EDUCATIONAL TECHNOLOGY INTERVENTIONS FOR EARLY GRADE READING

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Abstract: Meaningful learning begins with good reading skills, which forms the backbone of all education. Strengthening Early Grade Reading skills in developing nations is fraught with a myriad range of socio-economic challenges. In this context, ICT innovations in Early Grade Reading shows great promise since, it provides an interactive, user friendly and relatively human bias free approach in inculcating good reading skills in students. This paper aims to highlight these interventions in EdTech with regard to elementary grade reading in developing nations, with a special focus on India and bring out the potentials and challenges related to these interventions.

Keywords: Early Grade Reading, EdTech, ICT, Education, Innovation.

Introduction: The ability to read forms the cornerstone of academic success in schools. It opens a vast vista of opportunities, whether it is in the form of self-learning, or comprehension of subject matter that is imparted by teachers. The ability to read influences the psycho-social development of children in a manner that is crucial in understanding their educational choices and opportunities during the ensuing stages of their lives. Studies show that students who do not develop the ability to read during the first few grades of school are more likely to repeat grades and eventually, drop out of school as the education attainment gap increases between readers and non-readers (Bulat, 2016).

In developing nations like India, due to concerted efforts by the state and central governments even though the enrolment rates have increased significantly over the last few decades, dropout rates still remain high. Even where children from impoverished households are enrolled in schools; due to the poor quality of primary and secondary education in government schools in general, a large majority of these children falter on their basic reading skills and numeracy skills. In this context of poor early grade reading ability among children in developing nations, there is a strong potential for innovative Education Technology (EdTech) or novel technologies in the education sector, in bridging the education attainment gap between readers and non-readers.

Early Grade Reading: Challenges For The Developing World: With reassuring strides in elementary education in India, the access and retention has improved over the decades. However, the outcomes of learning are still a source of serious concern since, studies indicate that many children who reach class V and above are still unable to read simple texts, or perform elementary level arithmetic calculations (Ministry of Human Resource Development, n.d.). Needless, to say, the exam results of these children are poor and a huge majority of these under performers drop out of schools by the time they reach class X.

For example, according to ASER Centre, which reached 589 rural districts across India, to gauge the status of education in India, even though 96.9 percent of the children in age group of 6 to 14 in India were enrolled in schools in 2016 (Annual Status of Education Report, 2016), only 25.1 percent of rural school children in Standard III, 47.8 percent in Standard V and 73 percent of Standard VIII were able to read Standard II text. At Standard I, 46.1 percent of rural school children were not able to identify 4 out 5 letters in words. This data is a weighted average of both private and government schools in rural India (refer Figure I).

A trend analysis for reading abilities among rural students in Standard III, V and VIII showed, between 2010 and 2016, the percentage of students who can read Standard II text increased only for lower primary class, while it has reduced for Standards V and VIII (refer Figure II). This presents a troubling picture for education policy makers in India.

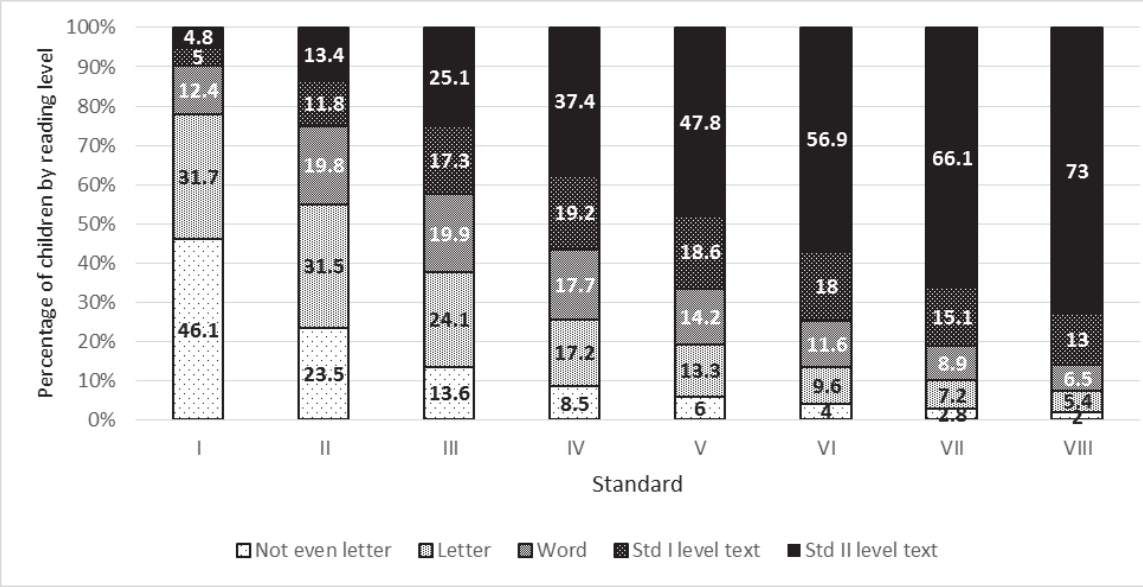

Figure I: Reading Levels Among School Enrolled Children by grade in Rural India (2016)
Source: Annual Status of Education Report, 2016. ASER (facilitated by Pratham). (2016). Accessed from http://img.asercentre.org/docs/Publications/ASER%20Reports/ASER%202016/aser_2016.pdf on 16th February, 2018.

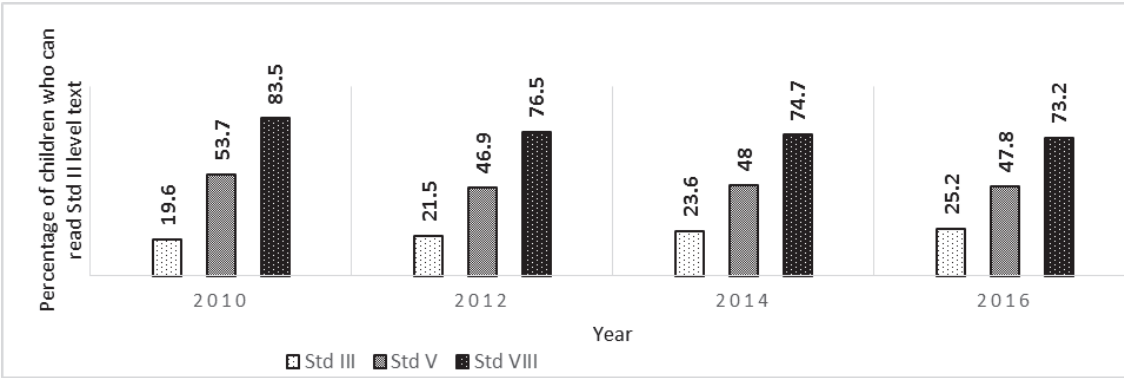

Figure II: Trends Over Time In Reading Levels Among School Enrolled Children in Rural India (2010-16)
Source: Annual Status of Education Report, 2016. ASER (facilitated by Pratham). (2016). Accessed from http://img.asercentre.org/docs/Publications/ASER%20Reports/ASER%202016/aser_2016.pdf on 16th February, 2018.

Early grade reading challenges present themselves not only among elementary school students, but even among school drop-outs and secondary school students enrolled in various vocational training programmes. These lacunae in early grade reading persist long after the students drop out of school and resurface, when they are enrolled in vocational skill training programmes under Rural Self Employment Training Institutes (RSETI), Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY), Pradhan Mantri Kaushal Vikas Yojana (PMKVY), etc. This creates not only a problem for the students, but presents a myriad range of issues for the various stakeholders of these government skill training programmes.

In rural areas, along with high rates of school dropouts, absenteeism from school is another major challenge for early grade reading. Children remain absent from school for long durations owing to socio-economic burdens like, taking care of younger siblings, working as wage labourers to augment family incomes, assisting family during harvest season, caste and gender prejudices, etc. Combined with this, poorly qualified teachers laboring under the pressure of completing syllabus on time, lack of support from illiterate parents, lack of funding, resource appropriation, etc., are indeed creating a situation in developing nations like India, wherein children suffer from basic numeracy and literacy skills even in advanced grades of schooling.

Educational Technology Interventions for Early Grade Reading: India has immense potential in combining low cost technology and education in order to eradicate literacy and espouse quality education standards. EdTech innovations also spell out great potential for Early Grade Reading in the form of Interactive digital learning platforms, technology enhanced pedagogy, digital self-learning apps, etc. In order to understand the scope and potential of educational technology, the most relevant interventions in Early Grade Reading are discussed in this section.

Computer Assisted Learning (CAL): Using computers and laptops to enhance the quality of learning for students has been in vogue since the 1990s, when the Technology-Enhanced Language Learning (TELL) protocol in language learning was introduced. In this approach computers are used to implement various interactive tools like flashcards, multimedia, digitally enhanced pedagogy in order to increase the reading skills of early grade students. And to a large extent, CAL has been found to be effective. For instance, an evaluation of a CAL programme that was implemented in a well-established network of NGO run schools in Western India found that one hour per day of after-school CAL instruction significantly improved test scores (J-PAL,2012). Various digital learning platforms have been introduced over the last few decades to strengthen reading skills of primary and elementary school students across the globe. These digital platforms are of various types and over the decades, have been customized to suit the target audience, i.e., students, teachers/trainers and parents.

Low Cost Tablet (LCT) Enhanced Pedagogy*:* The global experiment with Low Cost Tablets in education has yielded successful outcomes developing nations. Some of the most popular e- reading approach in the world using LCTs is being implemented by WorldReader. In India, the government took recourse to this technology by introducing the low cost Akash tablets in 2012. LCT has been used as a popular medium to inculcate good habits of reading across all major government skill programmes. A study in Idukki district of Kerala (Nedungadi et al., 2014) involving 38 students of mixed age groups shows that LCT enhanced pedagogy significantly reduced the time required by children to learn the complete Malayalam alphabet, compared to traditional methods of learning.

Digital Learning Using Mobile Devices*:* As in the LCTs, many organizations like BridgeIT programmes in India and Tanzania are resorting to the use of mobile devices/smartphones that use interactive apps to enhance the reading skills of elementary level students under the supervision of teachers and/or parents.

The central and state government, along with numerous NGOs have been able to implement many of these digitally enhanced learning systems aimed at strengthening Early Grade Reading in students. Some of these initiatives have been discussed in Table I.

Table I: Some EdTech Interventions for Early Grade Reading in India

Sl. No	Education technology	Innovating organization	Product
1	Digital self-learning	Educational Initiatives (EI)	***MindSpark***: Uses the constructivist theory of learning to read, understand and answer questions about students' current understanding of study matter, using tablets, phones and computers.
2	Digitally enhances language learning process	Karadi Path Education Company	***Magic English-SLL*** : An ICT enhanced learning process that uses Rhyme books, DVDs, phonetic DVD and flip charts for reading Path activities
3	Same Language Subtitles (SLS)	PlanetRead	***Anibooks*** (Animated books): Using SLS for both English and mother tongue language educational videos for young students aged 6 to 10 in order to inculcate the ability to read and comprehend through visual media.
4	Mobile devices for classroom video	BridgeIT	Distribution of classroom content in video format through student mobile devices.
5	Interactive digital learning platforms	Zaya Learning Labs	1. ***ClassCloud:*** a patented hardware device that enables the full e-learning experience offline. This is a boon for rural Indian schools that either don't have electricity or suffer from power shortages. 2. ***English Duniya***: An English reading and comprehension app that allows the child to learn vocabulary, grammar and more using a video game like simulation.

Source: Compiled from *'Early Language and Literacy in India'* (USAID, 2016), Mindspark (2017) URL: http://www.ei-india.com/what-is-mindspark/ and Dhillon (2017).

EdTech interventions: Potential and Challenges: In developing countries like India, EdTech in Early Grade Reading has great potential; however, the ICT approach in education must be reinforced with additional learning materials for students and teachers alike. Poorly educated/motivated teachers might prove to be the biggest challenge in implementing EdTech interventions for Early Grade Reading in schools and across skill training programmes. Furthermore, the context in which EdTech is introduced and the approach being followed is crucial for EdTech to succeed in the case of Early Grade Reading. For instance, in one study, it was found that ICT in Early Grade Reading was more effective where quality of teaching was low. In instances where the quality of teaching was high, replacing teaching time with CAL proved to be detrimental to students learning processes (JPAL, 2012).

Similarly cost considerations of implementing EdTech innovations and their actual effectiveness must be assuaged before implementing ICT to improve Early Grade Reading. Another barrier in the path of effective propagation of EdTech in rural India is the prevalent mindset among a faction of guardians, teachers and community, that technological interventions in education would do more harm to children than good in the long run. It must be kept in mind that the ICT interventions to enhance reading skills among primary school children can only progress in tandem with the progress and acceptance of ICT within the community in general.

Poor infrastructure access is another major challenge when it comes to implementation of educational technology (Sharp, Bransford and Lee, 2012) in Early Grade Reading with students and teachers suffering from frequent network connectivity issues, limited computer and mobile resources at schools and at home.

However, on a positive note, ICT can help students learn at their own pace and in a location of their choice. This is a great benefit for the rural students since; it allows them to pursue their education even outside the classroom environment, at a pace that suits their daily routine. This is especially a boon for young girls in rural India, faced with additional challenges of reduced mobility, increased household burden and limited parental support. Furthermore, EdTech interventions in Early Grade Reading can prove to be more useful for students with low attention spans, or with low level initial reading skills since, the approaches used under Edtech are interactive and user friendly.

Conclusion: ICT in education is a boon for students struggling with Early Grade Reading in developing nations like India which suffer from the lack of a proper environment conducive to imparting education, given its socio-economic deprivations; and also struggle with the issues of poor education infrastructure. Given this background, ICT can prove to be a blessing for students especially from impoverished, rural backgrounds who toil in government schools for years without even being able to read or write properly. Over the last two decades the Indian education ecosystem has integrated many of these EdTech interventions for improving Early Grade Reading among children. However, skewed focus on technology and scaling up, with lesser emphasis on the learning outcomes, needs of the target demographic, suitability of teaching approaches and educating the teachers, are leading to a situation where the cost-effectiveness of EdTech in Early Grade Reading interventions is being debated. Furthermore, ICT alone cannot redress the wide gamut of challenges in Early Grade Reading in India and hence has to be more holistically acknowledged, in conjunction with traditional teaching practices and frameworks prevalent in the country.

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