Online Learning Across Diverse Low-Resource Indian Contexts

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Abstract

Online learning environments are being deployed across socioeconomic strata to offer learning opportunities to diverse student communities, globally. In this submission we discuss the challenges we have faced in our attempt to understand the

We propose the deployment of such environments in middle-income afterschool settings in low-resource environments acrossIndia. We will draw on preliminary research (conducted in summer 2015)and leverage existing ties with NGOs to study these distinct contexts. Our larger goal is to (1) support tutors in curating and distributing learning content to students, (2) engage students in a mobile networked learning environment where they can share and collaborate, and (3) evaluate the potential of online learning environments for low-resource contexts. In this submission, our focus is on the differences across low-resource contexts and the impact these differences have on our design approach.

Author Keywords
ICTD; HCI; learning; India

ACM Classification Keywords
H.5.m [Information interfaces and presentation.]: General.

Introduction

Learning environments in developing world contexts have been too under-resourced (and thus under-explored) for feasible technology initiatives, but growing penetration of mobile technologies and internet connectivity drives us to explore the potential of state-of-the-art and relatively low cost technologies to enhance learning experiences for low-resource contexts.

We aim to address two problems with our research. First, there is an access problem. Students and tutors in low-resource settings have limited access to learning/teaching. Second, there is an immense opportunity to address a learning problem as well. The quality of teaching can occasionally be sub-par âĂŞ this is a part-time job for the tutors, they are compensated little for their efforts, they may be ill-equipped as teachers, and the students must learn alongside peers across a spectrum of ages and backgrounds. The first problem is more straightforwardly addressed by technology. As for the second, we aim to enhance pedagogical intent and capacity of functional learning environments, as recommended in [2]. Our primary and immediate goal is to integrate low-cost technology in low-resource learning environments to address an access problem. Our secondary, longer term goal is to address a learning problem, improving learning outcomes at scale through engaged, situated interactions with tutors and other students. Our research questions are thus as follows:

1. Teaching: Can tutors constrained for time and money benefit from an online learning platform? Do they value having access to varied educational content online? Can they successfully adapt their teaching style to integrate online learning?

2. Learning: Do students engage and adapt easily to online learning? What aspects of online sharing and collaboration do they value? Do they show measurable improvement in learning outcomes?

3. Feasibility: Can existing and relatively low-cost technology be leveraged to enhance the learning experience for students and tutors in low-resource environments? What implications might this have for testing larger-scale MOOC-style learning environments for rural users?

In answering these research questions, our project aims to incorporate the inputs of various stakeholders in this space, including children, tutors, and NGO volunteers, while designing the online learning experience. We stress that, for our initiative to be sustainable, active participation of the users (particularly that of the teachers/tutors) is critical to ensure a successful deployment.

Research Plan

There are multiple components to the system that we aim to build. First, we need a comprehensive assessment of the educational content currently being used by teachers in low-resource Indian settings. For this, we conducted an exhaustive survey of content providers that we describe the highlights of below. We also conducted interviews with teachers to assess their expertise with digital pedagogical content and their receptivity to a platform such as the one we intend to provide. This exercise would aid our second goal of providing content that the teachers can curate from a repository given to them. Third, we will build our learning environment and, fourth, we will generate curricula for a directed research study.

In terms of work done so far - in [1] we published findings from the needs assessment we conducted last summer at three target classrooms. We deployed a tablet (Android) application for Math learning and iterated on its design during a six-week study. We found that tablet applications were

appropriate and feasible learning and assessment tools, opened up avenues for personalized learning, led to improved learning outcomes (as assessed by the tutors), and allowed for the consideration of different kinds of learning content (e.g. Math and English, which students in Tamil Nadu have been found to be weakest in [9]). These findings and subsequent discussions with the NGO and tutors motivated us towards proposing and deploying a holistic model that integrates mobile technologies and curated media into an online learning community of students.

We next describe the highlights from our survey of Indian content providers (and electronic learning services) and our interviews with teachers.

Surveying Content Providers

We surveyed 40 web-based content providers and attempted to identify and compare their key features. The highlights of our survey are given below. A large number of online content providers are not in the open source domain and most services and packages provided, such as practice problem sets and lecture videos, are paid services. This can potentially prevent us from curating content, since a large chunk of the content is under a privately held license. Additionally, most of the content that we surveyed was directed at high school students, either focusing on grades 9 to 12 or on competitive examinations for universities.

We found a substantial repository of learning content in the open source domain as well. A lot of the content is aligned with the Indian education system. Many content providers provide software and hardware solutions, such as learning platforms and tablets/laptops respectively, packaged with their online learning content. We name a few notable web-based learning tools that we surveyed.

The Educomp Smart School Program [3] is a novel and comprehensive learning package that includes a complete digital repository of classroom learning content, bundled with learning and lesson plans, simulations, assessments, and virtual laboratories. This Smart School Project also contains an âĂIJEnglish MentorâĂİ, which is an English language tutor tool that simulates an English language learning course in an Indian accent, using suitable examples for a student studying in an Indian setting.

Nytra is an augmented reality application offered by the MBD Group [4] that works with Nytra textbooks to create augmented reality animations alongside course textual material. The application animates images and illustrations in the book with voiceovers and videos to increase student engagement while reading. The MBD Group also provides apps for kindergarten learning, in an assortment of rhymes in English and Hindi. Its goal is to create a blend of traditional rhymes and modern learning techniques, accompanied with music and animations.

Among other providers, there was Magic Pathshala [5], which provided students with a large open source repository of organized and categorized Math and English content, sorted by skills and grades. WybeeTab [6], produced by CarveNiche Technologies, is a comprehensive tablet-based learning platform and content provider that stores all content remotely so that the entire system works offline.

Interviewing Teachers

We sought a deeper understanding of the experiences of teachers/tutors regarding our proposed online learning community. These teachers taught in schools in peri-urban Kolkata and low-income, urban Mumbai. Their experiences with the digital content they had been consuming and their comfort level in their previous usage of digital media/devices gave useful feedback for our design process,

helping to identify how the technology can be improved.

Talking with teachers/tutors and NGO volunteers from different parts of India and in different socio-economically situated after-school centers/schools, we were told that children are more engaged when digital media (visual pictures/videos) are used to explain concepts. Another common theme that emerged was that students were far more enthusiastic than their teachers when it came to embracing the idea of an online learning community. The teachersâĂŹ reasons ranged from content not being in a language they are comfortable with (regional languages like Marathi/Bengali) to the content not having a "local flavor", to even not having enough training to use emerging technologies and digital media. These are concerns we will have to address as we design our online learning environment.

Future Work
Having conducted an elaborate and rigorous needs assessment, our goal moving forward is to compile a repository and allow teachers to curate lesson plans from this repository. We also intend to test the robustness and effectiveness that such a platform can offer in acutely resource-constrained regions. Deploying our platform in three disparate contexts âĂŞ rural Tamil Nadu, peri-urban Kolkata, and urban slums in Mumbai âĂŞ will also allow us to use a point of comparison that could be potentially useful from the perspective of a design probe.

References [**?**]