# 90-465 Technology for Development

Introduction

Which of these sounds like a likely failure?

- Teaching literacy by putting lyrics and "follow the bouncing ball" on music videos and then convincing broadcasters to put them on the air.

- Improve children's school performance by housing computers in adult-proof enclosures and putting them in playgrounds.

- Building portable internet cafes in modular shipping containers that could connect villages to educational, medical, and commercial services via included computers, scanners, projectors, telemedical equipment, and satellite Internet connectivity, all powered by solar energy.

Planet Read

- ## The problem:
  literacy in India

Literate 16% — 140 million
Non-literate 34% — 296 million
Early-literate 50% — 422 million
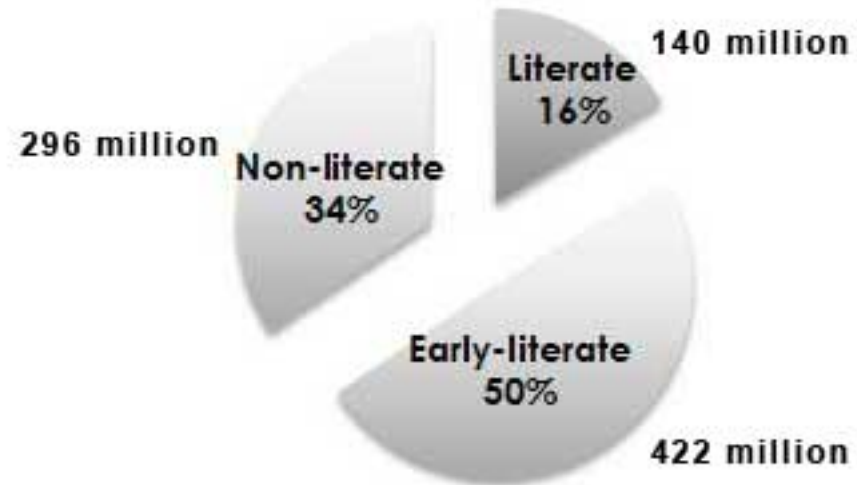
- India had an estimated 146 million fully-literate, 327 million early-literate, and 387 million non-literate people.

- The census overestimates the literacy rate:
  - "literate" == 1 year of schooling or write their name.

- More than half the people considered to be "literate" by the census, cannot read the headline of a newspaper.
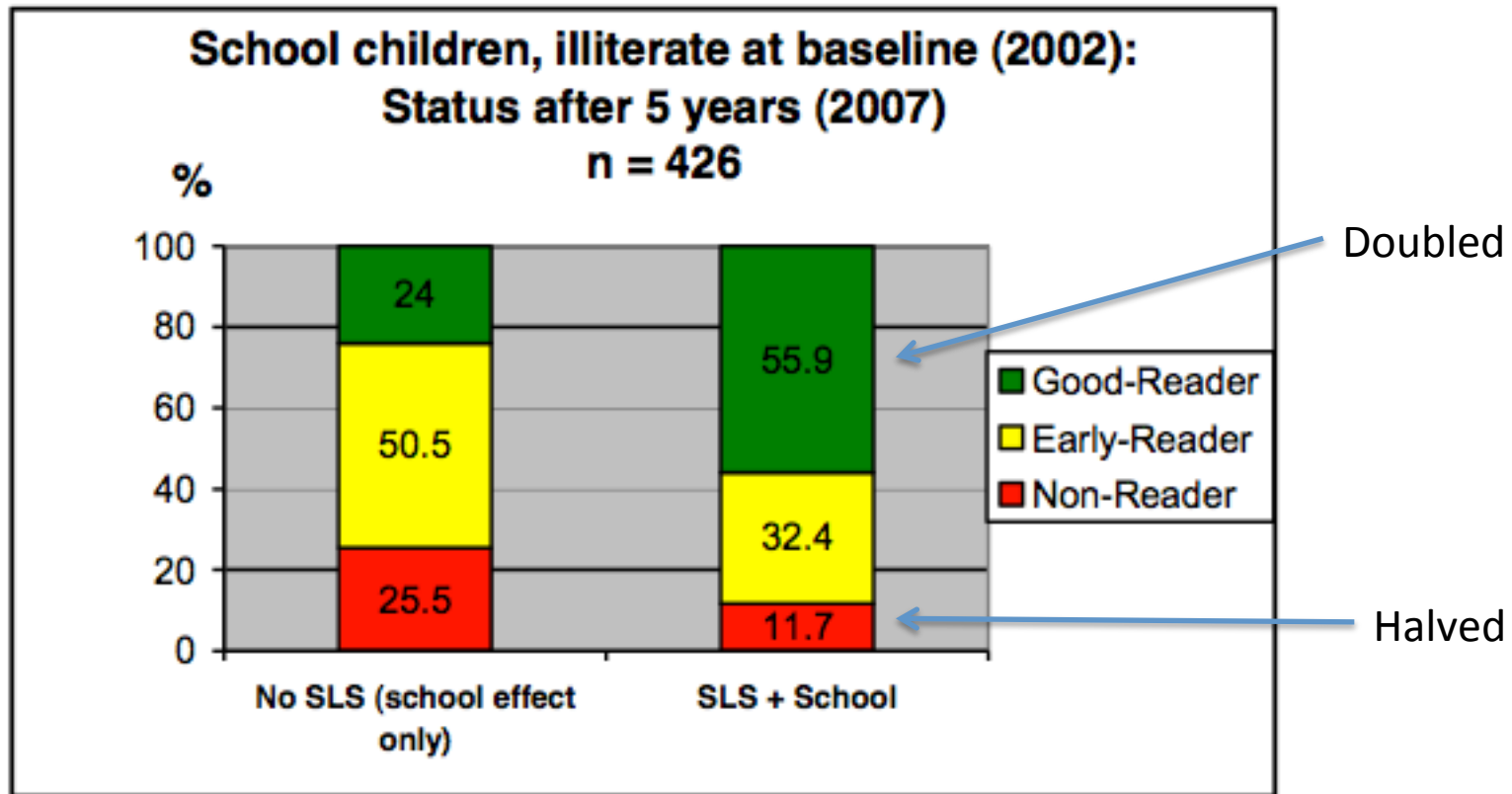
  Source: Planet Read: http://www.planetread.org/pdf/Research%20Summary_SLS.pdf

Planet Read

- The idea
  - Same language subtitling (similar to "follow the bouncing ball") provided on popular television shows.
    - http://www.planetread.org
  - Broadcast to whole regions of the country
  - Targets early-literates, giving them supported reading practice

Planet Read

- ## 2002, SLS was added to Rangoli
  - A nationally telecast program of Hindi film songs

**School children, illiterate at baseline (2002): Status after 5 years (2007)**

n = 426

No SLS (school effect only)	SLS + School
Good-Reader: 24	Good-Reader: 55.9 → **Doubled**
Early-Reader: 50.5	Early-Reader: 32.4
Non-Reader: 25.5	Non-Reader: 11.7 → **Halved**

Legend:
- Good-Reader (green)
- Early-Reader (yellow)
- Non-Reader (red)

Source: Planet Read: http://www.planetread.org/pdf/Research%20Summary_SLS.pdf

Planet Read

- Impact on newspaper reading
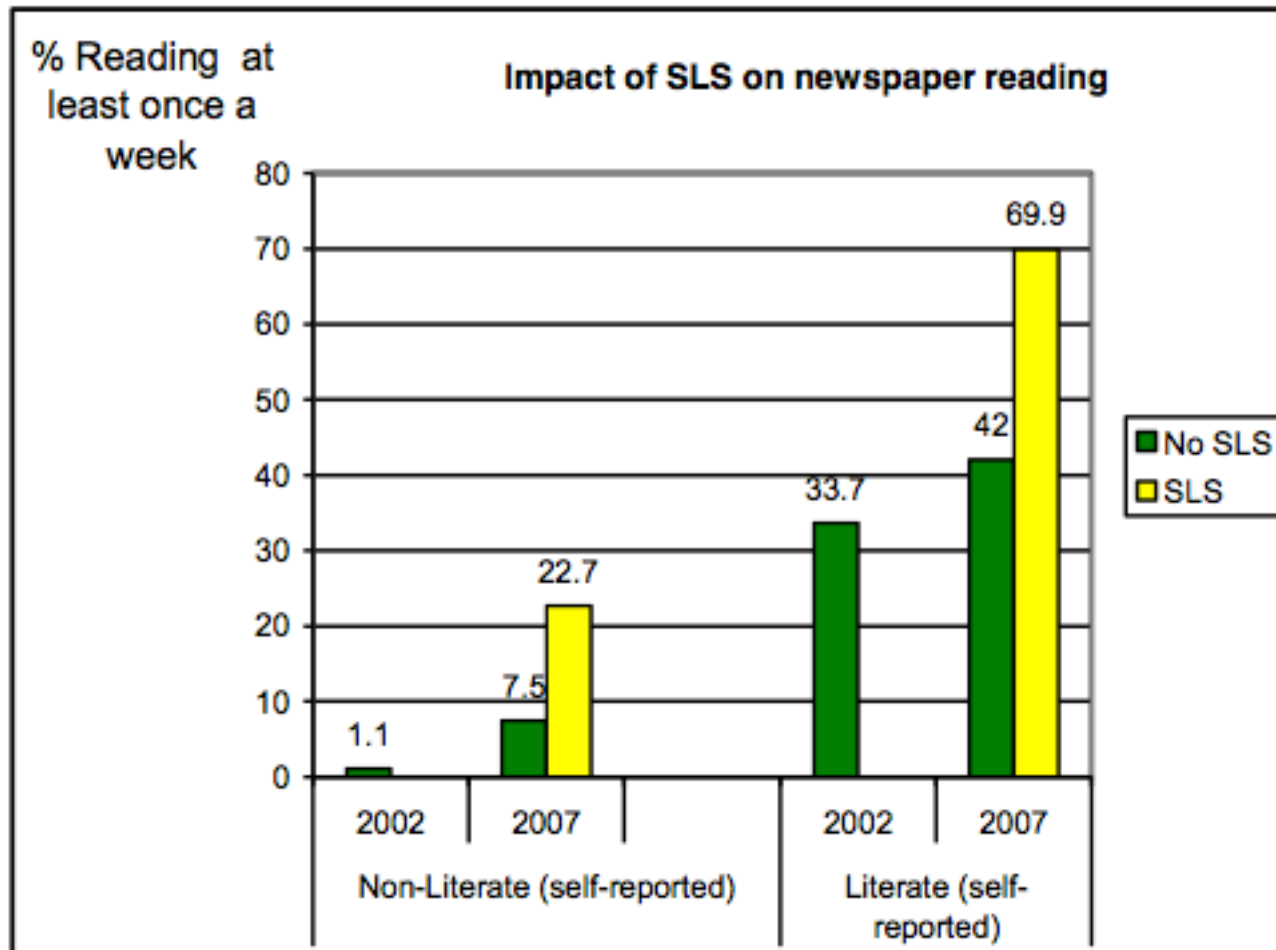
Planet Read

- Eye fixation:

No SLS : Eye-fixation on TV

Picture area

Subtitle area

With SLS : Eye-fixation on TV
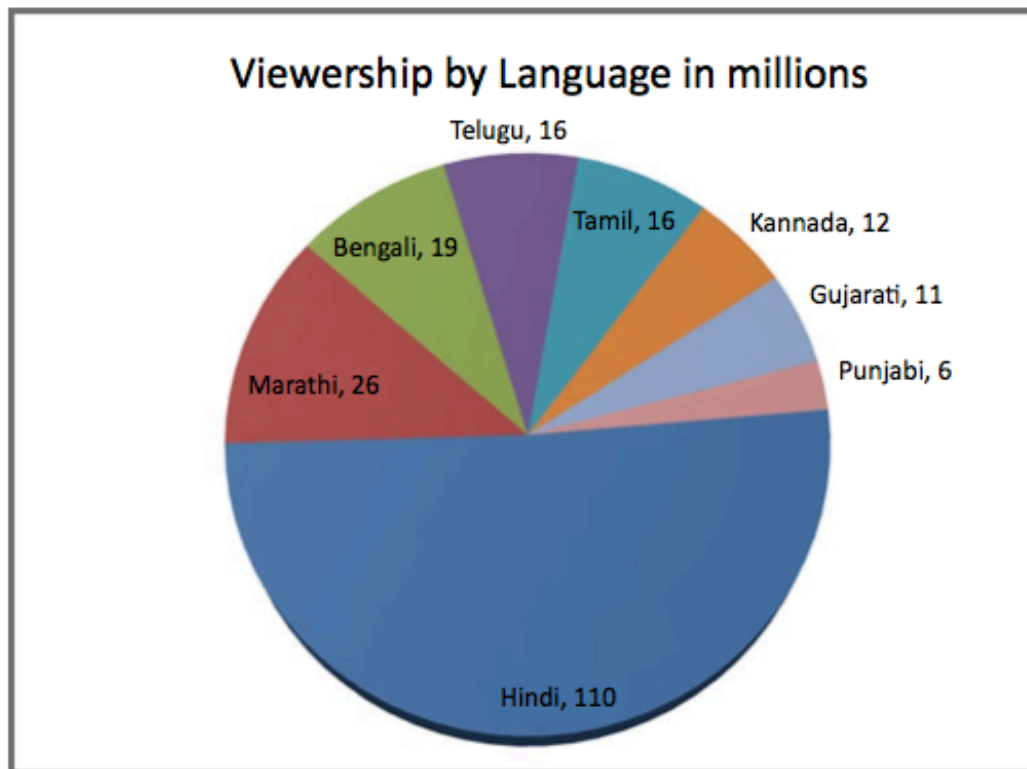
Picture area

Subtitle area
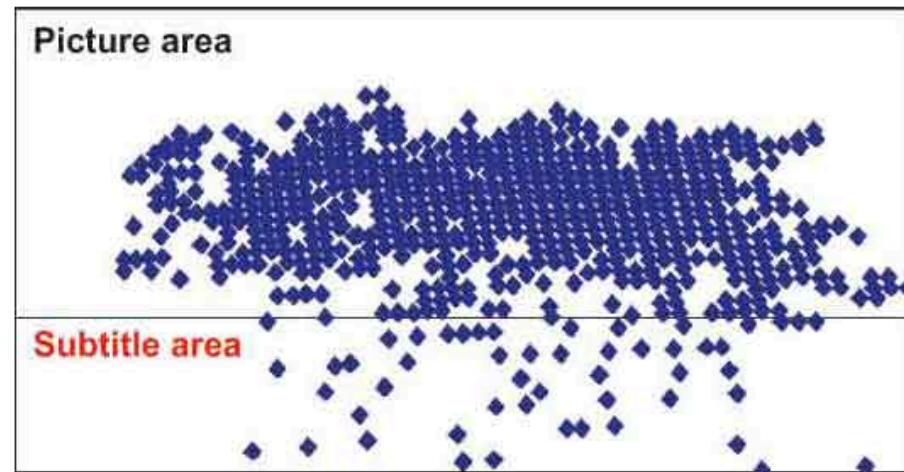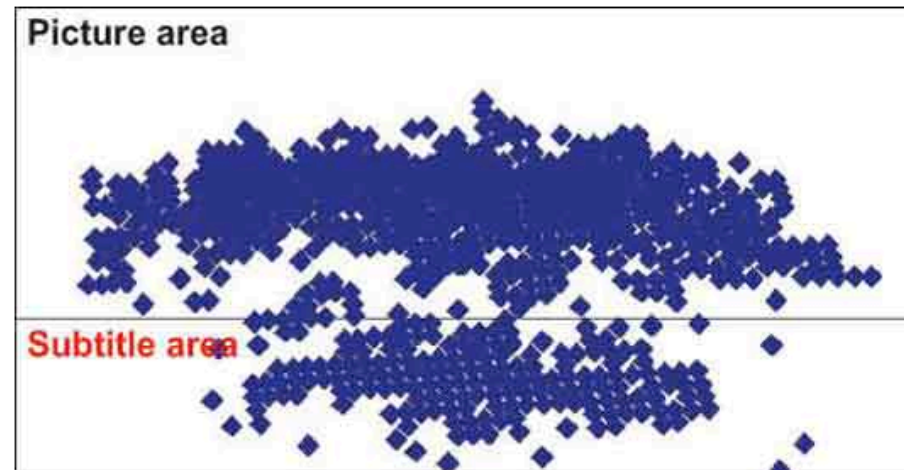
Planet Read

- Win-win:
  - SLS is preferred on song-based programming by 90% viewers.
  - When there was no SLS on Rangoli,
    - 27% reported to be regular viewers of the program.
  - With SLS:
    - 40%
  - Ratings of TV programs went up by at least 15% when SLS was added.
- Results
  - They are looking at it
  - They like it
  - And it improves literacy
  - For little cost
    - 5-20 paisa per person per year

Update today

- 9/2013: "The International Prize" a literacy award from Library of Congress, Washington, D.C., USA

In fiscal 2012, PlanetRead's SLS programs reached 216 million beneficiaries in eight languages, 42.3 million of whom were children. The program has grown by more than 56% since 2005.

Viewership by Language in millions

- Telugu, 16
- Tamil, 16
- Kannada, 12
- Bengali, 19
- Gujarati, 11
- Punjabi, 6
- Marathi, 26
- Hindi, 110

Graph source: http://www.planetread.org/pdf/Annual%20Report-PR-2012.pdf

Hole in the Wall

- http://www.hole-in-the-wall.com/

Dr. Sugata Mitra

- Chief Scientist at NIIT
  - (NIIT: An IT solutions and service company)
- 1999: Carved a "hole in the wall" of the back of the NIIT offices adjoining a very poor area of Kalkaji, New Delhi.

Sources

- Mitra, S. and Rana, V. (2001). "Children and the Internet: Experiments with minimally invasive education in India", The British Journal of Educational Technology, 32(2), 221-232.

- Mitra, S. (2003). "Minimally Invasive Education: A progress report on the "Hole-in-the-wall" experiments". British Journal of Educational Technology, 34(3), 367-371.

- Mitra, S. (2005) "Self organising systems for mass computer literacy: Findings from the 'hole in the wall' experiments " International Journal of Development Issues 4(1), 71 - 81

- Mitra, S. and Dangwal, R. (2010), Limits to self-organising systems of learning—the Kalikuppam experiment. British Journal of Educational Technology, 41: 672–688. doi: 10.1111/j. 1467-8535.2010.01077.x

Enclosure

- Brick structure
- Glass-covered "holes" show computer monitors
- Metal lid covers each monitor, keyboard, mouse combo
  - Sun shade during operational hours

Adult proof

- Height of monitor and lid requires adults to stoop

- Keyboard protected by cowl requiring small hands

- Designed to ensure children (<13) have priority access

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Adult proof

- Seating close to the wall
- Uncomfortable for tall people

Enclosure

- Building arranged so screens face north-east
  - To avoid sun glare
- Placed in safe, public locations
  - E.g. playgrounds
  - Where screens visible to passing adults
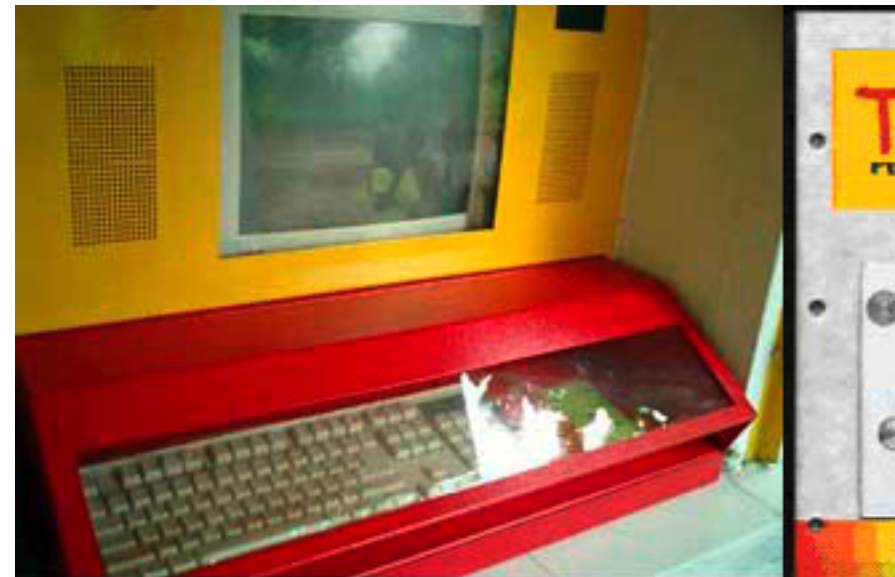 - Minimizes vandalism, theft, accessing pornography, etc.

ToBu Mouse

- Has no moving parts

- Six metal circles (touch buttons) embedded on a plastic plate
  - Two top buttons for left and right click
  - Four buttons below for cursor movement
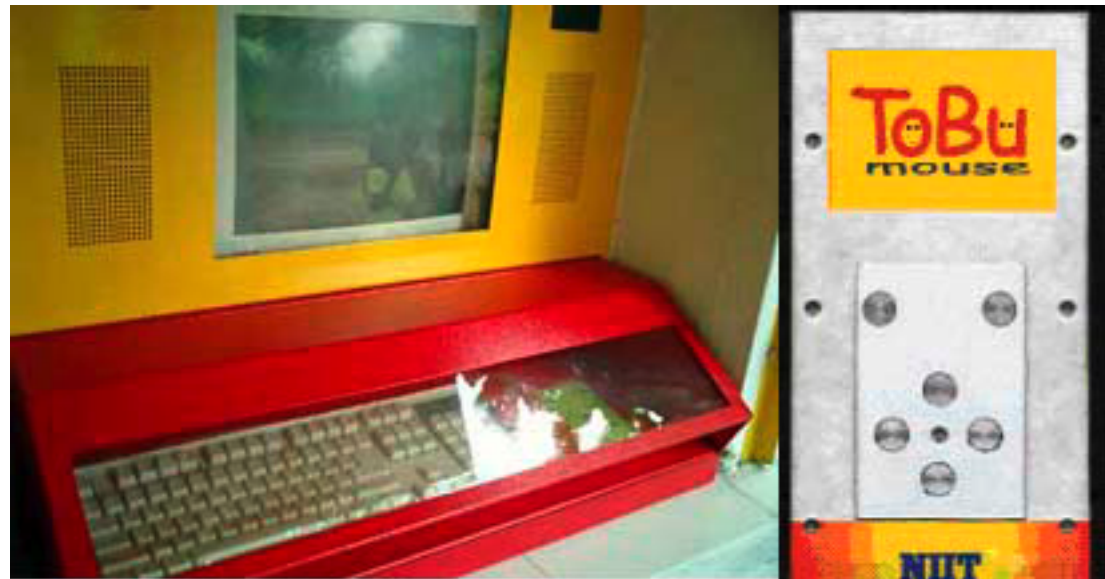
Keyboard

- Keyboard covered by a cowl to protect from dust
- User inserts hand under cowl
- Opening below cowl only big enough for small hands

Software controls

- No essential software or data can be deleted or renamed

- Desktop icons can not be deleted

- Unused programs are automatically closed.

- Computer automatically reboots on hangs

Learning research results

- Minimally Invasive Education
  - A pedagogic method that uses the learning environment to generate an adequate level of motivation to induce learning in groups of children, with minimal, or no, intervention by a teacher.

- In a controlled studies
  - Children develop basic computer literacy
    - Much better than students with no instruction
    - Almost as well as students with formal classes
    - For more: See http://www.hole-in-the-wall.com/Findings.html

Replication

- Playground Learning Stations
  - India
  - Bhutan
  - Cambodia
  - and countries in the African continent.

SOLE and SOME vs Schools

- Self Organized Learning Environments
  - Students working on their own
- Self Organized Mediated Environments
  - Working with a "grandmother":
    - "That's impressive dear, tell me more."
- Research question:
  - Could Tamil- speaking children in a remote Indian village learn basic molecular biology in English on their own?
  - Could a friendly mediator with no knowledge of the subject improve the performance of these village children?
  - How would the learning and test scores of these children in a remote village compare with those of children who were fluent in English and taught by subject teachers in a local state government school and those attending an affluent, private urban school?

Source: http://solesandsomes.wikispaces.com/file/view/fulltext+SM+Kuppam+BJET.pdf

Research Methods

- Identified a rural village, with a Hole-In-The-Wall, English is taught, but not used, and adults would have little to no knowledge of molecular biology.
- Control and experimental groups
- Pre and post tests
- Downloaded material to the Hole-In-The-Wall concerning molecular biology
  - See example: http://learn.genetics.utah.edu/
- Prompt: "There is some interesting new material on the computer, it is in English and it may be a bit hard to understand, but will you take a look at it?"
- 75 days of unsupervised time.
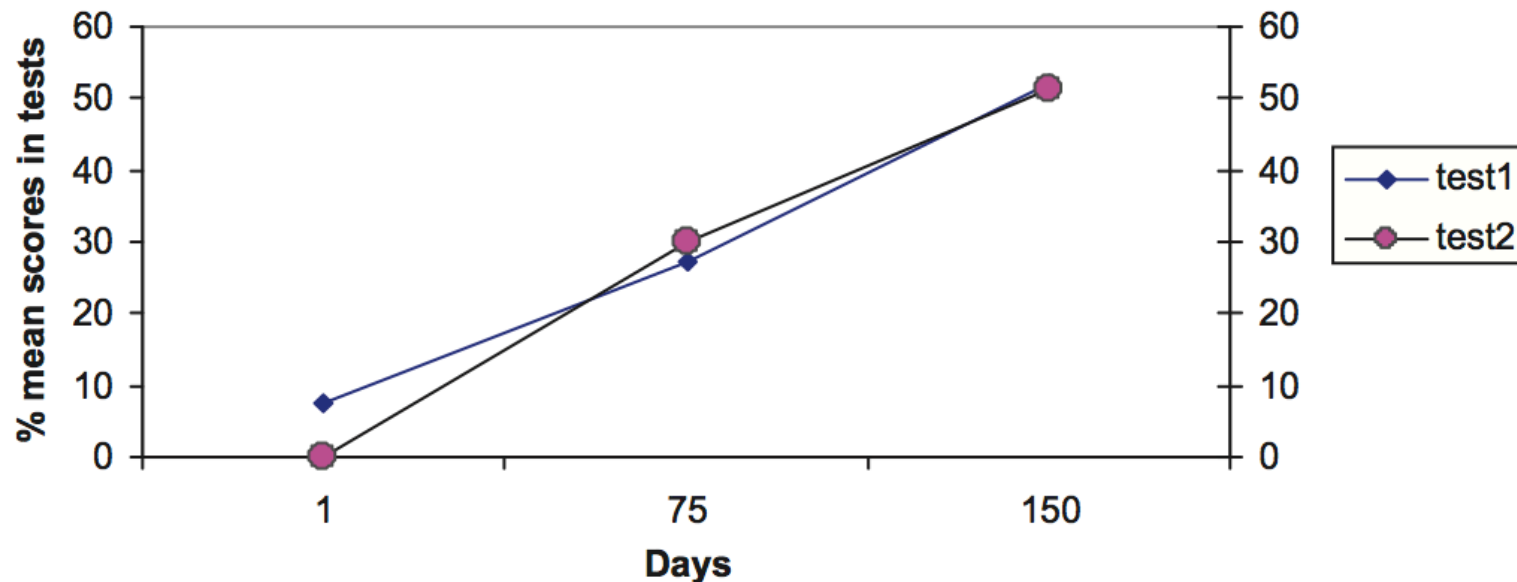- 75 days of mediated time.

Venue

Figure 2: Young and old using the Hole-in-the-Wall kiosks in Kalikuppam village

Sample test question & Results

12. There is a biological molecule given to you. The number of $A + T = $ Number of $G + C$. Identify the most likely molecule:

a) RNA ☐
b) tRNA ☐
c) DNA ☐
d) MRNA ☐

No instruction between day 1-75, mediated between day 75-150

Figure 4: Progress of unsupervised students followed by friendly but not knowledgeable mediation
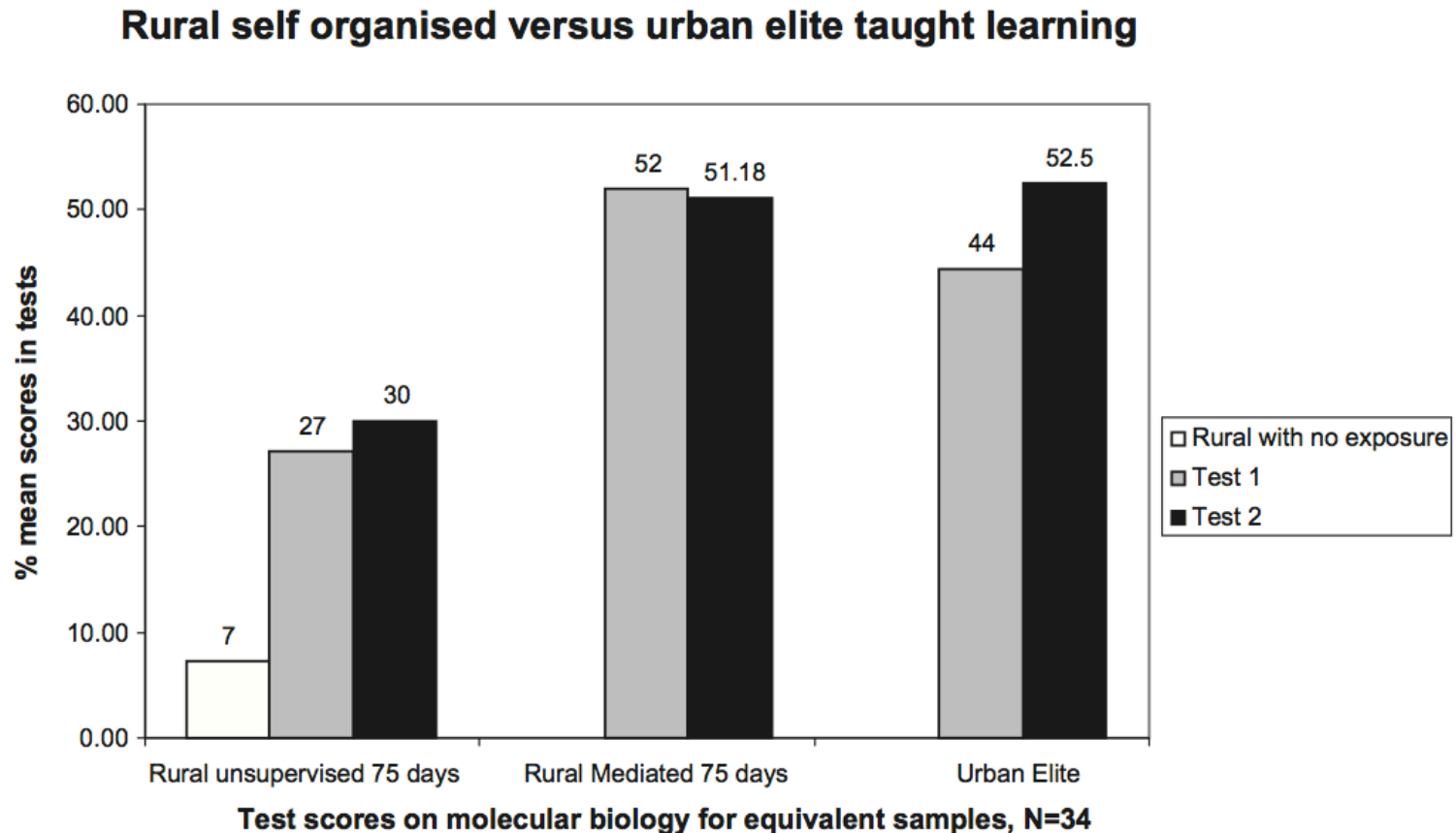
Results

Figure 5: Progress of unsupervised, then mediated learning, by the disadvantaged but self-organised rural children compared with urban, elite and taught children. The score 7 on the left is the baseline score in the Kalikuppam sample and is attributed to random guessing

Local research

- A local organization, ComputerReach, is working with Dr. Mitra on an experiment in which recent Bhutanese immigrant children "mediate" their parents learning of English.
    - http://computereach.com/blog/cj-and-sole/

Side notes...

- Vikas Swarup, the author of Q & A, which led to the Oscar-winning movie Slumdog Millionaire:

  "I was inspired by hole-in-the-wall project, where a computer with an Internet connection was put in a Delhi slum. When the slum was revisited after a month, the children of that slum had learnt how to use the Internet. I realised that there's an innate ability in everyone to do something extraordinary, provided they are given an opportunity."

  - Source: http://www.indianexpress.com/story-print/1080891/

  - Also see video:
    - http://edition.cnn.com/video/#/video/world/2009/02/22/sidner.india.slumdog.inspiration.cnn?iref=videosearch

- Dr Sugata Mitra won the 2013 $1 million TED Prize
  - Source: http://www.ted.com/pages/prizewinner_sugata_mitra

LINCOS

- "Little Intelligent Communities"
- Source:

   The Missing Piece: Human-Driven
      Design and Research in ICT and
      Development by Brand & Schwittay

- Used shipping containers as telecentres
- Dropped into formerly unconnected villages in Costa Rica
- Opened to great fanfare in August 2000
- Closed by November 2002

LINCOS

- Why was it not sustainable?
  - How the project was initiated?
  - How it was implemented?
  - That sustainability was not built in from the beginning?
  - That recycled shipping containers have a negative cultural stigma?
  - We will likely revisit LINCOS in the next few weeks
    - By the end of the course, you will be familiar with the pattern of unsustainable methods, and sustainable ones.

T4D

- Syllabus
  - Requirements
- Schedule
- Wiki:
  - Where to find it
  - How to edit