

IT@SCHOOL

“EXCELLENCE & QUALITY IN EDUCATION – NO EXCEPTIONS – NO EXCUSES”

IMPACT STUDY REPORT

Prepared by



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EXECUTIVE SUMMARY

Education forms the corner stone of development in any civilized society. As the society is rapidly changing from the industrial economy to knowledge economy, there is a need for redefining education to enable the pupils to adapt technology means- especially information technology- as an integral means of their learning process. The IT@School project stems from this need for transformational evolution required in school education in Kerala to develop future leaders and practitioners of knowledge era who could seamlessly integrate technology in their decision making process. Thus the project is envisaged as a means to create a new generation of thinkers, scientists, technologists and entrepreneurs who will be able to instantaneously access and use any relevant information using IT as a tool¹.

The ubiquitous nature of Information Technology has a lasting impact in the way human being works in the 21st century. The mastery of the IT skills becomes imperative for workforce to survive in the knowledge economy. Learning nuances of Information Technology in early stages of education is no more a matter of choice. However educating a large number of students studying in schools in a new technology poses an interesting challenge as necessary infrastructure , faculty and learning resources have to be created in a short time to achieve this. As IT skills can be learned only in a practical context, it is but necessary that adequate access is provided to the pupils to the technology in the learning process. IT@School Project was envisaged to achieve this daunting task. Thus IT@School tries to educate the students in high school and upper primary schools in Kerala in Information Technology in a phased manner to make them literate by providing basic skills in this new sunrise technology. Moreover, since the learning of IT will be complete if and only if the learner can integrate the same into his or her daily life, the project also has a greater aim to enhance the general comprehension ability of the pupil. i.e to make the learning effective, the project targets to improve the general learning of the pupils by enhancing their comprehension ability. To achieve this twin objectives, IT@School adopted an innovative approach of using IT as an enabler in teaching-learning processes of various subjects rather than limiting itself as an IT training programme. This is planned through a multipronged strategy for transformation covering academic infrastructure creation, teacher-learner empowerment and human resources development. The project has been implemented in all schools in Kerala following state syllabus. While Govt. Schools are provided with infrastructure support, Aided schools were provided the option of acquiring them at concessional rates. Training support was provided to teachers in all types of schools interested in the project. The impact of this innovative exercise on achieving the stated objectives of the project is examined in this report. The impact study was conducted in two phases: In the first phase a census study was conducted to assess the infrastructure

¹ Page 15 :IT in Education Vision 2010: Report of the Task Force, Dept. of General Education, Govt. of Kerala

availability and adaptation of the technology enabled learning means in the curricular delivery. In the second phase an indepth study is conducted in selected 35 schools from various districts in the State. The summary of the findings of this impact study is given in this section. The details are presented in the subsequent chapters of the report.

1.1 Unique Features of IT@School Project Implementation

The Impact Study has identified several unique features of IT@School Project. Some of them are presented below

- a) IT@School is one of the many IT education programmes being implemented by different State Governments in India with support from Govt. of India. However as against many other programmes, the role of Govt. is significant in this project. As an integrated project, IT@School focused on developing in-house capabilities by transforming the existing school teachers (in various subjects) to provide IT education, thus making IT education as a core activity in the schools
- b) Due to this approach followed there would be higher level of teacher engagement as IT classes will have high contextual significance. Moreover this endures scalability and sustainability of IT education
- c) Another major difference of IT@School project from conventional IT education schemes followed in several other parts of the country and abroad is the integration of the IT into the existing curricula of the schools during the second phase of the project. Rather than limiting the teaching of IT as a separate subject, the project envisages to extend it in making IT as a part of education delivery of various subjects taught in school like science, mathematics, humanities and languages. This integration of the program with existing structures and processes will make it more acceptable to the teachers, as it enhances their own effectiveness.
- d) *IT education, IT enabled education to IT embedded education.* IT@School is envisaged as a model way of mastering a new technology, which is generally regarded as a major enabler for decision making in varied fields, through a three pronged approach. It spans the entire continuum of IT education that extends from IT Instruction at one end (teaching software, hardware aspects, programming etc.) to IT embedded 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, in a phased manner. As of now, the project has progressed to occupy a position somewhere in the middle of this continuum, wherein it provides Instructor with freedom and flexibility to adapt IT to increase learning effectiveness. Though IT enabled learning itself is novel in Indian context at school level, the project is slowly migrating to IT embedded learning which will make its impact more visible and significant as there will be a strong compulsion to adopt and adapt IT in classrooms.
- e) There is no separate IT instructor handling IT subject under the project. Subject teachers provide instruction in Information technology in two ways. They handle IT

as a subject to provide them nuances of the technology to make the pupil master the technology. Further the 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”

- f) Once fully implemented, as against the mere computer literacy and software education programmes, IT@School will be an attempt to effectively use the computers and ICT means for enhancing pedagogical effectiveness. To this extent, IT@School can be viewed as a unique large scale computer aided learning programme that transcend different subject boundaries to provide holistic education.
- g) The software architecture of the project is based on Open Source Software making it one of the largest applications of FOSS in the world. This also ensures that the scalability of the project is not costly. The model also supports the innovativeness and creativity among students and teachers.
- h) The Collaborative content development schemes like School Wiki provides a novel platform for the various stakeholders to contribute to the sustainable development of the project.
- i) Finally, IT@School may be perhaps the first the IT education programme in India with specific learning goals and evaluation methodologies. By making IT as a compulsory subject at the matriculate level and conducting statewide examination in the subject of Information technology along with other subjects, IT@School project provide a way of measuring the skills learned by the pupil through the project.

1.2 Impact Study : Focus Areas

IT@School project, which emerged out of the *IT in Education Vision 2010* of Govt. of Kerala, is expected to provide transformational evolution to convert education into a process that creates individuals who are enabled in life long learning and whose intellectual capital would contribute to society’s wealth and well being². However this is a long term vision and it is too early to assess such a long term impact. However, as the project is 8 years old, it was possible to assess the maturity and impact of processes that is leading to such a long term vision. Hence this study is limited to assessment of realization of following (short term) primary objectives

- i) Understanding of nuances of Information Technology by the pupil.
- ii) Computer literacy and ability to use Information Technology vital in different spheres of their future activity.
- iii) Improvement in the intellectual ability of the teacher and comprehension ability of the students (learner)
- iv) Development of packaging of content for various subjects using ICT tools to enable faster and effective learning within the existing curriculum framework

² *ibid*

- v) Development of an organizational structure with the wide network of schools spanning the entire State of Kerala that could effectively deploy the ICT tools for education enhancement
- vi) Development of appropriate infrastructure for ICT enabled learning in schools
- vii) Achieving 100% computer literacy among school teachers
- viii) Development of distance learning modes through ICT means to enhance class room learning
- ix) Usage of satellite technology to create a synergic atmosphere of edutainment in schools under the project

1.3 Assessment Methodology

The impact study was conducted in two phases. In phase 1, data regarding the availability and usage of ICT infrastructure and tools were collected from all the schools covered under IT@School project. A sample of 35 schools were selected from various districts to do an in depth study. This study involves interviews with various stakeholders of the project- the teachers, students, parents and IT coordinator in the school. The primary purpose of this study was to make a qualitative assessment of the project in achieving the objectives outlined earlier. The results of the study are summarized in the next section.

1.4 Results of the Impact Study

The summary of the Impact Study is presented here. The details are presented in Chapters 4 and 5. The various dimensions of the project based on the impact are classified as High Impact, Medium Impact, Low Impact (areas requiring improvement) and Very Low impact (areas of concern). These are presented in annexure-1

1.5 Future Directions

The first phase of IT@School is a great success. It could achieve most of the stated objective to a large extent. The creation of basic infrastructure in all schools, Training subject teachers to double up as IT teachers, introducing IT as a compulsory subject in all schools as part of the curricula, conducting State-wide examination to assess the knowledge by making IT as one of the subjects in the centralized SSLC examination etc. are indicators of this success. The proof of the concept- learning IT by integrating the same into other subjects- is been established and a well oiled organizational structure to implement the same is also in place.

The project is now entering into the new phase of implementation. Rather than limiting it as a IT education programme, it is fast maturing as IT enabled and IT embedded education programme. However in order to realize this , there is a need to augment infrastructure in schools. This relates not only to IT infrastructure but the general class room infrastructure *per se* as class rooms are still not IT friendly. Attempts in this regard with support of funding

from SSA have to be augmented. Another area of development is in the area of human resources. While teachers have successful in their role as IT teachers, the transformation as IT enabled teachers (who uses IT means in enhancing the delivery of their own courses) is still in progress. Even though they are adopting this new way of thinking and working at a satisfactory pace, the role of the leadership-especially the head of the school is observed as a crucial element in the success of the project. As many of them are technophobic senior teachers, a separate methodology to address their concerns so as to ensure full buy-in from them have to be implemented. Similarly the parents and other external stake holders have to be educated about the philosophy of the project to ensure their support. Societal buy-in is crucial for further progress. Details of future suggestions are given in chapter 6.

IMPACT STUDY: OVERVIEW

2.0 Introduction

Information Technology plays a very important role in the economic development of modern India. The IT led knowledge era had ushered in a new found status for India in the global space giving the country attaining a leadership position for the high quality manpower supply in this sunrise sector. In 2009-10, the size of Indian IT-BPO industry has crossed 70 Billion USD³, making it contributing to 5.8% of country's GDP. The software and service revenues aggregated to around USD 60 Billion. The industry registers a continuous growth of around 20% for past several years making it one of the fastest growing sectors in the economy. This success story of India is predominantly driven by the quality of the manpower. The sector employs around 2.23 million directly and another 8 million indirectly. The high growth markets in Asia and Europe are expected to fuel further growth in this industry. However, in order to maintain the leadership position, it is imperative that the quality of manpower has to be augmented further. As country make further advances in the knowledge economy, it is necessary that adequate skills in Information Technology have to be imparted to the population at early stages of education itself. Such education schemes will not only create future professionals who can lead the growth in IT industry but also create an "IT way" of thinking among the populace making India a leader in Knowledge economy as a whole. Realising this Govt. of India and several state governments have started many schemes for providing education in Information Technology at School level so that the next generation will be "IT skilled" when they matriculate from the schools.

Kerala, the State having the highest literacy in India has also made remarkable strides in bringing Information Technology to improve the social life. Several innovative initiatives like Akshaya have seen at least some parts of the State achieving close to 100% IT literacy, making it a unique feat all around the world. The Government of Kerala is successfully experimenting with different projects to exploit IT as a tool to improve the quality and richness of deliveries of various citizen services. Being the State having the highest S&T manpower in India, it is natural that education figure prominently among this.

Kerala has identified the potential of using Information Technology as a major enabler in enhancing the quality of education in the State. In order to harness this untapped potential, the Department of General Education, Govt. of Kerala launched a unique project titled **IT@School**. The objective of project is to enhance the intellectual capability of teachers and the curricular comprehension of the students⁴ by providing ICT enabled education to 1.6 million students per year. The project has so far covered 4 million students and close to 130,000 teachers in the Govt. and aided schools. IT@School project is designed with an objective of traversing 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, is more or less completed and the schemes for introducing IT enabled education has already been initiated, perhaps for the first time in India at such a massive scale. The Impact study was carried out to assess the extent of realization of the goals set by the IT@School project in the initial phase of the project.

³ Source: NASSCOM

⁴ Source : itschool.gov.in/sitepage.php

2.1 IT@SCHOOL : Primary objectives

The landscape of education is changing rapidly. While the cost of educational delivery on the rise, it is important that the latest technological means have to be effectively exploited to enhance the scope, richness and quality of education. Unfortunately the attempts in India is generally limited to ICT education which is often delegated to teachers specialized in Information Technology subjects. As IT is treated as *just another* subject, the holistic nature of IT and its relevance in the overall learning of pupil are ignored. Rather than focusing on ICT education alone, the need of the hour is to use ICT as a tool for enhancing the educational delivery of other subjects of study. IT@School was started in this backdrop to enhance the quality of education delivery in Govt. Schools through effective deployment of ICT means. The specific objectives of the project are

- i) To create Information Technology skills in students passing out from schools in Kerala
- ii) To improve the intellectual ability of the teacher and comprehension ability of the students (learner) through ICT
- iii) To develop content for various subjects using ICT tools to enable faster and effective learning within the national curriculum framework
- iv) To cover all the Govt. Schools in the State at all levels so as to develop a future student community who will have necessary skills to use ICT in various functional domains
- v) Create an organizational structure with the wide network of schools spanning the entire State of Kerala to effectively deploy the ICT tools for education enhancement
- vi) Create appropriate infrastructure for ICT enabled learning in schools
- vii) To enhance the quality of service (QoS) parameters in education service delivery
- viii) To complement the course delivery in various subjects and laboratory experiments through ICT based simulation and other tools
- ix) To support the schools' entire information needs through effective deployment of ICT in administration and support functions
- x) To explore and exploit satellite technology to create a synergic atmosphere of edutainment in schools under the project

2.2 Assessment of IT education

IT@School is a revolutionary concept and may be one of the largest simultaneous deployment of IT at school level in the world. Being a unique project, it was important that all stake holders of the project mainly teachers, school administrators and students have to be taken into confidence during the implementation. Three levels of capacity building : namely *Infrastructure* : technical & organizational; *Skill development* : mainly for teachers to re-orient them initially as IT teachers and later extending the process to familiarise them

with ICT enabled teaching-learning process and *Content* : instructional resources that symbiotically merge the ICT tools in educational delivery are necessary for project success.

During the first phase of the project (2001-2009), the focus was on providing IT education in schools and prepare the facilities and teachers, to adopt IT enabled education (using Information Technology for enhancing learning effectiveness in different subjects) when introduced later (from 2010 onwards). As the ultimate objective of the project to make IT an enabler in education, the task of teaching IT as a subject was also assigned to subject teachers in the schools. The logic of this unique model (where no separate teacher for IT education is deployed) is that, when IT is taught by subject teachers, the inter linkage of IT with various subjects and its ubiquitous nature will be visible to the pupils, thereby motivating them to learn the same for their overall development instead of limiting it as just another subject. However this involves development in several counts as outlined below

2.2.1 Training of Teachers

As IT education is provided by subject teachers (who need not be experts in IT), 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. This way the teachers will be better prepared to adopt and adapt in their own subject delivery later (from 2010 onwards).

2.2.2 Development of IT infrastructure in Schools.

As a practical subject, Information Technology education required adequate ICT infrastructure. The Project has to provide IT infrastructure like laptops, computers, projectors and similar ICT equipments to schools. Even though this infrastructure was provided with community support in the initial period of project, the support from Govt. of India under the ICT scheme has accelerated the deployment since 2008. The entire gamut of 5827 Schools have to be covered during the project period.

2.2.3 Curricular support for IT education.

In order to provide a structure for IT education and to motivate the schools to adopt IT education vigorously, it is important to mandate IT education as a part of the School curriculum. This will also provide clear metrics for measurement of the "IT skill levels" of the students at various levels. However in order to realise this, proper content, syllabus, curriculum and evaluation (practical and theory) schemes are to be made available to the schools. As a part of IT@School project, IT was made a compulsory subject from Standard VIII onwards from 2003 and in Standards V-VII by 2009.

The primary scope of the impact study involves assessment of achievement in these three vital elements of the project.

2.3 Assessment of Readiness for IT enablement of Education.

As discussed earlier, IT education is not the final objective of IT@School Project. It is only a means to achieve the larger goal of IT enabled education, where subject teachers use IT as a tool in enhancing the effectiveness of pedagogy and course delivery. The second phase of the project starting in 2010, will focus on this ambitious goal. However, in order to achieve this, following issues have to be addressed

2.3.1 Infrastructure

As IT enabled education will take IT into classrooms from specialised labs where IT education is generally delivered, it is important the civil infrastructure of schools have to be "IT compatible". However as many of the Govt. schools do not have quality classrooms with adequate electrical connections, there is a need to improve on this count. Moreover, as computers assumes the larger role of a major learning tool, more number of multimedia projection systems and laptops are necessary to enhance class effectiveness.

2.3.2 Teacher Capabilities and Pedagogical Content

The other element which is crucial in the success of the IT enabled education is the capabilities of the teachers who are driving this transformation. Teachers have to be inventive and innovative to adapt and adopt IT in their subject delivery. It is necessary to support teachers with adequate pedagogical content and software tools to enable this transformation.

2.3.3 Curricular support

In order to ensure wide spread adoption of IT enablement of education, it cannot be left as voluntary choice among teachers. Inclusion in the curricular design with proper text books and other learning materials is necessary.

As a secondary objective of the Impact study, it is planned to assess the readiness of the various schools (where IT@School is implemented) to embrace the IT enabled education.

2.4 Structure of the Report

This report presents the assessment of the impact of IT@Project in the various Govt. and Aided Schools in the project. As the project completed its first phase in 2009, the primary focus of the study is to assess the extent of deployment of IT infrastructure, capability building among the teachers and to explore whether this has resulted in tangible achievements in enhancing IT skill sets of the pupil. However the project also looked at the readiness among the schools to adopt and adapt IT for enabling better education delivery in class rooms and in improving productivity of the teachers. The methodology followed in the study and summary of the data collected is presented in next chapter. The analysis of data collected to assess the impact of IT@Project in imparting IT education is presented in Chapter 4. Chapter 5, provides as assessment of readiness of the project beneficiaries to

adopt IT for enhancing education delivery. This chapter also provides a detailed assessment of gaps that have to be addressed to ensure effective deployment of IT for achieving the larger project objectives as outlined in the project document. Chapter 6 provides conclusions and directions for future growth of the project.

IMPACT STUDY: METHODOLOGY & DATA

3.1 Scope of the Impact Study

IT@School project, which emerged out of the *IT in Education Vision 2010* of Govt. of Kerala, is a unique scheme to provide transformational evolution to convert education into a process that creates individuals who are enabled in life long learning and whose intellectual capital would contribute to society's wealth and well being⁵. However this is a long term vision and it is too early to assess such a long term impact. The goal however is expected to be achieved through different phases envisaged in the project as shown in the figure 3.1 below

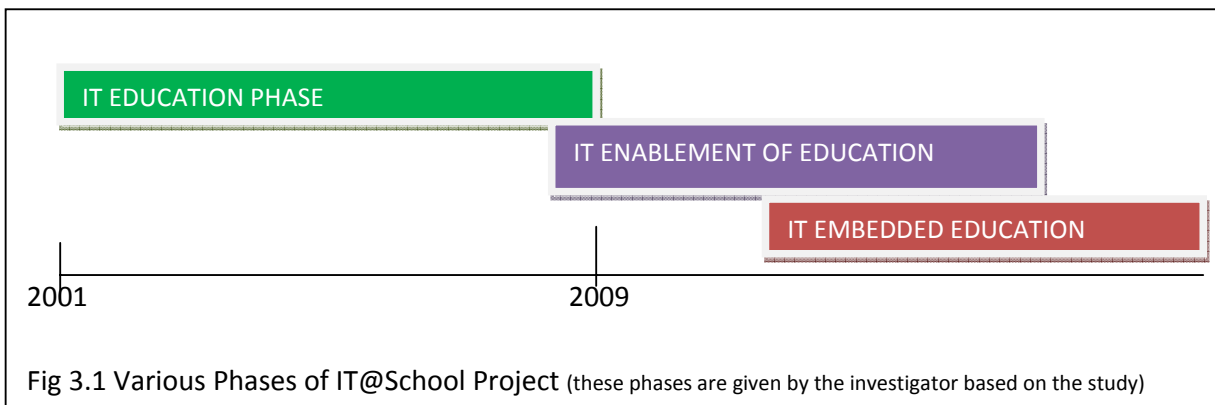


Fig 3.1 Various Phases of IT@School Project (these phases are given by the investigator based on the study)

The “IT education phase” focuses on making IT learning as an integral part of school curriculum while during the phase of “IT enablement of Education”, the adoption of Information technology to impart learning in different subjects will be stressed. In the final phase of “IT Embedded Education”, IT transforms itself as a major learning tool in different classrooms ranging from languages to physical sciences and humanities. By embedding IT in various courses- i.e designing courses in the “IT way”, information technology will become an integral part of the learning environment in school education, thereby achieving the visions envisaged in the project conceptualization document cited earlier.

Since the project is still in the completion of first phase of implementation, the focus of the impact study is limited to the following

- a) Assess the impact of IT@School on providing IT Education
- b) Assess the impact of IT@School in making the schools ready to adopt IT enablement of education

Of this focus will be to explore the how far the following (short term) primary objectives of the project are achieved

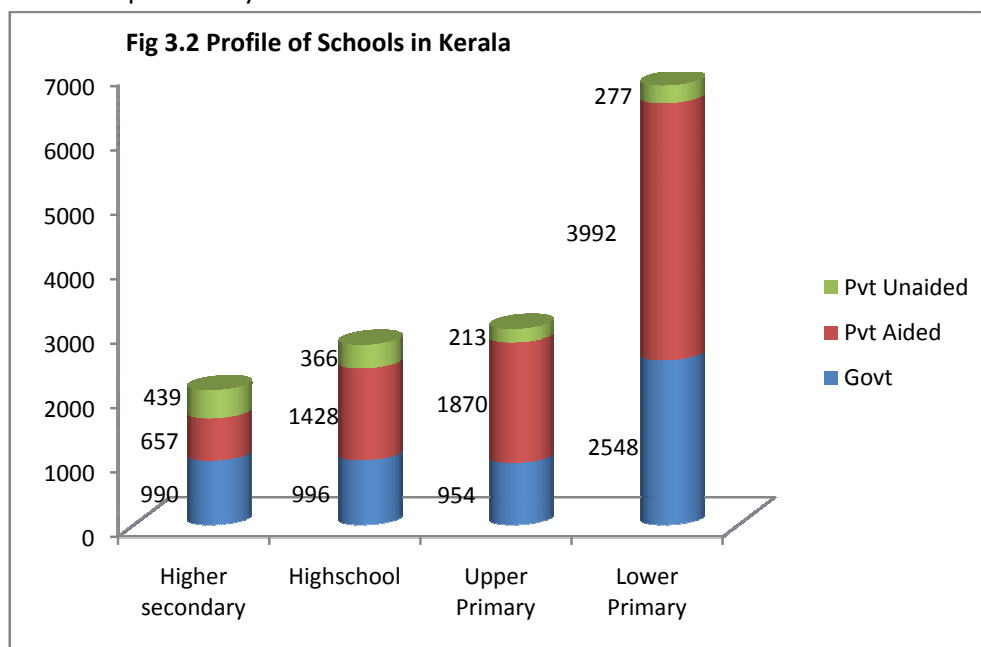
- i) Understanding of nuances of Information Technology by the pupil.

⁵ IT in Education Vision 2010: Report of the Task Force, Dept. of General Education, Govt. of Kerala

- ii) Computer literacy and ability to use Information Technology vital in different spheres of their future activity.
- iii) Improvement in the intellectual ability of the teacher and comprehension ability of the students (learner)
- iv) Assessment of the organizational structure with the wide network of schools spanning the entire State of Kerala that could effectively deploy the ICT tools for education enhancement
- v) Development of appropriate infrastructure for ICT enabled learning in schools
- vi) Achieving 100% computer literacy among school teachers
- vii) Development of distance learning modes through ICT means to enhance classroom learning
- viii) Usage of satellite technology to create a synergic atmosphere of edutainment in schools under the project

3.2 General Assessment Methodology

The profile of schools in Kerala⁶ is given in Table 3.2. As shown in Figure there is a total of 2790 High Schools and 3037 Upper primary schools in addition to 6817 Lower Primary Schools and 2086 Higher secondary schools. By 2009, IT@School has covered all High Schools and Upper Primary Schools in the State. Hence these schools form the population for the Impact Study.



The impact study was conducted in two phases. In phase 1, data regarding the availability and usage of ICT infrastructure and tools are collected (using a standard instrument) from all the schools covered under IT@School project. A sample of 35 schools were selected from various districts to do an in depth study. This study involves interviews with various stakeholders of the project- the teachers, students, parents and IT coordinator in the school.

⁶ This includes only schools following Curricula of Kerala State Board. There are many other schools following central schemes like CBSE, ICSE etc. which are not coming under the purview of this study.

The primary purpose of this study was to make a qualitative assessment of the project in achieving the objectives outlined earlier.

3.3 Assessment Methodology: IT Education

As discussed earlier, the assessment study has two specific parts namely a) assessing the impact of IT@School project on IT Education and b) assessing the impact of IT@ School project on the readiness of schools to adopt IT enabled education. In this section, the details of assessment study for meeting the first objective is described.

IT@School project has a primary purpose of creating IT knowledge among the students matriculating from schools under the project. To assess this, a two pronged approach is adopted in this study.

3.3.1 Impact Assessment based on Process Audit

Here, the processes available in the schools where IT@School is implemented to meet the stated objective of giving IT knowledge for students in High schools and upper primary schools are assessed. The impact of the project is assessed based on the robustness and maturity of these processes available. Specifically three types of processes are selected for study. The processes selected, the rationale, methodology used for assessment of robustness same etc. are given in Table 3.1 below

Table 3.1 Assessment of Robustness of Processes in Schools for providing IT Education

Process	Rationale	Assessment Methodology	Remarks
Teacher capability building	As IT Education is primarily teacher driven ⁷ , the processes that develop adequate IT skills in subject teachers to double up as IT teachers is very crucial for meeting the objective of providing the IT education	The maturity and robustness of this process is assessed through a sample study of 35 schools spanning 10 districts. Moreover, direct observation of training camps and examination of training material was also made to assess this process	The scalability of the process and stability of the support systems are also assessed during the study
IT infrastructure Development and maintenance	As IT is a practical subject, the availability of quality infrastructure is crucial in imparting IT education.	A census study is conducted in all schools under IT@School project to assess the availability of the infrastructure required for IT education. The process for procuring, maintaining	The data collected is verified in a sample of schools through direct observation

⁷ Please note under IT@School Project, there is no specialized teachers for IT teaching. Hence processes for skill development of teachers in IT are extremely crucial in the success of project

		and updating this infrastructure is also assessed during this study	and inspection
Learning Assessment Process (Curricular Support for IT education)	The extent of adoption of IT skills by the pupils also depends on robustness of learner capability assessments	The processes for assessing the learner capabilities as a part of curriculum are reviewed. The actual output of assessment is also examined to get clear picture on the impact of the IT@School Project in providing IT education.	

3.3.2 Impact Assessment based on Measured Outcome

The true impact of IT education can be objectively measured by looking at the marks scored by the pupils in the IT assessment tests and examinations. Govt. of Kerala made IT as a compulsory subject in the SSLC examination from 2005 onwards. While the pass percentage of this examination can be a good proxy for assessing the impact of IT@School Project as the IT education in schools are carried out exclusively through project, it may not rule out effect of other (even unknown) external elements in the observation variable (that is the pass percentage) due to lack of a robust experimental design to exclude such elements⁸. Hence the impact of the project is assessed by looking at the results of the examination in conjunction with the process variables (explained in earlier section) that contributes to the result.

3.4 Assessment Methodology: Readiness for IT Enabled Education

The second objective of this impact study is to assess the contribution of IT@School Project components in making teachers and schools ready to adopt IT as a major enabler in their education delivery from 2010. In order to assess the readiness of the schools, a sample of 35 schools are chosen (as given in table 3.2 below) from various districts. These schools are chosen to represent the differing levels of maturity and to reflect cultural, gender and societal differences, if any, that impact the adoption of technology⁹. In each of these schools in-depth studies are conducted to assess the robustness and completeness of processes that result in ICT adoption. Detailed interviews with different stakeholders were held in each of these schools (profile of respondents is given in table 3.3) to get a comprehensive picture of the ICT readiness. The various processes/variables selected for assessment and rationale for the same are given in table 3.4

⁸ As this is more of a *ex-post* study, it is difficult to make valid judgments just by observing the objective results like pass percentage, without having controlled groups to compare with.

⁹ Even though there are literature that supports the variation in technology adoption across different ethnic groups, no such studies are available in Indian context indicating the psychometric difference in Technology education.

Table 3.2 Profile of the sample of schools selected for study

District	No. of Schools	Remarks
Kasaragod	4	Schools are selected from different socio economic profiles and performance in IT education
Wyanad	4	Wynad is a underdeveloped district with substantial tribal population
Kozhikode	4	A mix of Aided, Govt., Rural and City schools were chosen to understand the differences
Ernakulam	5	A mix of High schools and UP schools are chosen
Kottayam	4	Different socio economic background is chosen
Idulkki	2	Tribal district chosen to reflect difference in implementation
Pathanamthitta	3	Schools are selected from different socio economic profiles and performance in IT education
Alappuzha	3	Schools are selected from different socio economic profiles and performance in IT education
Kollam	2	Schools are selected from different socio economic profiles and performance in IT education
Trivandrum	4	City, Rural schools are selected to understand the difference
Total	35	

Table 3.3 Profile of Respondents of the Study

State Level	IT@School Project Director
District Level	District IT Co-ordinator Master Trainer
School Level	School IT Co-ordinator (SITC) 5-6 Teachers with at least one language teacher and two teachers with varying degrees of IT adoption Headmaster/Headmistress Representatives of PTA Group Students from Std VIII and IX Technical Staff (if available) in IT Lab

Table 3.4 Assessment of Variables in Schools for making them ready for ICT Enabled education

Variables under study	Rationale	Assessment Methodology	Remarks
Civil and IT Infrastructure	ICT Enabled education takes IT into classrooms making IT an important part in course delivery	In the sample of schools availability of infrastructure such as “IT” ready classrooms with proper electrical connections, audio visual equipments, software etc. are assessed	
Teacher capacity building and availability of pedagogical content	ICT Enabled education is expected to increase efficiency and effectiveness of teachers. Hence teachers capacity to innovate and adopt in her classes is an important variable for observation. Similarly availability of adequate software and extent of usage is also a major element of observation	Direct observation and interview data. Examination of the pedagogy plan of teachers to assess the extent of usage of ICT means in their educational delivery Availability and usage of Tools like Geogebra, Chemtool, KTech Lab by the teachers are also assessed through interview with stakeholders (including students)	The usage of ICT for personal productivity improvement as a proxy for IT readiness is also measured for all teachers in the schools under study
Curricular Support	To accelerate the ICT adoption, curricular support and compulsion can play a crucial role	Mainly through interview with State/ District co-ordinators on the extent of Curricular support available and envisaged	

3.5 Data Collection

The census data is collected from all the schools under the project through District co-ordinators of the Project using a questionnaire (Annexure-3.1). The questionnaire seeks data regarding infrastructure as well adoption of ICT means for education. In addition to data collected by administering questionnaire in schools through District IT Co-ordinators, Five investigators have conducted field visits in the schools profiled in Table 3.2 along with District IT Co-ordinator for an in-depth study. Detailed interviews were held with various stakeholders to assess the impact of the project. While the interviews were done in an unstructured format, they were driven by the attributes listed in the questionnaire given in Annexure 3.2. The data collected is recorded and tabulated and used to decipher the process robustness as well as to assess the impact of variables as outlined in Tables 3.1 and 3.4. The results are presented in the next two chapters.

ANNEXURE 3. 1 Questionnaire to IT@School District Coordinators

Greetings from T.A.Pai Management Institute, Manipal. As part of the consulting work taken up with IT@School, we are in need of some basic information about the status of the IT@School project in your district. Kindly provide the data. Thank you.

Name of district: _____

Date of launch of IT@School project in district: _____

Number of schools in district

Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt HS	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec	Other/ Special

Number of schools covered by IT@School

Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec	Other/ Special

Facilities provided:-

1. Laptops

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No.of schools											
Total no. of laptops											
Cost											

2. Digital projectors

	Govt Scho ols	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No. of schools											
Total no. of projectors											
Cost											

3. Desktops

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No. of schools											
Total no. of desktops											
Cost											

4. Printers

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No. of schools											
Total no. printers											
Cost											

5. Scanners

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No. of schools	125	206	20		351	58	58	40	77	129	49
Total no. of scanners											
Cost											

6. ROTs

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No. of schools											
Total no. of ROTs											
Cost											

7. Information on Internet, Bandwidth (B/W)

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No. net connect ed schools											
B/W details											

8. Email connectivity

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No.of schools											
Total no. connect-ions											

9. Website information

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No.of schools											
URL info*											

* Please attach separate sheet, if required.

10. O.S. (Microsoft / Linux)

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
Microso ft O.S.											
Linux O.S.											
Both O.S.'s											

11. Subjects taught using Software

	Govt Schools	Aided Schools	Pvt Unaided	Urban /Rural	Total	Govt UPS	Govt High	Govt Hr Sec	Aided UPS	Aided HS	Aided Hr Sec
No.of schools											
Mathematics											
Social Science											
Physics											
Chemistry											

12. Topics taught using software

Topics			
Subject1 (Maths) using Dr. Geo and Geogebra			
Chemistry			
Physics			
Social science			

13. Edusat Training Centres

- (a) Yes / No :
- (b) Capacity :
- (c) No. of sessions during 2008-09:
- (d) Topics covered (subject-wise):
- (e) No. of students attended (subject-wise): 200

14. ViCTERS

[Indicate no. of times the programme under ViCTERS was beamed for the District during 2008-09, with details of classes, subjects, no. of beneficiaries]

15. District Resource Centres (DRC)

- (a) How many centres:
- (b) Capacity (no. of systems):
- (c) No. of Trainings conducted during 2008-09:
- (d) No. of master trainers:
- (e) No. of trained teachers:
- (f) Maintenance of Hardware and Software – capability: (Indicate details of hardware clinics done in the district)

No of Hardware Clinic conducted :

No of computers Repaired :

No of teachers trained

:

16. Details of training imparted to teachers

	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12
Mathematics							
Social Science							
Physics							
Chemistry							

17. IT application used for administrative functions – Details:

18. MIS reports usage – if any:

19. Infrastructure:

- (a) Electric Power : (Details of Power connection: (Single phase / 3 phase)
- (b) Diesel generator back-up : Make and Model No of Generator & backup details
- (c) UPS; Make and Model No of Generator & backup details
- (d) Electric power connections:
- (e) Any other:

Schools which have performed appreciably well under the project:

	Govt School	Aided School	Pvt Unaided	Urban/Rural
Address & Contact				
A short description				
Reason(s)				

10. For school staff with training, please indicate number with corresponding level of expertise in ICT use.

	Excellent	Very Good	Good	Fair	No capability
Teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-Teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Administrative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Definitions

" Fair - being able to operate basic computer functions and Word processing application

" Good - Being able to operate at least three MS Office applications (MS Word, Excel, PowerPoint) and use these for preparing lessons, to make classroom presentation, etc

" Very Good - All of the above skills used for teaching including the regular use of e-mail and Internet resources

" Excellent - all of the above including use of e-mail, Internet surfing and searching; use of ICT in teaching any subjects; development of web pages; participation in e-learning and putting class online

11. Please indicate the ICT facilities that are available in your school. Also please indicate number of units available.

12. Where are the computers located in school? Computer laboratory / Classroom /

Teacher's lounge / Administrator's office / Library / Others (please specify)

13. How long has the school had the computers? Less than 1 year / 1-2 years / 2-4 years / 4-8 years / More than 8 years

14. The school's computer networking environment is:

- All the computers are networked
- Some of the computers are networked
- None of the computers are networked

Does your school have access to:

Reliable Electricity

Generated power at school

UPS

Landline Telephones

Mobile phones

Fax machines

Internet

Cable TV

15. How many students have access to the school's computers?

- None / About 10 percent / About 25 percent / About 50 percent
 About 75 percent / All students

16. How many teachers have access to the school's computers?

- None / About 10 percent / About 25 percent / About 50 percent
 About 75 percent / All teachers

17. Do your teachers and students have access to the use of ICT facilities after school hours?

- No, they are never accessible
 They are sometimes accessible
 They are always accessible
 They are accessible for a fee

18. How does your school implement the policy on ICT in education?

- by offering separate computer courses
 by using ICT in teaching specific subjects
 by using ICT in the management and administration of schools
 by training teachers on ICT
 others (please specify)

19. Does your school offer ICT courses/computer education and ICT-based lessons/activities?

- Yes No

If yes, how are these offered? Also please indicate number of hours allotted for the course.

- as a separate subject no. of hours/subject
 integrated with other subjects approximate no. of minutes of integration per subject
 as an elective no. of hours
 integrated with elective subjects approximate no. of minutes of integration per elective subject
 as a special programme no. of hours
 others (please specify)
 don't know

20. In which classes or subjects in your school are computers and related technologies used?

	ALWAYS	A LOT	SOMETIMES	RARELY	NEVER
ICT subject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mathematics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Art	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. For what purposes do your school use ICT? (You may check more than one purpose as applicable and indicate the level of schooling where such purpose holds true. Please reply to each only if there is about 25-100% of the total teachers doing it)

- Learning enrichment or learning new things
- Remedial learning
- Regular instruction and training for developing computer skills (i.e., teaching about computers - computer literacy, computer science and programming)
- Finding/accessing information and researching through Internet
- Communicating with others
- As teaching/learning tool for teaching specific subjects
- Development of logic, reasoning, critical thinking and problem solving competence
- Development of ability to use basic application programs (i.e., word processing, database management, spreadsheets, presentation, graphics, etc.)
- For playing games and fun
- Helping with school administration and management
- Using in test administration, scoring and analysis
- Tracking of pupil/ student performance levels, instructional objectives mastered, instructional objectives currently active, and suggested instructional activities
- Others (please specify)

22. Do you collect fees for:

	Yes	No
Computer fee in general	<input type="checkbox"/>	<input type="checkbox"/>
Computer courses?	<input type="checkbox"/>	<input type="checkbox"/>
Use of computers after class by students?	<input type="checkbox"/>	<input type="checkbox"/>
Use of Internet after class by students?	<input type="checkbox"/>	<input type="checkbox"/>
Use of computers by non-formal classes	<input type="checkbox"/>	<input type="checkbox"/>

23. How many hours in a month does your school access the Internet?

24. How many computers are connected to the Internet either as

Stand alone Networked

25. Does your school have a website and e-mail?

a) With website Yes No

b) With email Yes No

26. Does your school have educational software applications (CD ROM and videos) for teaching and learning?

Yes No

If yes, please list down below software applications being used and indicate if these are commercial software or developed in-house and *in which language of instruction*

27. Does the school have a code of conduct for use of computers and Internet?

Yes No

28. Please indicate approximate number of hours allocated for use of X number of computers and related ICTs by students in the school per year

For Teachers

1. Gender: Male Female
2. Age in years:
 - Under 30
 - 30-50
 - Over 50
3. Number of years in the service:
4. Academic levels taught:
5. In which subjects do you use ICT as teaching tool?
6. How many years have you been using computers?
7. Did you receive any training in information and communication technology (ICT) over the past 3 years?
8. What are your main reasons for attending computer training?
9. Please rate your expertise in the use of the ICT tools.
10. How often do you use ICT tools in the following purposes:

	Very often (everyday)	Often (twice or more a week)	Seldom (a few times a month)	Never
Teaching-learning for specific subjects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teaching computer skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finding/accessing information and educational materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making presentations/lectures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparing lessons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with other teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicating with parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring and evaluating students' progress or keeping track of student's performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparing reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Further personal development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others, please specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. How many hours per week are your school's computers accessible to you?
12. If you have access to the Internet, how often do you use in the schools?
13. How do you use Internet in your job as a teacher?
14. Do you have an email address?

For Students

1. Grade/Year Level:
2. Gender:
3. Age in years:
4. How many years have you been using computers?
5. In which classes or subjects do you use computers and related ICTs?
6. Please indicate your level of skills in the use of the computer applications.
7. Who taught you about computers?
8. For what purpose and in what degree do you use ICT in schoolwork?

Purpose	Very Often (everyday)	Often (twice or more a week)	Sometimes (a few times a month)	Rarely (once in several months)	Not at all
Informative: to find, acquire and use information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Functional: to use and manipulate existing information for educational purposes using existing information (compile lists of books, abstract and summarize books and materials, use accessed information to prepare homework, compare information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creating - to compose, compile, produce new information (write papers, drawing, programming, make PowerPoint presentations, give oral presentations, prepare newsletter, create own website, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication - to exchange and to transmit information with other students, teachers and others using email and Internet; to join discussion forum and chats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. In your school, are you able to use the required ICT tools and facilities that you need in doing your subject schoolwork?
10. What are your favourite activities using computers?
11. If you are using computers and related ICTs, how many hours on the average per week of normal school hours are you able to use these computers and related ICTs to do your studies?
12. If no, where else can you have access and use of these ICT tools and facilities outside of your normal school hours?
13. Do you have access to Internet?
14. How often do you use the Internet for surfing websites in schools?
15. Do you have personal e-mail address?

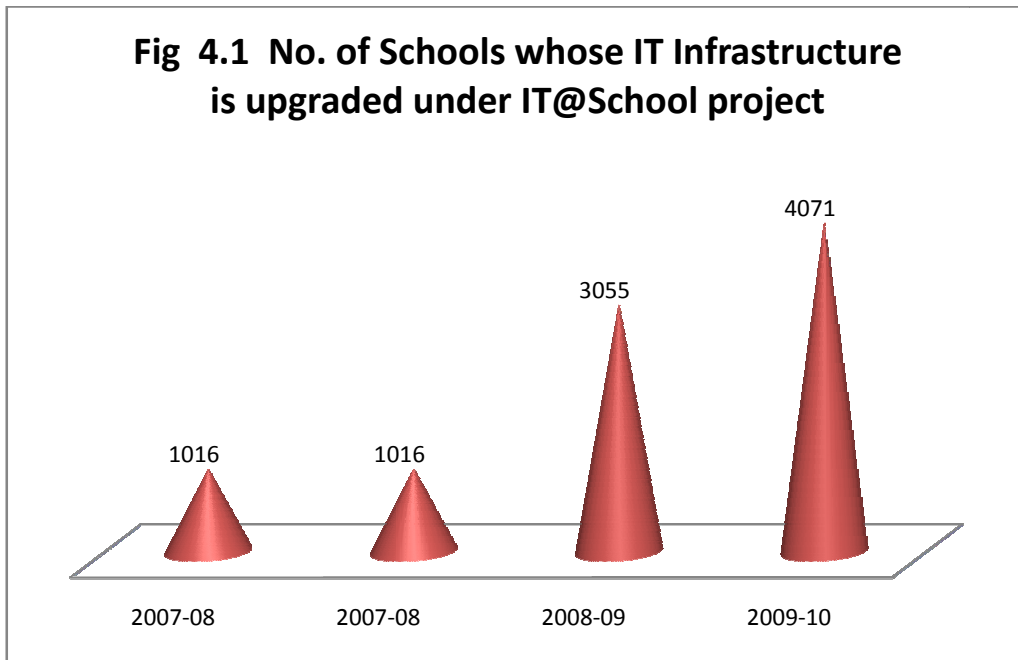
IMPACT ASSESSMENT: INFORMATION TECHNOLOGY EDUCATION

4.1 Project Components for IT Education

In this chapter, report the assessment of impact of IT@School project in imparting IT education in the State is presented based on the data collected. The chapter reports the robustness of processes that support this objective based on analysis of the data collected and field observations made in sample of schools. The primary purpose in the first phase of IT@ School project is to impart IT as a curricular subject so that pupils matriculating from the school systems have necessary skills for taking up higher level learning imparted in higher and vocational education. The understanding of Linux Operating system, wordprocessors, presentation tools, spreadsheets and basics of programming, database management and hardware etc. are expected from a student as part of IT education at school level. The unique feature of IT@School project is that, IT knowledge is not imparted by specialist IT teachers recruited for that purpose but by subject teachers who are trained to take up this additional responsibility. This can result better learning for the pupil¹⁰, as subject teacher relate application of IT to his/her area of expertise thus appraising students of the multi dimensional and pervasive application of IT tools and techniques. This is also a sustainable model as these “converted” teachers can lead the progress of project into next level of implementation of ICT enabled education. However, in order to convert a non expert into an IT teacher, there is a need for training and re-orientation of teachers. Of the 1,13,602 teachers in High school and Upper primary classes, 80,000 of them are already undergone training under IT@School project. Similarly the project also provided positive intervention in infrastructure (especially after 2008) development in schools. As shown in fig 4.1, the number of schools whose infrastructure is getting upgraded is on the rise during the last few years. The third element of the project that contributes directly to IT education is the inclusion of IT as a compulsory subject in curriculum. It was introduced in Class VIII during 2003, IX in 2004 and X in 2005. During 2006, for the first time theory and practical examinations in IT was conducted as a part of SSLC examination. The course was also included in upper primary classes (V-VII) by 2009. The impact of all these project components is assessed both on processes (as outlined in last chapter) and outcome. The data collected in the census study as well as the sample study was used for this analysis. This is presented in the following sections

¹⁰ This was also assessed and proved true in most (96%) of the cases; the assessment was done through in-depth interview with the students.

Fig 4.1 No. of Schools whose IT Infrastructure is upgraded under IT@School project



4.2 Teacher Capability Building

IT@School follows an interesting model for building capability of teachers in the schools. In every school, one teacher is identified as School IT Co-ordinator (SITC) who will be responsible for driving IT education and in propagating ICT enabled education (in a later stage). S/he will be given special training at District IT training centres. The District IT co-ordinator of the project is generally drawn from teachers themselves so that s/he is empathetic to the needs of the teachers in schools. Around 5600 SITC have been identified and trained extensively to drive the project. They are ably supported by around 200 trained master trainers dispersed across various districts. This process of Master Trainer-SITC-Teacher training and accessibility of a trained teacher in the school itself has helped the project substantially. IT@School has already provided training for over 80,000 teachers. If we take a pessimistic estimate of 30% of these trained teachers are capable to drive IT education, the project has so far created around 24,000 highly trained teachers, which translates as around an average of 4.11 trained teacher per school¹¹, which is a healthy figure for driving the project. Thus it is found that IT@School is hugely successful in creating manpower required to drive Information Technology Education in the State. The sustainable model of using subject teachers for teaching IT is a model worth emulating in other parts of the country, especially if IT education has a larger goal of imparting learning through IT means.

It is also found that the training cost for teachers under this scheme is far lower than that of similar training programmes elsewhere in the country. The details are given in annexure 4.1

¹¹ Based on the data that 6827 schools are covered.

4.3 IT Infrastructure: Development and Maintenance

The availability and upkeep of core IT infrastructure is essential for IT education. As IT is a practical programme, it is but natural that high quality infrastructure is available for the pupil to learn by doing. Originally IT@School project was not stressing on creating huge IT infrastructure in schools. However, as shown in fig 4.1, substantial upgradation has happened in recent pasts in schools making them possessing state of the art infrastructure. The Tables 4.1 and 4.2 gives the actual position of infrastructure in schools in various districts created under IT@School Project

Table 4.1 Status of IT infrastructure in Govt Schools

District	IT@School	Infrastructure							
	Govt	Desktop	Laptop	Projectos	Printers	Scanners	ROT	Bandwidth (B/W)	E-mail
Alappuzha	125	341	127	127	125	76	48	2 Mbps	125
Ernakulam	178	649	135	159	195	112	90	2 Mbps	118
Idukki	125	792	159	163	289	148	N.A	2Mbps	Nil
Kannur	159	769	229	145	216	85	99	2Mbps	118
Kollam	138	675	177	164	224	142	76	2Mbps	138
Kottayam	161	455	183	161	112	100	73	2Mbps	109
Kozhikode	143	N.A	105	N.A	N.A	N.A	N.A	2Mbps	Nil
Malappuram	276	849	138	134	232	129	195	2Mbps	163
Palakkad	127	528	93	66	126	102	66	2Mbps	98
Pathanamthitta	90	400	N.A	56	70	48	A.A	2Mbps	50
Thiruvananthapuram	217	909	120	162	260	141	120	2Mbps	161
Thrissur	142	1428	105	122	251	74	99	2Mbps	81
Wayanad	149	645	60	43	129	85	29	100Mbps	43
Kasaragod	150	400	98	98	136	102	60	2Mbps	77
	N.A : Data Not Available								

Table 4.2 Status of IT infrastructure in Aided Schools

District	IT@School	Infrastructure							
	Govt	Desktop	Laptop	Projectos	Printers	Scanners	ROT	Bandwidth (B/W)	E-mail
Alappuzha	206	451	32	36	164	72	12	2Mbps	206
Ernakulam	278	415	152	85	200	108	N.A	2Mbps	191
Idukki	206	N.A	N.A	N.A	N.A	N.A	N.A	2Mbps	Nil
Kannur	360	266	33	33	140	0	25	2Mbps	97
Kollam	270	326	89	93	216	93	0	2Mbps	110
Kottayam	353	496	105	59	225	144	N.A	2Mbps	270
Kozhikode	339	N.A	46	N.A	N.A	N.A	N.A	2Mbps	Nil
Malappuram	347	344	104	53	156	63	11	2Mbps	100
Palakkad	238	251	79	94	162	53	0	2Mbps	156
Pathanamthitta	195	650	N.A	30	120	40	N.A	2Mbps	100
Thiruvananthapuram	196	340	64	121	177	88	0	2Mbps	91
Thrissur	332	3257	27	154	345	20	51	2Mbps	151
Wayanad	77	360	30	24	56	50	10	100Mbps	24
Kasaragod	33	85	32	25	45	22	2	2Mbps	33
	N.A : Data Not Available								

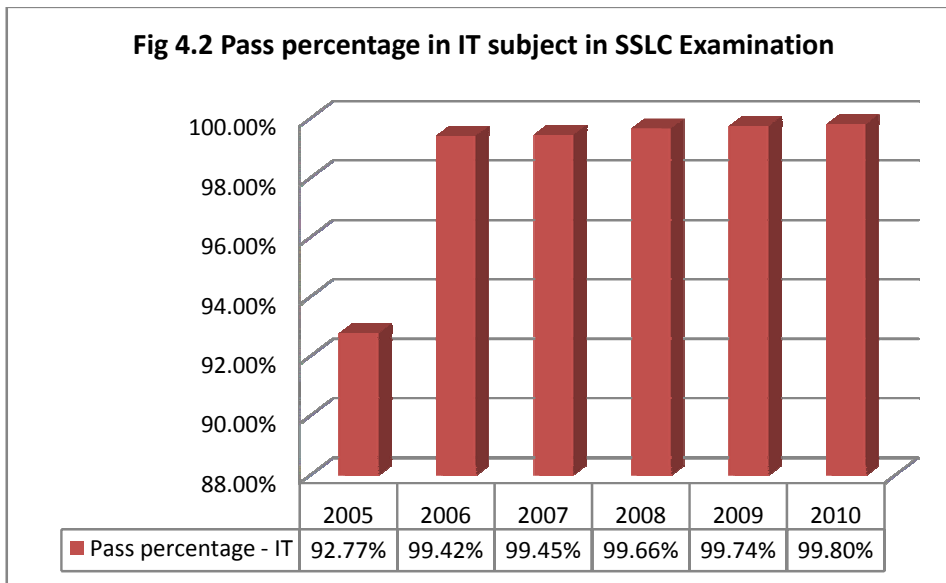
The data in the Tables as well as primary observations revealed that, schools have adequate infrastructure to cover the requirements for IT education. The average users per computer at any time (based on sample study) is around 3.98.

4.3.1 Infrastructure Upkeep and Maintenance

Maintenance of computers at school level is always the Achilles' heel in school ICT schemes. Past studies have shown that typically 42% of computers deployed in schools in India are either not-working or faulty. As IT education project under IT@School does not envisage providing any technical support staff, the upkeep of the computers and other IT means are all the more challenging. However, IT@School conducts frequent hardware clinics in many centres across the state so that the items requiring repair could be taken without much delay. This has ensured high level of upkeep of IT tools in the schools as evidenced during the sample study. Out of 35 schools studied, only 1 school has more than 20% of their IT assets either as faulty, under repair or not used. Thus impact of the hardware clinics in ensuring upkeep of machines and thereby contributing IT education is very high.

4.4 Learning Assessment Process

There is a structured Learner assessment process implemented as a part of IT@School project. Accordingly IT (Information Technology) is introduced as core /compulsory subject in the school curriculum from 2005 onwards in High School and 2009 onwards in upper primary classes. Proper course ware is developed and standardized to provide the necessary IT skills training through teachers trained by the process explained earlier. During 2005, IT was introduced as a subject in the SSLC having both theoretical and practical assessments. The results of the students in the SSLC examination in IT is strong indicator of the success of the project with respect to imparting IT knowledge to the students. Figure 4.2 provides the summary of results of the pass percentage in IT subject in SSLC examination. The failure of less than 0.2% in the matriculation examination signals the positive impact IT@School project is having in enhancing the IT knowledge and skills of the learner. This was also corroborated during the interviews with the students. Investigators randomly asked questions regarding IT tools and techniques ranging from elementary database concepts to advanced programming fundamentals to the student groups from Std VIII and IX interviewed in various schools. It was found that over 85% of students¹² could answer such questions correctly.



¹² These questions were asked randomly and students were not asked to come prepare for the same. The high percentage of correct answers is an indication of absorption and learning happening in the pupils

4.5 Summary

The impact study has shown that as far as imparting IT education is concerned, IT@School project is hugely successful. More than providing IT knowledge to the students, the project also created a breed of subject teachers who can lead the instructional process. The extensive training (even though at a much lower cost compared to other similar projects), a support mechanism involving SITC, Master Trainer and District Co-ordinator had worked extremely well resulting in subject teachers (ranging from languages to social sciences) confidently handling the IT subject instruction. This ensures that IT is no more an alien technical subject but is akin to a pervasive skill set that is required to be mastered by all. Thus the first step in creating a true knowledge society is achieved well by IT@School project in its first phase of implementation. The only area of concern is the development of infrastructure. Through IT education require only peripheral infrastructure, which is available in most schools, extensive skill set enhancement call for augmenting the infrastructure multifold in the years to come. With a well oiled mechanism of hardware clinics, ownership (and minor maintenance) by SITC (and/or a technician if present), the maintenance and upkeep is no more a major issue. However in order to give students far more hands-on-experience the student-computer ration needs to be augmented substantially.

Annexure 4.1

TRAINING COST OF TEACHERS

One of the major activities of IT@School Project is the Teacher Empowerment programme. It is a notable fact that the training expenses incurred in Kerala is far less than the same in most other states. As per the information received from Ministry of Human Resource Development, in most states, the average training cost per teacher for a 5-day training is usually between Rs.4,000/- to Rs.5,000/-. Whereas in Kerala, the average training cost is approximately Rs. 375/- per participant. The detailed breakup is as follows;

No of Participants	Remuneration per participant	No of days	Cost
20	Rs. 60 per day	5	Rs.6,000/-
Faculty – 2 nos	Rs.100 per day	5	Rs.1,000/-
Computer lab charges at Rs. 100 per day		5	Rs.500/-
Total cost			Rs.7,500/-
Average cost per participant for the 5 day training programme			Rs. 375/-

IMPACT ASSESSMENT: INFORMATION TECHNOLOGY ENABLEMENT OF EDUCATION

5.1 Introduction

As discussed in earlier chapters, IT@School is not envisaged merely as an IT education programme. While the first phase of the programme was concentrating on IT Education, the components of the project even at that stage was designed with a view to achieve the final objective of developing IT as a tool for enhancing the effectiveness of the holistic learning process for the learner rather than just “teaching” him how to use a set of tools. In the next phase of ICT enabled learning, learner will augment his learning in different subjects by leveraging on technology means. For instance, a learner will have a better understanding of chemistry, when she simulates a chemical reaction through an experiment in her computer with the support of a learning software (CBT). Or a learner in a language class, understands the cultural artifacts that shaped the language when he is driven through a multimedia interactive experience spanning several centuries. Such sort of IT enablement of education, not only motivate a pupil to learn the technology but will also sharpen the skills required to survive and succeed in the knowledge economy. Driven by the visionary thinking of the Task force headed by Dr. U.R Rao, IT@School envision to position itself as a IT enablement project rather than a mere IT education project. As IT education objective of the project is met satisfactorily creating three major strides namely

- a) Creating a breed of IT savvy (Non IT qualified) subject teachers
- b) Creating skeletal infrastructure in all the schools and
- c) Making IT as a compulsory course at Senior Secondary level and Ensuring very high pass percentage in the same

it is natural that the focus of the project have to be on the larger picture of IT enablement and embedding IT in the entire gamut of education. In this section, an assessment is done on the readiness of the Schools to move to this level of IT adoption and usage. The assessment is done by looking at the impact on the key variables (given in table 3.4) that contribute to the ICT enablement of education.

5.2 IT and Civil Infrastructure

This form one of the key elements that drive the readiness to adapt the ICT enabled education. As one moves to ICT enabled education, the need for usage of ICT means will also increases exponentially. As against usage of IT assets during the “Computer class hours”, IT assets will be demanded by all instructional spaces, be it a language class or a course in History. In other words, the demand for IT assets (multimedia facility as well as computers) will grow 5-7 times of the level when it is used exclusively for IT education. As true IT enabled education demands an interactive atmosphere, where the learner interacts solely with the computer, the sharing of computer, which is happening in IT education may not advisable. This increases the demand for the resources further. This was clearly evident during the assessment study also

During the assessment study, it was found (as given in Table 4.1), the usage of ICT means is abysmally low in most of the schools for non-IT education, despite having enthusiastic faculty having adequate skill sets. The primary reason for this limited usage is the lack of physical resources. As IT education being a curricular subject (and hence mandatory) take priority, the time available for other course instructors to use the Computer labs is extremely sparse with the average usage by faculty in the courses in the sample of schools interviewed is only around 4%. Thus there is a strong case for enhancing the IT infrastructure, if ICT enabled education have to be implemented properly in the schools

5.2.1 Civil Infrastructure

Along with IT infrastructure, civil infrastructure is also equally important in the context of ICT enabled education. Teaching IT generally happens in IT labs and computer centres. But when one uses IT in their core subject stream, it is necessary that either students should be taken to an IT facility (like a smart classroom) or Laptop or other ICT means to the class rooms. However during the study it was found that both these propositions are not feasible in most of the schools. While space and capacity of Smart class rooms are quite limited, most of the normal classrooms are not “IT friendly” with no or unsafe power connections with dilapidated wiring. Even though IT@School project is now focusing on improving electrical connections to the classes, in the sample of 35 schools more than 81% of classrooms are not IT enabled and need substantial modifications. The readiness of a school to adopt and adapt technology to enhance teaching-learning process hence get severely hampered due to lack of quality infrastructure.

5.3 Teacher Capacity Building and Availability of Pedagogical Content

IT@School has a remarkable success story of enabling a subject teacher to lead the instruction in the IT education. This unique exercise not only resulted in large number of IT teachers but also reduced the dependence on a few IT qualified teachers who in the past pose major bottlenecks in IT education. The doubling up subject teacher as an IT teacher also gave opportunity to teacher to experiment with examples, cases and situations from her domain of core expertise while she draws on illustrations to explain concepts and tools in IT (in a core IT education class). During the impact study it was found that most of IT instructors (74%) use examples from their subject area while teaching IT subjects. This is a first step to ICT enabled education, as such experiments will give faculty confidence to use IT tools more effective delivery of his own course. Thus by motivating teachers to take up the role of IT instructors, by providing extensive training, and creating supporting mechanism at district level, IT@School has led instructors to cross the chasm to be prolific users of IT in their course delivery. The use of ICT effectively in course pedagogies, however require that instructors must be more inventive and innovative. Unfortunately the impact study could not find many such cases.

During the impact study it was found that most (60-70%) of teachers who got training but not involved in IT teaching are reluctant to use IT in their own subject delivery. However, an IT instructor is more amenable to experiment IT in his (non-IT) course also, though percentage of such attempts is still less than 5%. Thus an in-depth analysis is done in this regard

5.3.1 Usage of IT for personal productivity

It was found that in most of the schools, the percentage of people using computers/ internet for personal purposes is on the rise. With introduction of new payroll system SPARK and several other e-governance projects, it is but natural for faculty to adopt and adapt usage of IT tools. As use of computers for personal purpose can be construed as a leading indicator for widespread usage of IT in the classrooms, more avenues that motivate faculty to work with computers have to be created.

5.3.2 Usage of IT for class effectiveness

In this stage the faculty uses IT based tools to increase productivity (delivering more content in a shorter time) and effectiveness (learner focused) of the classes. However during the impact study it was found that such productivity improvements have not come so far. In fact many find it counter-productive, as using IT is perceived as an extra work in delivery of a subject matter. The limited usage of IT in class delivery is captured through data is presented in Table 5.1 and 5.2

Table 5.1 Extent of Usage of IT in core subject delivery in Govt. Schools

Sl no	District	Subjects taught using Software								
		Maths	Social Science	Physics	Chemistry	IT	Biology	Science	Geography	Others
1	Alappuzha	180	171	85	120					
2	Ernakulam	360	170	Nil	190					
3	Idukki	100	Nil	45	56	615				14
4	Kannur	293	Nil	98	76					
5	Kollam	155	Nil	85	65					7
6	Kottayam	95	Nil	95	95		95			
7	Kozhikode	771	Nil	231	200				375	
8	Malappuram	640	340	Nil	Nil			830		
9	Palakkad	1410		Nil	Nil					
10	Pathanamthitta	215	Nil	109	116					
11	Thiruvananthapuram	120	60	120	120	120	60			
12	Thrissur	589	Nil	268	272					
13	Wayanad	30	28	43	33					
14	Kasaragod	77	18	77	77					

Table 5.2 Extent of Usage of IT in core subject delivery in Aided Schools

sl no	District	Subjects taught using Software							
		Maths	Social Sc	Physics	Chemistry	IT	Biology	Science	Others
1	Alappuzha	260	140	91	147				
2	Ernakulam	625	260	Nil	310				
3	Idukki	130	Nil	65	80	857			18
4	Kannur	297	Nil	145	92				
5	Kollam	312	Nil	126	107				8
6	Kottayam	251	Nil	251	251		251		
7	Kozhikode	Nil	Nil	Nil	Nil				
8	Malappuram	610	310	Nil	Nil			1150	
9	Palakkad	1568	Nil	Nil	Nil				
10	Pathanamthitta	Nil	Nil	Nil	Nil				
11	Thiruvananthapuram	95	50	95	95	95	50		
12	Thrissur	Nil	Nil	Nil	Nil				
13	Wayanad	Nil	Nil	Nil	Nil				
14	Kasaragod	33	0	33	33				

5.3.3 School Leadership

Another area of development is in the role of school leadership in stewarding IT enabled learning in the classrooms. Even though teachers are adopting this new way of thinking and working at a satisfactory pace, the role of the leadership-especially the head of the school is observed as a crucial element in the success of the project. As many of them are technophobic senior teachers, a separate methodology to address their concerns so as to ensure full buy-in from them have to be implemented.

5.3.4 External Stakeholders

In Govt. and aided schools, PTA plays a very crucial role in implementation of IT projects. In several schools, the IT education schemes were ably supported by PTA by providing the infrastructure during the early stages of the project. However the enthusiasm of PTA in supporting IT education is virtually absent in almost all schools when it comes to ICT enabled education. Major reason for this is the lack of awareness among the parents and other external stake holders about the new way of thinking which is emerging. During the study, it was observed that PTA's priority is to support curricular activities as against the out-of-curriculum activities like IT enabled learning. Hence it is important that

- a) Awareness programmes among parents to appraise them about the need, relevance ad necessity of IT enabled education have to be started at the earliest
- b) Curricular inclusion of IT enabled learning (discussed in next section) should be given priority

5.3.5 Availability of Pedagogical content

Ideally a teacher should carve out a pedagogy that blends IT with the subject. Since such attempts are few, IT@School project provides sample contents developed through a collaborative process among several (IT savvy) academicians. Even though such software like Geogebra, Chemtool, KTech Lab are bundled and distributed to faculty, the usage of the same is seen to be very limited. AS ICT Education becomes more common, it is imperative that faculty have to develop contents by themselves by modification of existing contents or by through innovation. This is going to be matter of great challenge in the future activities of IT@School when graduates from IT enabled education to IT embedded education

5.4 Curricular support

It can be argued that the success of IT@School to impart IT education is due to the fact that Govt. had made IT education compulsory part of the curriculum. Extending this logic, it may be worthwhile to make ICT as a compulsory enabler of education. Moreover the interactions with PTA also revealed that inclusion in the curriculum is the best (and perhaps the only) way to have societal buy-in for the new phase of the project. Such curricular modifications, however can be implemented if and only if the issues discovered in the Impact study are comprehensively addressed. For instance, introducing ICT as compulsory enabler of a subject requires that there is enough infrastructure and facilities available to the learner. Nevertheless, Govt. of Kerala has issued orders (see annexure-5.1) to start this scheme on a pilot basis in Standard VIII. As in the case of IT education, it is hoped that such a move will give fresh impetus to IT enabled education in the State and the impact of the same of overall learning of the pupil will be substantial within next five years.

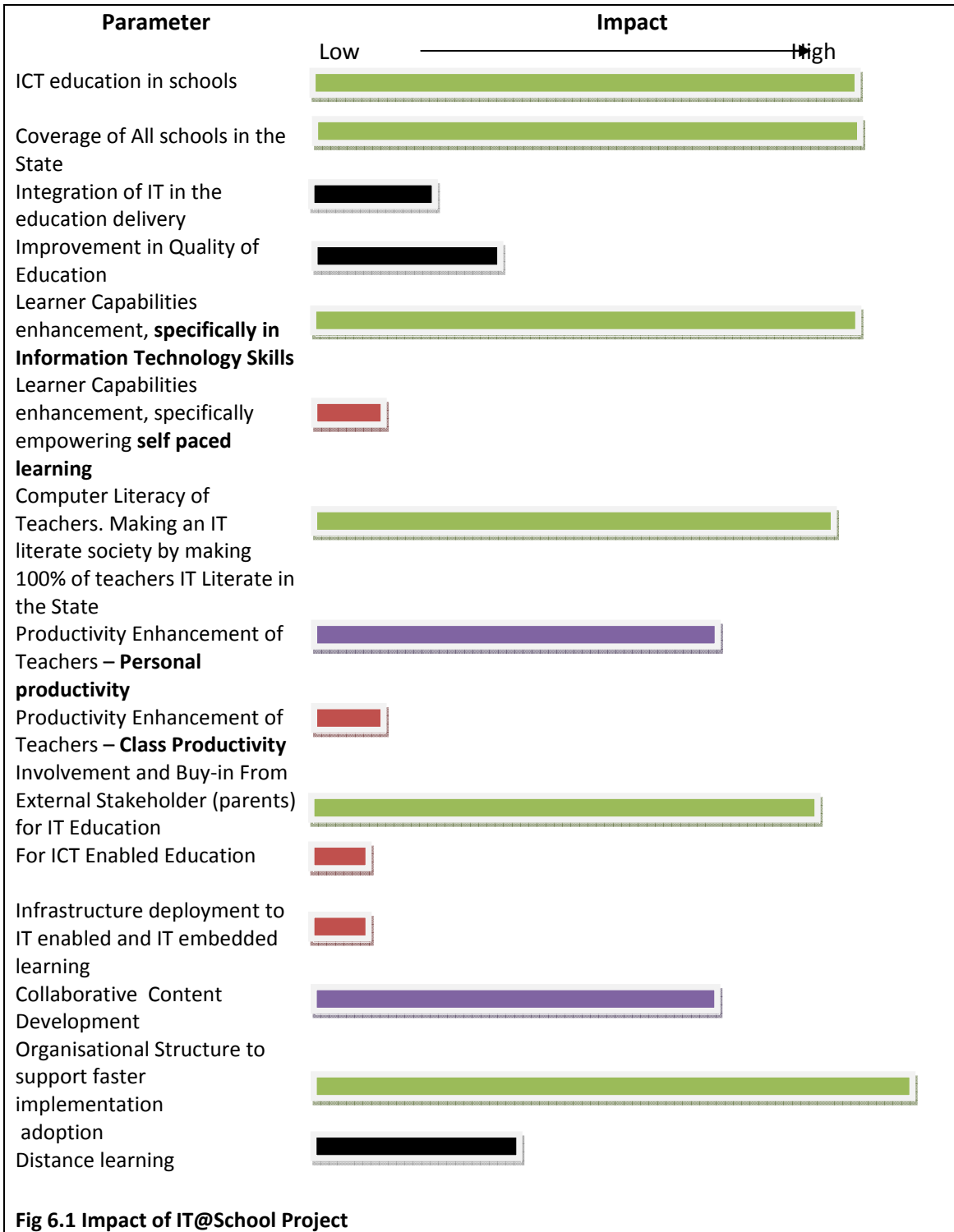
CONCLUSIONS & FUTURE DIRECTIONS

6.1 Findings of Impact Study

The impact study of IT@School project has resulted in mixed results of achievement. While the impact of the project is very high and successful in imparting IT education to students in High School, as evidenced by secondary (results in SSLC) and primary (interview with students, random quizzing, knowledge assessment etc.), the same cannot be said about the readiness among the schools for adapting IT as a learning tool for enhancing effectiveness in various subject deliveries. However this is not alarming as IT@School is only starting its entry into the next phase of growth and with curricular support and accelerated augmentation of IT infrastructure, this can be easily addressed. The findings of impact of various schemes and project component on learner capability is pictorially represented in Figure 6.1 below

6.2 Future Directions

IT@School is an unique project of IT enabled learning being implemented in Govt. Schools in Kerala. The project differentiates itself due to the “bottom-up” approach of development, wherein the subject teachers are transformed as IT teachers who take up the task of IT education and It enabled education. By creating a support system, driven primarily by the teachers themselves in schools and in district nodal centres, and supplementing the learning through Satellite based instruction schemes and a dedicated media channel, the project has achieved substantial success in IT education in the State. Basic infrastructure along with systems for their upkeep is already in position in various schools. However, the final objective of the project is to make IT as a strong enabler to increase comprehension ability of the pupil. To this end, IT enabled education is beginning this year. However as this study reveals, the readiness to the adoption of this is medium. Even though faculty resources are reasonably capable, infrastructure, societal support and school leadership will be the three key elements that determine the success of this phase. Hence specific measures (many of them have already started) have to be implemented to address these issues to repeat the success of first phase of the project. If successful, Kerala can be proud of another unique model of development wherein IT is deployed in mass scale to enhance the teaching-learning process, to create future ready professionals who can take up leadership role in the emerging knowledge economy.



ANNEXURE-1

SUMMARY OF THE IMPACT STUDY FINDINGS

Annexure 1: Summary of the findings of the Impact Study

SI No	Objective	Details of Project Component	Extent of Achievement	Impact as assessed by the Study	Assessment of Impact of the Project	Remarks
1	ICT education in schools	<p>Providing training to teachers, and making IT as subject in the curriculum.</p> <p>Providing course ware for learning IT in the school setting.</p> <p>Evaluation of acquisition of IT skills by the learner</p>	<p>ICT is made a compulsory subject in the Syllabus of State Curriculum in a progressive manner. It was made compulsory for Standard VIII in 2003, IX in 2004 and X in 2005 onwards. From 2009 onwards it is made compulsory for upper primary (Standards V,VI & VIII) classes also</p> <p>The evaluation of the course-both theory and practical is made compulsory to understand the knowledge of ICT by the learners. From 2005 onwards IT is made as compulsory subject in SSLC</p> <p>The ICT education is</p>	Very High	<p>It is found that 2790 High Schools and 3037 upper primary schools are covered by IT@School Project so far. The adoption of IT as a subject taught in classes 5-10 by subject teachers is a major highlight of the project and is working extremely well in all schools undertaken for study.</p> <p>The inclusion of IT as compulsory subject in School curricula has been tremendously successful. The pass percentage of students in IT is steadily increasing from 2005 onwards (from 92% in 2005 to 99.8% in 2010) reflecting the success of the project.</p> <p>More than 60% of the teachers in schools are trained in IT. SITCs are functional in all schools.</p>	<p>As an IT education programme for imparting IT knowledge, IT@School programme is very successful. The coverage of all schools, delivery of IT instruction by Subject teachers, inclusion of IT as a compulsory subject in curriculum and State wide examination of the learning (theory & practical) and high pass percentage in SSLC examination etc. are good indicators of the success.</p> <p>Thus IT@School has made a strong foundation in building IT enabled education, which has just commenced as the second phase of the project</p>

			<p>considered as the first step for the larger objective of IT enabled education (started in 2009), the IT teaching is done by subject teachers themselves. They are provided with adequate training to assume the new role. A unique organizational mechanism with a Master Trainer at each district and School IT co-ordinator to champion this change was devised as a part of the project</p>			
2	Coverage of All schools in the State	<p>Providing Basic ICT infrastructure for Govt. Schools and training support for other schools. However this was done as part of the Centrally funded scheme only from 2008 onwards.</p>	<p>All High schools in all districts are covered with basic infrastructure. However a few aided schools still have very poor infrastructure as they did not opt for a subsidised scheme offered under IT@School</p>	High	<p>A suite of IT tools including hardware –computer, projector, scanner, printer etc.- and software is provided free of cost of Govt. Schools While Computer is provided in all schools, internet/e-mail connectivity is limited only to around 63% schools. Similarly there is paucity in some of the aided schools. In aided schools,</p>	<p>Though the ICT infrastructure is deployed in all schools, there is a greater need to augment the same as the student: computer ratio is far lower than desirable level.</p>

					the computer facility is also poor. The IT infrastructure was provided as a part of the Centrally sponsored scheme, which became operational only from 2008. The lower level of impact is mainly due to this.	
3	Integration of IT in the education delivery	Providing extensive training for subject teachers and use IT as an integral part of pedagogy for course delivery	Training is provided to over 80,000 teachers involved in teaching in High school classes (target is to provide training to around 0.13 million teachers in all classes)	Medium	Medium to High. However this is ok, as per the project plan of IT@School, IT enabled education is commencing only from this year. However it was assessed that of the teachers got training around 25% of the teachers (10614 teachers in Govt. Schools and 9291 teachers from aided schools) have already actively adopted IT in their respective subjects. In general, these teachers are using IT in their course delivery to 10-20% of the course content. With IT enabled curriculum in place for Standard VIII from 2010, this figure will certainly go up in the next few years.	The integration of IT in course delivery is made more as a teacher initiative till now. However from 2010 onwards, the curriculum is redesigned to make it IT based (embedded) which will accelerate this adoption process
4	Improvement in Quality of Education	Use of CBTs, WBTs and other multimedia tools to enhance class room experience to make it more effective and conducive to	High quality multimedia content is developed on open standard platforms using freeware tools for various subjects and are extensively	Medium-High	The impact of the project in IT learning is Very High, as reflected in the High (99.8%) pass percentage in SSLC examination. However the impact of the same in general learning could not be objectively	Even though the project was started around 8 years back, the integration of the same to curriculum could be done only during past three years as teachers

		learning	deployed in the schools. Specific content CDs are available to address difficult portions in subjects of science, mathematics etc. Teachers are trained to effectively use the same		measured as there was no pre-project study done on learning capabilities of the pupil. However, the performances of the pupils in examinations have shown remarkable improvement during past few years, the project being one of the major contributors to the same. What is significant to note is that the learners are quite enthused with the usage of technology in class rooms	needed to be transformed to adapt to the new system. However proxy indices of performances indicate the positive impact of IT@School on learner capability enhancement
5	Learner Capabilities enhancement, specifically in Information Technology Skills	Developing course ware for teaching IT (as a subject) in schools Creating necessary environment that will make all the students IT literate	Information Technology is introduced as a compulsory subject in High School from 2005 and UP schools from 2009 onwards The nuances of technology is taught through a blend of theory and practical sessions	Very HIGH	The primary purpose of the first phase of IT@School is to impart IT education. The assessment study found that this is achieved quite satisfactorily in all schools in the State. The high pass percentage of students in SSLC examination, The large number of A+ Grades obtained by pupil etc. are indicative of the learning achieved by them through the project	By enabling IT education quite satisfactorily, especially through subject teachers, the first objective of making IT literate matriculates is already achieved. This will also provide a strong foundation for the second phase of the project which focuses on blending IT with general subjects
6	Learner Capabilities enhancement, specifically empowering self paced learning	The existing curricular framework followed by Schools in Kerala facilitates the innovation and creativity of pupil by	This is achieved to a limited extent in schools, that too only in schools where internet connection is available to them. In some schools	Low to Medium	Even though it is too early to assess the impact of IT enabled learning (as technically it is starting from this year only), a few enlightened individuals have already adopted the same in their schools. Understandably,	As IT enabled in education is starting from this year only, the limited achievement is not a matter of concern. However it is included here as a strong case

		<p>motivating them to engage in projects for self learning. Use of ICT in enhancing the quality of the project is envisaged in the IT@School project</p>	<p>innovative practices are adopted to provide more time for pupil to work with the ICT tools to enhance her learning</p>		<p>the impact of this on the learner is still low to Medium. The reason for this limited achievement is primarily due to the resource constraints especially with respect to Communication infrastructure. With limited availability of resources, mandatory curricular aspects get priority making the availability to support innovation, creativity and self paced learning more of an exception than rule</p>	<p>point for augmenting the infrastructure facilities. Participation from Private players as well as external funding etc. has to be explored.</p>
7	<p>Computer Literacy of Teachers. Making an IT literate society by making 100% of teachers IT Literate in the State</p>	<p>Extensive Training for teachers. Identification of motivated teachers to work as School IT Co-ordinators to facilitate IT literacy through “peer pressure”</p>	<p>This is achieved to a large extent through the project. Most of the teachers in the age group less than 50, have their own e-mail ids while some of the technophobic senior teachers occupying leadership positions like HMs and Principals were motivated (and compelled) to use IT for enhancing their administrative efficiency</p>	High	<p>High. Rather than a project that teaches teachers Information technology of Software, IT@ School project makes IT an integral part in some activity of a teacher’s life be it in education delivery, administration, class planning or even personnel finance planning. This has increased the adoption of IT by the teachers to a large extent. However this can be further enhanced by making some of the key processes being carried out through IT only, like submission of grades, reports or even preparation and presentation of salary bills</p>	<p>During the Impact study, it was found that there is a wide range of IT capabilities existing among the teachers. However it is found that the gap is fast diminishing making most if not all teachers IT savvy within next couple of years</p>
8	Productivity	Project envisages (as	Extent of	High	The learning of IT means is	

	Enhancement of Teachers – Personal productivity	a by-product) that teachers uses IT means to enhance their personal productivity	implementation is High. This is mainly due to other e-Governance projects like SPARK (state wide personal and payroll management system), computerization of processes in education department (like on-line transfer & posting etc.) which had given strong incentives for teachers to adopt IT in their daily lives.		becoming mandatory for teachers to interact with their higher-ups and to address the issues regarding their career and work. With personnel and payroll records being computerized (under SPARK), there is a strong incentive for the teachers to use computers extensively for personal productivity enhancement.	
9	Productivity Enhancement of Teachers – Class Productivity	Project provides teachers with flexibility to adopt and adapt IT means to improve the efficiency and effectiveness of their teaching (especially in the second phase of ICT enabled teaching)	The extent of achievement is low in this regard. This is basically due to the fact that most teachers are still in the first phase of learning (explained in detail in the report). Moreover the limited availability of infrastructure (most classrooms are not “IT” compatible) makes the IT	Low	Low. Like in the case of adaptation of any new technology, there is a reduction in productivity among teachers as they have to prepare separately for IT enabled and normal classes. However a few teachers who crossed the chasm could enhance their productivity substantially and have also adopted the tool very effectively. It is found that the numbers of such teachers are on the increase and are being looked as role models for	The platform is still in the stage of introduction and far from stabilization. During this period of transition, it is, but natural that substantial improvement in productivity may not be visible.

			integration as an extra job for the teachers		others, a strong signal in favour of future positive trend.	
10	Involvement and Buy-in From External Stakeholder (parents)	Project envisages active involvement of PTA for development and sustenance of the project. Moreover the facilities could be used for community usage and adult IT literacy after school hours	The extent of achievement is mixed here. While PTAs and community was primarily responsible in creation of infrastructure for IT education in schools (especially in the initial stages when there was no centrally sponsored scheme to support infrastructure creation), their support in ICT enabled education is low. As a new concept, most of the parents are not aware of the distinction between IT education and IT enabled education. A few PTAs have employed separate IT teachers, which is	Very High – in infrastructure creation for IT education Low with respect to support for ICT enabled education	The lack of buy-in from parents on the true philosophy and objective of the project is an area of concern and can severely hamper the project in long run ¹ . As a transformational project, the societal buy-in is crucial for the success. At the current stage this is low in many schools. However the support of PTAs and parents in the initial stages of the project (IT education) shows that this more a matter of perception and not a genuine lack of interest of stakeholders. As ICT enabled education will become compulsory from this year, it is quite possible that PTAs will play a critical active role in implementing the same, as they had done during the first phase of the project.	This is an area which should be improved in the next stage of implementation. Special campaigning to appraise the external stakeholders, the merits of ICT enable education has to be planned.

¹ A petition challenging the IT enabled education filed by a parent was admitted by Hon. High Court of India, which directed Govt. to appoint IT teachers. This is a case in point

			<p>against the spirit of the project. It is also seen that in such schools, the adoption of IT in other subject is abysmally low. Hence as IT@School project moves to next stage of implementation, a strong campaign to enlighten external stakeholders the merits of IT enabled education has to be undertaken</p>			
11	<p>Infrastructure deployment to IT enabled and IT embedded learning</p>	<p>The integration of IT into the education requires massive investments in improving basic infrastructure of the school to make it “IT ready”. The project envisages only a limited intervention in this regard</p>	<p>The extent of implementation on this is much below the requirement. With IT@School transforming education from IT education to IT enabled to IT embedded education, the need for proper infrastructure is very crucial for success. However this require very high investments</p>	Low	<p>Skeletal infrastructure, trained manpower, multimedia content and motivated pupil have already made IT@School a project of phenomenal success in Kerala. However, when the project scales up- as more teachers adapts IT to their pedagogies, the infrastructure will become a major bottleneck. As such all the infrastructure is having 100% usage with uptime close 99% . This is an indication for the need to augment the infrastructure further in the near future.</p>	<p>The IT infrastructure needs to be augmented 20 to 50 times from the current level to realize the vision of IT Task Force. However innovative ways to bring in private sector without compromising philosophy of IT@School have to be devised towards this end. In addition to IT infrastructure, it is necessary to augment basic education backbone so that there is</p>

						a strategic fit between IT and the general environment
12	Collaborative Content Development	Project supports content development by teachers and other stakeholders to ensure that project sustainability and contextual relevance. The basic platform is on FOSS which enable collaborative content development.	The use of open standards and free software and learning objects to shape the contours of content development. Schools and teachers are encouraged to join School Wiki, the collaborative content development platform for the project	Medium	Medium. Customized content for various courses are developed by the motivated teachers making IT@School project one of the most cost efficient implementation for mass education in the world. The collaborative platform also provide an “esteem” value to the developed among the peers motivating further adaptation of the technology	This is a unique feature of the project that is having tremendous impact on the long term sustainability of the project.
13	Organisational Structure to support faster implementation and adoption	A lean architecture is planned under the project where-in motivated teachers themselves play key role in implementation. The district co-ordinators, content developers and School IT Co-ordinator (a teacher who doubles up for IT@School Project implementation work) forms the	Organisational Structure is fully in place. District Co-ordinators and most of SITC are highly motivated individuals with good knowledge of IT. The maintenance clinics as well as frequent training programmes at the resource centres (distributed in the district) are proving to be very effective. The	Very High	The impact of the lean and crisp organization structure is very visible in implementation of the project. Since implementers are school teachers themselves, the customization is high making adaptation easy. IT@School thus have much better buy-in with internal stakeholders compared to outsourced (where similar project is done by an external private agency) models followed in many other states	The District co-ordinators and SITCs are the key champions in the implementation of the project. There is a need to continuously train and motivate this crucial resource to ensure sustainability of the project

		oragnisational structure. A separate structure for maintenance as well as training is also envisaged	organizational structure also support collaborative content development			
14	Distance learning	IT@School used EDUSAT to support distance learning. ViCTERS – the first full education channel in Asia is a means for providing high quality content in a synchronous manner to distant places in the State	ViCTERS terminals are deployed in all government schools in the State. However the many schools have technical problems – like lack of cable operator etc, which limits its use	Low	Low to Medium. Integrating ViCTERS into the curriculum has not happened. With limited viewing facility and lack of synchronization of programmes with the class requirement, makes its adoption very limited in schools. Though ViCTERS programmes are of high quality, lack of storage & replay facility to suit the need of the school /class is a major limiting factor in its adoption	Distance Learning is still alien to school education. There is a need for a change in mindset in this regard to make a substantive impact in this regard.