

## **Integrating ICT into Education of a Developing Country: an Analysis of IT@School in Kerala**

**Shafeeq.C.P.**

Department of English

Najran University, KSA

Email: [cp.shafeeq@rediffmail.com](mailto:cp.shafeeq@rediffmail.com)

### **Abstract:**

As access to information continues to grow exponentially, the potentials of ICT in education are widely accepted. It is perceived that schools must promote the acquisition of knowledge and skills that make possible continuous learning using the potentials of ICT. This paper is an attempt to analyze the programme called IT@School, introduced by the Department of Education, Government of Kerala. After reviewing some of the programmes related to integration of ICT into education in some other countries, it analyses how the IT@School is going to be significant after continuous and gradual development over a decade. The implementation of the programme suggests that a careful and visionary ICT initiative can influence the entire educational sphere, ranging from classroom teaching to higher administrative tasks. The programme's focus on the necessity of teacher's empowerment, infrastructural building, content development, effective e-governance, and collaborative efforts are some of the characteristics that make the programme highly appreciated.

*Key words: ICT in Education, Developing Country, IT@School*

Information and communication technology (ICT) refers to the various set of technological tools and resources used to communicate, create, disseminate, store, and manage information. Since the rationale of their use is widely acknowledged, ICTs are used in different institutions and organizations for socioeconomic development. Applications of ICTs are sometimes direct, but in some case they can be indirect as well. In their direct use, many organizations are benefitted directly. In their indirect use, ICTs assist governmental and [non-governmental organizations](#) in order to improve socioeconomic conditions. Both the applications are used globally.

Communication and information are central to the educational process. Therefore, use of ICT in education has a long and progressing history. ICT has played an educational role in formal and non-formal settings. However, the educational institutions are keen in acquiring the basic assumptions of ICT and its applications in education. As access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time. Rather, schools must promote the acquisition of knowledge and skills that make possible continuous learning over the lifetime. Thus, the illiterate of the 21st century will no longer be those who cannot read and write, but those who cannot handle the potentials of ICT in learning. These developments prompt the teachers and educational practitioners to study the possibilities of ICT in the actual teaching-learning process. In order to have a sense of direction in challenging the future trends of education in developing countries like India, it is necessary to acquire the basic knowledge, understanding, applications, and skills of ICT-based education. The educational policy makers in the developing countries are aware of the potentials of ICT in education. Depending on its general framework of education, every nation has its own contributions to this field of knowledge. India's apex body for school education, National Council for Educational Research and Training (NCERT), in its position paper on Educational Technology states:

*The creative potential of the computer, and the liberating potential of the Internet, can only be unleashed when we actively make these kinds of demands of these technologies. The students of the future should be oriented to this possibility, allowing them to stand their ground amidst the technology-mediated onslaughts of the modern world. Integrating ICT into education will require that these aspects of the technology are catered to as a whole (NCERT, 2006).*

Thus, education policymakers and planners must first of all be clear about what educational outcomes are being targeted through the integration of ICT. These broad goals should guide the choice of technologies to be used and their modalities of use. The potential of each technology varies according to how it is used. The use of the earlier technologies like print and audio-visuals are justified with their educational implications. Though many of the early stage technologies met the demands of the behaviourist approach, networked computers and the Internet are the ICTs that enable interactive and collaborative learning, and their full potential as reliable educational tools are still being studied worldwide.

### **Objective of the Study:**

The primary objective of the study is to analyze IT@School, a project for ICT integrated Education by the Department of General Education, Government of Kerala. In its broader sense,

the programme, along with the review of some other programmes, aims to have a sense of direction towards successful ICT integration into education of a developed country.

### **A Review of Lessons Learnt from Different Countries:**

ICT in education worldwide has to address a lot of issues in its implementation. When considering the overall impact of the use of ICTs in education, the issues related to effectiveness, cost, equity, and sustainability are central in many developing countries. Although valuable lessons may be learned from best practices around the world, there is no one formula for determining the optimal level of ICT integration in the educational system. There are a lot of significant challenges that policymakers and planners, educators, education administrators, and other stakeholders need to consider while integrating ICT into education. A review of the studies conducted by UNESCO may give glimpses into some of these issues.

*Integrating ICT into Education: Lessons Learned: A Collective Case Study of Six Asian Countries (2004)* is a significant document regarding the use of ICT in education. This package by UNESCO Asia and Pacific Regional Bureau for Education arose from the rapidly growing body of experiences, and innovative strategies and approaches from countries in Asia and the Pacific- Indonesia, Malaysia, Philippines, Singapore, South Korea and Thailand. Experience in the six countries except Singapore has shown that monitoring and evaluation are the weakest components in most ICT in education programmes. While a number of stocktaking research studies have been conducted on ICT infrastructure penetration and access in schools, there have been minimal monitoring and evaluation of ICT integration and its impact on teaching and learning. Evaluation is an important phase in the formulation and implementation of an ICT in education programme. Evaluation, both formative and summative, means that policies, practices, and activities are documented, interpreted and analyzed in detail. Both qualitative and quantitative methods are used, including observations, interviews, focus group discussions, reflective journals, questionnaire surveys and assessments. The data collected and analyzed will then provide information on practices and policies to effectively integrate ICT in schools. Unfortunately, the findings of the few research and evaluations that have been conducted have not been widely shared with policy makers and practitioners. This component focuses on three issues of monitoring and evaluation: (i) documentation of the benefits of using ICT in education, (ii) evaluation methodologies, and (iii) programme evaluation.

Based on the experiences of the countries except Indonesia, the following are the lessons learned with respect to three issues:

**1. Documentation of the Benefits of ICT Use in Education.** It is learned that proper use of ICT tools offers students and teachers learning and teaching opportunities and improves teaching and learning processes. Secondly, investment in research and development projects and centres has

contributed towards examining existing pedagogical practices, revising and refining practices, and exploring new pedagogical approaches to ICT in education. In addition, research has helped policymakers to formulate ICT targets and goals. Finally, evaluation can demonstrate the reasons for the under-utilization of ICT resources and identify major obstacles to their full utilization in schools.

**2. Evaluation Methodologies.** It is noted that action research is one of the best methodologies for documenting the process of effective ICT integration. Also, assessing the learning impact from ICT use is better measured through other means besides the paper-pencil test method. To gather the most meaningful data on the integrated use of ICT in schools, both quantitative and qualitative methodologies should be used, employing various data gathering instruments, such as case studies, questionnaires, face-to-face interviews and focus groups.

**3. Programme Evaluation.** Many countries recognize that evaluation of ICT in education programme should be a continuous process, covering planning, implementation, reflection, refinement, effectiveness and user acceptance. Due to limited experience in ICT use in the region, better quality directions for the programme can be obtained by benchmarking the quality of ICT projects against international studies, standards and best practices.

*Initiating and Managing School Nets: Lessons Learned (2007)* is the third volume in the ICT in Education Lessons Learned series. This volume provides an overall summary of the lessons learned during the implementation of the UNESCO School Net project, “Strengthening the Use of ICT in Schools and School Net in the ASEAN Context”, which was funded by Japanese Funds-in-Trust (JFIT) and the ASEAN Foundation. The UNESCO SchoolNet project succeeded in initiating new national SchoolNets, or strengthening existing SchoolNets, in eight member-countries of the Association of South-East Asian Nations (ASEAN); namely, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam. The project also implemented innovative methods of using ICT in schools and provided various types of training for teachers in the participating schools. Experiences and lessons learned through the project have been drawn out and summarized in the document to provide guidance for educators and others involved in initiating or managing national and international School Nets.

This document summarizes the key lessons learned from the study under different issues. They are as follows:

**1. Prepare the foundation of the SchoolNet.** It is important to establish clear goals, objectives and targets for the SchoolNet, to guide implementation, and set benchmarks and indicators so as to be able to measure progress. A co-ordination team is essential for the success of any attempt to initiate a SchoolNet, instigate improvements, or maintain an existing SchoolNet. Every SchoolNet requires a group of people which manages activities and which maintains and

expands the network of schools. All SchoolNet co-ordination teams require a person or persons to oversee activities at the school level. The best outcomes are achieved when this person is knowledgeable about the needs of schools and teachers. Further, a local or national focus is advisable to begin with. If a SchoolNet begins with a local or national focus it enables a strong foundation to be established, enables Internet use to become entrenched in education, and prevents language from becoming a barrier to participation by all members in SchoolNet activities. Also, deciding which schools to include when setting up or strengthening a SchoolNet, involves identifying teachers who are enthusiastic about utilizing ICT to improve teaching and learning, and who have support from school leaders and administrators. Since it is important not to exclude rural schools from SchoolNets, co-ordination teams should work with partners to find ways of ensuring these schools have the infrastructure required to participate. Finally, for a SchoolNet to succeed and be sustainable, it is important that the Ministry of Education “buys into” the process of establishing and strengthening the SchoolNet, and develops a conducive policy environment and provides ongoing support.

**2. Establish partnerships.** It is learned that partnerships are vital part of any successful SchoolNet. Given the wide range of factors that need to be managed in establishing or strengthening a SchoolNet, it is important for co-ordination teams to seek partners who can assist in providing the resources and expertise that are required. Partnerships should be formed with the national and local governments to ensure their buy-in and to synchronise SchoolNet activities with the various government education initiatives. Partnerships are needed between the national SchoolNet project and civil society and private organizations to benefit from their resources and expertise. Also, partnerships are needed with universities, especially teacher education institutions, to draw upon their expertise in the professional development of teachers and their pool of teacher educators. Finally, co-operation between teachers and between schools should be encouraged so as to promote sharing of experiences, best practices, and teaching resources.

**3. Acquire funding, ICT tools, digital resources and technical support.** It is vital that the SchoolNet co-ordination team must establish mechanisms for ensuring that schools have sufficient funding, equipment and other resources. It is also learned that co-ordination teams should consider alternatives and innovative approaches when equipping schools with affordable ICT tools. For example, an alternative to new computers is to purchase refurbished computers, and an alternative to purchasing proprietary software is to obtain open source software. Providing ICT equipment and operating software is not sufficient. Schools also need technical support and appropriate applications software and educational software. Support in setting up, managing, maintaining and repairing ICT tools is vital for the smooth running of any SchoolNet. Without it, teachers and students cannot participate effectively in SchoolNet activities. To ensure reliable technical support for schools, it is advisable for co-ordination teams to hire technical support providers that are situated in rural areas and which can provide support via telephone. In addition, Appropriate and useful digital educational materials should be compiled and made

freely available for use by teachers via CD-ROM and the Internet. While existing digital resources should be accessible to teachers, they may not always be appropriate for the culture, language or curriculum so teachers should be encouraged to create locally-relevant digital resources. SchoolNet co-ordination teams should also work with teacher education institutions and other partners to develop locally-relevant resources.

**4. Build the capacity of teachers.** To be able to utilize the Internet and related ICT tools effectively in the classroom, and implement successful SchoolNet learning activities, teachers need to be skilled in the use of these tools. SchoolNet co-ordination teams therefore need to ensure teachers are adequately trained, and organize or facilitate training where necessary. Since many teachers are not aware of the types of digital resources that are available online, and are not aware of the usefulness and relevance of these resources, teachers need to be shown these resources and given demonstrations in their use before they can make sense of them and use them in their classrooms. It is also useful for teachers who have not been able to attend training workshops to instead receive clear guidelines or handbooks showing them how to find or create educational resources that are appropriate to ICT-integrated education. Designing and implementing telecollaboration activities are challenging even for the most competent teachers. Training in how to organize and implement telecollaboration activities is therefore very important. To be able to utilize the Internet effectively in teaching, educators need to have skills in appropriate teaching methods, particularly in learner-centred pedagogy.

**5. Initiate telecollaboration and other online learning activities.** When designing telecollaboration activities, it is important that the teachers have a clear learning objective in mind and keep the activity in line with the school curriculum. Teachers should also keep the activities simple to engage in and enjoyable, and avoid the activity becoming overly time consuming or technically challenging. While a computer, internet connection and basic ICT skills are required, a telecollaboration activity need not require that the class has access to an entire computer lab or the latest equipment. In contexts where there is a diversity of languages and consequent communication difficulties, it is easier for teachers and students if telecollaboration activities are limited to the national rather than international level, until participants are confident with the technology. It is also noted that teachers are able to overcome some obstacles to telecollaboration (such as unreliable Internet connections and time constraints) if they have sufficient support from school administrators and SchoolNet managers.

*ICT in Teacher Education: Case Studies from the Asia-Pacific Region (2008)* is a document that provides information about the issues that are often faced in ICT-enhanced teacher education in the region and the lessons that have been learned through past experience. The case studies were compiled within the framework of the “Training and Professional Development of Teachers and Other Facilitators for Effective Use of ICT in Improving Teaching and Learning” project, which was implemented between 2003 and 2007 by the UNESCO Asia-Pacific Programme of

Educational Innovation for Development (APEID), with the support of Japanese Funds-in-Trust(JFIT).

Teachers and schools face a range of challenges, including infrastructural issues such as lack of power, telephone and Internet access, which hinder the effective use of ICT in teaching and learning. Schools also struggle to optimize use of the technology, due to a lack of appropriate professional development. While many teachers have developed basic computer skills, they have not yet become confident in using the technology to improve their own productivity and bring about pedagogical change. At the same time, ICT administrators and principals are requesting more support in technology management and organizational integration of ICT. Such support is needed in order to align the aims of ICT initiatives with overall school development objectives. The ongoing costs are a major concern for school principals and school committees. Organizational challenges, such as lack of personnel to manage community access, coupled with external challenges, such as lack of after-hours public transport, constitute critical barriers to further access. Teachers and schools are also struggling to clarify roles and responsibilities vis-à-vis the larger education system and are unclear about the support that they can expect from the government and other actors in the country. The study found that great advances have been made at the national level in formulating guiding policies for the use of ICT in education. At the same time, however, important follow-up activities, such as targeted budget allocations, the harmonization of school development strategies with national education development objectives, and the necessary organizational adjustments (distribution of roles and responsibilities) within government and other education stakeholders, have not yet been fully implemented.

The study results identify useful lessons learned from the ICT in education initiatives implemented in Samoa. The results of the study indicate that the initiatives have been successful in contributing to generating an enabling environment for ICT as a catalyst to enhance teaching and learning. At the same time, however, the results of the study have highlighted a number of areas which require additional work in order to better meet local needs and educational goals. With this in mind, a number of critical issues have been raised that should be considered before ICT initiatives in their current form are expanded to additional schools. Overall, there is reason to believe that if such considerations and lessons learned are taken into account, necessary steps undertaken, and appropriate interventions put in place, ICT can prove to be a valuable tool for improving access to, and the quality of, education in Samoa.

### **Summary of the Review:**

Thus, the main issue in the integration of ICT in a developing country does not revolve around the technology itself, but how they are used in a particular setting. In other words, technology should not drive education; rather, educational goals and needs, and careful economics, must drive technology use. Only in this way can educational institutions in developing countries

effectively and equitably address the key needs of the population, to help the population as a whole respond to new challenges and opportunities created by an increasingly global economy. ICTs cannot by themselves resolve educational problems in the developing countries; as such problems are rooted in the issues of poverty, social inequality, and uneven development. What ICTs as educational tools can do, if they are used prudently, is enable developing countries to expand access to and raise the quality of education.

### ICT in Kerala Schools:

Kerala, an [Indian state](#) located on the [Malabar coast](#) of [south-west India](#), has highest literacy among the states of India. More than 94% of the rural population has access to primary school within 1 km, while 98% of population benefits one school within a distance of 2 km. An upper primary school within a distance of 3 km is available for more than 96% of the people, whose 98% benefit the facility for secondary education within 8 km. The access for rural students to higher educational institutions in cities is facilitated by widely subsidised transport fares. Kerala's educational system has been developed by institutions owned or aided by the government. In the educational system prevailed in the state schooling is for 10 years which is subdivided into lower primary, upper primary and high school, After 10 years of secondary schooling, students typically enroll in [Higher Secondary Schooling](#) in one of the three major streams—[liberal arts](#), [commerce](#) or science. Upon completing the required coursework, students can enroll in general or professional under graduate programmes. Schools and colleges are run by the government, private trusts, or individuals. Many of the schools owned by private sector are aided by government. Most of the public schools are affiliated to [Kerala State Education Board](#). Other familiar educational boards are [Indian Certificate of Secondary Education](#) (ICSE), the [Central Board for Secondary Education](#) (CBSE), or the [National Institute of Open Schooling](#) (NIOS). English is the language of instruction in most self financing schools, while government and government aided schools offer English or Malayalam.

The Official Web Portal of Government of Kerala gives the following details:

*Among the Indian states Kerala is miles ahead of others in social indicators like literacy rate, higher enrolment of students, percentage of girl and SC, ST students in school, schools and colleges even in remotest regions, low dropout rate among students etc. State Government and Local Self Government Institutions are committed in providing good quality infrastructure and hygienic environment in schools. The state is making concerted efforts in sustaining the achievements in the elementary education sector and improving the quality of secondary, higher, technical education and research. Kerala's literacy rate is comparable to the most advanced regions of the world. Kerala's literacy rate which was only*

*47.18% in 1951 has almost doubled to 90.92% in 2001. The male, female literacy gap which was 21.92% in 1951 has been narrowed down to 6.34% in 2001. Even before independence, Kerala had been in the forefront in the matter of literacy and it retains this rank even now (The Official Web Portal of Government of Kerala, 2011).*

**IT@School:**

IT@School is a project of Department of General Education, Government of Kerala. setup in 2001, the project's objective is to foster the IT education in schools, that would facilitate ICT enabled education in the state. The Project has now been implemented from 5th to 12th Standards in the state covering as many as 8000 schools. An estimated six million students and two hundred thousand teachers are now part of this project who have benefited from ICT enabled education. Today, the Project has completed a decade of ICT integrated education. It has a strong network of 160 Master Trainers and 5600 School IT Co-ordinators statewide, who are school teachers themselves. The Project aims to empower all the school teachers in the state on ICT tools, making them IT experts and also to implement ICT enabled learning system for all subjects. Apart from infrastructure deployment to schools, the Project also ensures the proper maintenance of hardware equipment at schools through Hardware Clinics and reporting of faulty machines through the web portal which would then be rectified. The project functions as the nodal agency of General Education department for e-governance. It has now become instrumental for the automation of the entire department functions (General Education Department Government of Kerala, 2011).

**Functions of IT@School:**

The main functions of IT@School are as listed below:

- World's largest simultaneous deployment of FOSS (Free and Open Source Software) based ICT education
- Capacity building of the teaching and the learning community
- Infrastructure Upgradation of schools under ICT scheme
- Broadband internet connectivity to all schools in the state
- Hardware Clinics- first of its kind to repair damaged computers at schools
- Unique scheme for electrification of classrooms to fuel ICT enabled education.
- ICT based Content Development for teachers and students
- E-Governance Initiatives in General Education department
- School Wiki – to promote collaborative content development
  
- EDUSAT initiatives in the state including ViCTERS educational channel

It is noteworthy that the target group of IT@School Project is the 21<sup>st</sup> century students, teacher and parents, with the primarily focus on the students. Today after 10 years of operations in the state, IT@School has proven that ICT enabled education could be implemented in the state in a phased manner which would benefits millions of students.

**Developing Stages of IT@School:**

IT@School in Kerala has grown into the present condition after a continuous and gradual development over a decade. The following table illustrates the developmental stages of the project.

Serial	Year	Developments
1	2000	A task force was formulated headed by Prof.U.R.Rao & the Vision Document was submitted.
2	2001	IT@School Project was established and IT campaigns were conducted statewide.
3	2002	Network of Master trainers and School IT Co-ordinators were formed and Teacher empowerment programmes started.
4	2003	IT became a Compulsory subject in State Curriculum, IT practical exams undertaken.
5	2004	District Resource Centers of the Project were setup and IT enabled contents developed.
6	2005	IT@School Linux was developed so was the launch of EDUSAT ViCTERS network.
7	2006	Complete shift to Free Software, Handbooks and supplements developed.
8	2007	IT practical exam were conducted entirely on FOSS.
9	2008	(1) Broadband connectivity was provided to all schools in the state (2) Piloting of ICT enabled education from IT education commenced (3) Laptops were issued to all schools in the state (4) IT@School was selected as the nodal agency for all e-governance initiatives within Department of General Education (5) IT@School Project enabled a complete FOSS implementation within the Education department
10	2009	(1) The shift to ICT enabled education was at pace. (2) ViCTERS educational channel was made available in all local cable networks. (3) Electrification of classrooms was initiated by the Project.

		(4) IT@School Project was expanded to Upper Primary and Higher Secondary sections.
11	2010	(1) Complete implementation of ICT enabled education in the state commences. (2) School Wiki was launched by the Project. (3) Model ICT schools with Smart Classrooms are being implemented statewide. (4) Training for over 28,000 Student School IT Co-ordinators was undertaken.

### Activities of IT@School:

IT@School implemented diverse set of activities for the success of the programme. Important activities are enlisted below:

- Capacity building
- Infrastructure upgradation
- Content Development
- E-Governance initiatives
- Satellite based Educational System

**Capacity building.** IT@School project initially concentrated on capacity building. The objective is to transform the teachers into IT enablers, in such a way that they would use ICT in actual classroom practice. This new culture would also pave way to a situation wherein in the near future, students would themselves become the IT enabler, with the support of these teachers. As IT education is provided by experts, there is a need for providing training to impart adequate IT skills to teachers and support them with content and support systems to help them transfer this learning to the students.

During the first phase of the Project, it was acknowledged that though some of the schools had appointed a separate person as IT instructor to handle computer labs, it was learnt that a huge gap existed between the IT instructor and teachers as well as students. It was evident that by posting an IT instructor would in no way help in facilitating ICT education in the schools, but it would negatively affect the entire learning system. The subject teachers in schools themselves had to assume the role of the IT enabler and this core principle of empowering the existing teachers to use IT as an educational tool was a major vision of the project. The project has trained over two hundred teachers of the state till 2009. In 2009 a total of 14,546 teachers were given specific training in ICT especially for Physics and Chemistry, and it is expected to cover up to 60,000

teachers of other subjects as well. As part of implementing a complete ICT enabled educational system, the Project has imparted ICT training to 10,000 Student School IT Co-ordinators (SSITCs) in the state. In addition, intensive training programme was carried out at selected schools statewide. Training was given to familiarize the basics of Operating Systems and office packages and other application software. A 3 day hardware raining training programme was given on hardware maintenance and basic support. Another 20 hour Internet training training programme was given to all SITCs and interested school teachers. The trained SITC then trained all High School teachers in their school. Government has also issued strict instructions that every student in Std X in the school should get at least 10 hours of internet exposure per year. In association with Insight scheme of Kerala State IT Mission, the Project has successfully imparted IT training using free software for teachers of special schools for visually challenged, by exclusively using free software based screen reading software named ORCA. Also, a two day training on camera handling was given to the teachers, enabling them to create educational videos which could be beneficial in implementing ICT enabled education. Lastly, specific training on ICT enabled content was provided to teachers so as to enable them to use ICT enabled content in all disciplines of study.

**Infrastructure upgradation.** Prior to the commencement of the Project, IT infrastructure of the state schools were very poor. The Project conducted a detailed school survey with the help of Master Trainers and School IT Co-ordinators and subsequently the Project was able to provide necessary infrastructure in schools in a phased manner. Initially computer labs and multimedia rooms were setup at schools. The Project was able to provide all necessary infrastructure and ICT equipments to the schools, with the help of “ICT in Schools”, a scheme sponsored by the Government of India. As per this scheme a total of 4071 schools covering from Standard 8 to 12 benefits in the state. Several ICT tools such as Laptops, DLP Projectors, Printers, Scanners etc were supplied to the schools after scrutinizing their actual requirement. The Project also introduced with a unique concept for the maintenance and repair of damaged computers at schools – the Hardware Clinics. Through this programme, intensive hardware training was given to the teachers which boosted their confidence to such a level that they could handle most problems found in PC.

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. IT@School Project has also come up with a unique programme for funding the electrification of more than 20,000 class rooms in government schools. A total of over 2035 schools, which include 1045 high schools has benefited in this scheme, by getting 10 classrooms and their computer labs electrified. With electricity available in classrooms, it would

be possible for the teachers to bring in laptops and projectors and even wireless internet into classrooms, enabling ICT based teaching and learning.

**Content Development.** To foster the content development processes, IT@School Project has successfully rolled out several programmes which included the development of its own Operating System - IT@School GNU/Linux- which is now being used in all the schools in the state. Apart from this, several educational software are being extensively customized by the Project in developing teacher friendly applications for facilitating complete ICT enabled education in the state. The Project has also prepared interactive multimedia CDs, Handbooks & Training modules for ICT, as well as Text books for IT in standard 8, 9 and 10. Every content developed by the Project is strictly as per the new curriculum approach based on the National Curriculum Framework 2005. The Project has also associated with Intel Skool for collaborative content development programmes <http://kerala.skool.in>.

The Project has also developed contents for Upper Primary classes – for 5-7 classes and the same has been given to all schools. To add with this, the Project had developed E-Text books for Std 8 to 10. The ICT enabling process which was piloted in the state two years back has become a success; with this year's 8th Standard IT text book being entirely based on ICT enabled education, with inputs from all subjects. An unique 8GB Resource DVD for teachers was also developed by IT@School Project, which included the latest edition of Edusoft, 50 selected articles from Malayalam Wiki, Malayalam Computing tools, IT@School Linux 3.2 Operating system, New Edition of Ubuntu OS, ICT Training module, Educational contents on Biology & Maths and PDF versions of Textbooks and Handbooks. The ICT training by making use of the Resource DVD has been given to over 60,000 teachers in the state.

The Project also introduced a customized version of WIKI, namely [www.schoolwiki.in](http://www.schoolwiki.in) which provides a comprehensive knowledge database of all schools in the state. The aim of SchoolWiki is to bring out collaborative data building and to generate more interest among students to learn Malayalam and to generate more contents in various subjects. Schoolwiki also features an ICT Learning Corner, which would include the various contents prepared by schools for all subjects in ICT enabled education. The various contents are packed in DVD and CD ROMs which are supplied free of cost to the schools with the idea of free distribution among the learning and teaching community. This process eventually resulted in the Free Digital Library at Schools wherein the contents included the subjectwise contents, contents which are telecasted through ViCTERS channel, exam oriented programmes etc. With all schools provided with Broadband connectivity, most of these contents were also made available online.

An important fact to be noted here is that the Project functions on Free Software platform as 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.

**E-Governance initiatives.** IT@School Project has successfully implemented several E-Governance initiatives in the state. First of all, a single window admission system was introduced for Plus One admissions. This facilitated a systematic admission process for Plus One students. The system brought transparency, efficiency and social equity to the whole process. Secondly, noon meal computerization was setup to implement the management of noon meal distribution program in all schools by using an online system. Thirdly, online transfer and Posting of teachers was introduced to enable smooth transfer and posting process of school teachers throughout the state. Fourthly, youth festival software is a complete free software based ERP for the State School Festivals in Kerala. Fifthly, pre-metric scholarship was set up to enable pre-metric scholarship programme online using software so as to help the right students benefit through the scheme. Sixthly, centralized online textbook intend system was introduced to facilitate the timely distribution of all text books even before the opening of schools, through which even the online status of text book printing was made available. Seventhly, SPARK (Service Payroll Administrative Repository for Kerala) was implemented within General Education department for digitizing the service book details of all employees of the state so that the database could be used for the decision makers and to ensure the welfare of the employees. Eighthly, it introduced a completely digitized software on Total Physical Fitness Programme wherein details of three million students are available for further action. Finally, online transfer and posting of teachers was intended to facilitate the smooth transfer and posting of over 60,000 teachers in the state as well as Head Masters and Assistant Educational Officers. Every year, the department receives applications from teachers working in government schools requesting to be transferred to a place of their choice. In the manual system, the process of handling these requests was riddled with corruption and nepotism. Through computerized counseling, all the requests are now prioritized according to the reasons indicated in the request. One of the significant reforms is the online submission of application and transparent transfer policy. This transparent system eliminates bribery and corruption prevalent in the earlier manual system. The entire process of transfer and posting in general category can now be done even within one week.

**Satellite based Educational System.** The project functions as an agency for EDUSAT, a satellite that India has launched exclusively for the purpose of educational activities. With the technical support from Indian Space research Organization (ISRO), the project has successfully implemented various activities based on EDUSAT. The first phase of the programme introduced various interactive classroom sessions, facilitated by Receive Only Terminals (ROTs) in selected schools. This enabled valuable exchange between subject experts and students. Also, it enabled the students to expand their knowledge in academic subjects as well as gain new insights at the social level.

The second phase of EDUSAT initiative launched an educational channel - IT@School VICTERS (Virtual Classroom Technology on Edusat for Rural Schools ) in 2006. Through ROTs, a large majority of schools in the state are able to access ViCTERS. It is transmitted

through the local cable networks and covers 80 percent of the households in the state. Currently VICTERS is telecasted 17 hours in day; from 6 a.m to 11p.m. Programmes on the channel provide the right mix of entertainment and knowledge to the children. These include various local productions as well as international programmes. Numerous programmes on Science, Technology, Language, Art, Music, Films etc. are prepared for the channel. Various programmes and videos prepared by students and teachers are also aired through the channel. VICTERS has collaborated with several national and international institutions like NFDC, BBC, Deutsche Welle for providing world class educational contents for the benefit of thousands of students. Besides the regular role it plays for dissemination of knowledge and Information Technology, VICTERS strives to provide all physical conveniences to students and teachers to come up with their own productions. As compared to any other states in the country, the project has utilized EDUSAT's services to its optimum.

### **Lessons Learned from IT@School:**

It@School imparts the quintessence of integrating ICT in the education system of a developed country. It is learned that a systematic approach can bring about many developments in the field of education. It is also deduced that the influence of ICT is not limited to teaching learning process, but can encompass the entire spheres of education, including its capacity building, infrastructure, and administration. The implementation of the programme reveals the following implications that make it successful.

- The success of any programme lies in its vision. IT@School had the vision to see the possibilities of ICT in the field of education. It is learned that integration of ICT in school needs to be gradual and continuous as exemplified in IT@School.
- Effective monitoring of the programme is essential at all levels of administration. Education department should be keen in introducing continuous evaluation of the programme as well implementing novel ideas each year. An evaluation of IT@School shows that a number of new additions over a decade kept the programme alive and updated. Follow-up activities at regular intervals are necessary for the success of ICT integration in education, as discussed in previous documents (UNESCO, 2008).
- IT@School focused on empowerment of teachers from the beginning of its inception. As part of the programme, the education department made it compulsory for the teachers to receive necessary training both in software and hardware. It is very important to ensure that teachers are adequately trained, and organize or facilitate training where necessary, as learned from previous studies (UNESCO 2007).
- Infrastructure Upgradation of schools under ICT scheme is a significant move. Many ICT innovations in the developing world fail due to poor infrastructure facilities. It is noteworthy that IT@School has even focused the electrification of classrooms to fuel

ICT enabled education. This has been to ensure reliable technical support for schools situated in rural areas. The programme has well anticipated the problems discussed in many documents (UNESCO 2007).

- Content development is a noteworthy step in the programme. Several educational software are being extensively customized by the Project in developing teacher friendly applications for facilitating complete ICT enabled education in the state. Interactive multimedia CDs, Handbooks and Training modules for ICT, as well as Text books for IT could meet the requirements mentioned in various national as well as international documents. It is important to help teachers become better at what they do, by enabling collaborative development of teaching material and making this material accessible to all (IBM, 2006).
- Implementation of E- Governance initiatives in the state is a quintessence of the extensions that ICT can provide in the field of education. The services are a wide range of activities from student admission to the posting of teachers.
- IT@School has succeeded in building partnerships with many other organizations in the field. It is learned that partnerships are vital part of any successful programme in ITC (UNESCO 2007). The Project has worked as the agency for EDUSAT operations in the state and could collaborate with the department of IT.
- The project's educational implication is widened in its use of ICT applications in distance education. ICT including TV, radio and internet are useful as resources and providing access to ideas, or for the wider dissemination of information. Distance media can be effectively used to keep teachers in touch with other professionals in the field and to give access to professionals in education. This would go a long way in breaking the isolation of teachers while promoting a 'culture' of seeking academic support and providing the necessary platform for the same (NCERT, 2009).

### **Conclusion:**

An analysis of the project in terms of its initiatives over a decade shows that IT@School in Kerala is a quintessential programme of integrating ICT in education in a developing country. Developments of the programme show that ICT in education has multi-faced promises in education. The most important lesson learned from IT@School is that it is essential to have a comprehensive vision, and continual monitoring for the success of ICT integration. The programme also focuses on the necessity of teacher's empowerment and infrastructural building. Content development, effective e-governance, distance media and collaborative efforts are some of the characteristics that make the programme highly appreciated.

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