

# Case-study in Computer-Based Learning: Hole-in-the-Wall Schools



## Overview:

Hole-in-the-wall Learning Stations seek to create a new paradigm in the learning process by providing unrestricted computer access to groups of children in an open playground setting. We believe that such an open setting will use child's natural curiosity to stimulate learning.

## Challenge:

Traditional Computer Based Learning (CBL) methods typically rely on one-way transmission of information. These methods are seen as extensions of classroom learning and thus viewed by children as restrictive. Consequently, results from such CBL initiatives have, at best, been mixed.

## Solutions:

Playground Setting - The learning station is set up in an outdoor playground setting which children can access at any time. It ensures that girls, who would generally not be sent to close room housing a computer, can now easily access the Learning Station in an open setting. The playground setting offers a host of other advantages. Unconditional access to Learning Stations ensures that both children in-school and out-of-school can use them. Another advantage is that the unstructured nature of this setting also ensures that children themselves take ownership of the Learning Station by forming self-organized groups who learn on their own. Finally an unsupervised setting ensures that the entire process of learning is learner-centric and is driven by a child's natural curiosity.

Name: Hole-in-the-Wall Education, Ltd.

Sponsor: NIIT Centre for Research in Cognitive Systems, Hole-in-the-Wall Education Ltd., Government of Delhi

Location: New Delhi, India and 30 other locations in rural India and Cambodia

Established: 1999-present

Lead: Dr. Sugata Mitra

Area: 324 sq. ft./30 sq. m. (per kiosk)

Functionality: computer-based learning, computer literacy

Budget: \$10,000 (three-computer VSAT kiosk)



Dashinpuri, New Delhi



The Learning Station in Wat Bo, Camodia.

**Collaborative Learning** - The learning station fosters collaborative learning among groups of children instead of following the usual school model of rote based learning (unidirectional). This allows children to explore, learn, share and learn even more as a result of this exchange of knowledge.

**Optimum utilization of Learning station** - In a traditional computer lab setting, pedagogy is 'instruction based' where focus is on dissemination of information. Moreover the access to computer is restricted by average usage time available per user (more so by the 'scarcity mentality'). As opposed to this, HiWEL Learning Stations rely more on exploratory learning where children who can freely experiment on the Learning Station. Again, groups of children access the Learning Station leading to twin advantages of collaborative learning and multiple children using the Learning Stations at the same time. This leads to much greater impact on children than a traditional lab based setting.

**Integration with the school system** - A big advantage of the HiWEL learning station is that it fits in nicely with traditional schooling and seeks to reinforce structured learning through peer discussions, increased curiosity and better retention.

In schools where the Learning Stations were installed, some teachers have reported improved retention and increased receptivity among children. There have also been early indications of constructive in-class behavior and better scores among kids using the Learning Stations. HiWEL Learning Stations thus seek to enhance the effectiveness of overall learning experience by integrating with the schooling system.

**Learning to learn** – Apart from addressing the issue of education skills, HiWEL Learning Stations address a more fundamental skill set –the Process of Learning itself. By encouraging children to explore the Learning Station, it seeks to impart them with problem solving skills and an ability to think critically. So, while a child learns how to use educational software, she also develops an ability to analyze, synthesize and evaluate information which in turn builds her long term ability to learn.

**Projects by Children** - The Learning Stations are used for various real life projects. These projects are designed to engage children in authentic tasks relevant to their daily lives. Moreover they are designed to be locally relevant so that children can directly relate to them. The children can then use the Learning Stations for culling out information, compiling data and preparing reports. This will help develop their personalities while engaging them in tasks which could be of use to local community.

### *Technological Innovations*

HiWEL's mission is to make the Learning Stations accessible in even the remotest locations. Towards this end, the Learning Station has been especially designed with tough outdoor conditions in mind. The HiWEL team has come up with several patented innovations to ensure that a standard computer can be used in such a setting. Till date, the Learning Stations have been successfully deployed in many areas with extreme weather con-



Kalkaji, New Delhi



Specially designed rugged pointing device for outdoor use.



Designed for use by children.



Learning Station at the top of the world!

ditions like Leh (Ladakh region in India) and Jaisalmer (state of Rajasthan in India).

Specially designed rugged pointing device for outdoor use.

Outdoor Proofing – The Learning Station has a rugged design, so that it can be deployed in tough outdoor conditions. It therefore uses a modular enclosure and special panels that enable mass-market desk tops to be used in outdoor settings with extreme weather conditions.

Tamper Proofing –The Learning Stations are designed to be tamper proof using specially designed frames and materials to protect the system and peripherals from damage and pilferage.

Unsupervised Use -To be able to function in unsupervised setting, the Learning Stations are made sturdy with effective fault tolerance systems for software and protective covers for hardware, so as to reduce downtime.

Remote Data Capture and analysis-The Learning Station can be remotely monitored using a proprietary Remote Monitoring System (RMS) which makes day-to-day tracking of Learning Station very easy.

Power Management System- HiWEL has come up with a proprietary Power Management System (Auto.P.Sy™) in order to reduce maintenance costs.

HiWEL service offerings can be divided into three broad categories. These include:

1. Learning Services -The major thrust of Learning Services is educating the local community about the possibilities that a learning station represents. It has been found that the Learning station's impact is much more if the community understands the potential of the learning station resulting in buy-in from the local community. HiWEL also provides need based interventions based on the results of periodic monitoring that HiWEL conducts. These interventions are customized to the specific needs of the local community and are hence that much more effective.

2. Monitoring and Evaluation - Monitoring and Evaluation form the core of HiWEL's service offerings. Monitoring is done on a continuous basis both onsite as well as using a proprietary Remote Monitoring System (RMS). Evaluation is done using a battery of tests which measure various aspects of a child's development. These tests are devised by a team of experts and have been validated through rigorous research.

HiWEL has thus devised a comprehensive monitoring mechanism which clearly brings out the impact of Learning Station on children in a particular community and can point to corrective actions, if any, which need to be taken to derive more value from the learning station.

3. Maintenance - HiWEL also understands the importance of maintenance



A Learning Station getting ready for inauguration in Melekote, Karnataka. (2003)

and support for the overall effectiveness of the entire solution. As part of the overall solution, HiWEL provides effective support services to ensure that the Learning Station does not lie idle for lack of proper maintenance.



## Hole-in-the-Wall Schools

Location\_ New Delhi, India, and 30 other locations in rural India and Cambodia  
 Date\_ 1999–present  
 Sponsoring organizations\_ NIIT Centre for Research in Cognitive Systems, Hole-in-the-Wall Education, Government of Delhi  
 Concept\_ Dr. Sugata Mitra  
 Design team\_ Ravi Bisht, Ashoo Dubey, Sanjay Gupta, Vikram Kumar, Dinesh Mehta, Dr. Sugata Mitra, Nitin Sharma  
 Major funding\_ NIIT, Government of Delhi, ICICI Bank, World Bank  
 Cost per unit\_ \$10,000  
 (three-computer VSAT kiosk)  
 Area\_ 324 sq. ft./30 sq. m (per kiosk)



## Dr. Sugata Mitra's Hole-in-the-Wall school program has become a portal to the future and a connection to the outside world for many Indian children.

Mitra, a professor and chief scientist at NIIT's Centre for Research in Cognitive Systems, has been working to provide high-speed Internet access to children in rural areas of India since 1999 with rewarding, and often surprising, results.

The first computer terminal Mitra installed was in an abandoned, garbage-strewn lot near NIIT headquarters in New Delhi. He mounted the computer in a concrete wall and monitored the activity via video camera from his own computer. He discovered that most of the people using the computer were children between the ages of six and 12 who spoke little English. What they were learning astonished him. He then launched a campaign to install computer kiosks on school playgrounds, where children were encouraged to learn free from adults, exams, and all the other trappings of formal education.

Mitra says his original concept was based on the assumption that children could learn basic computer skills without instruction—an assumption that proved true. He reports that children learned to surf the Internet, download music, use a mouse, copy, drag, and save—all without direction. They also created their own computer terminology. When asked by a journalist, "How do you know so much about computers?" one child responded, "What's a computer?"

Even more telling, Mitra and his team of researchers found that children were able to transgress communication barriers,



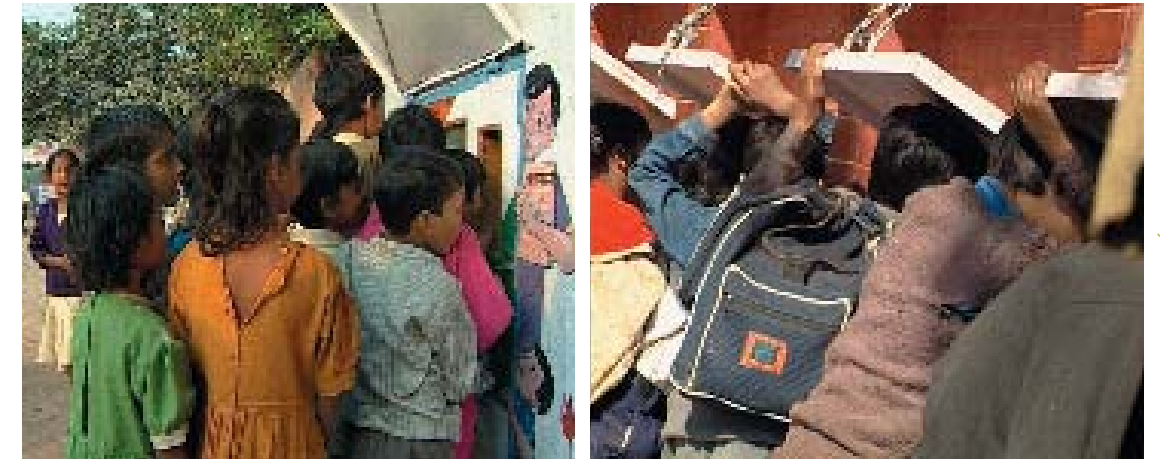
Children crowd around a kiosk in Vivekanand Basti, New Delhi, India. All photographs Hole-in-the-Wall Education, Ltd.

abandoning their native language Web browser for the English version of Microsoft Explorer. In one case children created a drawing using a Microsoft Word template that Mitra himself didn't know existed. By providing computers he found that children will work in groups to teach themselves basic skills and knowledge. However, Mitra is careful to point out that the kiosks are not intended to replace education but to give it a boost, freeing up scarce dollars for instructors to teach subjects children cannot learn on their own.

Since the introduction of the kiosks, parents have reported other interesting developments. They say their children have learned to share and work together, assigning time slots for terminal use without the aid of adult supervision. Often parents become the project's most ardent advocates, in some cases paying the electric bill for the kiosks from their own earnings in order to keep the computers up and running. (To avoid these costs, some kiosks, such as the one in Stok, a village in the Ladakh district of northern India, are being run on solar power.)

The Hole-in-the-Wall schools do have potential drawbacks. Mitra fears children may become targets of Internet crime. There's the task of monitoring who uses the computer and for what purposes. And there's the problem of maintenance. Design plays a role in mitigating many of these issues. For example, to deter adults from monopolizing the computers, the kiosks are designed to be more physically comfortable for children. To cut down on maintenance, the computers have very few moving parts and only the most basic function keys. Sensors on the terminals detect the presence or absence of finger movement and help conserve power. Finally, to discourage misuse, a sign above the kiosks warns that the terminals are being monitored in New Delhi.

Original funding for the project came from sources including NIIT, the World Bank, and the Indian and Delhi governments. Mitra estimates that an additional \$2 million would help educate as many as 500 million children; he says he is committed to making the kiosk design and plans available without charge to anyone willing to build one.



"The Hole-in-the-Wall experiments have given us a new, inexpensive, and reliable method for bringing computer literacy and primary education to areas where conventional schools are not functional. Such facilities are not meant to replace schools and teachers; they are meant to supplement, complement, and stand-in for them—to help in areas of the earth where good schools and good teachers are, for whatever reason, absent."

Dr. Sugata Mitra, chief scientist, NIIT