Classroom 3.0

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

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Director, Application Processor Business Unit

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Introduction

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

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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
- Contact info: jkang@marvell.com

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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

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Technology in Education

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

Educational Games

Mobinar

Mobile ePortfolio

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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.

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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?

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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?

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Challenges

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

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Challenges – Have nots

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Challenges – Have nots

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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

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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?

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What's been deployed today?

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

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Pocket School / Teachermate

- Game based learning for children

- Unique ID for Charging

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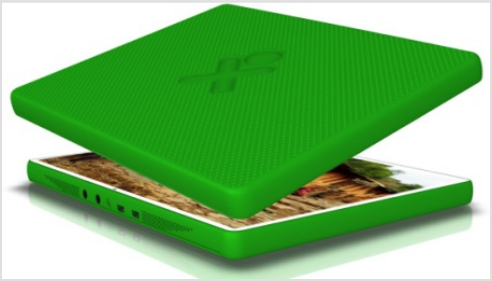
OLPC

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

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

XO 1.75 launches Q1 2012



XO 3.0 planned Q3 2012

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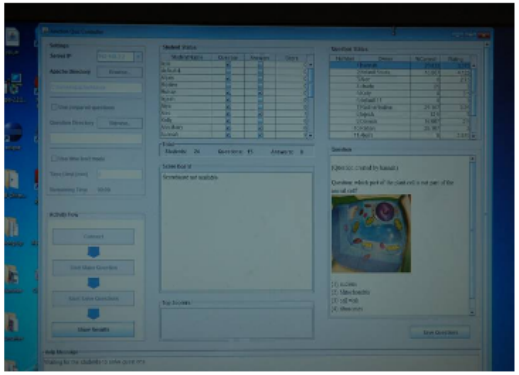
Junction Server

Figure4. 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

Junction Server

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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

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Solving the content problem with the plug

- Khan Academy
- UC Berkeley?

OER COMMONS
OPEN EDUCATIONAL RESOURCES

OEDb
ONLINE EDUCATION DATABASE

open learning initiative

Curriki

MITOPENCOURSEWARE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

OPEN EDUCATION

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Solving the power problem with the plug

- Very low power, 1-2W
- Battery as an option
- Solar Power

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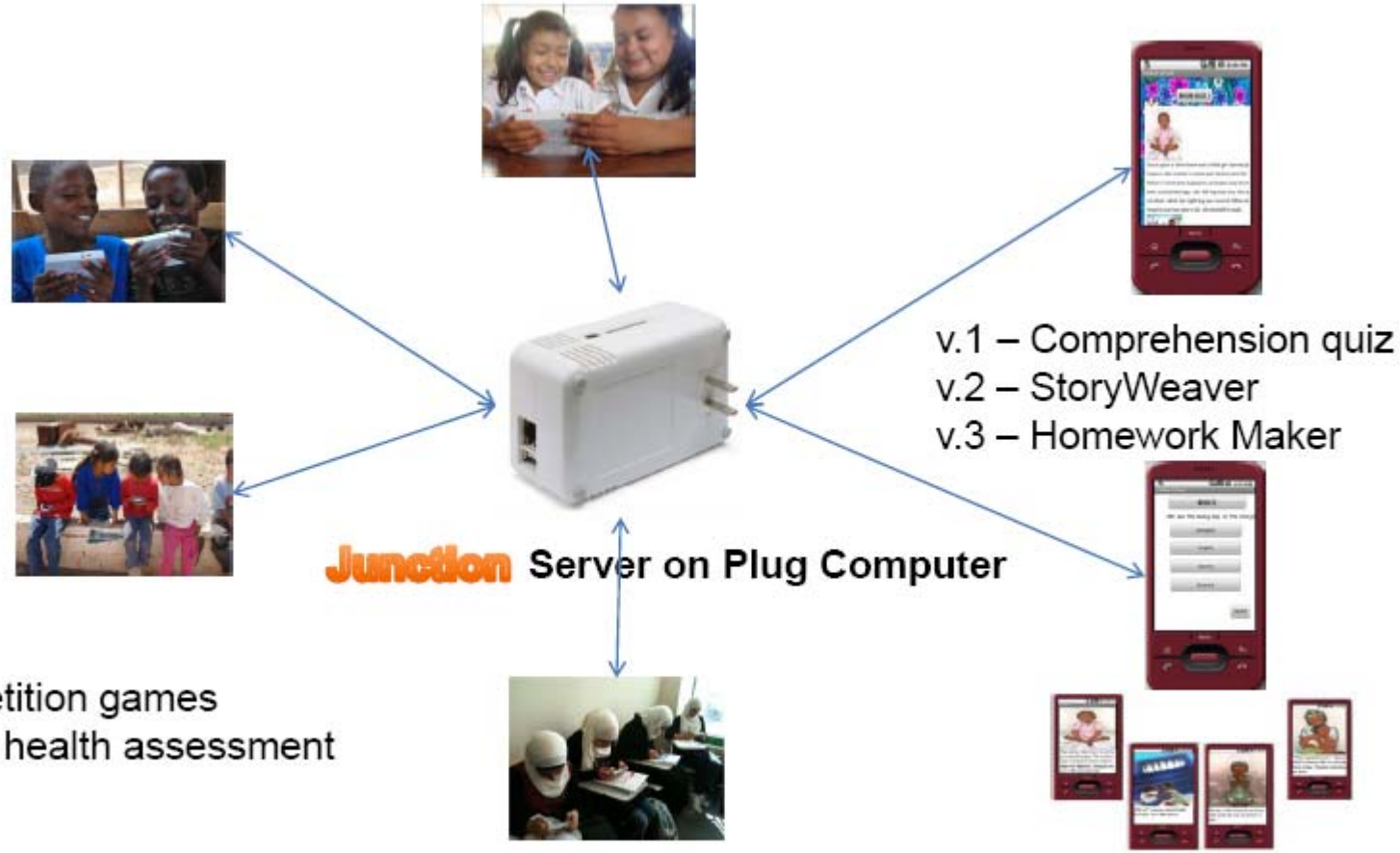
Removing the server/router/access point with the plug



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

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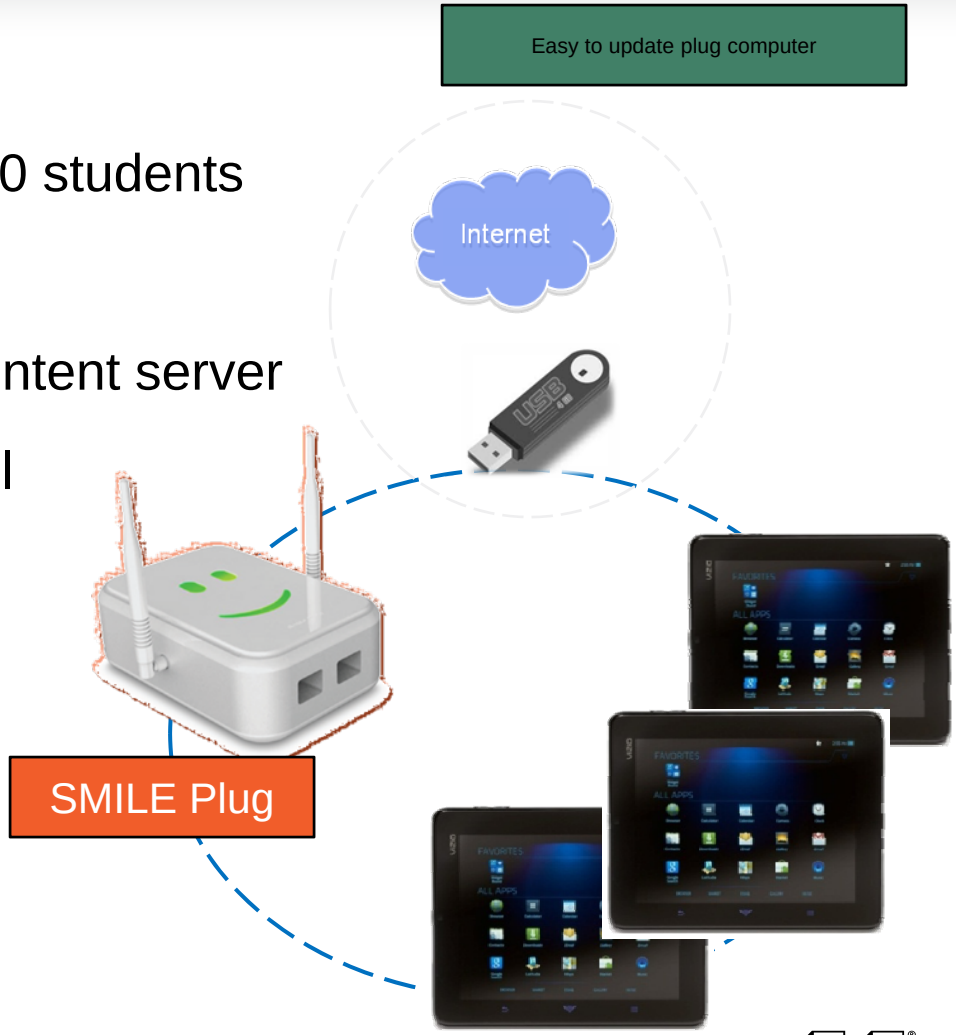
Reliable Digital Classroom : SMILE Plug

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



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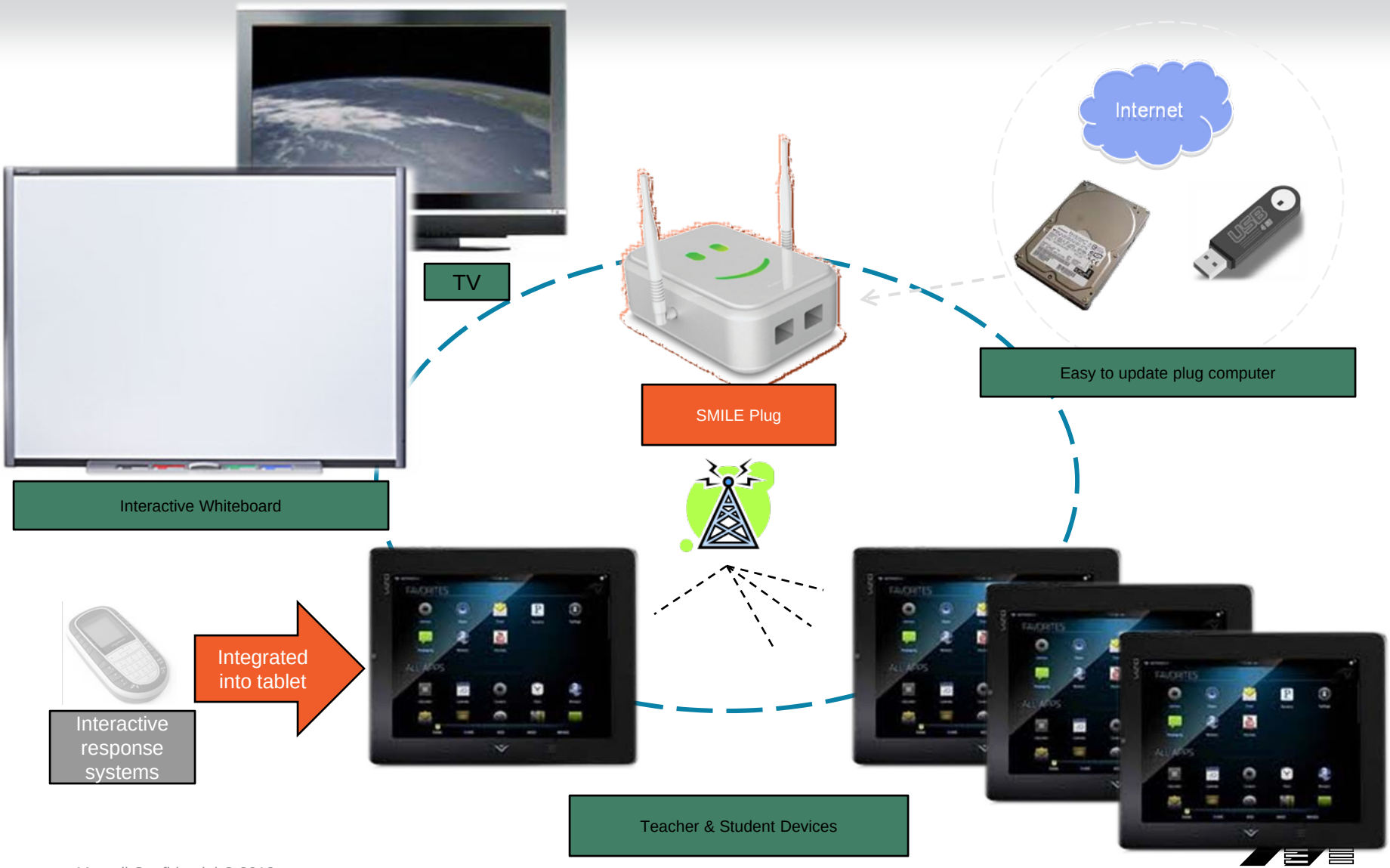
Classroom 3.0 in the Near Future



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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?

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Thank You!!

- Contact Info:
  - Jack Kang (jkang@marvell.com)

- Acknowledgement
  - Paul Kim, Stanford University School of Education
  - phkim@stanford.edu

- Key Links
  - www.stanford.edu/~phkim
  - http://www.plugcomputer.org/
  - http://www.marvell.com/company/news/pressDetail.do?releaseID=2000
  - http://www.marvell.com/solutions/plug-computers/assets/Marvell-SMILE-Plug-Platform-Brief.pdf
  - http://www.techamericafoundation.org/REALAgenda

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