The Digital Studyhall: Revolutionizing Education in India

Saurabh Panjwani

September 28, 2006
Perils of the Indian Education System

Public education in India is in a mess...

- Lack of Resources
  - Too many children; too few teachers. Even fewer “good” teachers.
  - Poor Infrastructure. *Half the schools don’t even have provision for drinking water* [Sai96, Bas04].
  - Myth: Parents don’t want to send their kids to school; Reality: There are no good schools at all! [Dre98]
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⇒ “Good” Education is accessible to a minority of the Indian populace.
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  - Teacher Truancy: On any given day, one-fourth of public school teachers are expected to be absent. [Bas04]
    - India’s record is one of the poorest; e.g., truancy rates in Bangladesh and Zambia are 16% and 17%.
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⇒ Even where kids want to learn, they can’t do so.
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- **Lack of Resources**
- **Poor Accountability**
- **Other Factors**
  - *Poverty*: Education is free on paper, not in practice. [Dre98]
  - *Social Stigma*: More girls dropping out of schools than boys.
  - *Skewed Govt. policies*: Part of public education funding goes towards subsidizing private schools. [Sai96]
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- The first problem is the most “approachable” of them all; let’s try and solve it first!
Solving the Resource Problem

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Let’s make use of technology!
When you hear **education** plus **technology**, you think **distance education**. So did our Government...
Satellite-Based Distance Education

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- Launched by ISRO in 2004; receiver installation complete at over 400 sites across India.
- Most of the installation in universities/colleges; unclear how many rural schools are receiving Edusat data.
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Pitfalls of Satellite-Based Education
When you hear *education* plus *technology*, you think *distance education*. So did our Government...

**Pitfalls of Satellite-Based Education**

- **Inappropriate Communication Model:** Communication is inherently *sender-driven*.
  - Receivers cannot *pause* or *rewind* a lecture.
  - How much can a kid *assimilate* from a live, non-interactive digital feed?
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Pitfalls of Satellite-Based Education

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  - Receivers cannot pause or rewind a lecture.
  - How much can a kid assimilate from a live, non-interactive digital feed?
- **Expensive:** Is the cost of installing worth the benefit?
  - Need receiver terminals in all villages.
  - As bandwidth demands increase, will need more satellites ⇒ more investment.
The Digital StudyHall (DSH)

Basic Philosophy:

- Make educational content available to low-resource schools in a cost effective and assimilative manner.
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▶ Pause-and-Resume: Unlike satellite-based distance learning, DSH enables receivers to pause and replay videos.
  ▶ Kids assimilate better if they can pause, and ask questions.
  ▶ No interaction with real lecturer; but a step in that direction.
DSH Methodology
The Hub-and-Spoke Model

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- Hub schools are more resourceful (better teachers). Hubs peer with each other via central repository; e.g., lessons recorded in Lucknow could be displayed in Pune.

- Spoke schools in villages/urban slums; regular in-person interaction between a hub and its spokes—some level of administrative control, plus frequent teacher training sessions.

- Each hub free to implement its **own policies** for content distribution to spokes.
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- Lectures are typically sub-titled for helping teachers (who play the video) with poor background.
### A Snapshot of the repository

http://dsh.cs.washington.edu:8000/Projects/StudyHall_D...

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>English Std 5: Birdie Poem</strong></td>
<td>English poem &quot;Birdie&quot; for std 5 lecture: English, 208MB, 0:30, for class: 5, alias: MkBirdiePoem, uploaded by: pune.</td>
</tr>
<tr>
<td><strong>Maths Std 5: Place Value</strong></td>
<td>Introduction to place values in number system. lecture: mathematics, 150MB, 0:20, for class: 5, alias: S5sPlaceValues, uploaded by: pune.</td>
</tr>
<tr>
<td><strong>Science Std 5: Digestive System</strong></td>
<td>A introduction to the human digestive system. The requirement for energy that is got from food. lecture: science..., 211MB, 0:30, for class: 5, alias: VsDigestive, uploaded by: pune.</td>
</tr>
<tr>
<td><strong>Hub administration tutorial at Pune</strong></td>
<td>Randy talks to Zareer about how to manage various aspects of the Pune hub staff training, 32MB, alias: PuneTutorial, uploaded by: pune.</td>
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- Project led by Randy Wang, ex-professor at Princeton, now working full-time on DSH.
Content Delivery Techniques

Technique 1 — Watch and Replicate

Spoke school teachers can watch the recorded lessons and improve their own teaching ability.

▶ The Mohan Experience: Mohan, a public-school teacher in a village near Lucknow, used to be a slacker. His job was to teach English, even though he could barely speak any English himself. The DSH videos not only improved his English, but also helped him become a more effective English teacher.
Content Delivery Techniques

Technique 2 — Mediation-Based Pedagogy

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- **TV group** (watches recorded lectures passively)
- **interactive TV group** (same as TV group but can also talk to teacher over phone)
- **TVI group** (watches recorded lectures in the presence of a facilitator, who pauses video and instigates discussion and problem solving amongst the students intermittently; no interaction with teacher)
- **live group** (teacher delivers lecture in class; kids can ask him/her questions directly)
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Finding: Quite counter-intuitively, the TVI group outperformed all other groups; not once, but in a series of experiments.
Content Delivery Techniques
Technique 2 — Mediation-Based Pedagogy

The TVI Experiment: The TVI — Tutored Videotaped Instructions — was a research experiment conducted in Stanford in the 1970s.

- Highlights the importance of learning from peers. (Learning is a social concept!)
- Good mediation is the key—the facilitator need not be an expert on the subject (like the teacher) but should instigate discussion actively. (Experiment fails with a disinterested facilitator.)
- Could the TVI experiment work as well in Indian public schools as in Stanford? DSH is finding out...
  - Signs are quite positive, e.g., class participation in village schools has increased significantly.
  - For sure, good mediators are easier to make than good teachers.
Content Delivery Techniques
Technique 3 — Peer-to-Peer Pedagogy (PPP)

- Can kids be effective mediators themselves?
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The Sandhya-Paul Experiment: At the Bangalore hub, two DSH folks, Paul and Sandhya, experimented with the idea of having a kid lead discussion in class, with the help of a taped video, *in the absence of the teacher.*
Content Delivery Techniques
Technique 3 — Peer-to-Peer Pedagogy (PPP)

- Can kids be effective mediators themselves?
- **The Sandhya-Paul Experiment:** At the Bangalore hub, two DSH folks, Paul and Sandhya, experimented with the idea of having a kid lead discussion in class, with the help of a taped video, *in the absence of the teacher.*
- Sounds like a chaotic model, but if it works, we’ll be golden!
  - (Potential solution to the teacher truancy problem; We don’t need no teachers!)

...Play Paul’s documentary at this point.
Going Beyond Textbook Education

Other interesting applications of the DSH model:

➤ **Science experiments** conducted by AID in rural schools in Tamil Nadu are being recorded; plans to replicate them in DSH schools.

➤ **DSH is going green!** Plans to record **farming lessons** and distributing to farmers in remote villages. First set of recording already taken place!

➤ The ultimate goal is to build a **learning eBay** — a portal of lessons on primary education, farming... who knows what’s coming next!
DSH folks have a penchant for creativity (sometimes wildly so). Some ideas that have been discussed on the DSH forum:

- **Using XBox**, coupled with remote controllers, to make communication between spoke school receivers and lecturers interactive.

- **Pedal-powering village schools**: Electricity is scanty in Indian villages; and they need electricity to view DSH content. Can we generate electricity locally (within school premises) using, say, **pedal-based generators**? (Already implemented by Mazgaonkar et al. in Gujarat!)
To Conclude...

- DSH is a concept **not about distance learning**, but one that is **far above it**. There’s a lot happening in the system beyond the passive transmission of education content from one end to another.
  - We should feel fortunate that DSHers have chosen India as their testbed for experiments!
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- **Solid foundational principles**: Technology is just a **tool** in reaching a much more general goal. (Recall the magic nail soup!) The more important part of the system are **people** (and their work ethics).
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- **Defining new trends in education:** Mediation-based and Peer-based Pedagogy are attractive ideas; could have a long-lasting impact on the way we think of education.
Kaushik Basu.
Combating India’s truant teachers.
Article In BBC Online.

Jean Dreze.
Elementary education in India: Myths and reality.
Survey conducted by Centre for Development Economics, Delhi School of Economics.

EDUSAT’s Official Website.

Rahul Karmakar.
Teacher at 11, gets the boot at 18.

P. Sainath.

*Everybody Loves a Good Drought.*
From the DSH discussion lists.

- **Before (March 10th, 2006):** He (Mohan) had a showcase demo lesson that he’s really good at. It blew me away when I first saw it. This time, despite his objections, we insisted that he did a non-showcase lesson that we picked. He elected not to use our contraption and tried to do it on his own. It was an extremely embarrassing performance.
From the DSH discussion lists.

- **After (March 31st, 2006):** At Madantoosi, Mohan way exceeded everyone’s expectations! First, he did a well-rehearsed lesson without the contraption. We then forced him to do a second un-rehearsed lesson with the aid of the contraption. Tanuja and I fully expected him to fall flat on his face to make a point about what happens if one doesn’t prepare. Contrary to our expectations, he aced it!

- Between March 10th and March 31st, Mohan spent time watching the DSH lessons, practising by himself. Eventually, his confidence in English teaching improved and so did his English.
From the DSH discussion lists.

- **September 4th, 2006:** Then we (Paul and Sandhya) walked upstairs, and noticed that there was an unattended class. The class was yelling and screaming and kids were running all over the place when we saw them. We decided to try an experiment on the spot. This classroom was sitting next to the empty classroom that houses the DSH content/TV/DVD player...
... First we took the star-student, the one that was mediating the class since the teacher was absent and we had her sit and watch part of a lesson in Kannada on Roman Numerals. The room that houses the TV set was the room next door to this class. She sat quietly and seemed pretty interested. Then we brought 10 more kids into the room, and again they quietly sat down and started watching the fun educational games happening on the TV. We watched, and I talked to Sandhya...Let’s bring in the whole class now (about 60 kids), and we’ll leave them alone and see what they do...
From the DSH discussion lists.

... We brought them all in, and they all started listening. Sandhya then mentioned to them that if they want to respond to the teachers questions they can respond as well. Immediately they started screaming the responses, just as the kids did during the live lecture. We left them, watching them and taking some pictures for another 10 minutes or so, and then I asked Sandhya if she could ask for a volunteer that would be willing to try and give this lesson himself/herself. Sandhya thought that would be a cool thing to try, so we asked and a girl stood up and said that she think she could teach the class to play that game, if she could have the TV running at the same time. We thought that would be great.