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NO ONE LEFT BEHIND
TECHNOLOGY AND LIFELONG MASS LEARNING

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Introduction

NIIT Limited was started in 1982 with the mission of 'bringing people and computers together … successfully'. From the early days when NIIT pioneered training in information technology in India, the identity of the company has been built on continuous innovation. This presentation briefly describes the path taken by NIIT to reach millions of learners worldwide. It also presents a potential solution for bridging the digital divide.

The digital divide is not merely an issue of access to digital technology. As the trend toward globalization becomes irreversible and the world moves closer to being a knowledge-based economy, the digital divide can have a devastating effect on entire populations, affecting livelihood, education and healthcare. It is a problem that can no longer be ignored.

Waves of Change

NIIT's journey through the years can be best described as a series of disruptive changes that challenged existing assumptions:

The First Wave (1982 – 1986): Initiation

At a time when the use of computers in India was largely restricted to select research laboratories, NIIT predicted that information technology (IT) would play a critical role in the growth of the Indian economy. And a very large number of trained IT professionals will be needed to fuel that growth. In this phase, NIIT set up the first IT education centers in India,

delivering instruction on cutting-edge technologies. Even in this early phase, the company experimented with many new delivery technologies to increase the efficiency of the learning process. These technologies included video-aided instruction, computer-aided instruction and distance leaning.

The Second Wave (1986 – 1999): Proliferation

Not only did NIIT catalyze the IT revolution in India, it also created the first generation of IT training entrepreneurs. To reach the millions of students in small towns across the country, NIIT set up its franchise operations. In this phase the number of education centers exploded, reaching thousands of towns. With this massive scaling up of education delivery, NIIT faced the challenges of quality, consistency and cost. The company met these challenges using the tool that it knew best – information technology. From a fully-automated student management system to the first virtual university on the Internet, this was a period of unprecedented creative energy. This was also the period in which NIIT set up the largest content development facility in the world.

The Third Wave (1999 – 2005): NIIT Inside

Having reached enrollment figures of hundreds of thousands of students, the next challenge was to break the million-student barrier. To do this, NIIT expanded its reach into rural India, providing computer education in village schools. On any given day, NIIT teaches about 1.5 million students in these remote schools, some of which do not even have a telephone.

Need for Non-Linearity

When we look at the rapidly increasing reach of NIIT, from tens of students to a million students, it does look like a significant achievement. However, if we were to look at the context from the outside in, it is clear that the existing methods of education are largely inadequate. A linear, incremental approach to education will not help us reach the estimated 227 million children who live in poverty. Nor will such methods work to reach the estimated 122 million children who are out of school.

Existing methods of education are not scalable because they are constrained by the availability of trained teachers. By some estimates, the

number of teachers in developing countries has to increase by 20% every year to reach a student-teacher ratio of 40:1 by 2010.[1] This rate of teacher training and deployment is improbable. The situation is further exacerbated by low learning outcomes in school. A recent survey in India shows that 51.9% of children aged 7-14 cannot read grade 2 texts and about 65.5% of these children cannot perform simple arithmetic operations.[2]

With the cost of teachers and infrastructure increasing exponentially, and with a simultaneous decrease of computing and communication costs, it is now viable to use information and communication technologies (ICTs) to reach the unreached. At the same time, these new technologies have to be more effective and efficient than existing methods of education to have widespread adoption.

The Fourth Wave (1999 – 2005): Beyond the Classroom

It was with this goal in mind – that of massively scalable, efficient and effective education – that NIIT started the experiments of Minimally Invasive Education. In this new pedagogy, groups of children interact with a computer installed in an outdoor playground in ways that are very different from classroom behavior.

The early experiments in 1999 showed that groups of children, with no prior exposure to computers, could acquire functional computer literacy with no adult intervention. A three-year national research project covering eight Indian states proved the hypothesis that, 'If given appropriate access and connectivity, groups of children can learn to use computers and the Internet with none or minimal intervention from adults'. The results showed that these children could acquire such skills irrespective of gender, socio-economic background, language, culture and ethnicity.

Minimally Invasive Education requires that computers be placed in outdoor, playground settings. This creates significant engineering challenges in ensuring that computers work in harsh outdoor environments without supervision and with minimal maintenance effort. The researchers at NIIT's Center for Research in Cognitive Systems, have created several patented innovations to overcome these challenges. These include tamper-proofing hardware and software, remote monitoring systems and designs for outdoor tropical kiosks.

[1] Education for All Global Monitoring Report 2006.
[2] Annual Status of Education Report for Rural India 2005.

It is now widely accepted that Minimally Invasive Education is a viable solution for bridging the digital divide. But the researchers were intrigued by some results that showed that children were not only acquiring functional computer literacy, but also improving their skills in reading and mathematics. This was corroborated by teachers who went on record to say that children's concentration, attention and ability to understand instructions improved significantly after being exposed to playground computers. This resulted in several studies being initiated to measure the impact of Minimally Invasive education on academic performance and metacognitive skills. The early indications from these studies show that Minimally Invasive Education might have benefits far beyond computer literacy.

Conclusion and Future Direction

We conclude that groups of children can learn to use computers on their own, irrespective of who or where they are. This will happen if computers are provided to them in safe, public locations.

This method of acquisition of computer literacy does not depend on the existence of schools or teachers. It is also considerably less expensive than traditional methods of computer education. Therefore, in those circumstances where schools and teachers are absent, playground computers are an adequate substitute. Places affected by natural disasters, such as the recent Tsunami in the Indian Ocean, or places affected by war, such as Afghanistan or Iraq, or places affected by economic or social problems such as poverty or HIV/AIDS in Africa are likely to benefit quickly and reliably through such self-learning methods.

While this paper is about the acquisition of computer literacy, there are indications that playground computers produce other changes in children's social and educational achievements.

NIIT believes that Minimally Invasive Education using playground computers is a pedagogy that turns the classroom inside out, changing the efficiency, attitudes, and economics of the education system. It is a solution that can potentially bridge the digital divide on a global scale.

Current work at NIIT is focused on two critical issues related to Minimally Invasive Education.

– There is an intense research focus on identifying the factors that influence outcome and to create a theoretical framework for analysis;

– Significant development effort is being made on creating hardware and software solutions to overcome infrastructure challenges, such as power and connectivity.

Also, before a solution can be adopted for large-scale implementation, there is a need to establish scaled pilots of 5,000 to 10,000 units that will create critical mass. NIIT is exploring ways in which such scaled pilots could be funded and deployed.