Technology for Universal Education

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Workshop Announcement

• Needs and Opportunities for Technology in Developing Regions
• bridge.berkeley.edu/workshop_needs.html
• Tentative topics
  - Education
  - Energy and the Environment
  - Informal trading markets
  - Microfinance, micro-enterprises
• Asia, Eastern Europe, Latin America
How long can children expect to stay in school?

Source: UNESCO, 2004
How does duration of schooling relate to national wealth?

Source: The World Bank, 2003
India, A Land of Disparity
Background

• 3-year pilot in village schools pioneered by Dr. Urvashi Sahni
Background: CSCL and Computer Literacy
Background: Hindi Courseware
Background:
CSCL and Hindi Courseware
Background: CSCL and Student Authoring
The Study Hall
Contrast: Bright Uniforms
Contrast: Furnished Classrooms
Contrast:
Swimming Pool and Facilities
To the Village Schools
To the Village Schools
Rural Public Schools
Rural Schools: Life as a Student
Rural Schools: Household Circumstances
Rural Schools: Attendance
Rural Schools:
Physical Environment
Rural Schools: Physical Environment
Rural Schools: Lack of Electricity
Rural Schools: Lack of Electricity
Rural Schools: Lack of Electricity
Limited Coverage
Rural Schools: Computer Literacy
Rural Schools: Pride in Being Self-Contained
Rural Schools: Pride in Being Self-Contained
Newspapers
After-School Program: Classes
After-School Program: Computer Lab
After-School Program: Computer Lab
Village Schools + After-School Program: Evidence of Learning
Village Schools + After-School Program: Evidence of Learning
Other Forms of Literacy
After-School Program: Urban Slum
After-School Program: Urban Slum
Constraints

• Teacher shortage, qualifications
• Unsupportive parents, school attendance
• Unreliable electricity
• Keyboard usability
• Limited daily computer usage (~15 minutes)
• Limited building space
• Lack of Internet access (village school), or poor connectivity (Study Hall)
Enablers

• Conducive public policies
  - Rice and monetary incentives
  - Standardized state-wide syllabus
• Culture of peer tutoring, 2-way exchange
• Pride in personal accomplishments
• Availability of textbooks and stationery
• Child interest in graphical representations
• Ample open spaces
• Shared computer was a draw for parents
Hypothesis 1

• Learning through digital storytelling
Digital Storytelling

- Motivation: existing authoring tools (Flash, PowerPoint, Adobe Premiere) too complicated for 8-10 year olds
- Simple tool for students to create digital stories and interactive exercises in small teams
- Pen-based user interface, sketching
- Low-cost digital camera, microphone
- Possibly also color printer and/or mobile computing
Expected Educational Value

• Explaining concepts is part of active learning
• Ability to communicate concepts to peers
• Team authoring process involves collaborative learning, develops teamwork skills
• Creation of digital content that could be shared with other schools
• Developing interactive exercises fosters metacognition
• Additional means for teachers to assess student authors’ understanding
Hypothesis 2

- Usability engineering and pedagogy must go hand-in-hand
Hypothesis 3

• Mobile technology can help overcome constraints in access to education
Hypothesis 4

• Shared computing can be augmented through paper-based user interfaces
Other Hypotheses

• (Audience participation)
Computers can improve teaching and learning in 6 ways (Rusten)

- Computer-assisted learning
- Simulation and exploration
- Research and analysis
- Computation and production
- Learning networks
- Artistic expression and creativity
A Dark Side of Education

- Disconnect between formal schooling and informal economies
- Disenchantment
- How do you create more formal sector jobs?
- How do you create more opportunities for people to realize their full potential?
- Population pressures of rural-urban migration?