Classroom 3.0

Why the promise of the Digital Classroom depends on technology addressing the human issues first

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Introduction

- Background
- The Promise of Technology
- The Human Challenges
- Classroom 3.0 SMILE Plug
- How you can make a difference
About Jack

- Berkeley EECS (B.S 04)
  - CS152 TA
- Digital/CPU Design Engineering Background
  - 11+ patents
- Currently Director of Application Processor Business Unit, Marvell
- Member of the REAL Commission
  - Recommendations for Education and Advancement of Learning (REAL) Agenda –part of the White House Digital Promise
- In Education: Partners with Stanford School of Education, MIT Media Labs, OLPC
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About Marvell

- Founded in 1995 by 3 UCB Grads
  - Sehat Sutardja, Weili Dai, Pantas Sutardja
- 3rd Largest Fabless Semiconductor Company in the World
- 5900+ Employees
- $3B+ Revenue
- Key Markets:
  - Mobile and Wireless
  - Storage Solutions
  - Networking
  - Consumer Solutions
  - Green Technology
  - Print Technology
- Chip company -> Technology company
Technology in Education

- Mobile innovations certainly create a whole new set of interaction and process enhancement possibilities

Educational Games  Mobinar  Mobile ePortfolio
Technology in Education

- Unfortunately, public K-12 education systems in the US and worldwide have hardly benefited from today’s technological innovations.

- Furthermore, digital divide between those haves and have-nots is still one of the most significant problems to be addressed today.
Technology in Education

- What are we trying to accomplish?
- Why?
- Why do we think Technology can do this?
- Who is this for?
  - 3rd world countries?
  - US K-12?
Is this Technology in the Classroom?

Digital Content Solution: Cost reduction on textbooks

- Tablets preloaded with content: textbooks, small videos, other curriculum created or purchased by teacher
- Update content/software over school breaks
- Tablet or eReader device

Good minimum….but can we do more?
Challenges

- Social DNA Issues – What education must look and feel like
- Resistance to change
- Reliability issues
- Fragmentation
Challenges – Have nots

No computer. No Internet. No Library. Extremely underserved school because of political reasons. Kids go through this checkpoint everyday to go to school. Hard to receive external aids/2hr/day electricity. What good is all the mobile innovation for these children?
Challenges – Have nots

When we asked them to write their own stories, they weren’t confident in writing. Hardly anyone wrote even a paragraph. When we asked them to tell us a story through mobile devices, they lined up and gave us stories.
Challenges – Have nots

- **Content**
  - Where does high quality content come from?
  - How do you deploy and share content?

- **Infrastructure**
  - Electricity

- **Teachers/Lack of Knowledge**
  - How do I use technology?
  - What if the students know more than me?
  - What if I’m replaced?
  - OLPC example
Challenges – Haves

- Reliability
  - Example: 50 minute lesson
  - Spotty Internet

- Computer Labs?

- Social DNA
  - Imagine a teacher with her worksheet

- Teachers
  - Control
  - Job Security
  - Are you replacing me?
What’s been deployed today?

- Case Study 1: PocketSchool/Teachermate
- Case Study 2: OLPC
- Case Study 3: Junction Server
Pocket School / Teachermate

- Game based learning for children

- Unique ID for Charging
OLPC

OLPC Sugar Platform

• Provides school network infrastructure
• Provides Internet Gateway
• Supports wireless network set-up
• Provides presence and collaboration service
• Provides back-up and restore
• Acts as installation and upgrade server
• Act as internal activation server
• Provides remote administration

XO 1.75 launches Q1 2012

Off-the-shelf server with XO school server software called XS

XO 3.0 planned Q3 2012

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Junction Server

Figure 4. Login Window
Figure 5. Main Window
Figure 6. Make your question
(a) The picture of Teacher's application in India
(b) The picture of Teacher's application in USA
Introducing the Plug Computer

- Watch videos at: http://www.plugcomputer.org/about/video.html
Plug Computer Specs

- **Very powerful CPUs**
  - Up to 2 Ghz ARM based CPUs

- **Robust Peripheral Sets**
  - USB, Gigabit Ethernet, SATA, etc.

- **Connectivity Options**
  - WiFi, 3G Modem
Solving the content problem with the plug

- Khan Academy
- UC Berkeley?
Solving the power problem with the plug

- Very low power, 1-2W
- Battery as an option
- Solar Power
Removing the server/router/access point with the plug

- Very low power, 1-2W

Battery as an option?

Junction

Server on Plug Computer

- v.1 – Comprehension quiz
- v.2 – StoryWeaver
- v.3 – Homework Maker

- Competition games
- Mobile health assessment

Mini Plug Computer (Working with Marvell): Wireless server, Router, & Access Point
Reliable Digital Classroom: SMILE Plug

Reliable Digital Classroom

- Private classroom cloud for up to 60 students
- Easy, low-cost deployment
- Portable access point, gateway, content server
- Secure content with teacher control

Easy to update plug computer
Classroom 3.0 in the Near Future

Interactive Whiteboard

TV

SMILE Plug

Easy to update plug computer

Internet

Integrated into tablet

Interactive response systems

Teacher & Student Devices
Call to Action!

- SMILE Plug Potential Projects
- Server-Client model: SW and HW development on both plug and clients
  - Teacher/Student Interaction
  - Teacher Control of classroom
  - Content Filter/Aggregation?
  - Data aggregation – test results? Standard tests? How students interacts with their devices in real time?
  - Server Administration
  - Remote Access
  - Update Capabilities
  - Interactive Learning?
  - Individual Learning?
  - Ways to port existing content?
Thank You!!

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- Acknowledgement
  - Paul Kim, Stanford University School of Education
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- Key Links
  - www.stanford.edu/~phkim
  - http://www.plugcomputer.org/
  - http://www.techamericafoundation.org/REALAgenda