

MILLEE: Mobile and Immersive Learning for Literacy in Emerging Economies

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ABSTRACT

Poor literacy remains a barrier to economic empowerment in the developing world. Of particular importance is literacy in a “global language” such as English, which is typically a second language for these speakers. For complex reasons, public schools are often not effective for second language learning. Our solution is a suite of language-learning games on cellphones that target skills in conversation, listening comprehension, phonetic decoding and sight reading. Their design is informed by second language acquisition theories, as well as design patterns from successful games and highly rated commercial language learning software. We argue that cellphones are an excellent technology platform in the typical ecologies of underdeveloped regions. We employ a framework called PACE which is intended to support the rapid, scalable development of language learning software localized for a particular community of learners. They are usually skeptical of formal education and cultural biases encountered in “remote” languages. Content localization is indispensable to make the language *relevant* to them and to encourage them to adopt it.

Author Keywords

Content development, Developing world, Digital divide, Language learning, Literacy, Third World

INTRODUCTION

Poor literacy remains a barrier to economic empowerment in the developing world. While there is still resentment of English in post-colonial India, it is widely seen as a key to socioeconomic success [12]. English is taught in almost all schools in India: as a second language in public schools, and as a first language and the medium of instruction in most private schools. Fluency in English can almost be equated with membership in the middle and upper classes [5]. A recent article states that mastery of English is the “single most influential factor that determines access to elite educational institutions, and hence to important avenues of economic and social advancement” [9].

More broadly, the literature [e.g. 3], our conversations with development professionals in Africa, East Asia and South Asia, and further experiences in the field indicate that a

large proportion of low-income populations in these places desire to improve their command of an appropriate “world language.” English is certainly one of these, as is Mandarin Chinese and Spanish. But even in countries where such a language is an official “national language,” many speakers (inevitably the least empowered) have a different native language, and many *regional* languages (let alone dialects) are often spoken. In India, Hindi and English are official “national languages,” but Hindi is native to only 20% of the population; there are 18 major regional languages. “World language” fluency opens the door to further education, a larger regional (or world) marketplace, to “new economy” outsourced jobs, and often improves access to government, health and legal services.

PROBLEM STATEMENT AND PROPOSED SOLUTION

Unfortunately, government schools in developing regions face difficulties, especially with ESL (English as a Second Language). From the literature [e.g. 1] and our fieldwork in the poorest state of India, two significant factors stand out: non-regular attendance in schools owing to the need for students to work in the fields, homes, etc., and disinterest in schoolwork owing to the perceived costs or lack of benefits of formal schooling. Another factor is the qualifications of local ESL teachers, who were often unable to communicate with us in English without interpreters.

We believe that ESL learning games on cellphones can address the above challenges. In particular, we hypothesize that learners can improve their ESL skills by using mobile devices in out-of-school settings. We also believe game-like design can improve enjoyment of the learning experience and encourage spontaneous adoption. Technology-assisted learning in developing regions is not far-fetched. At least two NGOs, Pratham and the Azim Premji Foundation, have used computer games in their initiatives for children in the urban slums and rural areas of India respectively. Most importantly, a large-scale evaluation by Pratham¹ showed significant gains on math test scores from playing computer

¹ A longitudinal randomized experiment over more than two years with over 10,000 urban slums students.

games [2]. It is plausible that similar learning outcomes can be replicated using mobile games for ESL. We also believe that many of our lessons will transfer to other languages.

INITIAL RESULTS

We have conducted 5 field studies [6-8] between July 2004 and January 2007 with children from the urban slums and rural areas of India. The goal of these prior studies was to learn first-hand about their everyday learning contexts as part of a broader needs assessment, as well as to assess the feasibility of ESL learning via cellphone games. Each study lasted 2 weeks and was assisted by local interpreters.

In our latest two field studies, we piloted a suite of mobile games which were designed based on the PACE (Pattern-Activity-Curriculum-Exercise) framework [8], so as to target locally relevant functional literacies. Patterns are used to inform the design of an Activity, which is next associated with a specialized Curriculum, resulting in an Exercise application that learners interact with. A Pattern represents, in skeletal form, the steps for a language learning task. Patterns hence scaffold designers who lack background in second language acquisition to implement such learning tasks in the form of software. They may also capture tacit knowledge about the domain after having evolve through iterative design cycles. In this way, there is no need to reinvent the wheel, and new designs can benefit from the reuse and localization of older designs. We have over 50 design patterns from reviewing successful games and highly-rated commercial language learning software, e.g. Rosetta Stone and Pimsleur.

Pre- and post-tests administered for the above games show statistically significant gains on small samples. Qualitative observations also indicate that learners enjoyed the game-like lessons [8]. These results are by no means conclusive, but indicate that ESL learning games on cellphones are feasible for developing regions and merit further study.

NEXT STEPS

We are returning to India in Summer 2007. Our objectives are twofold. Firstly, we plan to learn more about the out-of-school scenarios in the everyday lives of school going-age children in underdeveloped regions, in order to envision the mobile learning scenarios which our applications must be designed to support. We will employ lessons [11] that we have gained from early-stage co-design work elsewhere in other developing regions, so as to elicit ideas from learners and other stakeholders for these scenarios.

Secondly, we will investigate the feasibility of situating our technology design process within the broader context of a curriculum development process. A candidate methodology for the latter is task-based language teaching (TBLT) [10]. In TBLT, the learner's *holistic* learning needs are identified together with possible learning scenarios and the constraints that these contexts entail. In fact, our hybrid development process will incorporate elements from educational models

for out-of-school learning such as Cole's Fifth Dimension [4]. By integrating systems development with curriculum development, we ensure that our suite of language learning games is able to *comprehensively* meet the learning needs of our target learners over a *sustained* period of time. These steps will pave the way for a longitudinal deployment and evaluation that we plan to commence after Summer 2007.

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