A Prelude

The State of Kerala has identified the potential of using Information Technology as a major enabler in enhancing the quality of education in the State. It was in this context that the Department of General Education of the Government of Kerala launched a project titled IT@School in the year 2001. The objective of the project is to enhance the intellectual capability of teachers on the one hand and the curricular comprehension of the students on the other by providing ICT-enabled education to 6 million students and 0.2 million teachers every year. The Project has been designed with an objective of traversing the entire continuum of IT education ranging from Information Technology Education, ICT enabling of education, and ICT-embedded education over the different phases of the project. The first phase of the project which started in 2001, has more or less been completed and the schemes for introducing IT-enabled education has been initiated, perhaps for the first time in India at such a massive scale. The Project is now being implemented from 5th to 12th standards in the state covering as many as 12,000 schools.

IT@School is not envisaged merely as an IT education pro-
gramme. While the first phase of the programme focused on IT Education, the components of the project even at that stage were designed with a view to achieve the final objective of developing IT as a tool for enhancing the effectiveness of learning process rather than just teaching the use of tools. In the new phase of ICT-enabled learning, learners are augmenting the learning in different subjects by leveraging on technology. The Project integrates diverse activities such as capacity building, content development, infrastructure deployment, satellite-based education and e-governance initiatives in a holistic manner, to effect a common cause which could benefit millions of students in the state. The ICT-enabled education which has been initiated in the state from the year 2010 onwards is a result of an integration of the above core factors.

IT@School is envisaged as a model for mastering the ICT approach through a three-pronged approach. It spans the entire continuum of IT education that extends from IT Instruction at one end (teaching software and hardware aspects, and programming) to IT enabled education (where all the education delivery is done based on IT - with multiple touch points ranging from classroom technologies to instructional design and delivery) at the other end.

The Network
Right from the beginning of the Project itself, it was understood that the school teachers themselves have to be the sheer anchors for the drive for ICT-enabled education, because they are the right people to teach their subjects using IT in its most effective manner. The Project aimed to empower all the school teachers in the state in ICT tools, making them IT champions and also to implement ICT-enabled learning system for all subjects. The project’s approach was not to deploy separate teachers for ICT education but to equip the regular subject teachers with adequate skills to move towards ICT-enabled education. This has already been proved effective, as students are able to relate to ICT as a ubiquitous tool in learning various subjects rather than approaching it as yet another subject. Over the years, the Project has trained over 2 lakh school teachers in the State in numerous ICT skills. Today the Project operates through a strong network of 200 Master Trainers and 5600 School IT Co-ordinators (SITC), who are school teachers from Government and Aided schools. The Master Trainers are attached to the Project on Working arrangement while the SITCs takes responsibilities of every ICT initiative in their school.

In order to support the ICT based learning process in schools, every school in the State is now equipped with a minimum of 10 students as IT Co-ordinators, thereby creating a network of around 28,000 Student School IT Co-ordinators (SSITCs). SSITCs support the respective SITCs in their schools in imparting trainings to their colleagues, hardware-software support etc.
In order to implement the various initiatives of the Project in its most effective manner, a State Project Office has been set-up at Thiruvananthapuram, which houses around 60 technical, non-technical and administrative personnel. The Studio complex of ViCTERS is also attached to this office in which the EDUSAT Hub is also positioned. 14 District Offices as well as Edusat Training Centers have also been established in each of the district, under the supervision of the District Co-ordinator. The Executive Director of the Project oversees the entire functioning of the Project, amply supported by the various teams.

Key Policy changes and Strategies

The foremost policy change that facilitated ICT-enabled learning was making Information Technology a compulsory subject in the school curriculum. It was made compulsory for Std 8 in the year 2003 and in the subsequent years, the same pattern was extended to classes 9th and 10th. Accordingly, Information Technology was introduced in the Lower Primary sections (Std 5, 6 & 7) from 2009-10 onwards.

Transforming existing subject teachers themselves as champions of ICT was another major strategy adopted by the Project. As teachers themselves are trainers, there is no requirement for an external trainer which otherwise would have had implications to the State’s exchequer.

Another major policy change was the decision to make inhouse ICT contents rather than opting for contents which were available in the market prepared by external agencies. The project was able to prepare quality ICT content by empowering the existing teachers themselves and thus integrated different media such as print, television, web, and satellite for effective ICT content delivery.

Yet another major policy change was the shift of the conventional concept of “IT education in Computer labs” to that of “ICT education in Smart Classes”. The Project was able to equip Smart Classrooms in each of the 140 constituencies of the State, wherein electricity and internet connectivity was available to fuel ICT-enabled learning. Five schools which excelled in ICT enabled initiatives were also selected as Smart Schools, to be the role model for the rest of the group.

Integrating Virtual Classroom Technology as a mode of education was another successful strategy. By making use of EDUSAT services, the Project provided the student populace in the State with a never-before
opportunity to interact with teachers and experts directly, irrespective of where they were stationed. Moreover the launch of ViCTERS (Virtual Classroom Technology on EDUSAT for Rural Schools) as a complete educational channel of the State has taken the educational scenario to newer dimensions.

The project functions completely on Free Software platform since it provides the freedom to an individual to study, copy, modify and re-distribute any content, a process which would ultimately benefit the whole society. IT@School Project is termed as the world’s largest simultaneous deployment of FOSS (Free and Open Source Software). By deploying Free Software-based Operating System and applications instead of proprietary software, IT@School Project is able to save an amount of ₹11 Crores each year. Today, the entire activities of the project are based on Free Software including the training programmes and its content, the comprehensive ICT-based content for students, E-governance initiatives and many more.

The conduct of State IT Mela every year is also a key strategy to encourage ICT-enabled learning among students. Every year, as many as 500 students from all districts of the State, who have secured the first and second place in the school & sub-district level competitions compete in the 3-day State IT Mela. Competitions in Digital Painting, IT Project, Multimedia Presentation, IT Quiz, Malayalam Computing and Web Page Designing are being held during the event. The programme also provides the participants with an opportunity to interact with eminent personalities in the field of ICT and academia.

Capacity Building for Teachers, Students and Parents

As IT education is provided by subject teachers, there was a need for providing training to impart adequate IT skills to teachers and support them with content and systems to help them transfer this learning to the students. The Project has trained over 2 lakh teachers so far and the training programmes include ICT training, subject-wise ICT training, Internet training, training for the visually challenged, and training in camera handling. The subject-wise training contents are strictly as per the State Curriculum and the training contents are being developed by the teacher groups themselves. As quoted earlier, all the trainings are being given by the teachers themselves in a systematic and structured manner.
Moving on with time, it was essential to ensure the effective ICT knowledge transfer from teachers to students. To support this process, various trainings are being given to students including Animation movie making (ANTS), ICT trainings for SSITCs etc. The Project has trained as many as 14,404 students this year alone in Animation movie skills, perhaps the largest of its kind in the world and steps have already been taken for acquiring the Guinness World Record in this regard. The training for these students was conducted in three batches in over 400 locations simultaneously which also made use of the Video conferencing facility on Edusat.

In order to extent the scope of ICT among public and parents, a one-day ‘Parental awareness programme’ on ICT was conducted statewide. This programme, was intended to educate parents on the modern ICT tools being used in schools in the State, besides making them ICT literate, and to ensure their participative support in upgrading the available ICT facilities in the schools. The programme gave a bird’s eye view on the new outlook of the classrooms along with the upgraded educational systems, ICT facilities made available in schools, ICT enabled education, functioning of School IT Clubs, IT Mela, various ICT trainings for students, apart from understanding more about IT@School ViCTERS channel, prevention of Cyber crimes etc. The project also imparted training programmes for other agencies and government employees in the State including Police Officers, Kundumbasree personnel etc. Last year, the Project successfully imparted SPARK training to 43,024 government officers from 22320 offices simultaneously in as many as 627 centers.

**Indigenous ICT content development**

The Project realized that ICT enabled content has to be prepared exclusively to serve its purpose. The Project was successful in customising its own Operating System - IT@School GNU/Linux and IT@School Edubuntu which is now being used in all the schools in the state. Apart from this, several educational software tools like ‘Dr. Geo’, ‘Rasmol’, ‘K-Tech lab’, ‘Geoebra’, ‘Chemtool’, and ‘Kalzium’ are being extensively customised by the Project for developing teacher-friendly applications. The Project has also prepared interactive multimedia CDs, handbooks and training modules for ICT as well as text books for IT in standards 5th to 10th. All content developed by the Project is as
per the new curriculum approach based on the National Curriculum Framework 2005. The revised ICT textbooks are being used in Std 8 and 9, while the process is ongoing for the Std 10 textbook. A resource portal exclusively for Std 10 students have also been launched by the Project www.resource.itschool.gov.in with contents on mathematics, physics, chemistry, biology and social science. The Project has also associated with Intel’s ‘Skoool’ for collaborative content development programmes (http://kerala.skoool.in). The Project has also developed a separate Operating System for Lower Primary section which is named IT@School Junior Linux, which is ready to be deployed to all LP schools.

A Resource DVD for teachers was developed by IT@School Project which included several resources and ICT contents. In another pioneering effort, IT@School introduced ‘SchoolWiki’ (www.schoolwiki.in), a customized version of WIKI, the largest and most popular general reference website on the internet. SchoolWiki provides a comprehensive knowledge database of all schools in the state, and includes the learning outcomes of students derived from group activities as well as various educational contents prepared by the teacher groups. SchoolWiki also features an “ICT Learning Corner”, which would include the various content prepared by schools for all subjects in ICT-enabled education.

Infrastructure sustainability in Schools

The move from conventional educational system to that of an ICT-enabled model demanded availability of adequate infrastructure facilities at schools. To ensure availability of necessary hardware at all schools in the state, the Project conducted a school survey to estimate the current status of hardware availability. Based on the results of the survey, the Project was able to mobilize required hardware for schools from the development funds.
of local self-government institutions, local area development funds of the Members of Parliament (MP) and the Members of the State Legislative Assembly (MLA), and the funds available with the Parent Teacher Associations. From 2007-08 onwards by effectively using the centrally sponsored 'ICT @ Schools' scheme, the Project ensured that all high schools and higher secondary schools in the state are equipped with ICT infrastructure to fuel ICT enabled education. The Project came up with a new concept for the maintenance and repair of damaged computers in schools – Hardware Clinics. Through this programme, intensive hardware training was given to teachers which boosted their confidence to such a level that they are able to handle most of the common technical problems. Hundreds of classrooms in the State were electrified as part of the Project’s initiative and with electricity available in classrooms, it is now possible for the teachers to bring in laptops, projectors, and even wireless Internet into classrooms, enabling ICT-based teaching and learning. Till now, the Project has deployed ICT hardware worth over ₹150 Crores in thousands of schools in the state, which fuels the ICT-enabled learning process. These ICT equipment include computers, laptops, netbooks, printers, multimedia projectors, multifunctional scanners, televisions, 3 KVA UPS, generators, handcams, and many more.

In addition to this, the Project also introduced the laptop to teachers scheme this year, by which as many as 10,000 school teachers were able procure laptops and netbooks at a price which was as low as one-third of the market price without incurring any financial commitment to Government. Strict after sales and service conditions were also put forth for these equipment. In another major step, the Project was able to rope in the PC donation programme of Intel, by which as part of Intel’s World Ahead program, 625 Classmate PCs (Netbooks) were provided to the Smart Schools in the State, absolutely free of cost.

The Project has provided Broadband Internet connectivity to all High Schools and Educational Offices of the state, in association with BSNL. Detailed usage norms
were also issued to all schools with respect to the Internet connection provided to ensure safe and secure browsing at schools. The project was able to completely implement this scheme in 2008 itself, two years ahead of the planned period. The Project is now in the process of facilitating VPN broadband connectivity to all schools and educational offices in the State. By upgrading the current ordinary broadband connection to VPN mode, it not only provides high speed internet connectivity but also enables unlimited data sharing without the need to avail normal internet bandwidth. All schools and educational offices within VPN connection would experience a data transfer mode similar to transfer between two adjacent computers in a lab, that too with increased security features. The State Date Center, which is part of this VPN cloud, would enable unlimited data sharing within the 4,300 institutions at a higher speed without facing any difficulty such as jamming of internet bandwidth etc. The new form of internet data transfer which is termed as VPNoBB (VPN over Broadband) will function as a private virtual network in MPLS (Multi Protocol Label Switching) cloud.

**The EDUSAT network and ViCTERS educational channel**

Moving ahead with time, IT@School has added a new dimension to the state’s education system by making use of EDUSAT facilities. The Project is the nodal agency for EDUSAT operations in the state. EDUSAT is the dedicated satellite that India has launched exclusively for the purpose of imparting education. With the technical support from Indian Space Research Organisation (ISRO), IT@School Project has successfully implemented various activities based on EDUSAT till date. The first phase of the programme was mainly through various interactive classroom sessions, facilitated by Receive Only Terminals provided to selected schools which enabled subject expert – student interaction. In addition, it helps the students expand their knowledge in various subjects as well as gain new social insights.

The second phase of EDUSAT initiative was the launch of an educational channel - IT@School ViCTERS (Virtual Classroom Technology on Edusat for Rural Schools) in 2006. Majority of schools in the state are able to access ViCTERS through Receive Only Terminals (ROTs). In addition, VICTERS is transmitted through local cable TV networks and covers most of the households in the state. Currently VICTERS is telecast 17 hours a day; from 6AM to
11PM. Programmes on the channel provide the right mix of entertainment and knowledge/information to children, which include various in-house productions as well as international programmes. Programmes on Science, Technology, Language, Art, Music, Films etc., are prepared for the channel. Programmes and videos prepared by students and teachers are also aired through the channel. VICTERS has tie-ups with national and international institutions like BBC (British Broadcasting Corporation), DW (Deutsche Well), NFDC (National Film Development Corporation), UGC (University Grants Commission), Vigyan Prasar, Science and Technology Council, SIET (State Institute of Educational Technology), and C-DIT (Centre for Development of Imaging Technology) for providing worldclass educational content for the benefit of millions of students.

Besides the regular role it plays for dissemination of knowledge and Information Technology, VICTERS strives to provide all physical facilities to students and teachers to come up with their own productions. IT@School Project has enabled the state to utilize EDUSAT's services to its optimum, compared to any other state in the country.

VICTERS is now made available Live via internet also at www.victers.itschool.gov.in, thereby enabling anyone from any part of the world to view the programmes telecast through the channel live. Live streaming of the channel through internet also ensures that the students need not depend on a Television or Cable / DTH connection to watch VICTERS. Students and general public could also pick their favorite programs of the week since the programme schedule is published on the website as well as
in all leading newspapers a week in advance. Thus the channel is reaching its target populace via local cable networks, DTH networks and also through internet, thereby maximizing its impact.

E-Governance

IT@School Project has been instrumental in rolling out several E-governance initiatives for the General Education Department and the Project is the nodal agency for implementing e-governance initiatives in the Dept. Some of the innovative and successful initiatives include Online transfer and posting of teachers, Noon meal distribution computerization, Centralised Text Book Intent System, Total Physical Fitness Programme, Single Window admission system for Plus One, Youth festival software, Pre-matric scholarship online, Implementation of SPARK (Service Payroll Administrative Repository for Kerala) within General Education Department etc. These online applications ensure systematic, stabilized and automated processes to meet its objective. Government has attempted business process re-engineering along with change management to make all processes within the Education Department e-friendly, thereby ensuring efficiency and transparency. All the E-governance processes use Free Software applications only and this not only generates cost savings but also increases the security aspects.

One of the major e-governance initiatives being rolled out by IT@School Project is the SAMPOORNA School Management Software which is being implemented in all schools in the State. The application is intended to be a comprehensive database of students and teachers of all schools in the State, which could facilitate implementation of various educational activities of the schools, the authorities and even the State and Central Government. Various cumbersome processes such as preparation of Transfer Certifi-

Extract from the comments of Jury of Stockholm Award 2010

“IT@School has a well-established management, organization and infrastructure. It has achieved greatly and has had great impact. This project has well organized ICT-enabled education by integrating diverse elements such as capacity building, infrastructure, content development, and advanced technologies. It is notable to see a “School WIKI” for sharing knowledge. To improve the intellectual ability of the teachers and comprehension ability of the students is always a difficult task. This on-going award project with 10 years under its belt is no doubt impressive in size. We can appreciate the logistics involved in project with this extension. Soon IT@School will have to confront the challenge of renewing itself. We are certain they will be up to the challenge, given IT@School achievements so far.”
cate, copying of Admission register, time table preparation, generating various reports related to students, parents, teachers etc would be made easier using the online software.

**Recognitions to the Project**

The innovative ICT-based learning initiatives has earned IT@School Project numerous accolades including the glorious recognition of Stockholm Challenge Awards -2010, National E-Governance award 2006, World is Open Award 2008, E-India Award 2008, ODF Alliance International Award 2008, State E-Governance Award 2010 etc. The Project also received special appreciation from Ministry of Human Resource Development, Government of India in 2011 for successfully imparting ICT training to all visually challenged teachers in the State.

**Impact of ICT education in the State**

The State has witnessed considerable improvement not just in the educational front, but also on the societal aspects, after the introduction of ICT-based initiatives in the State. The innovative approach of IT@School Project has seen tremendous impact on its target populations, who are lakhs of students and teachers in the State. In the case of teaching community, the Project has empowered them to make use of ICT tools in such a way that they are able to teach different subjects more effectively. Moreover, the approach has significantly enhanced their confidence levels. Subject teachers provide instruction in Information Technology in two ways. They handle IT as a subject to provide them the nuances of the technology to make the students get used to it. Further, the

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**Extract from the report of IT for Change, Bangalore**

“The Kerala model has some important learnings for governments seeking to implement computer education in schools. Some of these are: integration of computer education into the regular system of school education, decentralization of teacher training as well as hardware/software support, and finally the free availability of educational software in local languages, all of which have significant impact on the processes and outcomes of computer learning and computer aided learning in schools. Incorporating some of these principles and features and replacing the dominant BOOT model with an integrated approach to ‘ICTs in education’ may be essential for such programmes to be meaningful and effective.”

*extract from the paper on Computer Learning programmes in Schools undertaken by Gurumurthy Kasinathan, Director, IT for Change, a NGO based out of Bangalore working on ICT.*
learning is enhanced by integrating IT in their own courses of delivery thereby consolidating the learning of the students. This is done by providing extensive training to the subject teachers in technological means, thus making them and classrooms “knowledge economy ready”. As far as students are concerned, the entire educational process is being upgraded to a higher level of understanding and efficiency. The student population is being exposed to the latest tools in ICT-enabled education and initiatives of the Project such as SchoolWiki, ANTS (Animation Training for Students) and ViCTERS give them a platform to showcase their talents.

The IT@School Project is a perfect example of a successful Government programme in implementing an ICT enabled educational system in the State, by making effective use of the limited resources and existing human resources. The success of IT@School Project has encouraged other states to plan for ICT enabled education. IT@School Project has been receiving requests from other states for support in ICT enabled education.

Through the various lessons learned, it has been understood that a systematic, practical and pragmatic approach to ICT enabled education is essential for its successful implementation at any place. The various components are to be integrated holistically, yet each one of them has to be given its due importance.