Published in:

Information Society and Development- The Kerala Experience Ed. Antony Palackal, Wesley Shrum (2007)

IT@ SCHOOL AND FREE SOFTWARE IN EDUCATION THE KERALA MODEL

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The technology driven development that manifests itself in all fields takes the world in a state of dynamic transition and changes the way we live, the way we communicate and the way we work. New technologies seem to have the potential to provide access to a vast volume of information and to handle this information more competently. The recent developments in computer technology and telecommunications have revolutionised the field of education. Multi-media, computer simulation, virtual reality and other teaching tools have enhanced the teaching and learning experience, both conceptually and pedagogically. As a result, there is a boom in IT based educational products. Students and teachers can interact through the computer networks, Internet, satellite television and so on and successfully take part in various educational programmes. Notwithstanding these developments, often the more privileged classes in society reap the benefits of new technologies, as access is limited. It is in this context that Kerala's efforts in circumventing the digital divide are revealing, as they show the way to the rest of the country. Kerala is the first state to actively promote free software in School Education, illustrating how free software can be used to the advantage of the people at large.

The model of IT in education for school children is a unique feat for Kerala. In April 2002, the project 'IT@School' was initiated with a view to remodel the conventional teaching methodologies in classrooms through the use of Information Technology. The project aims at imparting computer education to high school students. Over 1.5 million students have been covered under this project, one of the largest IT Education programmes based in schools. The new instructional technologies have enhanced traditional teaching, and have brought about changes in curriculum, content and pedagogy. The General Education Department, Government of Kerala, launched IT@School Project to integrate information and communication technology in the school education system. It is also meant to provide an opportunity to children from the economically weaker sections of society to learn computers and digital technology. The highlight of the project is that ICT is primarily used as a tool rather than content in teaching. At the same time IT is being taught in high schools as part of the project.

Why did Kerala opt to introduce IT as a subject in the classrooms? To answer this question, we need to engage in a critical appraisal of the earlier technology assisted interventions in the school education system in Kerala. In order to improve the quality of teaching and learning methods, the Government of India as well as several State Governments have tried continuously to introduce and integrate technology in the school education system. As part of this attempt at technological interventions radio, tape recorders, television, and computers were introduced in schools, but none has produced desired results.

In the 1960s and 1970s, radio was introduced to assist the teaching and learning process in schools, followed by audio tape recorders (RCCPs). The 1980s saw the introduction of 16 mm projectors with educational films. These ventures failed miserably, mainly because appropriate supplemental software-radio programmes or lessons in audiocassettes dovetailing with the curriculum did not support them. The third attempt was to introduce colour televisions and video cassette players in the 1990s. This programme still continues in some schools, so it was not a total failure. However, it is not effectively used as an educational tool in most classrooms, though several softwares are made available through television channels. These softwares usually did not synchronize with the curriculum. For instance, the SIET telecast of the educational video in Doordarshan, (the public television channel) from 10.30 am to 11.00 am every day, clashed with the school timings and so most of the students found it difficult to view. Since it provided no alternatives to the students to watch at a more convenient time, the needs and convenience of the target audience were ignored. Further, students who are exposed to the high quality programmes of international channels like *Discovery*, *National Geographic* and BBC naturally would lose interest in the comparatively poorer 'swadeshi' versions. The teachers themselves do not take much interest in showing the material available, however inferior it may be, to enhance learning.

The next major attempt in 1994-95 was to supply computers to schools under the CLASS project (Computer Learning And Studies in Schools) of the Government of India. This programme also did not succeed in achieving the desired objectives. We note that computers found no mention in the textbooks of the early 1990s, except for the Mathematic textbooks of eighth and ninth standards. On the basis of a specially designed curriculum, it was in 1996 that the Directorate of Public Instruction of the Government of Kerala launched computer training to teachers and subsequently the school curriculum also was redesigned.

The following reasons may be identified for the apparent failure of these attempts of technology interventions in classrooms: 1) the 'need' element was absent, 2) lack of suitable educational content that could be easily assimilated by the school curriculum, 3) the minimal involvement of technologically empowered teachers and 4) inadequate system of maintaining the equipment, given that schools could not raise resources to meet ever increasing recurring expenses. However, the most important reason is that the stakeholders never felt a critical need for technological intervention. Whenever such interventions were made, the results were intangible and not immediately visible.

The continuous failure in the use of technology based educational tools in schools ultimately pointed to the fact that the educational system in Kerala relied only on rote learning of students, which did not require their cognitive abilities and practical knowledge. This type of learning system did not really need any supportive audio-visual aid and educational tool. In such a situation such tools, even if available, are not used much in classrooms. Hence, even in the era of Information and Communication Technology (ICT), the 'chalk and talk method' is widely employed and the learning process greatly depends on the eloquence of teachers. The conventional learning climate that prevailed in the educational system in India pointed to the dire need of engaging in serious preparation at the school level prior to the introduction of Information Technology as a tool. Hence, the first phase of IT@School was designed and initiated as a preparatory stage with the triple objectives of equipping the schools, making the teachers computer literate, and generating awareness in the minds of the parents, students and all concerned about the need of using ICT as an educational tool. A series of advocacy campaigns were unleashed to enlighten the school authorities on the need for moving towards IT education first and then IT assisted education later, when the ground has been prepared. In 2000-2003, the Government of Kerala implemented the project scheme in three phases. The first phase, for the academic year 2000, sought to initiate teacher training. The second phase that followed in the next academic year was meant to introduce IT as a teaching tool. The final phase aimed at full-scale integration of IT as a teaching and learning tool in 2003.

IT@SCHOOL PROJECT

In summary, the IT @ School Project is an innovative attempt for the intensive and judicious use of information technology in the school education system. The project aimed at IT enabled teaching and learning at the High School level and it envisioned using IT as an instructional tool and not as a subject. The focus was on a complete and systematic overhaul of the traditional education system, with an emphasis on participation and activity, coupled with constant upgrading of skills and knowledge of the teacher. We emphasize that the project intended to transform the <u>teacher</u> as the pivotal point for technology aided teaching and learning. Hence, conceptually, it sought to empower the teachers and enhance their creativity and ingenuity rather than supplying them readymade softwares. IT@School project shifted its focus from IT enabled learning to IT as a <u>subject</u> in the curriculum owing to the lack of infrastructure for IT enabled learning, the anxiety of the school community as regards the new educational methodology, and their concern about the possibility of a loss of seriousness in the learning process.

Advocacy campaigns were unleashed to ensure proper interlacing of interest of all the stakeholders, such as the teachers, parents, people's representatives, Local Self Governments, former students and philanthropists. The project adopted a method of decentralization of decision making power to the schools for running and raising necessary resources for not only setting up the infrastructure but also for meeting the monthly recurring expenditure. Each school was directed to constitute School IT Advisory Council with People's Representatives, PTA, School Management and Teachers. The Head Master was given only nominal power of meeting daily expenses subject to a maximum of Rs. 1,000/- at a time. Other financial power vests with the IT Advisory Council, so as to avoid complications of financial transactions. It came as a great relief for the heads of the institutions who were always haunted by the ghosts of audit system. The involvement of IT Advisory Council made the decision making process happen at the school level and brought in a democratic and transparent system of decision making process. The resources were raised mainly from three sources, viz., (a) collection of IT tuition fees from non SC/ ST students, (b) reimbursement of IT tuition fees of SC/ST students by the Government, and (c) income generation operation outside the school hours.

Private agencies were also solicited to assist the schools in meeting the cost of setting up computer labs. Build-Own-Operate-Transfer (BOOT) labs were established in

schools. The microenterprise mission of Government of Kerala among women – *'Kudumbasree'* had also set up computer labs in 150 schools. Thus, it brought a culture of self-reliance, enterprise and entrepreneurship in the education system through multi-pronged strategies. The results were evident even in the very initial stages to the extent of having around 2000 computers in different schools in 2001, with the number increasing to over 35,000 by 2005. Schools were permitted to collect fees and generate other resources to purchase more computers and look after their maintenance and upgradation. The involvement of Local Self Governments, MPs, MLAs and the IT Advisory Council at the school level ensured great transparency, monitorability and accountability.

In order to create the essential element of the 'need' for IT enabled learning among teachers, students, parents, and, particularly school managements, information technology was introduced as a curriculum subject. Further IT practical training was given much more weight than theory in the examinations and in 2005 it was made a compulsory paper in the tenth standard. Having generated an awareness of 'need', the next step was to build the infrastructure and empower teachers. In fact, the unique concept mooted by the project was that ordinary schoolteachers were to be empowered to transform them as the key implementer, which further ensured general acceptance of the IT@School Project. The syllabus was kept simple and easily comprehensible so that it was accessible to the most disadvantaged students, such as those in the tribal hamlets of Idukki Wild Life Sanctuary

VICTERS - THE EDUSAT INITIATIVE

When technology assisted education by IT@School Project was nearing completion, Kerala acquired the support of Indian Space Research Organization (ISRO), Government of India, and developed the promising ViCTERS-Virtual Class Technology on Edusat for Rural Schools. Hence EDUSAT launch perfectly coincided with the IT@School in Kerala. The State Uplinking Station was established at Gorky Bhavan at Thiruvananthapuram and the studio (set up in association with the Government of Kerala) C-DIT beams signals to the *Edusat*. Satellite Interactive Terminals (SIT), capable of two way video and audio interaction between the faculty and participants, have been set up in 35 centers of all the districts of the State. This is now primarily used for teacher training and departmental conferences.

The Receive Only Terminal (ROT), is a variation of the Direct-To-Home (DTH) technology and brings in signals to television sets in a cost effective solution for a virtual classroom, but is restricted to forward interaction only. ISRO adopted the Malappuram district and so all the government schools in Malappuram, from lower primary to higher secondary, have been provided with ROTs and TVs. The project also used its funds to set up ROTs and TVs in 100 government high schools located in remote locations like Attapady Hills. The ViCTERS, Kerala's complete education channel, commenced experimental transmission from 13th February 2006. In three months 1006 government high schools, even in the remotest corners of the State, set technology aided education in motion. Soon this initiative will be scaled up to nearly 13000 schools in the State.

POLITICS OF TECHNOLOGY CHOICE

The State Council of Educational Research and Training (SCERT), an autonomous organization recognized by the State Government, prepared the syllabus for the IT@School programme. The government had neither framed nor adopted any guidelines for the choice of software. The SCERT syllabus prescribed the software by brand and insisted that school computers should have pre-installed Windows9x as the operating system. Hence, it appeared that the IT@School project patronized and preferred one software brand to other products, which closed off alternatives and inhibited the possibilities of economizing the costs¹.

In February 2000, Intel Asia Electronics had started a Training Programme 'Intel Teach to Future' among teachers in various states of India with a view to promoting Microsoft's proprietary software and paying teachers directly. It was an attempt to enter the schools through trained teachers who acted as links with the student community at large without the participation of the Education Department. Later, the Directorate of Public Instruction (DPI) and Intel Asia Electronics signed a Memorandum of Understanding (MoU) to spearhead IT@School project in Kerala, which ushered in the corporate sector in promoting IT Education in the State. Thus, as part of the IT@School project, Intel could continue with the same 'Intel Teach to Future' training programme among the teachers, but this time with the financial support of the Government. By 2002, Intel imparted training to 300 teachers as master trainers for the project². Later the first IT textbook was prepared based on the proprietary software and 18,000 teachers were trained in Windows. The IT@School Project insisted that the schools develop necessary infrastructure with the support of local self-government and neighboring communities. Thus schools had to bear the burden of building the infrastructure and acquiring personal computers. Schools were compelled to purchase a particular brand of computers and had no real choice, since these were prescribed in the syllabus. At this point some schools began to use unlicensed versions of the software, ignoring issues of piracy.³ Multinational companies threatened and even conducted raids in some schools. This situation sparked public debate on different options in the use of softwares, which generated some awareness about the potentials of free software and its advantage over proprietary software.

The advocates of free software in Kerala raised objections in using proprietary software in the public education system. The problems of the school community in using proprietary software also strengthened the arguments against it. Kerala School Teachers Association (KSTA) in collaboration with Free Software Foundation organized meetings to sensitize teachers and those teachers who were affected by the costs and restrictions on proprietary software soon were attracted to free software. As a result, the Government was forced to include free software products such as GNU/Linux and Open Office as optional subjects in the curriculum in 2003. The Government also changed the prescribed computer syllabus to be neutral, instead of basing it only on proprietary software. Hence the IT textbook for 9th standard in 2003 contained both Microsoft and Free Software Operating systems and the corresponding application softwares. Nevertheless, ignoring the training and development of free software, the IT@School project continued its training programmes in the Windows platform in view of conducting the IT practical

examination for the 10th standard within three years. At this juncture the opposition leader Sri. V.S Achuthanandan wrote a letter in support of the use of free software to the Chief Minister Sri. A.K Antony, and KSTA conducted a study on the IT@School project favoring free software. The study succinctly pointed out that most of the teachers are ignorant of the prevailing norms in the use of proprietary software and revealed that around 60% of the schools used unlicensed versions of software and 43% of the Heads of the Institutions are unaware of the piracy issues involved in it. The IT@School Directorate also revealed that the project had no mechanism to monitor the use of software and almost all the approved training centers used unlicensed versions for their training. Despite these attempts, the Government neglected free software and the training and teaching continued in the proprietary software.

In March 2004 the Director of Public Instructions (DPI) introduced an online Examination System for the students of standard IX on an experimental basis, with a view to begin exams for the 10th standard in the following year. Windows 98/2000/XP was used in developing the experimental Softexam and this necessitated installing Windows 98 and MS Office 2000 for several schools which had already shifted to Free Software for their IT education. Led by KSTA, schools protested against this move and finally the Government officially accepted the demand to include Free Software in the coming years.

FREE SOFTWARE EDUCATION

With the introduction of computer education facilities in large number of schools in Kannur district in 2002, *Swathantra* (Free) Software Solutions developed software

solutions based on GNU/Linux and technology for diskless workstations using LTSP (Linux Terminal Server Project) servers and ether-boot. The other GNU software packages installed include open office, multimedia, Internet applications, programming tools and many applets for subjects such as physics, chemistry, maths and so forth. After providing basic training on how to use the GNU/Linux based system, the teachers have made a smooth transition.

In 2004 for the first time the Department of Education initiated training in free software. The training was intended to introduce GNU/Linux and Open Office, although the first IT textbook made a direct reference to free software in 2002. The academic year 2003-2004 witnessed the first IT Soft exam in Kerala School curriculum. Two schools conducted the soft exam in free software while all other schools depended on propriety software. IT@School project gradually started its efforts towards transforming Windows to GNU/Linux platform. In 2005, with the help of Model Engineering College, Ernakulam, the IT@School project has completed the first phase of Teachers' Training in free software involving around 200 master trainers. At present, it is also involved in the process of conducting the second phase, consisting of district level training for 6 to 10 days. Nearly 15000 teachers were trained in GNU/Linux and other application softwares.

In 2004, IT@School Project with the support of Free Software Foundation of India and Kerala State IT Mission developed a customized GNU/Linux version called IT@School GNU/Linux. In 2006 a new version 'IT@School GNU/Linux Light', which will operate in computers with low memory, was introduced. Presently the project is utilizing this customized version in schools. During the academic year 2005-2006, the syllabus of standard 8th was exclusively based on free software. In the following academic year this was extended to the ninth standard, with a supplementary IT textbook completely based on free software and IT enabled learning. Nearly half (48.5%) of schools conducted the soft exam on free software platform in March 2006.

As the project authorities have realized, the Kerala Free Software Community has the technical expertise to accomplish the professed educational goals and the Project anticipates a complete shift to free software by the academic year 2007-2008. The IT@School project aims at setting up a Free Software resource center at its Ernakulam regional center, beginning a Training Programme for 200 Master Trainers in ten batches. The state is in need of an effective resource group to support efforts to promote free software.

CONCLUSION

The IT @ School Project thus envisaged universal access and comprehensive coverage at the grassroots in order to percolate the concept of Information Technology to the very roots of society, enabling dynamism and motivation. The relevance of IT@School comes to the forefront, especially in the context of the eroding quality of education in the State. The State of Kerala has always been a forerunner in India in social indices. Issues of access and retention hampering universalization of elementary and even secondary education have been always been tackled in Kerala. But the quality of education remained far from impressive. In areas of professional courses and university education the quality of output is far from the requisite standards. The roots of the malady should be attacked at the lowest rung, i.e., the schools. IT@School is the outcome of

constant vigil and conscious policy initiatives for toning up education and making it resilient to the needs of the changing times. It ensures a learner-centered approach marked by a new pedagogy and a new recognition of the need for constant upgradation of skills and knowledge of the teacher.

The concept of "Softexam" ensured the transparency and accountability of the examination system and enhanced the students' faith in the system. The few detractors to this new system of examination, being tried for the first time in India, could not stop it being introduced in a sensitive school final examination like SSLC. The students, parents and, of course, the teachers wholeheartedly welcomed it and for the last two years, nearly 4.75 lakh students have participated and emerged with laurels.

¹ Total cost of the prescribed operating system and the application software specified in the syllabus came to be approximately an astounding sum of rupees 74,10,00,000/- (rupees seventy four cores and ten lakhs - Rs. 3,500 + Rs. 25,000 = Rs. 28,500 x 10 computers per school x 2600 schools). During the resource development drive they ignored the legal and ethical aspects such as copyright of the software. Due to the poor socio economic condition of the majority of the schools, they were unable to follow the legal aspects involved in the use of proprietary software

² This was the first attempt by a corporate to intrude into the Education system of Kerala. Subsequently, corporations such as Azim Premji Foundation have entered and are involved on a large scale.

³ Even during the training programmes teachers were not appraised of issues of piracy. The Trainers' Trainings in fact contained some modules on copyright. But this was meant only to protect the interests of software proprietors. Most of the schools had either a single copy of the licensed version of the software or pirated software purchased from hardware dealers.

Milestones of IT Education in Kerala

1980Class Project with the involvement of Central Government1996Computer Training for Teachers by D. P. I 1998State IT Policy for IT Education2000Vision 2010 document envisioned IT enabled Education; First Government order to start a project on IT enabled Education2001State IT Policy with a special reference to promote Free Software2000-2002SCERT and SIET organized Teachers' Training with the help of INTEL2002Introduced IT as subject in Schools under IT@School Project based on Microsoft Proprietary software 2002-2003Public debate on the issue of using Proprietary software and Free Software2003IT@School curriculum added Free Software as optional for study2005-2006Training on Free Software given to Teachers Free Software