations of blended forms.

- The lowest mean fluency scores were for syllable identification (on average, 19 correct syllables per three minutes). This may be explained, in part, by the high number of potential syllable combinations. Additionally, assessments on syllable identification are a new experience for these students.
- Almost two out of three students received zero-scores on reading comprehension (either because they were not able to read any of the reading passage, or because they were unable to answer a comprehension question correctly).
- The highest fluency rate was for letter name identification fluency (mean score of 41.5 correct letter names identified per three minutes).
- Students demonstrated high capabilities in listening comprehension skills, with the average student being able to answer up to three questions out of four correctly.

VI. Recommendations

The results of this EGRA baseline raise a number of issues that have implications for the project scope and focus:

- **Strengthen letter name identification and syllable identification.** These are the building blocks for all reading activities. The Bookshare project should support teachers, particularly in the lower grades, to make sure students have a strong grasp of the basic syllable sounds they need to identify before trying to move into more advanced reading.
- **Strengthen teachers' understanding of strategies to teach reading skills and, ultimately, comprehension.** The baseline results show that future interventions should provide guidance for teachers regarding how to support children in the early stages of literacy development, beginning with diagnostic and formative assessments, and building up to phonemic awareness, word reading, and reading comprehension.
- **Third grade students have better basic skills than second grade students.** This provides the right window to use the Bookshare technology to build children's foundational skills in braille.

Annex A. EGRA Adaptation Process (Marathi, Bharati Braille)

Adaptation Workshop Agenda

Tuesday, October 6

Daily objective: Understanding of EGRA purpose and content, and components for letter name identification, syllable awareness

9:30-10:30 a.m.	Welcome and introductions Kristina Solum, School to School International (STS) Madhu Ranjan, USAID India Jacob Devabhaktula, World Vision India Hanumanta Talar, Benetech Siddharth Pillai, Sesame Workshop India Trust
10:30-10:45 a.m.	Break
10:45-12:30 p.m.	Overview of EGRA and review of components: Kristina Solum, STS
12:30-1:30 p.m.	Lunch
1:30-3:00 p.m.	Prepare components: letter name identification and syllable identification
3:00-3:15 p.m.	Break
3:15-5:30 p.m.	Continued

Wednesday, October 7

Daily objective: Oral reading and listening comprehension components, non-word reading

9:30-11:00 a.m.	Prepare component: oral reading fluency (ORF) passages
11:00-11:15 a.m.	Break
11:15-12:30 p.m.	Continue ORF stories and develop questions
12:30-1:30 p.m.	Lunch
1:30-3:00 p.m.	Prepare component: listening comprehension passages
3:00-3:15 p.m.	Break
3:15-5:30 p.m.	Prepare component: Non-word reading

Thursday, October 8

Daily objective: Pupil questionnaire and preparation for pre-testing

9:30-11:00 a.m.	Review and update pupil questionnaire
11:00-11:15 a.m.	Break
11:15-12:30 p.m.	Review and finalization of all components
12:30-1:30 p.m.	Lunch
1:30-2:30 p.m.	Prepare for pre-testing
3:00-3:15 p.m.	Break
3:15-5:30 p.m.	Tangerine testing

Friday, October 9

Daily objective: Pre-test the tool Marathi and Braille tools

9:30-12:30 a.m.	Visit local schools to test EGRA tools in Marathi and in Braille
12:30-1:30 p.m.	Lunch
1:30-2:30 p.m.	School visit debrief
3:00-3:15 p.m.	Break
3:15-5:30 p.m.	Begin finalizing tools

Saturday, October 10

Daily objective: Finalize the tools

9:30-5:30	Finalize tools Breaks at 10:30 and 2:30

EGRA Assessor Training and Pilot Schedule

Date	Activity
Mon., Oct. 12	Assessor Training Day
Tues., Oct. 13	Assessor Training Day
Wed., Oct. 14	Assessor Training Day
Thurs., Oct. 15	Pilot with student with low vision/blindness
Fri., Oct. 16	Uploading revisions into Tangerine and tablets Finalizing braille instruments

Annex B: Baseline EGRA Instrument (English)

See attached pdf file

Benetech EGRA Baseline Tool.pdf

Annex C: Item-Level Statistics

Summary of Overall Fluency and Mean Scores by Subtask

Subtask	N	Mean	SD	Min	Max
Letter Name Identification Fluency	66	41.5	42.5	10	100
Syllable Identification Fluency	66	19.1	26.9	10	100
Familiar Word Reading Fluency	66	18.9	29.4	5	50
Oral Reading Fluency	66	18.1	29.2	0	60
Reading Comprehension	66	1.12	1.66	0	5
Listening Comprehension	66	2.45	1.28	0	4

Subtask: Letter Name Identification

Item difficulty (p) and discrimination (d)

	p	d
Item_1	.79	.499
Item_2	.80	.565
Item_3	.77	.469
Item_4	.70	.658
Item_5	.61	.754
Item_6	.55	.663
Item_7	.48	.623
Item_8	.68	.601
Item_9	.59	.747
Item_10	.62	.670
Item_11	.59	.555
Item_12	.52	.610
Item_13	.50	.694
Item_14	.52	.743
Item_15	.65	.651
Item_16	.64	.621
Item_17	.24	.705
Item_18	.59	.628
Item_19	.38	.721
Item_20	.59	.692
Item_21	.61	.718
Item_22	.47	.650
Item_23	.58	.736
Item_24	.53	.745
Item_25	.50	.757
Item_26	.38	.605
Item_27	.29	.557

Item_28	.45	.744
Item_29	.52	.749
Item_30	.41	.704
Item_31	.56	.803
Item_32	.56	.824
Item_33	.56	.824
Item_34	.53	.723
Item_35	.38	.672
Item_36	.50	.743
Item_37	.41	.773
Item_38	.52	.809
Item_39	.30	.624
Item_40	.48	.815
Item_41	.50	.811
Item_42	.47	.767
Item_43	.56	.807
Item_44	.44	.786
Item_45	.44	.742
Item_46	.30	.632
Item_47	.44	.795
Item_48	.32	.671
Item_49	.48	.761
Item_50	.47	.764
Item_51	.44	.797
Item_52	.35	.736
Item_53	.36	.679
Item_54	.32	.668
Item_55	.39	.706
Item_56	.29	.797
Item_57	.41	.749
Item_58	.42	.786
Item_59	.36	.775
Item_60	.38	.810
Item_61	.33	.698
Item_62	.33	.734
Item_63	.32	.745
Item_64	.29	.807
Item_65	.26	.749
Item_66	.21	.761
Item_67	.24	.775
Item_68	.26	.742
Item_69	.29	.760

Item_70	.20	.656
Item_71	.20	.733
Item_72	.23	.809
Item_73	.23	.807
Item_74	.24	.834
Item_75	.21	.796
Item_76	.21	.776
Item_77	.23	.823
Item_78	.20	.736
Item_79	.21	.794
Item_80	.20	.750
Item_81	.21	.720
Item_82	.15	.659
Item_83	.21	.737
Item_84	.21	.737
Item_85	.21	.737
Item_86	.20	.711
Item_87	.17	.726
Item_88	.18	.681
Item_89	.20	.707
Item_90	.18	.761
Item_91	.09	.527
Item_92	.14	.650
Item_93	.17	.714
Item_94	.20	.707
Item_95	.18	.761
Item_96	.15	.692
Item_97	.14	.670
Item_98	.14	.670
Item_99	.15	.692
Item_100	.09	.530

Subtask: Syllable Identification

	p	d
Item_1	.32	.785
Item_2	.38	.761
Item_3	.35	.794
Item_4	.30	.794
Item_5	.36	.740

Item_6	.35	.678
Item_7	.39	.752
Item_8	.42	.753
Item_9	.35	.682
Item_10	.47	.670
Item_11	.42	.780
Item_12	.44	.772
Item_13	.39	.793
Item_14	.35	.800
Item_15	.44	.760
Item_16	.32	.813
Item_17	.23	.735
Item_18	.36	.670
Item_19	.30	.821
Item_20	.39	.765
Item_21	.36	.812
Item_22	.35	.750
Item_23	.23	.727
Item_24	.26	.629
Item_25	.30	.807
Item_26	.38	.719
Item_27	.27	.808
Item_28	.39	.741
Item_29	.35	.776
Item_30	.27	.724
Item_31	.32	.825
Item_32	.35	.800
Item_33	.32	.848
Item_34	.29	.828
Item_35	.27	.821
Item_36	.29	.832
Item_37	.20	.733
Item_38	.18	.662
Item_39	.26	.866
Item_40	.20	.807
Item_41	.23	.898
Item_42	.21	.840
Item_43	.18	.795
Item_44	.23	.839
Item_45	.20	.826
Item_46	.20	.879
Item_47	.24	.851

Item_48	.20	.816
Item_49	.20	.797
Item_50	.23	.890
Item_51	.15	.675
Item_52	.20	.896
Item_53	.18	.831
Item_54	.15	.800
Item_55	.17	.807
Item_56	.15	.792
Item_57	.20	.896
Item_58	.17	.858
Item_59	.17	.775
Item_60	.12	.746
Item_61	.12	.751
Item_62	.15	.794
Item_63	.14	.726
Item_64	.11	.687
Item_65	.09	.701
Item_66	.12	.739
Item_67	.12	.739
Item_68	.09	.701
Item_69	.11	.717
Item_70	.09	.645
Item_71	.12	.774
Item_72	.12	.774
Item_73	.09	.711
Item_74	.11	.758
Item_75	.09	.705
Item_76	.11	.758
Item_77	.09	.705
Item_78	.08	.632
Item_79	.08	.643
Item_80	.05	.524
Item_81	.05	.524
Item_82	.03	.432
Item_83	.05	.524
Item_84	.05	.524
Item_85	.03	.452
Item_86	.05	.524
Item_87	.05	.524
Item_88	.03	.432
Item_89	.05	.324

Item_90	.05	.524
Item_91	.03	.452
Item_92	.02	.349
Item_93	.03	.452
Item_94	.03	.452
Item_95	.03	.452
Item_96	.02	.349
Item_97	.03	.452
Item_98	.03	.452
Item_99	.03	.452
Item_100	.02	.284

Subtask: Familiar words

	p	d
Item_1	.44	.829
Item_2	.52	.694
Item_3	.44	.774
Item_4	.47	.807
Item_5	.44	.783
Item_6	.36	.863
Item_7	.50	.699
Item_8	.45	.823
Item_9	.35	.842
Item_10	.39	.816
Item_11	.42	.785
Item_12	.35	.695
Item_13	.39	.876
Item_14	.36	.821
Item_15	.39	.752
Item_16	.36	.890
Item_17	.36	.897
Item_18	.26	.780
Item_19	.32	.833
Item_20	.36	.914
Item_21	.36	.863
Item_22	.36	.914
Item_23	.35	.911
Item_24	.36	.872

Item_25	.27	.798
Item_26	.30	.858
Item_27	.29	.883
Item_28	.29	.913
Item_29	.21	.813
Item_30	.24	.907
Item_31	.20	.755
Item_32	.23	.820
Item_33	.21	.869
Item_34	.23	.862
Item_35	.24	.907
Item_36	.24	.907
Item_37	.23	.886
Item_38	.23	.888
Item_39	.23	.888
Item_40	.23	.888
Item_41	.21	.850
Item_42	.21	.869
Item_43	.21	.856
Item_44	.23	.888
Item_45	.21	.869
Item_46	.18	.797
Item_47	.14	.662
Item_48	.15	.728
Item_49	.15	.707
Item_50	.12	.625

Subtask: Reading comprehension

	p	d
Item_1	.38	.668
Item_2	.27	.796
Item_3	.24	.831
Item_4	.12	.619
Item_5	.11	.650

Subtask: Listening comprehension

	p	d
Item__1	.76	.458
Item__2	.59	.344

Item__3	.71	.437
Item__4	.39	.350