The Digital StudyHall

The Digital StudyHall (DSH) project seeks to improve education for the poor children in slum and rural schools in India and Bangladesh. The educational opportunities available to these children today range from the very poor to the non-existent. In a nutshell, think of the technical approach of DSH as the educational equivalent of YouTube + Netflix + Kazaa. DSH stresses: (1) cost realism in a resource-constrained environment, and (2) solving end-to-end education problems, instead of narrowly focusing on merely the technological aspects.

1. Technology for Sharing Community-Generated Video in a Developing World Setting

A conventional “wire-the-school” attempt is simply not feasible for large-scale replication in rural India today or in the near future. Technically, what we would like to have is akin to a user-generated video sharing system. The question we face is how to build such a "Web 2.0" application without having to replicate the "Web 2.0" physical infrastructure in slums and rural areas of India and Bangladesh today.

![Figure 1: A peer-to-peer system for sharing community-generated video.](image)

A best example illustrating our approach is what we call the Postmanet, in which computer network packets normally placed on wires are now placed on DVDs transported by the postal system. On top of this low-level connectivity provided by the Postmanet, we build
the rest of the distributed DSH database in a way that is conceptually similar to how an existing peer-to-peer content sharing network works on the “real” Internet.

Figure 1 illustrates our end-to-end system. On the far left is a fleet of inexpensive digital camcorders serving as the eyes and ears (or input devices) of the system. They are shared among the DSH participants who contribute content into the system and, like rental cars, they may be constantly on the go. The resulting tapes are funneled to the nearby “hubs” for digitizing and uploading into the local databases, which communicate with other instances of the local databases at other hubs via the Postmanet and synchronize their content. (The DSH database is also connected to the conventional Internet as well so content can easily flow between the “DSH network” and the Internet.) On the far right, shared TVs and DVD players economically serve as the output devices of the system in slums and villages.

What Figure 1 illustrates is a “two-tier” model of connecting people in our system. In the center is a small “high-tech core.” The “core” is akin to “the cloud,” in Internet jargon; one difference is that the core here is embedded inside and run by the community. Outside the core, lies a “light-tech fringe,” which employs more practical, simpler, cheaper, and better-understood metaphors to allow our end users to contribute content and gain access to a “Web 2.0”-like repository. This approach can be seen as an extreme version of the “thin-client” model, tailor-made for a developing country setting.

2. A “People’s Database of Everything”

Using the system described above, we are enabling a community of volunteers to build several digital video databases. One is a comprehensive K-12 curriculum database for all the major languages in India. Compared to other education content production efforts, our approach has the following important unique characteristics. First, content creation in DSH is a community-based effort. The grassroots contributors to the DSH database include best teachers in middle-class urban schools, best teachers in rural schools, students, and other idealistic volunteers such as retired university professors, scientists working in government labs, college students overseas, and various NGO staff members. In short, the database is created by the people, and for the people. This approach has important scalability and local relevance implications.

Second, the DSH database is video-centric: our contributors film live lessons of model teachers in front of a real-life student audience. This approach is important for addressing a society with low literacy rate, effectively showcasing the “people skills” and “performances” of the best teachers, and cheaply and quickly producing a vast amount of content.

Third, the DSH database is (at least initially) populated by video lessons of curricula designed, sanctioned, and stipulated by the various state governments of India. This approach is important for us to gain easy acceptance and adoption by target schools, which by law or by choice, overwhelmingly tend to strictly follow official syllabus. At the same time, the adherence to official syllabus does not conflict with innovative teaching methods: our filmed lessons are all highly interactive and activity-based; they incorporate established educational principles; and our contributors, including middle-class peer students, produce a stream of complementary materials, such as digital stories, science courseware, and drama to further complement the content dictated by the syllabus.
3. A Network of Hubs and Spokes

DSH is not a physically centralized system. Instead, DSH is designed to work as a decentralized network of hubs and spokes. Each hub is a center of education excellence and the hubs themselves communicate with each other. The spokes are typically the under-served rural and urban slum schools. The hubs-and-spokes model is how we may effectively scale up the DSH system (Figure 2).

In addition to being a scaling vehicle, another important role served by the hubs-and-spokes model is ensuring content relevance for the target audience. Factors such as language, syllabus, and student background differences contribute to a big gap that makes a direct transfer of content between middle-class schools and under-served schools ineffective. To address this gap, we enlist the best teachers from the middle-class schools, but instead of filming their regular classes in front of the middle-class students, we film classes given to poor girls from the neighboring slums. This hybrid model combines the best of both worlds: top-quality teachers and an appropriate student audience.

Yet another way for a hub to accomplish scalable content production and ensuring its relevance is to involve the under-served spoke schools themselves in the content production process. Under this approach, explored in our Bangalore hub, we identify the best teachers in the village schools, organize them in a regular recording schedule, and the resulting content is shared with the other peer schools. Under this approach, the model village school teachers being recorded strive to learn and use the best methodology to put on the best shows they can, and the peer teachers who receive the content are inspired to match their best peers. This approach is perhaps an even truer manifestation of the philosophy behind the “People’s Database.”

4. Mediation-Based Pedagogy
The principal means of disseminating the content in the DSH database is shipping DVDs to spoke schools. Each spoke school is given at least a TV and a DVD player. (We are also working with engineers on electricity generation schemes for schools that have no grid access.) Put simply, “mediation-based pedagogy” refers to the need of placing a teacher (or a “mediator”) in between the students and the TV (Figure 1(a)). The mediator periodically pauses the video and engages the students in various activities based on what has just occurred on TV. These activities may include asking questions, inviting kids to do board work, and organizing role-playing activities. The mediator’s job is to make his or her class as lively, dynamic, and interactive as the one conducted by the model teacher in video. In effect, the video and the mediator form a “team:” the video provides an example, a framework, a lesson plan, and a content and methodology model; while the mediator, who may not be particularly knowledgeable about a certain subject, supplies the crucial interactive element.

Another variation of the theme is “peer-mediation,” the approach of enlisting the brightest fellow students to serve as mediators during periods when the local teachers are absent (Figure 1(b)), which are common occurrences in government schools in India. The student leaders typically display a high degree of responsibility and enthusiasm, and a different social dynamic of peer-mediation can play an effective complementary role.

Yet a third way the DSH database can benefit the spoke schools is helping train the teachers of the village and slum schools. In traditional teacher training workshops that last just a few days, the short duration necessitates that the topics covered must be kept at an abstract level, and it is not always clear how such abstract principles should relate to the daily topics to be taught. In DSH, the videos carried home by the participating teachers provide an ongoing and highly specific training, as these teachers get to observe and learn from the model teachers in videos day in and day out, during either mediated sessions in class or private review sessions outside class.

Therefore, the focus of DSH is not to replace people with technology; instead, it is about amplifying the reach and the power of the relatively small number of the skilled teachers, and to train and empower the less skilled teachers. In this sense, DSH is foremost a “people system,” not just a computer- or network-system.