



**All Children Reading: A Grand Challenge for
Development, Round 2
Beneficent Technology Inc.
Final Project Report**

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1.0 Executive Summary

In response to USAID’s call for projects designed to improve the reading scores of primary school children in the developing world, Benetech proposed a pilot project that combined technology advances in converting educational content to human-narrated audio with support and instruction in primary schools. The pilot project focused on adding Marathi human-narrated audio capabilities to Bookshare, Benetech’s library of accessible books for people who are blind or print-disabled, to demonstrate the impact of providing students with accessible mother-tongue language educational content that can be read on low-cost audio devices in conjunction with braille reading.

The goal was to identify, produce, and host 30 titles in the vernacular language of Marathi for use in partner schools. Engineering work required to allow Bookshare to support books that are in a human-narrated audio format was foundational to be able to implement the project. This engineering work was completed in year one, and improvements were made based on student and teacher feedback. The project was then ready to scale, and with supplemental funding from World Vision, Benetech set a target of adding an additional 500 locally relevant titles. Benetech staff developed strong partnerships with five conversion house partners, 83 publishers, and a diverse advisory committee to help identify which books to convert. We are pleased to report that we achieved 244% of that goal, adding a total of 1,295 locally relevant children’s books to the India collection in Marathi, Hindi, Gujarati, Telugu, and English. This achievement demonstrates the scalability of the technology, as well as the strong capacity we have built with partners.

In classrooms, the project had three intervention components: provision of appropriate reading materials to students, weekly classroom visits by a local “Story Uncle or Auntie,” and consistent independent reading time for students each day at school. For the first component, Benetech utilized our web-based platform, Bookshare, to host and deliver human narrated audio stories and braille books. However, because schools did not have Internet access, students received the stories predownloaded on DAISY players. Books were selected to be age appropriate and of high interest to students. Teachers also received training on literacy instruction and the use of the provided reading materials. The Story Uncle or Auntie, a Benetech contractor, visited schools once or twice each week to lead students in 30 minutes of guided reading outside of regular school hours. They used handheld teaching tools called slate and cube kits to expose students to basic reading and writing concepts in braille, concentrating on braille words already familiar to students through spoken language. The Story Uncle or Auntie also guided students on using the DAISY players to listen to audio books as they followed along in braille storybooks. For the third component – independent reading time – students had the opportunity to practice reading for 15 minutes daily using their braille storybooks and the DAISY players, except on the days when the Story Uncle or Auntie visited. The Bookshare India project operated within a school environment and sought to encourage development in pre-reading and foundational literacy skills. The project reached 131 students who have low vision or are blind in Grades 2 or 3 at four schools in Maharashtra, India. However, since one school served as a pilot for the project, data were collected from three schools.

We are proud to share that evaluation of the project by the School-to-School International (STS) team found that participating students showed significant gains on all Early Grade Reading Assessment (EGRA) subtasks from baseline to end line. Moreover, the improvements were observed across gender, grade, and vision status.

2.0 Overall Project Accomplishments

Benetech is pleased to report that this project has been a tremendous success. First and foremost, we were able to introduce new technology to our partner schools that helped blind and low-vision students read more and improved literacy scores. By working with students, teachers, and administrators, our team on the ground broke down barriers and helped them overcome reluctance to trying new approaches. At the beginning of the project, it was difficult to get teachers to accommodate the time and new techniques; by the end of the project, students and teachers were asking for more books and more time to continue learning. Teachers and principals want the Story Auntie to continue, and community leaders are now working to support her time in the classroom. Furthermore, we have been able to dramatically exceed the number of titles in vernacular languages we sought to add to the India collection. Initially we targeted converting 30 human-narrated titles for the pilot project with the schools, and with supplemental funding the target increased to 530 locally relevant titles. By the end of the project, we were able to add 1,295 children's titles, or 244% of our goal to the Bookshare India collection. This increase is due not only to supplemental funding from World Vision but also to key partnerships with advisory committee members in identifying locally-relevant children's books, publishers, and conversion houses to facilitate scaling up the collection of accessible books. The groundwork of testing human-narrated audio books in vernacular languages in the schools, coupled with developing strategic partnerships and local capacity building more broadly, laid a critical foundation for scaling our work in delivering accessible books to students throughout India.

We are pleased to report that we have met and exceeded all of the specific project objectives, as detailed below:

Objective 1 - 100% of project stakeholders using ICT (information communication technology/technologies) to improve reading.

100% the teachers and students participating in the pilot project used ICT/assistive technologies to access Marathi language learning materials we created. DAISY players were the primary technology used, as Benetech distributed the devices along with human-narrated stories in Marathi to more than 115 students in four partner schools for the blind: Kutroot Girls School, Koregaou Boys School, Alandi Girls School, and Boseri Boys School. The devices, along with "Story Uncle" and "Story Auntie," reading time, and braille, provided students with multiple modes of learning to improve reading skills over the course of a year.

The core goal of the intervention was improvement in reading, and the project demonstrated strong success. To assess this impact on improved reading abilities, School-to-School International (STS) provided a report analyzing the project's impact. We are extremely proud to share that the STS report found that students improved their scores on all Early Grade Reading Assessment (EGRA) subtasks, indicating improved reading skills from the baseline to the end line of the project. The report, *Bookshare India: Improving Reading Skills Among Primary Students with Low Vision or Blindness*, goes into detail on each of the subtasks and the improvements. The report concluded that “[s]tudents who participated in the project showed significant gains across EGRA subtasks from baseline to end line. This trend was observed across gender, grade, and vision status.”

While multiple factors affect an increase in learning, qualitative feedback from project stakeholders indicates that the students benefited from the project and use of technology. The teachers reported high satisfaction with the project as it drew to a close and unanimously desired an extension to the project as they felt that the intervention had made a significant impact on the reading skills of most of the students. Many of the students also requested more books and were very eager to read them.

Objective 2 - Engineering work on Benetech system to be able to accept, host, and distribute Marathi content in human-narrated audio and braille formats.

Engineering work was completed early in the project, thanks to the partnership with the National Association for the Blind in Delhi (NAB Delhi). Benetech worked with NAB Delhi to address differences in production processes and available formats, and we were able to process, host, and distribute Marathi content in human-narrated audio (MP3s) and braille formats (BRF). The team also added the ability for organizations outside of Benetech to download human-narrated audio titles through our application programming interface (API). The team continued to improve the conversion processes, handling of the Marathi character set, and user friendliness throughout the project period. Because the bulk of the engineering work was completed at the front end of the project, we have been able to scale conversion in Indian vernacular languages cost effectively, even if those languages do not have a viable text-to-speech engine.

Objective 3 - Marathi-language titles in human-narrated audio and braille formats are available through Bookshare. They will be added in increments throughout the year.

The team initially worked with Pratham Books, a leading Indian social enterprise that creates content in Marathi, to select appropriate books for the pilot project with the four schools. Our local team and our disability experts completed their careful identification of 30 stories in Marathi from the Pratham collection in order to provide students with a progressive learning and reading curriculum, taking into account local educational needs. They selected three sets of 10 stories that offer an increasing level of reading proficiency for students in Grades 1-3. We made sure that our second and third book sets offered more advanced reading materials than the first one, so that the students could continually improve their reading skills.

As detailed in Objective 2, production of audio and hard copy braille materials was done in partnership with NAB Delhi. The human-narrated audio books were recorded by NAB Delhi and were read by a professional radio artist. All Marathi-language titles in human-narrated audio and braille formats were added to the Bookshare collection online and available for all school and student members to access; however, the schools participating in the pilot project did not have Internet connectivity. As a result, we added the books manually to DAISY players and distributed them directly to students.

Based on feedback from both teachers and students, we found that the speed of narration of the first 10 books we created was slightly too fast for the students to read braille while listening the audio. In reality, students with visual impairments were lagging behind in their reading, and the audio had to be paused for the students to catch up in their braille book. We had one of the teachers of the Kutroot Blind School re-record these books with a slower pace, and we immediately provided all the schools with the new recording.

Although Internet accessibility was a major challenge to exposing students in the pilot project to more Marathi-language titles, we greatly exceed our goal of adding 30 titles in human-narrated audio and braille formats. Thanks to supplemental funding provided by ACR, we added over 800 Marathi titles to Bookshare as well as to the National Accessible Library Platform (NALP), an online platform supporting more than 100 organizations who are either producers or distributors of accessible materials in India. Readers may access the books on either platform.

Objective 4 - Participating students are able to access Marathi-language content in multiple formats.

We provided more than 115 students with multiple tools for accessing Marathi-language educational material: a DAISY PLEXTALK reader, the storybooks in hardcopy braille, and the essential slate and cube kit for braille learners. These tools enabled multimodal reading for the students – braille and audio – in their native language. Marathi content was delivered in multiple formats:

Human-Narrated Stories – Human-narrated audio files were available to students on their DAISY players. Once the recordings were recorded at a slower pace, students learned to follow the text while listening to the recordings. This dual-modality style of learning is helpful for students who are blind or have low vision, as well as for slower readers. Teachers reported an overall increase in student enthusiasm for reading storybooks, as students asked to read and use the DAISY players during their free time.

Story Uncle/Auntie – A Benetech contractor, a Story Uncle or Auntie, visited schools to lead students in 30 minutes of guided reading outside of regular school hours. The Story Uncle (Hanumanta Talar) left the project in 2016, and the Story Auntie (Reshma More) took over soon thereafter. Both visited Koregaou and Kothrud schools twice a week and Alandi and Bhozeri schools once a week. The Story Uncle or Auntie guided students on using the DAISY player to listen to audio books as the students followed along in braille storybooks. They also used teaching tools called slate and cube kits. Toward the end of the intervention,

Story Auntie More began to use verbal games as well as read new stories to the children from Bookshare's expanded Marathi collection. The Story Uncle or Auntie was an innovative approach that we implemented during this project, but it was also an untested component of the intervention. As noted in the STS report, the use of the Story Uncle or Auntie, while having strong benefits to the children, made it harder to identify the key driver in the impact of the project.

Reading Time – Students received independent reading time during the regular class time. At Koregaou and Kothrud schools, teachers aimed to give 15-minutes of reading time four times a week (on the days that Story Uncle or Auntie did not visit) for a total of 60 minutes per week. At Alandi and Bhoseri schools, the goal was 15-minute reading times five times a week for a total of 75 minutes per week. Because teachers had full schedules and competing priorities, it was difficult to implement the full amount of reading time. Students averaged about 2,000 minutes of reading time over the course of the project, about 65% of the target amount of 3,000 minutes.

Objective 5 - Training of teachers and students.

Benetech held a training session for teachers and a specific event for administrators, gathering a total of 24 participants on November 26, 2015. Our experienced disability specialists gave an extensive, hands-on training to visually impaired teachers, sighted teachers, and administrators for Grades 1, 2, and 3 from our participating schools. In order to ensure teachers the highest level of training, we contracted with Mr. Nirmal Verma of the Perkins School, an advisor to the Indian Government, to support the coordination, planning, and implementation of the workshop. His input was extremely helpful in all aspects of the program. In the evening, we held a dinner and brought together three visually impaired and five sighted administrators from our target schools to foster collaboration and communication as well as to pass on key information about the next steps of the project.

The teacher training included the following modules:

- Introduction to the ACR Program
- Reading a story on the DAISY player and learning the navigation in the book
- Braille writing and reading: approaches and strategies
- Creation of low-cost tactile books by the teachers and use of props to supplement reading
- Development of a game based on braille
- Training for helping children access reading materials through Bookshare
- Presentation by URC Team (University Research Co., LLC who is our supplier that oversaw and supported us with back up for monitoring and evaluation areas) about the evaluation process and the key part the teachers will play in this process
- Feedback and conclusion

We also provided ongoing training to the Story Uncle and Story Auntie to support them in building relationships with students, teachers, and administrators. We also provided Story

Uncle Hanumanta with an extensive training session in Delhi that included one-on-one instruction with a master PhD teacher with a specialty in blindness at the National Association of Blind. That specialist, as well as other teaching experts, observed Hanumanta in the classroom and gave him crucial feedback to improve his teaching techniques for students with visual impairments.

The program team continued to engage with and support teachers and the project through informal meetings and consultations. We worked closely with teachers to strategize around improving their impact on all students, not just those who already know how to read braille. For instance, Story Uncle and Story Auntie struggled to connect with certain students in the classroom. It was observed early on that some of these students struggle with multiple learning challenges that affect their ability to participate in project activities. With the help of teachers, we identified the children with additional learning differences at all four schools, which helped the Story Auntie understand the students on a more individualized basis and adapt her interactions and support for their individual needs.

Focus Group Discussions (FGD) – URC also conducted FGDs with 112 students and 12 teachers on February 12-15, 2016. Additional FGDs were conducted with 15 teachers and principals on August 11-12, 2016, and in November 2016. The overall feedback given by students and teachers to URC was very positive. These settings were important spaces to gather project feedback and course correct along the way. Some of the key themes and solutions that arose during the FGDs include:

- Speed of human-narrated books: The narration of our human-narrated books was too fast. Our team addressed that problem through re-recording the books at a slower pace.
- Theft: Teachers were concerned about potential theft of the devices when they were left to charge in open classrooms. We bought and gave all schools extension boards, which will enable teachers to safely charge multiple devices at the same time in their staff room.
- Time: Teachers found it difficult to introduce the players and reading every day for 15 minutes. Our team encouraged them to continue the 15-minute program and provided guidance on how they might successfully modify their teaching schedule to accommodate the reading time.
- Instruction: Teachers were overall very satisfied with Story Auntie but offered up several suggestions on how she could improve her process for engaging students and increase her support and impact in the classroom. Benetech trained the Story Auntie on being more inclusive and supportive of children who cannot read during her time in the classroom, as well as structuring her reading time with students so that each student who reads can read a sentence of the story instead of Story Auntie reading it all to students.
- Variety: Teachers requested more variety of books for different levels of readers. We made a concerted effort to expose the children to a wider variety of Marathi books.
- Tools: Cubes, which are designed to help students learn the alphabet, have proven to be too tight for most students to use with ease. Thus, only a few teachers report

using them, and only occasionally. However, plates are still being widely used to help students who have yet to pick up on whole word braille reading and by students with multiple disabilities. We identified ways for teachers to continue incorporating the use of plates into their work with students who already are reading in braille.

Feedback from the FGDs was incorporated into the project activities throughout the project period, and teachers and students at our pilot schools reported satisfaction with the changes.

Objective 6 - Supplemental Award Activities

World Vision awarded an additional \$100,000 to Benetech to add 500 locally relevant books to Bookshare, with the supplemental grant agreement signed in late June 2016. Per the request of our program officer, we are separating supplemental activities information into a single objective for this report:

1) Identifying appropriate literature:

- a) Put together a team of experts composed of educators, writers, editors, and administrators who will review books*
- b) Establish a group process in order to choose books*

The ACR project team assembled and activated a large, multi-disciplinary advisory committee to seek out information on what locally relevant books and other content stakeholders would like to have included in Bookshare. The diverse team of vendors, professors, and disability and tech experts met to select books for conversion. Members are:

- Professor Raghuraman – Founder, Karna Vidya Technology Centre (KVTC)
- Professor Rajashekar – Professor, English and Foreign Languages University (EFLU) and Bookshare Consultant
- Mrs. Shanta Rangarajan – Principal, National Association for the Blind – Delhi
- Ketan Kothari – Advocacy Manager, Sightsavers India
- Dr. Sam Taraporewala – Director, The Xavier's Resource Centre for the Visually Challenged (XRCVC) and Associate Professor and Head of the Dept. of Sociology at St. Xavier's College
- Apurva Ashar – Publisher and Technical Advisor for publishing-related matters

The group established a clear process for jointly choosing books that is proving to be very effective. They work in small groups, according to their language preference, and select titles that are then passed on to the vendors. These vendors then check for the availability of the selected titles on Bookshare. If it is not found in the collection, they begin production of the title.

2) *Selecting what books to convert, taking into account both content relevance and conversion constraints:*

We identified titles that are relevant for our Indian members, are of high-interest to children, and are at an appropriate level of complexity for their reading levels. The advisory group focused primarily on children’s books in vernacular languages. They looked for books with mostly text, along with some images (which have alternative text describing the images where possible). In general, the books that were almost entirely image-based with minimal text were not selected due to conversion challenges. Leaders in our partner schools identified content needs for curriculum and books, and our team of experts prioritized their curricular needs as they decided which books to convert first for Bookshare. For example, the students at Kutroot School requested ghost stories and stories about animals, and we have added titles that speak to these interests. The advisory committee also solicited input from stakeholder groups such as the DAISY Forum of India.

3) *Converting books:*

Converting books, which can include specific and time-consuming work around image descriptions, is often complex and expensive. We trained six individual conversion houses, each of them with different areas of expertise and specialization. Selected books were sent to the appropriate vendors based on their conversion requirements. We worked with the following conversion partners to upload our selected materials in several different vernacular languages, many for the first time:

- Accessdeeds (Hyderabad – for Telugu, English)
- Cygnet (Ahmedabad – for Gujarati, Hindi, English)
- Indic (Lucknow – for Hindi)
- Veda (Pune – for Marathi, English)
- Worth Trust (Chennai – for Tamil, English)

We established book conversion workflows, making production faster and more accurate. It also eased problem solving, as all of our vendors started using the same protocol. With the supplemental funding, we were able to convert 1,295 total children’s books in different vernacular languages:

- English – 119
- Hindi – 222
- Gujarati – 20
- Marathi – 806
- Telugu – 128

Please see the attached document for the full list of books, broken down by language.

4) *Developing and strengthening relationships with publishers and identifying more local publishers with elementary content:*

Developing strong partnerships with publishers is critical to scaling content conversion. We raised interest by giving many talks and holding meetings with community leaders, prospective funders/donors, authors, and publishers. Our team across the country educated partners on why children need accessible books written in vernacular languages, which helped us to secure partnerships with publishers such as Pratham Books, Scholastic, The National Book Trust, The Children's Book Trust, Eklavya, Tulika, Katha, Room to Read, and Navneet Publications. Most recently, Benetech signed an agreement in June 2017 with ACR prizewinner Sesame Street, and we look forward to partnering with them in converting their material in the near future.

In addition, we have been able to find a few new partnerships with local philanthropic organizations. We received funding to convert books from the SEBBI Inner Wheel Club of Pune and a few private donors. The Rotary Club of Bombay also has been a generous support of our ACR project, focusing on helping us fund sourcing and conversion of new books. To date, we have raised over \$8,000 in funding from local sources to continue book production.

5) *Once books are converted, communicating to educators and professors through multiple channels:*

Outreach workshops with multiple agencies have helped to create awareness about the availability of locally relevant content through Bookshare. The main challenge is the lack of reading devices in the concerned age group. We are encouraging institutions to use common devices for small groups to overcome this challenge and take advantage of Bookshare content.

The ACR team utilized the DFI (DAISY Forum of India) and DAISY web forums as primary methods to communicate our project to the visually impaired community and to parents and teachers. Additionally, the team has been attending book fairs and hosting workshops throughout the country for interested audiences. We have also begun sending information on Bookshare to several mailing lists for Indian organizations serving people who are blind or visually impaired

3.0 Personnel

Throughout the grant period, Benetech hired staff members and contractors who helped to improve the project effectiveness. At the beginning of the project, hiring experienced project managers was critical to a successful launch. The project timeline for implementation was delayed, but we were still able to achieve all project outcomes and hold a full year of implementation. Another critical position that provided ongoing instruction and guidance to teachers and students in the schools, the Story Uncle, turned over in 2016. This transition resulted in some challenges due to additional time needed for training and building relationships, but the teachers and students were satisfied with the new hire. Below is a list of the new hires during the project period:

- In 2015, Benetech hired Terry Jenna as Global Literacy International Program Manager, replacing Kristina Pappas. Prior to joining Benetech, Terry worked in over 60 countries with large organizations such as USAID, AUSAID, and the European Union. She managed staff in 22 nations, bringing an extensive background in international project management to the ACR project. Terry is passionate about serving people with disabilities, as she has a print disability herself. Terry quickly came up to speed and was able to refine the work plan and coordinate key stakeholders in the field.
- Ms. Jenna hired Dr. Homiyar Darayas Mobedji in 2015 to manage the ACR program on the ground in India. A visually impaired adult himself, Dr. Homiyar received training as a Physiotherapist from the Blind Peoples Association in 1984. Five years later, he became the first visually challenged physiotherapist to start his own clinic. He established the first, exclusive College for Physiotherapy for the visually challenged in 2005 and helped to start the Indian Association of Visually Impaired Physiotherapists. He is the former CEO of the Technical Training Institute, a subsidiary of President Pune Blind Men's Association, and the former CEO of the National Association for the Blind.
- Ms. Zainab Chin, a local residing in Pune, Maharashtra, was hired as the Bookshare Outreach and Membership Officer in 2015 and later promoted to Membership Head - Asia, Africa, and Middle East.
- When Story Uncle Mr. Hanumanta Talar left his full time role in 2016, Story Auntie Ms. Reshma More joined the team.
- In 2016, Swetha Patil joined as the India team administrative and human resources support. As most of our India staff is low- to no-vision, Swetha is a tremendous support as a sighted member of the team. She played a significant role in helping Reshma acclimate to her new role and worked closely with principals. She often visited the classrooms to perform quality checks (averaging once a week) and support Story Auntie.
- In 2017, Sunila Fernandez was hired as a part-time contractor in order to support our local team with school membership activities.

4.0 Budget

There were no changes to the budget.

As requested, the following table shows the percent of time billed by Benetech employees to the project during the lifetime of the award:

Anna Berns, Director, Grants Administration	3.75%
Betsy Beaumon, President	0.75%
Brad Turner, VP Global Literacy	1.06%
Carol James, Collection Development Manager	0.03%
Clotilde Vasconi, Business Development Officer	1.54%
David Murphy, Director of Engineering	0.17%
Deanna McCusker, UX Engineer	0.32%
Demetria Jones, Administrative Assistant	0.93%
Elaine Wallace, General Counsel	0.31%
Fred Slone, Director of Operations	0.86%
Ginny Grant, Senior Product Manager	3.86%
Guillian Hetzler, Digital Content Manager	0.86%
James Fruchterman, CEO	0.03%
Jerri Weber, Membership and Support	2.46%
Joan Mellea, Director of Administration	0.11%
Kamlender Datt, Engineer	0.11%
Kathy Schwart, Collection Development Associate	0.14%
Kristina Pappas, International Project Manager	4.68%
Laura Deck, Writer/Editor	1.12%
Lisa Wadors, Program Manager of Education, Research & Partnerships	0.44%
Mario Oliveros, Sr. Marketing Communications Manager	0.11%
Mark Roberts, COO	0.18%
Mary Kong, Executive Administrative Assistant	0.22%
Nirupa Anantha, Web Developer	0.19%
Paul Anderson, Sr Engineer	0.19%
Pavithra Metha	2.67%
Purnima Gaddam, Business Development Manager	2.56%
Rick Dane, Engineer	0.19%
Ritesh Kadu, Engineer	0.19%
Rob Turner, Engineer	0.19%
Robin Seaman, Director of Content Partnerships	0.74%
Ron Ellis, Sr Engineer	0.06%
Stan Raichlen, Engineer	0.52%
Steve Jankowski, Contracts & Procurement Specialist	0.72%
Surya Barker, Contracts Coordinator	0.57%
Terry Jenna, International Project Manager	27.42%

5.0 Communications

Benetech publicized the ACR project through several different methods as reported in the quarterly reports. Human-interest stories have been compiled and are listed below and in the supporting documents (see Intellectual Work). Staff delivered over 40 presentations to schools and colleges, organizations serving the blind and people with learning disabilities, potential funding partners, publishers, and many more over the course of the project, educating people across India and internationally on our work in Pune. Photos were submitted throughout the project, and several more from the last quarter are attached as well. The project has been featured in blog posts, Twitter chats, and Facebook. A final blog post summarizing the project has been created and is scheduled to be posted in late August.

To further opportunities to continue and grow this program, Benetech has developed a Communications Plan to disseminate the project results. We plan to create a shortened version of the STS evaluation report highlighting key impacts and lessons learned from the project. We will send the information to project stakeholders, including school administrators, teachers, and vendors, and talk about the project at relevant conferences. We are promoting the project through the Benetech website and blog. We will also share results with other schools and stakeholders in communities beyond Pune in India to generate further interest and participation in future Bookshare projects in India.

6.0 Challenges & Recommended Revisions

This pilot project utilized an on-the-ground, hands-on approach to working with a targeted population of blind students and students with low vision. We chose to implement this project because we wanted to ensure that we could offer alternative technologies to provide accessible books in languages in which text-to-speech (TTS) engines are not viable. For many vernacular languages such as the ones spoken in India, producing TTS engines is cost-prohibitive, but we recognize the importance of providing accessible books in mother-tongue languages. This project, in part, served to test the viability of human-narrated audio content conversion in vernacular languages and to ensure that blind and low-vision students would benefit from the technology.

As a technology company, Benetech was able to complete the engineering work relatively quickly. Upon testing the first series of books with students, we gathered feedback and made appropriate adjustments, such as slowing the pace of narration. We were able to identify, build relationships with, and train five conversion houses to convert books in various vernacular languages. This approach, along with supplemental funding from ACR, allowed us to go to scale and convert over 1,295 books.

This project provided a new learning experience for Benetech. We gathered valuable insights from working intensively in four schools in a developing nation. Some challenges are outlined below:

- Gaining full participation and collaboration from our four partner schools was one of the main challenges. Although the schools were happy to commit to the project, the realities of scheduling, competing priorities, fear of theft of the devices, and reluctance to change presented implementation challenges as an outside organization working in the school setting. Few of the teachers had formal teacher training and were hesitant to try new approaches that required them to move out of their comfort zone. The team spent a significant amount of time discussing the issue with school administrators and teachers and working to improve processes and project participation along the way. The Story Uncle and Story Auntie were an addition to the project in order to accommodate the needs of teachers and students early in the project, providing critical support in the classroom while also ensuring consistent implementation. We recognize that having teachers implement the project takes more time and ongoing training, and outside support can also expedite the adoption of technology and assist students in achieving learning outcomes. As we move forward, we will look to build a volunteer base that can serve in that role in other schools.
- We found that the partner schools taught reading phonetically (relying on sound and sound blending to introduce students to letters and signs) rather than using a whole word or sentence approach, and some of the students had no braille familiarity at all. Our human-narrated audio and braille stories in Marathi are not currently designed to help students break down and blend sounds. Instead, they use a whole sentence approach to reading, echoing, and listening. As the story sets advanced in reading level, students had a harder time with reading the books in braille. Benetech staff worked closely with teachers through this process to adapt project activities to bridge the divide between reading instruction methodologies in the classroom and behind our human-narrated audio stories and braille books. They encouraged teachers to use the learning plates¹ and cubes² distributed earlier in the year to help students increase connections between sounds and words in the books they read.
- Another challenge we faced on the ground was the presence of children with multiple disabilities within the same group. There were some children who, in addition to blindness, had either very low dexterity in their fingers, suffered from sensation loss in their fingers, or had lower cognitive abilities. This complicated the teaching within the class, hence reflecting on the overall performance of the class. This is a reality of working with a population of blind and low-vision students. We plan to expand to other schools focused on students with learning disabilities, and we plan to do so as we grow the project.
- Schools, teachers, and children in the project faced an underlying technological issue: they are lacking devices (smart phones, computers, DAISY players, etc.) and bandwidth. These schools have not invested in technology so far and, very often, the only computer

¹ The alphabet plate is approximately 4" x 7" and has embossed braille characters spaced across the plate. Each braille character has a print version below it so non-braille reading teachers can help someone interpret the characters correctly. Plates are currently only available in Hindi; however, Marathi only has two additional characters in braille and they are not widely used.

² The cube has 16 hexagonal discs with braille-embossed dots. Plates are rotated to create combinations of braille characters and words.

available is for administrative use only. The only access to technology available is through the teachers' personal phones and the DAISY audio players we distribute as part of this project. Thus, the lack of devices and bandwidth will be the real barrier for schools, teachers, and students to access accessible educational material through Bookshare. As we expand the project to other schools throughout India, we believe that exposing administrators and teachers to Bookshare, assistive devices, and accessible books can influence decision makers in the school to invest more resources in technology and internet connectivity.

7.0 Sustainability Plan

The Bookshare India pilot project was a fruitful and important experience for Benetech as we delved into four schools and built technologies to improve literacy among blind and low-vision students in India. As a technology company, we will build on the experience of this pilot project, using lessons learned to continue to make improvements on our technologies and our processes and ensure increased availability of accessible books in nations throughout the world. We are pursuing additional funding to continue our work in Pune and other communities in India with both long-term funders of Bookshare and new potential funders.

As funding permits, Benetech plans to continue working with the four schools in Pune and expand into other schools. In particular, we are looking to include partnerships with schools serving students with learning disabilities. As we move to the next phase of work in this project, Benetech recognizes that the level of effort needed to work in the schools with students is extremely resource-intensive. A critical lesson learned during the pilot phase was that it is important to have staff in the schools that can support student learning. To sustain the efforts, we will create a volunteer program for Story Uncles and Aunties. We hope to secure an institutional partnership with a college that offers a teaching credential in order to have university-enrolled teaching credential candidates volunteer with Benetech in exchange for course credit. This approach would allow us to build a stable, reliable, and well-trained team of volunteers that can provide consistent attention to the students.

This pilot project allowed Bookshare to establish core processes and partners for human-narrated audio in the Marathi language and test the new technology in schools. Students provided necessary user feedback, and our team made adjustments to improve the technology. With the supplemental funds, we have been able to secure partners and an advisory board that enabled us to scale content production. We will continue to work with local publishers and conversion houses to increase content production of human-narrated audio books in vernacular languages. We plan to continue to work with and expand the advisory committee to identify books in more vernacular languages to convert. Currently Benetech operates in 11 of 29 India states, and we plan to continue expansion into other states and languages, focusing primarily on students with disabilities.

Financial sustainability of this project will increase as content increases.

