CLOUD BASED LEARNING PLATFORM

Milestone 2 Update

Grant # AID-OAA-F-13-00033

September 5, 2013

Update on project implementation including any challenges encountered, and plans to mitigate them.

Status

Project implementation is on track to-date and milestone 2 deliverables have been completed.

Issues

While delving into the CBSE curriculum for India and planning requirements for the math learning application due for milestone 3, we realized that it would be too ambitious to cover the curriculum for grades 1 – 6 due to the short time window till the Pilot. The content presents too wide a range of math topics and it would be difficult for us to cover everything given the timeline. After consultation with Wes Day (AOR), we will be focusing the curriculum for grades 3 – 5.

Updates

We are in discussions (via Columbia) with IFMR in Chennai to engage them as a partner to help with the on the ground implementation next year. They will be helpful both in terms of providing our local team logistical support and helping spread word to policymakers.

Plans to assess cost-effectiveness (extent to which the intervention has the potential to deliver greater impact per dollar than other ways of achieving same development goals). The comparison should include other solutions in the in current area of implementation, and target future areas. The analysis should discuss specific indicators.

Cost-Effectiveness Methodology

We will assess cost-effectiveness of the intervention by measuring the $ per student or $ per standard deviation increase in test scores number at the end of the pilot. The inputs to determine cost for the intervention include the following costs: tablets, internet connectivity, maintenance / repair or troubleshooting help costs, depreciation rate, and cost of teaching training. Some of these items we know now for sure, some we have assumptions about and the pilot will help us learn actual numbers (e.g. maintenance costs - how often are they likely to break down in a real environment). We'll use this data to come up with the fully loaded per student cost or the per standard deviation gain cost of the Treatment group vs. the Comparison group. We'll have a concrete number at the end of the pilot, and we'd expect this cost to go down at larger scale (e.g. because tablets can be purchased on bulk).

Comparison of Computer Assisted Learning (CAL) Programs

There exists very little rigorous evidence on the impact of computer assisted learning on educational outcomes and not an abundance of evidence for India or other developing countries exists. One program in Gujarat in which students spent 2 hours a week playing math games on a shared computer raised test scores by 0.36 and 0.54 standard deviations in the first and second years, respectively

(Banerjee et al. 2007). The program cost was $15.18 per student per year (Banerjee et al. 2007). This does not include software development costs.

We feel we'll be able to do much better in terms of cost-effectiveness because tablets are cheaper and more intuitive than computer desktops s and we'll be able to provide students with more screen time. This traditional CAL model is also more difficult to scale than our infrastructure because the available content is limited and it ties schools into one specific software product. We believe our cloud platform will incentivize creation of content through crowd-sourcing, enabling free provision to schools. Our technology also enables the development of learning cultures, where the value of continual learning is inculcated in every student.

Evaluations of other Indian CAL programs have found gains of 0.27 standard deviations in reading (He et al. 2008) and 0.28 standard deviations in math using the The Gyan Shala CAL program (Linden 2008), with larger gains for remedial students in the latter study. We have not been able to find hard dollar costs for the former program. The Gyan Shala CAL program had an estimated cost of $3.70 per student and effectiveness of $3.22 to $4.59 per tenth of a standard deviation gain. The computers used in this study were donated so the per student cost is an estimate.

Alternate Solutions

The cheapest intervention to date seems to be the Balsakhi program, which augmented teachers in the classroom. The program trained and placed local village residents as assistant teachers in schools to provide remedial math education in India. The program only covered math and did not help non-remedial students. The program increased math scores among weak students at a cost of $2.25 per student per year, making the program one of the most cost-effective interventions that have been tried (Banerjee et al. 2007). This translates to a cost of about $0.67 per standard deviation gain of the Treatment group vs. the Comparison group.

We feel it's important to have these numbers in mind but we believe our solution is more scalable because it will deliver many subjects for the fixed cost of one tablet when it scales. In Balsakhi's case, covering more subjects would require additional teachers, which—combined with high teacher turnover and difficulty in monitoring quality—undermines the cost-effectiveness and scalability of this program. So we don't feel that we have to meet $2.25 per student per year cost because in the long run we can deliver more than this program.

References

Banerjee et al.

2007. "Remedying Education: Evidence from Two Randomized Experiments in India." *Quarterly Journal of Economics*.

He, Linden, and MacLeod

2009. *"A Better Way to Teach Children to Read? Evidence from a Randomized Controlled Trial."* http://www.leighlinden.com/Teach%20Children%20to%20Read.pdf. Last visited Aug 10, 2013.

Linden, Leigh L.
2008. "*Complement or Substitute? The Effect of Technology on Student Achievement in India.*" http://www.povertyactionlab.org/publication/complement-substitute-effect-technology-student-achievement-india. Last visited Aug 10, 2013.

Plans to assess interest from developers and the financial viability of the system, including the potential to generate revenue from ads, fees from schools, and plans to assess the system and program costs (e.g. costs of tablets and of program implementation).

Once our math application is live, we will begin a media campaign to start advertising the goals of the Pilot and our business methodology. Following this announcement, we will approach select developers who have built educational applications to assess interest and shop the business model. We expect to receive positive interest for the platform and we'll share the data from the Pilot demonstrating preliminary revenue numbers to convince developers of the business viability of the platform.

As we scale, the financial viability of the system will be based on optimizing costs and charging for the platform. We will keep track of the costs associated with tablets, internet connectivity, maintenance / repair or troubleshooting help costs, depreciation rate, and implementations costs around teaching training and field staff costs. These indicators will help us determine the fully loaded program costs and we believe that many of these costs can be optimized as we scale. For instance, in our model, we have allocated $80 for the cost per tablet. This cost can be reduced by 20 – 25% as we scale even to a thousand tablets.

We plan to generate revenue by charging schools or governments for the cost of tablets and a per student annual subscription for access to the cloud based platform. Additionally, we expect Ads to deliver revenues both for Pixatel and our App developer partners. We may also share a portion of the per student annual subscription with third party developers in a Netflix like business model.

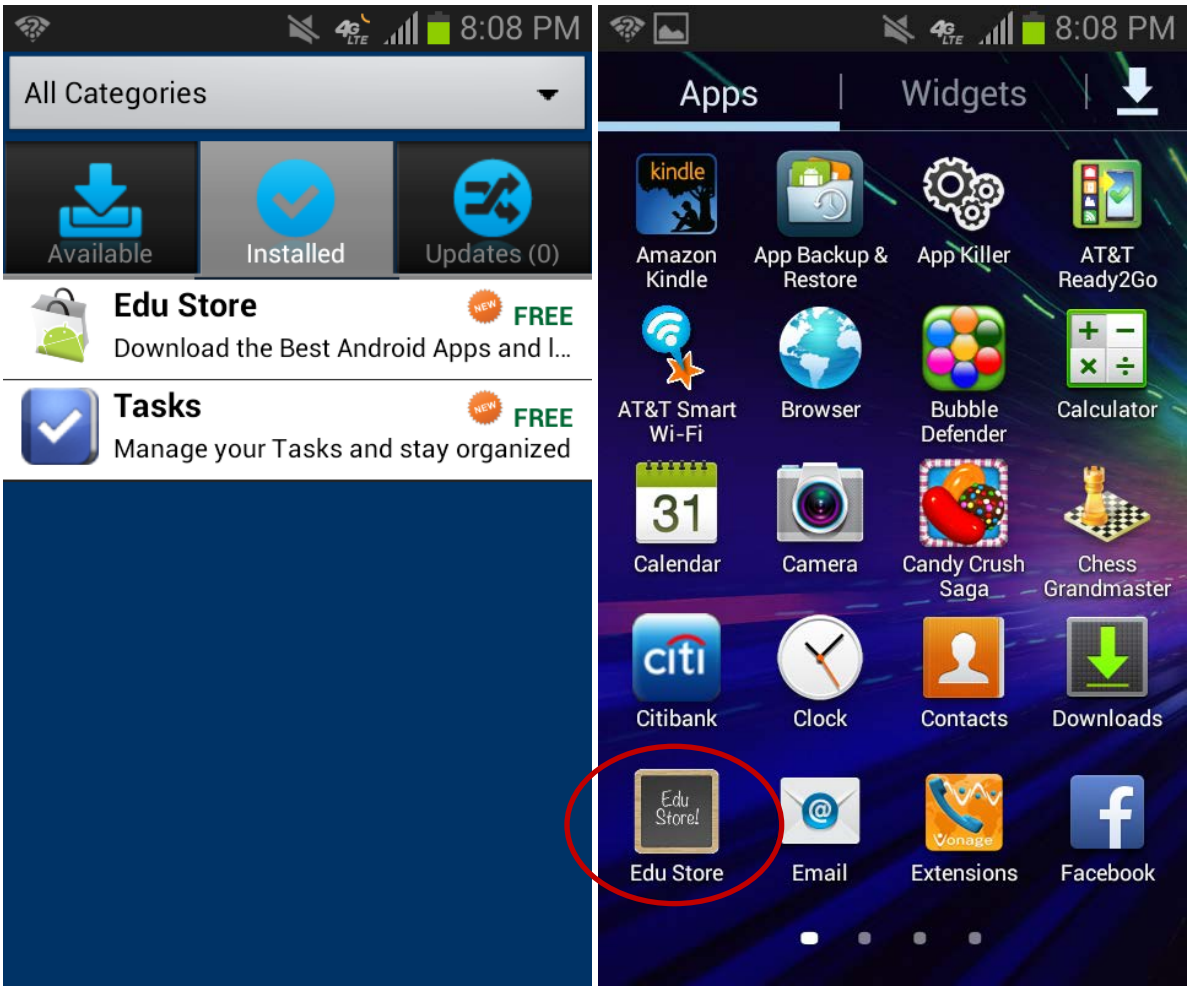
Develop and deliver cloud based education platform

We have developed the cloud based education platform and deployed a sample Tasks application that enables Pixatel to track end user engagement and usage statistics for the sample application. The EduStore.apk file is attached to this report and can be installed on any Android device.

The appstore can also be downloaded from the project webpage located at http://olive.pixatel.com (Olive is the internal codename for this project).

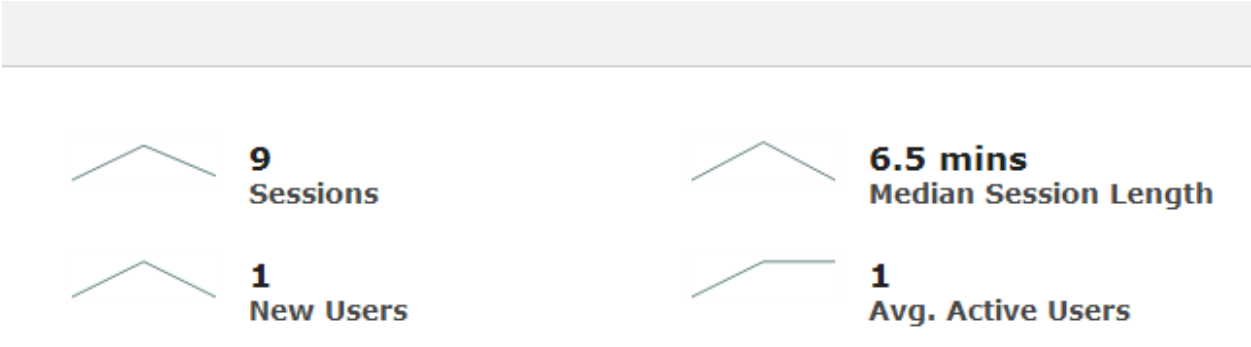
The user name to access the directory is **archimedes** and the password is **Eureka#!**

Screenshots of the Android Client are included below:



The metrics we are tracking for each student are the following:

- Session Frequency per user
- Session Length
- User Geographical Location
- Milestones completed

The above statistics will enable us and teachers to validate application usage by students. We will also be able to correlate student test performance against application usage. We plan to build in additional content related instrumentation into the mathematics application. The below graphs display the types of data points that will be made available to us.

Sample Graphs