

Technology for Education

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Usage Models of Classroom Computing



Computing for the Poor Initiatives

- 1984: IBM's PCJr launched. Attempt to increase computer users by decreasing cost
- Late 1990s: New wave: Initiatives targeting special computer needs for the developing countries

What were the 3 main problems that the new wave of low cost PCs aimed to deal with?

- Reduction of the device cost
- Building robust machines that withstood harsh weather, dust and poor quality power.
- 'Usage appropriateness' - issues related to literacy, cultural appropriateness and social norms of resource sharing.

In the context of your development experiences, which of these problems is the most important to overcome?

Different projects tried to overcome these issues

Simputer (Simple Inexpensive Multilingual Computer)

- low price
- strong casing, a plastic cover and large sturdy buttons
- easy-to-use by first time computer users

Computador Popular (CP)

- low price

One Laptop Per Child (OLPC)

- low price
- low power usage

Classmate (Intel)

- reasonable price (\$400)

Demo- OLPC



What were some of the supply and demand side challenges faced by the 'computing-for-poor' projects like Simputer?

Supply Side Issues:

- **Production:** volume not large enough to enjoy economies of scale-> High Cost-> Prevented device customization
- **Marketing:** Universal marketing strategy to engage governments from taxation to direct purchases-> What are state priorities?
- **Distribution:** Working with the government leads to the separation of producers from the micro-environment within which technology sales and maintenance take place

Demand Side Issues:

- **Planning:** For the creation of an appropriate content and applications
- **Brand Impact:** "computers-for-the-poor" associated with low status

Models of Computer Usage for Child Education

- **Single ownership**: individual child learning, e.g. OLPC and Classmate
- **Single user per classroom computer/terminal**: single users operate computers shared by the community, e.g. Computer labs in the US and India, Computador Popular
- **Multiple users per shared classroom computer**: computers shared by, on avg, 5 students at once, e.g. rural India and other developing regions

Evaluation of the 3 methods: Studies from rural India

Economic Feasibility:

- lowest annual cost of providing shared computers (US\$ 1.06 billion per year for providing shared computers to all 149 million Indian students, as opposed to US\$ 12.42 billion for providing laptops).

Education Effectiveness:

- learning effectiveness with collaborative learning on multiple input computers is as good as learning with single user computers in classrooms

Do you think that this result is applicable to other developing countries as well?

Socio-Cultural Suitability:

- Aruna will talk more about it =)

Case Study : Mischief




How does Mischief work?

- 2 Remote screens, one mouse per child and the teacher has a mouse
- Microsoft PowerPoint slides
- Large version of a Single Display Groupware
- Standard telephone network and speakers on the side of the room
- Microphone on a web cam
- Mouse gestures



SCIENCE

 $32 + 8 = ?$ 7	 $44 + 16 = ?$
 $75 + 15 = ?$ 68	 $18 + 72 = ?$
 $61 + 19 = ?$ 44	
 $44 + 26 = ?$	
 $33 + 44 = ?$ 12	
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Calculator keypad:
1 2 3 4 5 6
7 8 9 0 =
C + - * ÷
() DEL ENTER

Overview

Mischief combines:

- Audience Response Systems
 - Free-form feedback with T/F, Multiple Choice
- Large scale Single Display Groupware (SDG)

Benefits:

- Higher engagement
- Better participation and task performance
- Positive impact on collaboration and motivation
- Students in a distributed learning environment perform as well or even better than students in tradition classrooms
- Provides more social interaction in an affordable, extensible and engaging manner

Problems

- What is the motivation behind creating Mischief and what problems does it address?
- Improve current limitations of Distance Education in rural China
- Education suffers from
 - Insufficient funds
 - Lack of basic infrastructure
 - Incompetent and unmotivated instructors
- Failed solutions
 - TV/Radio/DVDS, real-time distance education
 - Integrating computers
 - Lack of appropriately designed content

Discussion

- How do traditional rural classroom teaching methodologies compare and contrast to a more Western style of teaching?
 - Rural China
 - Blackboard
 - Individual and group identity
 - Individual attention
 - Positive public reinforcement
 - Raising hands
 - Unison response
 - Gauging class status

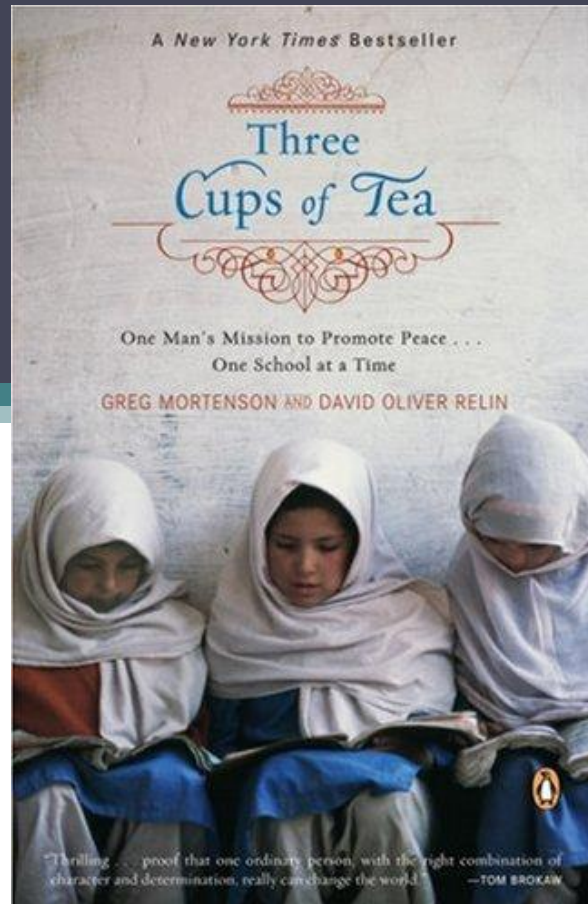
Discussion

- Explain how Mischief supported the various classroom practices abroad and what was the effect?
- Blackboard
 - Utilizes mouse and voice to guide content
- Individual group identity
 - Customized identity with cursor icon
- Positive public reinforcement
 - Gives stars
- Participation
 - Mouse gestures
- Built in hand raising

Discussion

- What are some drawbacks with the current design system of Mischief and what kind of changes can be made to improve it?
 - Hard to gauge emotions and be interactive
 - Cannot generate exercises on the fly
 - No way to give private feedback
 - Improve program by integrating Wireless mice and other low-cost peripherals

Video: *Three Cups of Tea*



<http://www.youtube.com/watch?v=oe-817DhelU>

Social Factors of Education in T4ID



Shift from Agriculture

- Strong desire to move away from agriculture
- Preference for government jobs
- Male children: government job, factory job, teacher
- Female children: teacher, nurse, housewife
- High payoff from education

“Computers will get my child respect”

- Versus “computers will get my child jobs”
- Discussion: What symbolic values (separate from their functional values) are tied to computers in developing countries?
 - Social and economic ascendancy
 - Social equity: “My child now sits in the same benches and uses the computer alongside the rich children of the village.”
 - Hope
 - Investment in the people

Parents' perceived impacts of computers in schools

- Varied responses
- Spike in children's interest in school
- Seen as a waste
- Nonfunctional computers
- Spending on other social welfare investments
- Discussion: What are the effects of *prioritizing technology in schools over other social welfare investments* in this case? Are these concerns global?

Computers affect Power Dynamics

- Discussion: In this case, what are some of the resulting changes in *power dynamics* (i.e. *gender gap, generational gap, etc*) when computers were introduced in rural India? Are some of these dynamics prevalent throughout the developing world?

Ownership and Sustainability

- Discussion: How can the presence and ownership of a school impact developing (especially rural) communities?

Q & A

- Questions?

Sources - Links

- **Usage Models of Classroom Computing in Developing Regions:**
http://tier.cs.berkeley.edu/docs/education_shared ICTD.pdf
- **Mischief: Supporting Remote Teaching in Developing Regions:**
http://research.microsoft.com/pubs/81841/mischief_chi2008.pdf
- **My child will be respected: Parental perspectives on computers and education in Rural India -**
<http://www.springerlink.com/content/j7481046147859nq/>
- **One Laptop Per Child (OLPC):**
<http://pcic.merage.uci.edu/papers/2009/OneLaptop.pdf>
- **Video on *Three Cups of Tea*:**
<http://www.youtube.com/watch?v=oe-817DhelU>