A Journey to Reading Hub: A Repository of Bangla Reading Skill Development through technology

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ABSTRACT

Reading is the basic foundation for all other learning activities for a child. Children who do not learn to read in the primary grades are more likely to struggle as they continue their schooling. Many scholars have proved that early grade reading skills are essential for all children to master in order to progress academically. Nonetheless, schools and students around the world still struggle with literacy development in the first years of schooling. Technology can be a tool to overcome this obstacle and several simple innovations in this area have proven to help children develop reading skills.

Bangladesh is betting on technology as a supplement to supporting children's reading development. Save the Children, in partnership with the Government of Bangladesh's mandate for a "Vision 2021", and with support from the United States Agency for International Development (USAID), launched an ICT in Education component under their larger READ (Reading Enhancement for Advancing Development) project.

This paper outlines the ways in which the READ (Reading Enhancement for Advancing Development) project has developed digital resources for early grade learners, using a web-based platform without any other dependencies. This paper also describes the steps taken to develop the web-based platform, how teachers were trained to use it, the successes and challenges in making this platform accessible to all, and how such a platform works in rural schools in Bangladesh.

Keywords: READ, Read Digital Content, Reading Hub, ICT in Education, Early Grade Readings.

1. INTRODUCTION

Technology is becoming an integral part of public school curriculum and is transforming the way information is being created and distributed at school among students. The ICT revolution has created new tools, such as personal computers and the Internet, reinventing and in many instances, improving teaching and learning. Even in rural areas, technology is seen as a tool that can support schools, classrooms and children. Bangladesh, a middle income country with a majority rural population, is betting on technology as a supplement to supporting children's reading development. The Bangladesh government has been heavily involved in promoting ICT, fronted by the flagship initiative ("Digital Bangladesh by 2021") as part of the 2008 election manifesto. This vision proposes to mainstream ICT as a tool for digital empowerment through human resource development, increasing mobile penetration, digitizing government services to increase access, and integrating ICT in business. Save the Children, in partnership with the Government of Bangladesh's mandate for a "Vision 2021", and with support from the United States Agency for International Development (USAID), launched an ICT in Education component under their flagship project READ. The READ project is a 4-year nation-wide literacy initiative, implemented by Save the Children in close collaboration with the government of Bangladesh. The goal of the project is to ensure that all children are able to read at grade level, teachers have the necessary tools to be able to teach children to read, and teachers are able to effectively assess and monitor children's learning.

Bangladesh has made dramatic strides in improving access to basic education, driven by strong government leadership and successful partnerships among government, donors and NGOs. Despite unprecedented gains in educational access, however, the government's National Student Assessment findings in 2011 and 2013 point to weak Bangla language competency in grades 3 and 5. The findings also show that Bangla competency, including reading skill, decreases from third grade to fifth grade. This suggests that some children fall more and more behind due to a weak foundation. Weak literacy negatively affects the education system and economy as a whole as well as reducing the learning opportunities of the individual. The Government of Bangladesh's (GOB) Third Primary Education Development Plan (PEDP III) provides a comprehensive framework to address these challenges. With USAID support, the READ project will reinforce government efforts to improve the quality of education.

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Over the last decade the primary education sector in Bangladesh has achieved remarkable progress in passing rate, enrollment rate and gender equity. However, improvements in quality have not kept pace. The government is committed to achieving 'Digital Bangladesh' where a resourceful and modern country develops through effective use of ICT. The prime focus of this vision is the education sector, reflected in the National Education Policy of 2010, where the extended use of information and communication technology (ICT) instruments in the educational process is mentioned at every level. Furthermore, the National Education Policy of 2010 also emphasized the use of computers in teaching and learning starting at the primary level, ensuring that all students will be computer-literate by the time they arrive at secondary school. More recently, the Directorate of Primary Education (DPE) drafted its ICT Strategic Plan for 2014 in alignment with the National Education Policy and reiterated the importance of creating a generation educated in science and technology with the highest emphasis on the use of ICT. The National Science and Technology Policy for 2011 also emphasizes the use of ICT at the primary level, including such ideas as developing digital contents in local languages for conducting teaching-learning processes in the classroom; ensuring internet connectivity for all schools and training institutions; providing training for teachers on using technology. These policies are the backdrop for the development of this repository.

2. DIGITAL CONTENT DEVELOPMENT

READING HUB:

Reading is many things, but it must always begin with access to text. Yet in many parts of the world this access is either non-existent or sorely lacking. For centuries, limited access to texts has been a barrier to literacy. Reading requires books. Without them literacy remains out of reach. The spread of inexpensive technology is a tool that can aid in providing access to reading materials. Technology, including mobile phones and tablets offers a new, affordable and easy-to-use portal of reading materials. In order to catch the world wave, from the beginning the journey of education should be based on digital technology. Many schools now have basic amenities such as desktop computers and projectors, and some even have internet connectivity.

In Bangladesh, the current government is implementing an agenda focused on digitizing classrooms and the impact of this agenda on the education system is tremendous. Bangladesh Government has focused on ICT for Development under its "Vision 2021" agenda. As part of this, Access to Information (a2i) project has initiated to reform the traditional education system by introducing ICT based education. This project has brought a change in the paradigm from earlier philosophy of 'ICT education' to 'ICT for education' with an aim to make teaching and learning more interactive. As part of this, Quick-Win named 'Multimedia Classroom' and 'Teacher-led Content Development', one of the capacity development initiatives of the Ministry of Education, is introduced to improve the quality of education in primary, secondary and madrashas of the country.

Along with government initiatives READ project aims to introduce leveled reading materials and games to enhance reading skills to all its project schools. Combining these goals, the READ project has produced ICT enabled digital content, aligned to the Bangladesh curriculum, that early grades students can use to develop reading skills focusing on five key components – Letter Knowledge, Phonetics, Vocabulary, Fluency and Comprehension. Keeping in mind accessibility for offline and online use, the READ team created a simple, open, and easy to use repository for teachers and students (http://ict.readbangladesh.org), called the Reading HUB (see Figure 1 below).

Figure 1: Reading Hub

DEVELOPING READING HUB

The hub has also been designed for teachers in multimedia schools who have access to ICT and have been trained by the READ project to use ICT for improving reading instruction. This was developed through a participatory process, engaging A2I (Access to Information; specific government project for ICT & Innovation), DPE (Directorate of Primary Education) officials, the National Curriculum and Textbook Board (NCTB) and subject specialists.

Most digital content/ e-content in Bangladesh has been developed using Flash technology. The Reading Hub was developed using the HTML 5 platform, a unique technique, as the Flash technology has other interrelated dependencies especially in smart devices. For example, Adobe Flash Player must be installed on a machine in order to run flash based content. And usually, Adobe Flash Player is from various third party websites, not from the official Adobe site, leading to malicious viruses that destroy or damage the operating system or corrupt important files. This is a serious problem associated with free unauthorized software. Additionally, flash developed contents sometimes cannot be played or opened exactly as they are on different smart devices. These types of dependencies of

interoperability among different smart devices makes flash based content a less than ideal piece of software.

On the other hand, HTML 5 provides many benefits: the digital content is more flexible, it is device agnostic, allowing anyone from anywhere to use the content, and does not have any third party dependencies. The READ project also offered the Reading Hub content as an offline version, accessible by a portable Google Chrome browser. Users do not need to install the Google Chrome browser separately. These contents also can be downloaded from the Reading Hub (http://ict.readbangladesh.org/en/downloads-2/). Users simply play the content without any other software. This ease of use allows for much greater user ship, particularly in rural areas of Bangladesh, where familiarity with technology is still relatively new.

DIGITAL CONTENT on READING HUB:

The digital content on the Reading Hub are of two main types:

1) Textbook-based content and
2) Supplementary Reading Materials (SRM)

The textbook-based content helps children in grades I-III learn to read Bangla language (the national language of Bangladesh) in a step-by-step, systematic, attractive way. Children can enjoy this material at their pace and stop/start as they need. The textbook-based content is linked with the reading skills present in Grade 1-3 textbooks and the contents are completely aligned with the learning outcomes of the national curriculum. The READ project selected these contents through a rigorous process that considered the difficulty level, complexity, and alignment with Bangla Reading Competencies. The selection and development of the text was a collaborative process involving teachers, Bangla subject specialists, NCTB (National Curriculum & Textbook Board) officials and DPE personnel. Therefore, these contents are fully aligned with the READ project's reading components which have been shown to increase early grade learners reading skills. Teachers can easily use these contents along with their lessons as they have the option to play and pause the digital content.

Table 1: Grade-1 contents linkage with competencies & reading components

Grade	Contents	Respective competencies in curriculum	Reading Components
Class One	Vowel	1.1 Can read Bangla alphabet	Letter Knowledge and Phonemic Awareness
	Consonant	1.1 Can read Bangla alphabet	Letter Knowledge and Phonemic Awareness
	Vowel Symbol	1.2 Can read letters linking the vowel symbols	Letter Knowledge and Fluency
	Conjunct Letter	1.3 Can read some selected conjunct consonants	Fluency

Additionally, the READ project has a mandate to develop numerous early grade reading materials for children and make them accessible in different formats. For that purpose, SRMs are leveled story books that have been digitalized and stored on the Reading Hub.

There are a few unique features to the READ developed content compared to what is available in the market:

- The content is aligned with learning competencies as mandated by the government, rather than on lesson plans or textbooks. Reading competencies are a sustained outcome, which guide the educational system as a whole whereas lesson plans and textbooks change rather often. Each 'lesson' aims to develop a given competency (see Table 1 above).
- Letters are introduced using the correct and appropriate sound. As the correct pronunciation of the letters are a debatable issue in Bangladesh. Therefore, the introduction of approved letter sounds are very helpful to students for their phonemic awareness. Children here really struggling with the phonemic awareness (see Figure 2).

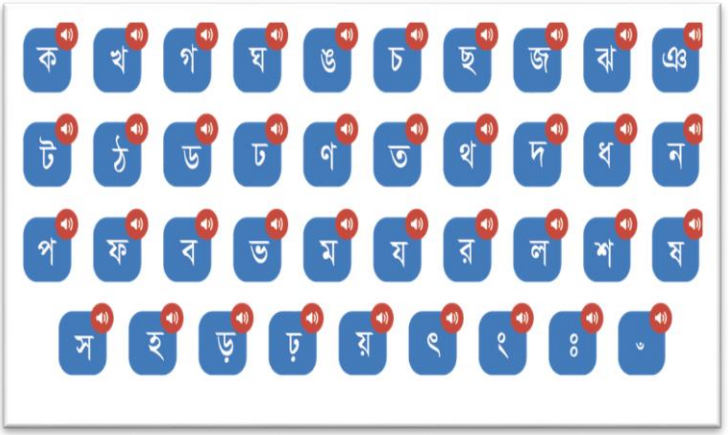

Figure 2: Letters with sounds

- The lessons use a whole language approach, consistent with NCTB's approach to Bangla language teaching.
- Some materials are interactive, combining text, animation and sound. (See figure 4)
- The writing style uses the most recent writing conventions introduced by NCTB. For conjunct letters, the development team had to use customized *pictures* of each letter rather than Unicode because the textbooks do not use Unicode font. The team made this huge effort to ensure that the digital conjunct letters look the same as the font used in the new textbooks for grade I-III (see Figure 3 above).

Figure 3: Conjunct Letters

- To accommodate students living in urban locations, the team introduced content that children in this setting may be more familiar with urban contexts rather than the more typical rural content that the textbooks tend to include (animals, plants, rivers, seasons, etc.).
- For every component introduced, there are games and content that go beyond the textbook content, broadening children's perspective and knowledge.

Figure 4: Game for Vowel Symbol

- The digital content activities are designed in such a way that children cannot simply memorize answers. For instance, if an answer is wrong, the exercise is re-shuffled and the child has to find answers from a new selection of possibilities.

The second type of content, which READ calls Digital Supplementary Reading Materials (DSRM), are digital versions of print books that have been leveled by READ with the support and approval of the requisite Ministry of Education bodies. The READ project produced 156 unique leveled books, ranging from level 0 (beginner) to 6 (advanced) targeting primary grade students. Of these, 169 were digitized and uploaded onto the Reading Hub (http://ict.readbangladesh.org/dsrm/). Some of these digitized books have an audio component, allowing the child to hear the story being read aloud. Our informal observations show that children find these DSRMs very interesting. Different research shows that technology is able to increase students reading skills through proper resources and going forward, the READ project aims to conduct additional research into this area. Some books are in small PDF format, these books are appropriate for the reader who can read independently (see Figure 5).

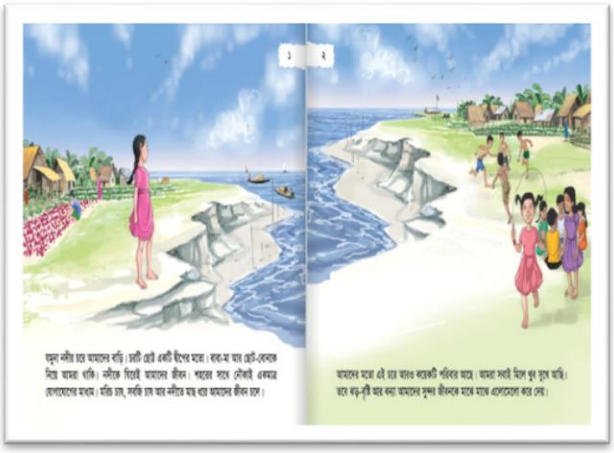

Figure 5: Leveled Book

READ APPS:

Bangladesh is a country with 156.6 million people and almost eight and a half million people in Bangladesh use smartphones. Interactive games and applications can be used to learn, teach, and grow knowledge. Additionally, the smartphone is a device that children find intriguing and enjoy manipulating. It was only natural then, that the READ project take its web-based digital contents and create free and easily downloadable apps for smartphones. Currently at September 2016, READ has developed three apps for Android-based devices, which can be downloaded on the Google Play store. For easy admittance READ divided the contents into three apps. These apps are fully compatible with Android version Lollipop, Marshmallow and Nougat. After lunching till now these apps downloaded in total 458 times and actively used by 184 users. (See figure 6)

Application		Active/Total Downloads
READ Bangla Grade-1 1.0.0	Free	85 / 217
READ Bangla Grade-2 1.0.2	Free	50 / 114
READ Bangla Grade-3 1.0.0	Free	49 / 127

Figure 6: Download Numbers of the Apps

For the upcoming year, READ plan to develop one more app on Bangla language learning games focusing on the five key components of Reading Skills Development.

3. TRAINING

To ensure that all stakeholders understand how to use and integrate the digital content of the Reading Hub into their lessons, the READ project conducts a three-day training program for Government Primary School teachers. The training, contented "Use of Digital Contents for Improving Early Grade Reading Skills" combines pedagogy, technology instruction and integration of pedagogy and technology for improving early grade learners reading skills. The pedagogical part focus on the national curriculum, national competencies on Reading, Link of the competencies with reading skill development components, how teachers can assess those in formative and summative assessment technique. The technological instruction part covers basic technics that teachers need to know and follow for using ICT equipment in the classroom. As the targeted teachers had basic skills and training from government, this training is a refresher for them. Teachers can recheck their learning and skills throughout the whole three days activities. And the last area of this training is integration of technology and pedagogy. Many demonstrations, both from teachers and facilitators made the sessions hands-on and interactive. Each day of the training program teachers had to demonstrate how to integrate technology and use the strategies of reading skills development. These demonstration sessions really helped teachers to rethink their current practices and way of improving this instructions. This demonstration part is highly appreciated by the teachers. The training manual and resource book is accessible on the Reading Hub[3] (see Figure 7).

Figure 7: Training Manual & Resource Book

The READ project has trained 2,250 government primary schools teachers. The analysis of pre and post-test from the training shows the effectiveness of these training.

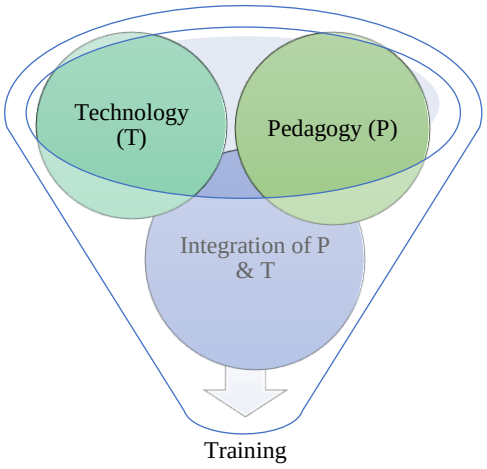

Figure 8: Training Topics

The training also provided teachers an opportunity to develop one MS PowerPoint lesson using the content, thereby ensuring that teachers have something concrete to share with students when they go back to their classrooms. To ensure that teachers are well supported, READ project staff provide regular follow up and guidance to teachers, demonstrate proper use of the materials, guide teachers to engage students, and troubleshoot any issues or questions teachers have.

The image below (Figure 9) shows a traditional classroom where teacher use the Reading Hub contents and a student is participating the teaching learning process effective. The teacher of this class received training from the READ project and incorporated the techniques of using Reading Hub into her lesson.

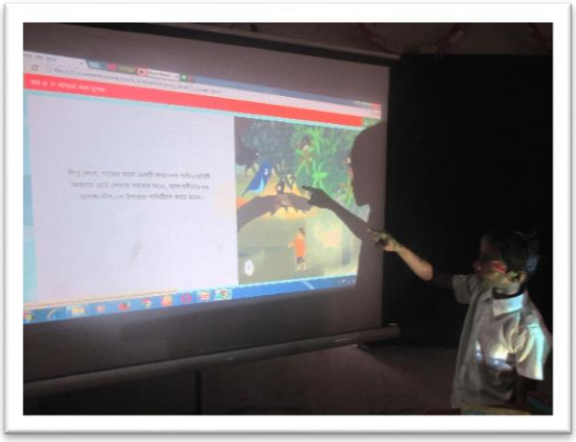

Figure 9: Use of Reading Hub at Classroom

4. CHALLENGES/ WAY Forward

"The integration of ICT in teaching and learning is not a method; rather it is a medium in which a variety of methods, approaches and pedagogical philosophies may be implemented"[4]. This

[3] http://ict.readbangladesh.org

[4] N. Garret, "Technology in the service of language learning: Trends and issues," *Modern Language Journal*, vol. 75, no. 1, pp. 74-101, 1991

statement shows that the effectiveness of ICT in Education depends on how and why it is applied and integrated. The process of using ICT in everyday teaching-learning process is very complicated for teachers in Bangladesh. The opportunities provided by ICT to support teaching and learning are not problem free. The virtually limitless opportunities of access to information in an educational context can pose a real danger of information overload if the teachers do not have the skills in filtering information for relevance, or are unable to establish a coherent organizing principle. Both students and teachers may lack the necessary skills to access, process and use information.

There are a number of difficulties that act as barriers and prevent teachers from integrating ICT into the classroom. According to the READ project, the most common challenge is involving teachers to use and integrate digital content into their lessons in a new way. Although each school has access to the Reading Hub content, teachers are not comfortable incorporating the interactive games and activities while teaching Bangla language. To mediate these problems, the READ project staff are conducting more demonstration sessions during the training and during follow-up visits. Another common problem is related to hardware and software. Teachers have very limited knowledge in these areas, and when faced with problems related to installing Bangla font onto their laptops, for example, they are at a loss for what to do. Moreover, lack of basic trouble shooting skills also a great problems for teachers and schools. At local level there is very limited resource for basic trouble shooting. Infrastructure another serious problems for Government Primary Schools. There is no scope to set up a fix classroom for using ICT equipment. Therefore, teachers have to carry laptop and multi-media projector when they wish to take class with this equipment. That's really time consuming task to set up those equipment really cost the 10-15 minutes of total class time. Electricity another concern need to consider. At local level disruption of electricity is very common problem. Many schools have the electricity connection but unfortunately, during the class time or school hours load shedding going to happen.

The READ project is also planning to develop some online training sessions that can be accessible from the Reading Hub to address these technical issues. Short video clips of facilitators demonstrating how to use the content will also be created and included on the Reading Hub. One additional app are also in development to ensure more resources for the early grade learners.

5. CONCLUSION

READ is a unique and large-scale project. Providing technical input to improve the teaching-learning process of government schools in no small task. Achieving the goal of increasing reading competencies among grade 1-3 students requires a multi-pronged approach---from improvement in teacher preparation to an increase in teaching and learning materials. Introducing technology supported contents to improve reading is a novel concept in Bangladesh and despite government's commitment to a Digital Bangladesh, there are many hurdles to overcome. ICT as a teaching aid is more complicated in that it demands more specific skills from teachers. Moreover, teachers are faced with some challenges and barriers that prevent them from employing ICT in the classroom or developing supporting materials through ICT. The READ project recognizes these obstacles and through its training and regular follow-up, will help teachers address these challenges. Creating additional ways for families across Bangladesh to access digital learning materials from apps to supplementary reading materials, the READ project is working to make technology a more mainstream part of children's everyday lives. By undertaking systematic research into how teachers interact with and employ ICT in the classroom, the READ project will add to the body of data which discusses how technology can improve learning.

Technologies are now embedded in our society. Focus has shifted from whether or not to use them in teaching and learning, to understand which technologies can be used for what specific educational purposes and then to investigate how best they can be tailored and adopted across the range of educational contexts in schools.

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