Digital StudyHall

Experience of Technology Development for Improving Rural Education in India

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Some “alums”

Paul Javid
- UW
- 2006-2007
- UC-Berkeley (MBA/MPH)

Kurtis Heimerl
- UW
- 2007
- UC-Berkeley (PhD)

Ronak Parikh
- Tufts
- 2008
- Columbia (MPH)

Sumeet Khullar
- IIT-Delhi
- 2009
- IIT-Delhi

Anna Spessard-Mulhair
- UW
- 2008-2009
- (to apply)
Found live workshops very helpful

- But can only be done very infrequently
• Mostly one-way transmission of videos
• No systematic and prompt feedback

• No systematic peer-to-peer exchange
Making DSH a truer “network”

- For sharing experiences, advice, feedback, encouragements, trouble-shooting tips
- Reduce sense of isolation, foster sense of a larger caring community, provide opportunities of continued professional development
- Not just for “sermons” from above, but truly “owned” by all
- All-to-all communication: systematic, prompt, convenient

Similar need for other applications

- Lokarpit: HIV/AIDS awareness program along highways
- How do we do systematic follow-up with audience?
- How do we allow audience to share with each other?
Teachers leave “voice mails”  
Voice stored in a hub database

• Hub staff accesses voice database  
• Serves as a “moderator”  
  – Or like Google News—an “aggregator”  
• Answers questions, makes new broadcast messages, designates peer-shared messages, etc.
• Teachers hear broadcast messages, shared peer messages, personalized replies, etc.

• Systematic all-to-all communication
How is this better than X?

- Why not just regular cell phone calls, answer machines, call centers, conference calls, ...?

- Examples
  - A question, answered by an expert, re-broadcasted to everyone
  - A comment, made by one teacher, shared with everyone else, generates more followups

- Time-shifting (asynchronous), sharing, re-use (with database indexing, searching, linking, etc.)

Connecting the phone system to the Internet

- Data and system features also accessible on the net
- Staff working from home or traveling
- Partners in US
- A rural teacher in India is effectively “on the net”
Built with open-source components

- **Digium ISDN line card**
- **Linux (Ubuntu)**
- **Asterisk**: open-source PBX framework
- **Django**: database-driven content management framework
- **Red5**: flash streaming server
- 15K lines of **Python**

**Features**

- Net integration: bridging between VOIP and regular phones, email
- Distributed support: mirroring, selective dump and restore, live backup machines
- Modes of adding voice: upload, record, reply, VOIP, regular phones, ...
- Modes of hearing: call in, auto-dialed, broadcast, personalized, peer-shared
- Permissions and privacy
- Key word indexing, searching, threading, linking, ...
- Browser integration: hear, record inside your browser
- ...

http://dsh.cs.washington.edu:8080/admin
Proprietary vs. open-source PBX

- Flexibility, customizability
- Scale: experimentation and deployment
- Cost
- Open standards

Proprietary development:
- Needs telco blessing ($$-driven)
- Hard to do small-scale experimentation
- One size fits all
- Opaque
Proprietary vs. open-source PBX

- Open-source PBX development:
  - Can do it yourself
  - Easy small-scale experimentation
  - Extreme local customization
  - Responsive, quick changes
  - Transparency (data, protocol)

Proprietary vs. open-source PBX

- Decentralized development
- Networked
- Analogy: “poor men’s web servers”
Fringe—low-tech: cheap, practical, simple, easy-to-use, plentiful devices
Core—high-tech: small amount of more sophisticated hardware and software embedded in community centers, with database, logic, better trained staff
“Dumb” fringe devices no longer so dumb—they become “terminals” of a coherent network (“the cloud”)
A more practical infrastructure for reaching the people
Support for community-generated content
“Internet without the Internet”

- Fringe—low-tech: cheap, practical, simple, easy-to-use, plentiful devices
- Core—high-tech: small amount of more sophisticated hardware and software embedded in community centers, with better trained staff
- “Dumb” fringe devices no longer so dumb—they become “terminals” of a coherent network
- A more practical infrastructure for reaching the people
- Support for community-generated content

Working with teachers
Example design issue 1: keep it simple

- Typical IVR systems
  - "press 0 for X, press 1 for Y, etc."
  - Too complicated
- Make the user experience really simple
  - A call = listen + record
  - The system knows: your number + your entire call history
  - The system "guesses" the “best” thing for you to hear
  - Each message must be short and interesting

- For example:
  - Members of different caller “groups” get different responses
  - If others have recorded a message in response to you, you hear that
  - If you have recorded a message, you hear it played back to you
  - If you have heard >60% of a message, you won’t hear it again
  - ......
Example design issue 2: who calls?

- Trial 1: the system calls
  - Free to teachers, but most don’t pick up, not convenient for callees
- Trial 2: ask the teachers to call
  - Call cost significant for teachers, not easy to reimburse
- Trial 3: hand out designated “school phones”
  - Who keeps the phone where? Not convenient
- Trial n: the system calls but teachers specify times
  - Free, convenient, hard to forget, works great!

Stats

- Stats kept since August, 2009
- About 80 teachers
- From 9 schools
- Total calls: 2,000
- Recorded messages: 272
- Total call duration: 257,000 seconds
- Total recorded duration: 46,000 seconds
I want to express my views on Siya Ram ji’s messages. I feel that a lot is being done for teaching girls by various organizations but all of it is a waste until everyone understands the simple idea of educating girl child. Like Siya Ram ji said that girls should get educated and work for a better domestic life. A girl’s responsibility stretches out to the outside world and is not just confined to four walls of her house. Development of our society and our country is not responsibility of boys alone girls have equal share. Girls are equal to boys in the eyes of law but somehow we have a mental block about girl’s stature. I heard Sharda ji’s message where she says that ‘if we make weak students sit with sharp ones, weak students shy off and stop coming to school’ and I heard a similar message by Shazia. I feel that both these messages are related to each other. I feel that we lose track of capacity of student when we teach them. Definitely the capacity of student can be inflated slowly and patiently. We should encourage student again and again, We should encourage them for whatever they are good at be it sports, singing, drawing. Ask question keeping standard of the student in mind. and mould them for learning. I heard Urvashi auntie’s message too, She said that we should split the class in small groups which is a very valuable suggestion, and this is something that we do in our school, Vidyasthali. But even we face problem. When a weak student realizes that he is being taught lower standard course, and rest of the class is learning something else, he is driven out and gets distracted. I feel that we should prepare a mental frame for student first, they should be ready and open to learning.

—Pratima, Vidyasthali, 10/16/09.

http://dash.cs.washington.edu:8080/admin/db/item/?dash_uid_exact=091016_112032_74256983
Girls are sent to school and as soon as they finish class 7th or 6th they are married. Sometime last year a girl from 8th class was getting married. When we got the news we went to that girl’s home and talked to her parents. And we were able to stop the marriage for a couple of years. My point is that when ever we see any such problem around us in our school, then we should take a step forward and talk with guardian. In our case we notice that marring girl when she is fairly young is very trivial. It is something that runs in family though generations. It is our responsibility to educated them. If we understand why a girl should not be married at young age then we should not only explain it to our student but we should also reach out to parents. We have heard about cases where girls have to go through awful experiences after marriage, only if the girl is well educated it would help her to stand on her feet. We need to spread awareness about it.

—Shazia Khan, SEWA, 10/20/09.

I agree with Urvashi Auntie, But it is very difficult to talk to parents. Even if we tell them that a girl should only be married when she is 18 years old. Parents feel that we are corrupting their kid. The other thing is that ours is not a school its just a centre. This is harvest time and we have very low attendance, especially girls. And I am very sure that by the time they come back they would have forgotten everything taught in the class. Girls want to study but they get to work on Rs70 daily wages and that gets in the way of studies. We also have problem with the electricity, because of which laptop is not working. I request Pratyush sir to please look at it.

—Kanta, BETI-Barabanki, 10/21/09.
The country we live in considers girl as ‘Paraya Dhan’ (which is to say ‘She ultimately belong to other family’), Kanta ji never told the age of her students which is a very important factor in this case. If girl's age is 18 or more then it is totally legal for a girl to get married. otherwise its illegal and unacceptable. Kanta ji said that she gets a fresh batch and she need to start over every time, I feel that this is true with every school. Marriage is not the only factor for children to move out of school. children complete their studies and move out of school and we have to work with a new batch of students our self. Talking about girls, they add more value to our nation than male section of society. Girls always ahead, specially in studies. Everyone gets married and the girls have to get married too. An educated girl has to get married too. We educate girl so that she can stand on her feet and face the world if she has to, So that she can take care of her responsibilities and discover her individuality. Take care of her parents if she has to. Taking care doesn't necessarily mean to be inside 4 walls of the house. A girl can support her parents financially too. I feel the institution of marriage is not to be blamed here, Everyone gets married rich and poor. We need to remember that their is a age limit for marriage. Urvashi auntie said that in their school they make parents sign a bond, we can not make parents sign a bond as we are from rural area, but we can definitely hold meetings and spread awareness about this issue. Families from rural areas consider child girl as ‘paraya dhan’, and they don't understanding of modern ways of life. If a girl is seen talking to a boy in the village then she is considered corrupt. People from rural areas have a fear of girl engaging in relationship. These are some of the major factor for a girl to be married early. We can be a messenger and spread awareness.

—Praveen Shukla, Education Academy, 10/26/09.

Example messages

I hadn't heard the 'girl education' discussion and I just heard all of them. and I agree to what Urvashi ma'am said that girls have to work a lot with their mothers. Our school is in rural area and we have to deal with such problem. Say a girl argues with her mother to come to school, then the mother would come to school and request school to let go of her daughter. Mothers would emotionally blackmail us by saying that we wont be able to survive without our daughter's working hands and we will starve. But at the same time parents do not stop boys from attending school. Girls would not only help with the house work but also take care of her siblings as for boys they work in field but parents would always want their boy to go to school and work for a better future. As for girls they would get married and move away. We talk to parents and they do get convinced but they later succumb to financial and social forces. And they marry their girls at a very young age. But I do see that now more than ever parents do want their girls to be educated. These days most of the guardians want to teach their girls. Their are many successful government programs running too, like Jyoti Bai Phule program where girls are given Rs 15000. School uniform and a bicycle. I see that these days girls are more rapid learner as compared to boys, they are always ahead.

—Sharda Singh, Madantoosi, 11/03/09.

http://dash.cs.washington.edu:8080/admin/db/item/?dash_uid__exact=091103_111448_12220530
Example messages

These days our scout guard team of girl students, they are participating in a rally in sitapur. Umesh ji and my self were keeping busy for the same last few days. And I was not able to reply on voice system because of this. I feel that the voice system is very valuable, it brings about awareness and a spirit of competition among students. Its a place we were get to hear ideas from other people. We get to hear how others are dealing with there problem. Topics like girl education are never talked about out in the open, I was very happy to see it on voice system. I asked a question if teachers can participate in singing competition. I would love to see teachers activities on the system.

—Avanish Kumar Shukla , Gangaganj, 12/16/09.

http://dash.cs.washington.edu:8080/admin/db/item/?dash_uid=091216_190213_69009558

Future

- Health applications
- More fringe devices (radio)
Conclusions

• Make “Internet” without Internet: software-driven smart core + simple fringe devices
• Iterative design and adaptations for local conditions
• Work on non-technical aspects: pedagogy research, teacher training, bridging inequality, combating prejudice, …

Conclusions

• Make “Internet” without Internet: software-driven smart core + simple fringe devices
• The Internet is more than a tool, it’s a “philosophy”
  – Openness (content, code, protocol)
  – Sharing
  – Community-building
  – Grassroots self-help
• Let this philosophy blossom in the developing world!
Thank you!

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