DRAFT

National Policy on Information and Communication Technology (ICT)

In School Education

Department of School Education and Literacy

Ministry of Human Resource Development

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Detailed Comments from
Archana Mehendale, Independent Researcher
Gurumurthy Kasinathan, IT for Change
Vimala Ramachandran, Educational Resource Unit.

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1. Preamble

The National Policy on Education 1986, as modified in 1992, stressed upon employing educational technology to improve the quality of education. The policy statement led to two major centrally sponsored schemes, namely, Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS) paving the way for a more comprehensive centrally sponsored scheme – Information and Communication Technology @ Schools in 2004.   Educational technology also found a significant place in another scheme on upgradation of science education.   The significant role of ICT in school education been

highlighted in the National Curriculum Framework 2005 (NCF) 2005. Use of ICT for quality improvement also figures in Government of India's flagship programme on education, Sarva Shiksha Abhiyan (SSA). Again, ICT figured comprehensively in the norm of schooling recommended by Central Advisory Board of Education (CABE), in its report on Universal Secondary Education, in 2005. With the convergence of technologies it has become imperative to take a comprehensive look at all possible information and communication technologies for improving school education in the country. The comprehensive choice of ICT for holistic development of education can be built only on a sound policy. The initiative of ICT Policy in School Education is inspired by the tremendous potential of ICT for enhancing outreach The notion of 'outreach' represents top down centralized design, ICTs are equally capable of supporting decentralization and local design/implementation as well. The NCF 2005 position paper on ET is critical of such centralized design and identifies centralized design as a key cause of failure of ICT programs.

Our experience with 2 major computer aided learning programmes in India, suggest that the actual situation in the school did not inform the model – it was not at all in sync with ground realities. ICT is capable of supporting local / decentralised designs and hence 'outreach' thinking is not useful.

and improving quality of education. This policy endeavours to provide guidelines to assist the States in optimizing the use of ICT in school education within a national policy framework.

2. Vision, Mission and Policy Goals

Vision

The ICT Policy in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socio- economic development of the nation and global competitiveness. the vision must be to promote achievement of existing educational aims of which knowledge society may be a sub set. Again 'Global competitiveness' is a parochial notion and does not cohere with the spirit of the NCF 2005. The emphasis on all round socio-economic development is welcome (the earlier draft emphasized the economic aspect and ignored the social aspect). The political aspect – developing an informed and engaged citizenry also needs to be critical part of the vision.

The vision of ICT should encompass ways of learning – it is not only about technology and creating a knowledge society. It should be about learning, about understanding and using ICT as a tool to learn / teach the curriculum. ICT is not for something "different" from the essential aim of education. It needs to integrate / support / enhance teaching learning processes, promote self learning and promote exploration.

Mission

Devise, catalyse, support and sustain ICT and ICT enabled activities and processes in order to improve access, quality and efficiency equity needs to be an important goal here. Efficiency can often conflict with equity and access, quality and equity are understood as the three key goals of education policy/program in the school system Equity needs to be brought centre stage. We just have to ask – how ICT can help us address the issue of quality education for all.

Policy Goals

To achieve the above, the ICT Policy in School Education will endeavour to: Create

an environment in the states to develop ICT knowledgeable community we can use the simpler term ICT Literacy here

• an ICT literate community who can deploy, utilise, benefit from ICT towards achieving educational aims and contribute to

•nation building

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an environment of collaboration, cooperation and sharing <u>the emphasis on collaboration and sharing is welcome</u>, conducive to the creation

- of a demand for optimal utilisation of and optimum returns <u>the idea of 'optimal returns' does not fit well with in educational processes and programs and also militates against the emphasis on sharing and collaboration in the same line. Measuring 'optimal returns' has never featured in any earlier educational process/program and needs to be dropped –</u> on the potentials of ICT in education

Promote

universal, equitable, open and free access to state of the art ICT and ICT enabled

- tools and resources to all students and teachers <u>the emphasis on open and free access is very important. The public education system cannot survive in its absence.</u>

development of local and localised quality content and enable students and teachers <u>emphasis on local content is welcome, ICTs present opportunities for local curriculum which has been an important educational aim, but not fulfilled in absence of suitable technologies/processes.</u>

- to partner in the development and critical use of shared digital resources development of professional networks of teachers, resource persons and schools to <u>the stress on networks for professional development of teachers and teacher educators is most welcome</u>

- catalyse and support resource sharing, upgradation, and continuing education of teachers; guidance, counselling and academic support to students; and resource sharing, management and networking of school managers and administrators, resulting in improved efficiencies in the schooling process research, evaluation and experimentation in ICT tools and ICT enabled practices in

- order to inform, guide and critically utilise the potentials of ICT in school education Motivate and enable

wider participation of all sections of society <u>'universal participation' is welcome, specific stress on equity, in terms of participation by the poor and marginalized sections would be even better</u> in strengthening the school education

- process through appropriate utilisation of ICT

<u>Among the goals should be to develop confidence as well as the ability to use technology (diverse sets of technology – including radio (incl Edusat), electronic, audio-visual media) by teachers and students. This implies that we do not adopt a minimalist approach to ICT – facilities should be good, functioning, usable and freely accessible. There is no point in installing technology if other related connectivity / power / hardware issues are not addressed simultaneously.... To this end, the policy should recommend a "basic minimum non-negotiable conditions" for an ICT programme.</u>

3. What is ICT?

ICTs stand for Information and Communication Technologies and are defined, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. (UNDP, 2000) The term, information and communication technologies (ICT) refers to forms of technologies that are used to   create, store, share or transmit, exchange information. This broad

definition of ICT includes such technologies as: radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing and electronic mail. (UNESCO 2002)

Information and Communication Technologies consist of the hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services. ICTs can be divided into two components, Information and Communication Infrastructure (ICI) which refers to physical telecommunications systems and networks (cellular, broadcast, cable, satellite, postal) and the services that utilize those (Internet, voice, mail, radio, and television), and Information Technology (IT) that refers to the hardware and software of information collection, storage, processing, and presentation. (WORLD BANK 2002) For the purposes of this policy, Information and Communication Technologies are defined as all digital devices, tools, content and resources, which can be deployed for realising the goals of teaching-learning as well as management of the educational system.

4. Information and Communication Technology in School Education

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The policy envisages three stages of ICT implementations at the school level – ICT literacy and Competency Enhancement, ICT enabled teaching – learning and introduction of ICT related elective subjects at senior Secondary level.

4.1 ICT Literacy and Competency Enhancement

The policy defines ICT Literacy in terms of levels of competence. Based on the stage of schooling at which a student or teacher is introduced to ICT, they may progress to different levels. These levels are suggestive and adaptations must be made to suit local conditions. The levels do not correspond to class levels and time duration must also be locally determined. Also, these levels must be revised periodically to keep pace with changing technology. However for uniformity a certain level of competency would mean achievement of a certain stage. Learning is always about concepts and principles and not about specific products. A student learning about automobile engineering learns the principles of locomotion and not about a specific car. However, large part of ICT education unfortunately focuses entirely on learning specific products only. This goes against basic principles of learning. The stress should therefore be on learning different kinds of software applications that are relevant to the student's learning.

Stage 1: Basic

Basics of computers and basic use of tools and techniques – operating a computer, storing, retrieving and managing data, using a computer to achieve basic word and data processing tasks; connect, disconnect and troubleshoot basic storage, input and output devices Connecting to the internet, using e-mail and web surfing, using search engines, keeping the computer updated and virus free, operating and managing content from external devices (sound recorders, digital cameras, scanners etc.); connect, disconnect, operate and troubleshoot digital devices;

Stage 2: Advanced

Creating and managing content using a variety of software applications and digital devices; using web sites and search engines to locate, retrieve and manage content, tools and resources; install, uninstall and troubleshoot simple software applications etc. Implementation Strategies

4.1.1   A programme of ICT literacy will be implemented across all secondary schools in the

States, both government and private within the XI plan period.

4.1.2   States will develop an ICT literacy curriculum and appropriate course materials

mapped to the stages mentioned above for uniformity. These will be in the form of self- instructional materials, enabling students and teachers to process them on their own. The ICT literacy programme will endeavour to provide a broad set of generic skills and conceptual knowledge and not focus on mastering the use of specific software applications. This is a very significant and welcome and corrects past distortions in ICT learning

4.1.3   The Boards of Secondary Education will develop a suitable scheme of examination.

ICT would be an additional subject, with the marks/grade listed separately together with the award of a certificate of proficiency.

4.1.4   A dedicated teacher for imparting ICT literacy will be engaged in each secondary

school. This teacher will also function as the ICT coordinator of the school. With the growth of infrastructure in the school, a suitably qualified technical assistant may also be provided. The role of the person is really that of a 'lab assistant' who will help teachers of the school in the program. Whereas in the classical boot models, the entire responsibility of the program vests in the 'vendor resource person', which is a big failure point.(See ITfC paper on 'CLPS – Moving from BOOT models to an integrated approach'

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4.1.5	The ICT Literacy programme will be extended to the upper primary stage by the end of the XII plan period. However States may take up this expansion earlier, based on resource availability and capacity of the system.

4.2 ICT related Elective Courses at the Higher Secondary level

4.2.1	States will initiate the process of launching/creating courses in different areas of ICT for the higher secondary stage. The courses will factor in the requirements of students of different streams.

4.2.2	Courses will be modular in design to enable students to select appropriate software applications based on current needs of higher education and job prospects. Courses will be revised frequently to keep pace with emerging trends in ICT. Again the stress should be on principles and concepts and not on specific products, in fact exposure to a variety of products in any domain will only broaden understanding of the learner

4.2.3	A Post Graduate teacher with appropriate qualifications to teach these courses will be appointed.

4.2.4	An ICT Lab attendant/technical assistant with appropriate qualifications will be appointed to manage the ICT/Multimedia Resource lab.

4.3 ICT enabled teaching – learning process

4.3.1	ICT enabled teaching-learning encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the teaching-learning process. Ranging from projecting media to support a lesson, to multimedia self-learning modules, to simulations to virtual learning environments, there are a variety of options available to the teacher to utilise various modes/ICT tools for effective pedagogy. Each such device or strategy also involves changes in the classroom environment, understanding of which has a bearing on its effectiveness. Availability of a wide range of such teaching-learning materials will catalyse transformation of classrooms into SMART classrooms.

4.3.2	All teachers, all of whom would have acquired a basic competency to handle these resources, will be encouraged to adopt ICT enabled practices in teaching learning. A wide range of appropriate software applications, digital content, tools and resources will be made available through the proposed digital repositories. Teachers will participate in selection and critical evaluation of digital content and resources. They will also be encouraged to develop their own digital resources, sharing them with colleagues through the digital repositories. The Kerala IT@Schools experiences need to be highlighted, where they are already doing these activities

Selection of the digital content and resources should be made keeping in mind the curricular, co-curricular objectives and not be based on the availability/supply of material alone. In fact, digital content and resources should be developed in a way that meets the learning objectives and are based on sound learning and pedagogical principles. The government could also invest in developing appropriate materials, especially based on textbooks and curricular objectives. Specific parts of the syllabus which can be best transacted using ICT should be identified by teachers and educationists and these should be the basis for developing new content/resources.

4.3.3	In schools equipped with EDUSAT terminals, DTH or other media devices, relevant activities will be planned and incorporated into the time schedule of the school. EDUSAT represents top down centralized ICT education, largely as a 'dissemination' with no space for 'co-construction'. Hence this program and its relevance/utility needs to be studied in the light of NCF 2005 and other policy documents

4.3.4	Initially the teachers may use the Computer lab for teaching-learning but progressively more classrooms will be equipped with appropriate ICTs, making way for SMART classes

FOR SMART CLASSROOMS, TEACHERS CAPACITIES NEED TO BE ADEQUATELY BUILT SO THAT THEY ARE COMFORTABLE ENGAGING WITH ICTS AND APPROPRIATING ICTS FOR LEARNING.

5. ICT Infrastructure

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There will be two types of Infrastructure:

Core ICT Infrastructure

Enabling Infrastructure

5.1 Hardware

5.1.1   The States will establish state of the art, appropriate, cost effective and adequate ICT and other enabling infrastructure in all secondary schools

5.1.2   Based on the size of the school, needs of the ICT programme and time sharing possibilities, States will define an optimum ICT infrastructure in each school. Not more than two students will work at a computer at a given time. At least one printer, scanner, projector, digital camera, audio recorders and such other devices will be part of the infrastructure. it is important to diversity ICTs beyond computers – devices that support 'creation' such as cameras/audio recorders are as important as devices to 'access information' such as monitors or TVs. Mere dissemination without any role for co-creation is not useful

5.1.3   Each school will be equipped with at least one computer laboratory with at least 10 networked computers to begin with. Each laboratory will have a maximum of 20 computers, accommodating 40 students at a time. A student computer ratio of minimum 10: 1 is to be achieved progressively in all schools.

5.1.4   Exclusive laboratories with appropriate hardware and software will be provided for the higher secondary classes.

5.1.5   In addition, at least one classroom will be equipped with appropriate audio visual facilities to support an ICT enabled teaching-learning.

5.1.6   Appropriate hardware   for Edusat terminals will be provided to selected schools in each state.

5.1.7   Computers will be provided at the library, teachers' common room and the school head's office to realise the objectives of automated school management and professional development activities.

5.1.8   ICT enabled education can be significantly enhanced and the range of classroom practices expanded with the introduction of digital devices like still and video cameras, music and audio devices, digital microscopes and telescopes, digital probes for investigation of various physical parameters. These will also form a part of the infrastructure. States will make appropriate choices and promote the use of such devices in classrooms.

5.2 Network and Connectivity

5.2.1   All computers in the school will be part of a single local area network to enable optimum sharing of resources.

5.2.2   Each school will be serviced with broadband connectivity of at least 2MBPS capacity. The number of computers given internet connectivity will be governed by the available bandwidth, in order to ensure adequate speeds. A mechanism to cache internet content will be set in place to enable offline access. Connectivity related details are placed at Appendix D) Kerala has got a good arrangement with BSNL for providing broadband internet to all schools, worthy of study if not emulation

5.2.3   In addition to the laboratory, internet connections will also be provided at the library, teachers' common room and the school head's office.

5.2.4   An Edusat network will be planned at each state with interactive terminals and Receive Only Terminals (ROTs). At least 1000 such terminals could be planned at each state.

5.2.5   Teachers and students will be educated on issues related to the safe use of internet Firewalls and other security measures will be implemented to block inappropriate sites and to guard the school network against misuse of the ICT facilities . GNU/Linux (FOSS) operating system has superior security architecture and this needs to be incoporated.

5.3 Software

5.3.1   A wide variety of software applications and tools, going well beyond an office suite is required to meet the demands of a broad based ICT literacy and ICT enabled teaching learning programme. Graphics and animation, desktop publishing, web designing, databases, and programming tools have the potential of increasing the range of skills and conceptual knowledge of the students and teachers. A judicious mix of software will be introduced at the secondary stage.

5.3.2   Free ware, free and open source software applications will be preferred. Creation and widespread dissemination of software compilations, including specialised software for different subjects, simulations, virtual laboratories, modelling and problem solving applications will be encouraged. The Kerala IT@Schools program convincingly demonstrates the superiority of FOSS over proprietary software. Hence any use of proprietary software in ICT in school programs needs to be adequately justified.

5.4 Enabling Infrastructure

5.4.1   The enabling infrastructure required to efficiently maintain the ICT facility will be defined, established and maintained.

5.4.2   Regular and regulated supply of electricity, appropriate electrical fixtures, adequate power backup and support, including alternate sources of energy, where needed, will be ensured. Students and teachers will also be trained in the safe use of electrical outlets and fittings.

5.4.3   Physical facilities like an adequately large room, appropriate lighting and ventilation, durable and economic furniture suitable for optimisation of space and long hours of working will be established.

5.4.4   Adequate safety precautions and rules for use will be established. Each laboratory will be equipped with a portable fire extinguisher and students and teachers trained in its use. An appropriate fire drill will also be implemented.

5.4.5   All the equipment and resources will be covered under an appropriate insurance policy against theft and damage.

5.4.6   Where a State has implemented an EDUSAT programme or has arrangements for Radio or Video broadcasts, provision for EDUSAT and/or DTH will also be made. States will ensure an appropriate definition of use, mechanisms for generation of content and capacity building for integration into the curriculum.

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6. Digital Resources

6.1 Digital Content and Resources

6.1.1   The state shall endeavour to provide universal, equitable, open and free access to ICT

and ICT enabled tools and resources to all students and teachers. the stress on a free and open access environment is welcome. There is no place for restrictive copyrighted material in the public education system. Sharing and collaborating possibilities are greatly enhanced by new ICTs and this should give a great fillip to local content design and creation. District level syllabi which our MHRD DIET manual suggests can become a reaility in many districts if we can support teachers and teacher educators to collaborate and support one another, take support of educational experts and institutions, and create local texts and learning material. Suh activity has huge process benefits, of creating professional networks amongst these groups, which would be even more beneficial than the actual content created. This possibility is perhaps the single biggest benefit of using ICTs in this domain.

6.1.2   Given the diversity of the country's educational, linguistic and social situation, there

exists a need for a wide variety of digital content and resources for different subjects, curriculum, ages/grade levels and languages.

Content development has to be led by educators / teachers and not by techies.

Local language and local content development is perhaps the biggest benefit/power of new ICTs. The DIETs, CTEs, BRCs, CRCs, schools should be sites where educational content is co-created in local languages which is made available on websites. Such large scale availability of content in different Indian languages is a necessary part of their protection, preservation and thriving. The central and state governments need to launch specific programs for local creation in local languages. (The Karnataka State Knowledge Commission has begun a project for digital content in Kannada language covering different subjects)

For children with special needs, special investments are required in creation of material that is appropriate for different categories of impairments, including learning disabilities, autistic children, hearing impaired children, visually impaired/ blind.

6.2 Development of Content

6.2.1   There is a need to phase out digital content development – initially concentrating on

difficult to teach/comprehend concepts, moving further to development of content for all concepts and finally culminating towards more sophisticated interactive ICT tools for teaching and learning, e.g. virtual laboratories. Local content creation can be an expression of learning, joy and identity amongst teachers and students, hence there is really no need to 'start with hard spots' etc. Digital content would be created through variety of methods – computers, internet, digital cameras, video cameras, audio recorders etc. Audio visual content creation requires to be encouraged in addition to text content. This will also help in democratization of use of ICTs

6.2.2   The proposed web based digital repositories will host a variety of digital content,

appropriate to the needs of different levels of students and teachers. This is welcome. Free and open digital respositories, that include locally created content, in local languages can be very useful

6.2.3   Raw content resources like photographs, video, audio and animations will be

remodelled to develop multimedia learning objects.

6.2.4   Textbooks, teachers'/students' guides, question banks, FAQs, laboratory manuals,

problem sets, activities, notes and a variety of other print based learning resources available in the public domain will be digitised and deployed on the national and state level web based digital repositories.

6.2.5   Educational standards and instructional designs for a variety of digital content and

resources will be widely disseminated to enable development of quality digital content, including interactive

multimedia materials and learning objects.

6.3 Sharing and Dissemination of digital content

6.3.1. Widespread sharing and dissemination of digital content will promote infusion of ICT into classroom practice. Suitable open standards for interoperability, web based sharing and appropriate norms for free access will be defined to catalyse use of digital content and resources. Examples like Wikipedia (which is available in few Indian languages) should be studied

6.3.2 Collections of digital content and resources will be deployed on web based digital repositories, which will be universally accessible. State level and National level repositories will be developed and maintained. Emphasis will have to be placed on multi lingual e- content development in State Regional Languages with facilities for translation to other languages so as to optimise time, effort and cost.

6.3.3 National level organisations like Central Institute of Educational Technology (CIET), National Council of Educational Research and Training (NCERT). Indira Gandhi National Open University (IGNOU) and State level organisations like State Institutes of Educational Technology (SIETs) will play a proactive role in developing and sharing of digital content.

They will also support the capacity building activities of teachers in digital content development and usage.

6.3.4   Content developed by state funded projects and programmes will be deployed under
appropriate licensing norms (like the creative commons) to facilitate open and free access to these resources.

6.3.5   Teachers and students will be oriented to prevailing copyright regimes, different types
of restrictions on reuse of content and the need to respect copyright. Teachers and students will also be educated about alternate forms of licences like the creative commons and encouraged to use them.

6.4 Role of School Library

6.4.1   The library in the school will search, collate and categorise digital resources and
make them available to the teachers and students. The school library will have to be digitized in cataloguing and the library automation will gradually will need to be in place for facilitating access to the variety of digital resources. An automated library with internet access will catalyse the use of digital resources in all classes.

7.   Capacity Building

7.1 Capacity building of In-service Teachers

7.1.1Capacity building of teachers will be the key to the widespread infusion of ICT enabled practices in the school system. A phased out programme of capacity building will be planned. In service training of teachers will comprise of Induction Training as well as Refresher Courses. The induction trainings should be imparted by the State Councils of Educational Research and Training (SCERTs) or such other institutions of the State Government and should preferably be completed before the commencement of the academic year. The refresher trainings should be carried out every year to enable the teachers to share, learn and keep abreast of the latest trends in ICT based teaching learning processes. The induction training would be followed by teacher's evaluation to ensure that the minimum competency is achieved.

All pre-service and also select in-service programmes need to include ICT and education for new and old teachers. Their confidence and comfort is essential if the programme has to make any meaningful impact.

The experiences of the Kerala IT@Schools program are worth understanding. Kerala has provided ICT Literacy training to ALL teachers in high schools and this has significantly enhanced their capacities to use ICTs for learning. This was possibly because the state integrated ICT training into its own structures instead of outsourcing the activity as States using BOOT Models have done.

7.1.2   Training in ICT will be integrated with general training programmes organised for
teachers and school leaders at all levels in order to popularise its use and to demonstrate effective practices in ICT.

7.1.3   Beginning with an initial sensitisation through ICT operational skills and ICT enabled
subject teaching skills, teachers will become part of online professional groups (e.g. English teachers association) to continue their education, pool in their resources and actively contribute to the strengthening of domain specific knowledge within the country.

7.1.4   Teacher participation in the digital content development process will catalyse its
broad based usage in the classrooms. Teacher capacities will be developed in instructional design, selection and critical evaluation of digital content, and strategies for effective use of digital content to enhance student learning.

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7.2 Capacity building through Pre-service Teacher Education

7.2.1 Teacher educators will be suitably oriented and trained to use ICT in their pre-service teacher training programmes. They will also be expected to enable pre-service teachers to be sensitised to and practice the use of ICT.

7.2.2 All pre-service teacher education programmes will have a compulsory ICT component

The existing curricula for pre-service teacher's training will need to be revised for including the appropriate and relevant ICT course. All teacher trainees passing out of teacher education programmes will have obtained adequate levels of competency in ICT and ICT enabled education. This proficiency will form a part of the eligibility criteria for teacher appointments.

7.2.3 National Council for Teacher Education (NCTE) has already laid down guidelines

about availability of ICT infrastructure in each such training institution. NCTE would prescribe appropriate curriculum in ICT, to be revised periodically, for such teachers and also provide necessary funds under its own budget.

7.3 Capacity building of Schools Heads

7.3.1 School heads will play an important role in establishment and optimal utilisation of

ICT and ICT enabled education practices in the school. All school heads will undergo appropriate orientation in ICT and ICT enabled education training programmes.

7.3.2 School heads will also be trained in processes leading to automation of

administration, management and monitoring of the school system and will play a proactive role in the implementation of School Education Management Information System (SEMIS).

7.3.3 School heads will be oriented to ensure the upkeep and safety of the ICT

infrastructure and the optimum use of the ICT facilities. Capacity building of State / District Education Department Personnel

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7.4.1 States / Districts Education Department personnel at all levels will be oriented to

infuse ICT into their work. They will also be oriented to various aspects related to the ICT implementation at the school level, SEMIS and sustenance of the ICT infrastructure.

8. ICT for other Areas of School Education

8.1 ICT for Children with Special Needs

8.1.1 Use of ICT will catalyse the cause and achieve the goals of inclusive education in schools.

8.1.2 ICT software and tools to facilitate access to persons with disabilities, like screen readers, Braille printers, etc. will be part of the ICT infrastructure in all schools. 12

8.1.3 All teachers will be sensitised to issues related to students with special needs and the potential of ICT to address them. All capacity building programmes will include components of ICT enabled inclusive education.

8.1.4 All web based interfaces developed for the programme including digital repositories, management information systems, etc. will conform to international guidelines for accessibility.

8.1.5 Web based digital repositories will address the lack of availability of resources for persons with disabilities. Digital content and resources, for the exclusive use of persons with disabilities, talking books for example, will also be developed and deployed.

8.2 ICT for Skill Development (Vocational Education)

8.2.1   Job oriented courses in ICT will be developed and established for students of the vocational stream at the higher secondary level.

8.2.2   The courses will be modular and students will be provided a wide range of choices, catering to a variety of job options, hardware and software platforms, tools and resources. Appropriate mechanisms to counsel students in selecting career paths and courses will be developed simultaneously.

8.2.3   The courses will be frequently revised and updated in order to maintain relevancy to changing requirements of the job market and emerging trends in technology. Hence it will also be imperative to conduct such courses in close liaison with industry.

8.2.4   The institutions offering Vocational courses will be required to integrate ICTs in their teaching-learning process.

8.2.5   An open learning system will be developed permitting students to continue to reskill themselves. Conventional restrictions of age and previous qualifications will be suitably reworked to facilitate an open system. Where feasible, online and distance modes will also be explored. Lateral and vertical mobility needs to be established amongst the courses available with multi entry and multi exit. Open learning systems need to be based on free and open access principles

8.2.6   A system of On-demand evaluation and certification, to enable students to obtain timely qualifications will be developed.

8.3 ICT for Open and Distance Learning

8.3.1   Open and Distance Learning with the use of ICT opens out alternate possibilities for students who have dropped out, cannot continue formal education or are students of the non-formal system of education. Existing formal systems of Education will be strengthened with ICT based instruction available in Open and Distance Learning System so as to cater to the needs of such learners referred herein.

8.3.2   Present Open Schooling systems (e.g. National or State level Open Schools) will be strengthened by harnessing ICTs innovatively. Access to e-books, e-content, Digital Repositories (with relevant learning resources) etc. could be developed by these institutions as student support services. This will also be used for online capacity building for open and distance teacher training.

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8.3.3   National Institute of Open Schooling (NIOS) has effectively used ICT to bring about a

major transformation in its basic operations under the project known as NIOS Online <Ni- On>. Online registration facility is provided for Admission, Examination, e-Accreditation, fixation of Examination centres and Payment gateway, which is available through out the year (24X7). Under the project a user friendly, convenient Learner Support Centre (LSC) was made functional to sort out the grievances of the learners on toll free numbers and through e-mail.

NIOS has also implemented the On-Demand Examination System (ODES) where by learners can appear in the examination as and when they are ready for it. This system will be strengthened and extended to its State counter parts for the benefit of learners from the non-formal sector.

8.3.4   EDUSAT and DTH will be promoted, wherever feasible, to enhance access to

information and resources. A Broadcast Server for digital storage, retrieval and transmission of broadcast quality educational audio-video programmes will be deployed.

8.3.5   The proposed mentoring system for students involving expert teachers will be

extended to these students also. Online courses, online on demand exams, and digital repositories and content, media broadcasts planned through DTH/EDUSAT, open learning systems allowing multiple entry and exit points, opening out the school resources to non- formal students, guidance and counselling.

9. ICT for School Management

   9.1 Automated and ICT managed school processes

States will adopt or adapt an e-governance and automated school administration programme for schools, build capacities for its implementation and deploy school based Management Information Systems (MIS). These MIS will be integrated with the proposed state wide web based School Education Management Information System. A school wide local area network enables automation of a variety of processes. Beginning with library automation, locally cached offline access to internet resources, office automation, maintenance of records, student tracking, resource planning, using the existing ICT infrastructure will increase efficiencies. At the same time, savings in cost, time and effort will also accrue. The school wide local area network will be used to facilitate this automation.

At the system level, the policy envisages a web enabled networked environment, in which schools, teachers, students, school managers, and the community at large participates. This implementation will include the School Education Management Information Systems (SEMIS); digital repositories of tools, content and resources; professional development and continuing education platforms; and guidance, counselling and other student support services.

States will define norms for automation of school processes for administration and management. Development of an MIS system will be undertaken and implemented in both

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offline and online modes. The scope of information to be collated by the MIS will be broad and include student and teacher tracking, particularly from their academic needs.

9.1.1   States will adopt an e-governance and automated school administration programme

for schools, build capacities for its implementation and deploy school based Management Information Systems. These MIS will be integrated with the proposed national level web based School Education Management Information System (SEMIS).

9.2 School Education Management Information System (SEMIS).

9.2.1   A nation wide network will be established in which schools, teachers, students, school

managers, and the community at large participate. This implementation will include the School Education Management Information Systems (SEMIS); digital repositories of tools, content and resources; professional development and continuing education platforms; and guidance, counselling and other student support services.

9.2.2   SEMIS will emerge as a single window clearing house on all information related to

the secondary school system. The information will facilitate research and analysis activities and guide decision making at different levels in the education system, contributing to enhanced efficiencies.

9.2.2   States will define norms for automation of school processes for administration and

management. Development of an MIS system will be undertaken and implemented in both offline and online modes. The norms will also define standards of technology including language fonts, word processors, technical dictionaries, etc. Where such standards exist, they will be adopted as is. Care will be taken to ensure open standards facilitating universal access to information, content and resources.

10. Implementing and Managing the Policy

10.1   Programme Monitoring and Evaluation Group (PMEG)

10.1.1   Programme Monitoring and Evaluation Group (PMEG) of the Department of

School Education & Literacy will be tasked with the overall responsibility of guiding the implementation of the ICT programme in schools across the country. The PMEG may set up task groups and invite institutions or individuals to develop norms, specifications, evaluation reports, white papers etc. to guide the States in implementing the ICT programme.

10.2   Inter-ministerial Group

10.2.1   An Inter-Ministerial Group consisting of members from the Ministry of HRD, Ministry

of Communications and Information Technology, Ministry of Information and Broadcasting, Department Of Space, Ministry of Power, Ministry of New and Renewable Energy, etc. will be set up and tasked with the responsibility of guiding technological choices and specifying cost effective and optimum infrastructure and connectivity.

Ministry of Science and Technology should also be a member of this group since ICTs have close linkages to foundational S&T. The Inter-ministerial group should also have Ministry of Women and Child Development to ensure that the child protection policies are ensured in all uses of ICT

10.2.2   The group will also review the state of the art technology, connectivity and inter

sectoral convergence based on its relevance to educational ICT goals, feasibility of implementation in the school sector, appropriateness in terms of finance, environmental footprints, need for training and learning curves for use and managing the system. The

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group will regularly review technological choices and guide the states in making informed investments, maximising the educational benefits.

10.2.3   Technology choice reviews will include standards and norms for computer

configuration, input and output devices like scanners, printers and projectors, operating systems and system software applications including virus scans, productivity applications and educational software, power conditioning equipment, and other digital equipment like camera and audio recorders. It would also include norms for Edusat terminals. Norms for pricing of enabling infrastructure like telephone, internet, and electricity will also be considered and states guided in establishment and management of the infrastructure.

10.3   National and State level Agencies

10.3.1   National and State level agencies, like the National Council of Educational Research

and Training, the Central Institute of Educational Technology, the National Institute of Open Schooling, the State Councils of Educational Research and Training, and the State Institutes of Educational Technology will develop curriculum, resources, and capacity building programmes, which will serve as models for adaptation and implementation across the system.

10.3.2   All public funded National and State level agencies will partner in developing,

compiling and making available digital content, resources and tools. Norms for quality, universal open access for different types of digital content will be defined.

10.3.3   Public funded broadcast agencies at the National and State level, agencies managing

the EDUSAT networks will be engaged with to ensure wider dissemination of support services and resources.

10.4   Role of the States

The States will have a two fold task:

Define norms, standards, guidelines and frameworks to enable various aspects of the

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programme

Facilitate and monitor the implementation of various aspects of the programme

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These tasks will include:

A programme of action, an appropriate road map and a feasible time line

Guidelines based on national standards and norms for infrastructure, implementation

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processes at various levels, capacity building programmes, monitoring and evaluation criteria, targets, etc.

Framework for procurement, development, selection, evaluation, deployment in

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repositories, and use of digital content

Facilitation of wide spread participation of all stake holders, including community and

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private partners in various aspects of the ICT programme Development, deployment and maintenance of infrastructure and digital repositories

•Development and phased implementation of an appropriate capacity building

•

framework

Mobilisation of resources including from private and community sources

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Development of an appropriate legal and regulatory framework

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Monitor and evaluate the implementation

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10.5   Programme of Action

10.5.1   The States will draw up a Programme of action to inform and guide various aspects

of the ICT programme, viz., development of infrastructure, management of the programme, development of digital resources, capacity building, monitoring and evaluation of the programme.

10.5.2   Based on a suitable road map and time line, the States shall ensure coverage of all

Government and Government aided secondary and higher secondary schools by the end of XI plan. It will also ensure similar development in all unaided schools through the respective State Boards of affiliation. The time line will be broken up into appropriate phases and suitably monitored. The programme will be expanded to the upper primary stage, covering all the schools by the end of the XII plan.

10.5.3   The States will set up an institutional mechanism for implementing the ICT

programme under the existing educational system, suitably delegating responsibilities up to the school level. States may experiment with different models based on past experience and appropriateness.

10.6   Advisory Group

10.6.1   The States' Department of Education will spear head an advisory group to guide the

implementation of the ICT programme , its monitoring and evaluation. The advisory group, will be consist of the concerned Departments, a reputed engineering Institute of the State, University, etc taking into consideration the variety of technical, educational, financial and administrative tasks involved.

There is a great need to emphasise that educationists should play an active role in this process. ICT in school education is a 'curricular' policy and not a technology policy. Use of ICTs in different educational institutions is quite strong (several examples are there such as Delhi Teachers Network, Use of Moodle in TISS MA Education program, Maths wiki by HBSC, radio programs of CLR) etc) and maturing and the experiences of educationists is indispensable to program design. The lack of mention of this aspect is a significant limitation of this document and needs to be remedied.

10.6.2   The States' Department of Education will synergise with the appropriate departments

and state level agencies to ensure the establishment of connectivity and electricity in all schools. This will include negotiated norms for pricing, quality of service and maintenance.

10.7   Norms, Standards and Procedures

10.7.1   In order to ensure uniform and high standards of ICT, optimum utilisation and cost

effective implementations, States will adapt standards and norms suggested by the inter ministerial group at the national level for all aspects of the ICT implementation, in particular the technology mix, specifications of equipment, selection of software and connectivity, selection and deployment of digital resources and capacity building programmes.

10.7.2   Prevailing norms in the State will be utilised to phase out, dispose of or exchange old

and obsolete equipment. Care will be taken to minimise avoidable upgradation and generation of electronic waste.

10.7.3   States will develop procurement, installation, operation and maintenance

procedures, and draw up appropriate agreements with the vendor/agency. The vendor will deploy an onsite person, who would ensure the day to day troubleshooting, repair and maintenance of the total system, establishment of toll free reporting system. This will particularly include upkeep of the equipments, security of data & virus management. The MoUs/ agreements will involve strict compliance clauses to ensure quality of equipment and service and minimum downtime.

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10.8   Models for ICT Infrastructure

10.8.1	Build, own, operate and transfer (BOOT) models for ICT infrastructure will be

preferred. BOOT is demonstrated to be a huge failure. The Kerala model which integrates ICT education into the mainstream system is vastly superior and needs to be studied and emulated. BOOT models like Mahiti Sindhu have fatal limitations and policy should strongly discourage outsourcing of ICT education to private vendors. BOOT is privatisation of school education and is against educational policies Different combinations of services like equipment only, equipment + manpower, equipment + manpower + software and e-content will be tried out and appropriate combination, based on feasibility and cost effectiveness, adopted by the States. Based on prevailing depreciation and obsolescence norms, the State may also choose to use a Build, own and operate (BOO) model.

BOOT model is acceptable for hardware and basic infrastructure. However the e-content and the software as well as teacher training should be driven by educationists and not by technology experts.

10.8.2	States will explore the possibilities of sharing the infrastructure partly or wholly with

the community to extend education or train youth after school hours or similar purposes. The BOOT agency and/or the school may also utilise it for augmentation of resources. States will try out and establish appropriate community partnership models for optimum utilisation of infrastructure and resources, while ensuring safety of school property.

10.8.3	States will evolve mechanisms for bulk purchase, rate contracts based on dynamic

pricing, and school wide licensing of software in order to ensure a low total cost of operation. Upgradation of software, where applicable, will also be built into the pricing models. Kerala has done some good work on this aspect and its procurment prices are far lower than DGS&D norms.

10.9	Regulatory Measures

10.9.1	Access to the Internet enhances the risk of inappropriate content reaching children.

Appropriate advisories for regulating access, monitoring internet activity and education of teachers and children will be taken up at the instance of the Advisory Group. Heads of schools and teachers will be trained in appropriate security and regulatory measures.

10.10	Incentives

10.10.1	The States will draw up an appropriate incentive scheme for teachers, students and

schools to recognise, showcase and promote initiative and talent. Easy loan schemes for procuring ICT equipment and resources, awards, professional support packages, and a variety of similar incentives, will be considered. States will also explore the possibility of partnerships and sponsorships with Government and Private agencies like Banks, Corporations and Charitable Institutions.

11. Financing

The procurement and utilisation of the ICT infrastructure requires appropriate allocations through both Centrally Sponsored as well as State schemes. These can be supplemented through public private partnerships and as part of corporate social responsibilities. The States will make adequate allocations in their budgets to ensure uninterrupted support to the ICT programme The program requires adequate public funding so that it is not dependent on private funding sources and provides the required infrastructure. Public private partnerships should not allow for the privatization or outsourcing of curriculum and transaction.

11.1	Infrastructure

Financial assistance should provide for:

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11.1.1	Enabling infrastructure viz. Proper room (s), power supply, telephone connection,

furniture, etc.

11.1.2	ICT infrastructure viz. Hardware, software and connectivity.

11.1.3   Recurring costs for maintenance of the equipment with proper planning to enable cost effective use and servicing

11.2   Content

Development and updation of e-content, capacity building of teachers to enable effective teaching in the classroom and capacity building of officials for use of ICT in school administration should be strengthened.

11.3   Sustainability

11.3.1   Each school may develop an ICT plan, based on locale specific requirement, to optimally utilise the infrastructure established in a cost effective manner. This should be based on the learning needs of the students and training requirements of all staff, including teachers.

11.3.2   The school level plans may be reviewed at the district/ State to make available adequate resources for raising the quality of education imparted.

11.3.3   The States will adapt appropriate models of infrastructure, procurement, maintenance to keep the total cost of operation low and optimising investments. It will also ensure optimum utilisation and minimise renewal and upgradation.

11.4   Total Cost of Ownership (TCO)

11.4.1   A TCO analysis of the programme should be done to gauge its viability and guide corrections in future implementation strategies. An analysis may be done of the total costs of acquisition and operating to the accruing tangible as well as intangible benefits. This section seems out of place in this document and its meaning is unclear, Public investment in schools does not follow ROI, TCO concepts or norms.

12. Monitoring and Evaluation

A mechanism for regular monitoring and evaluation will be made an integral part of the ICT programme. The State advisory group will function as the nodal agency for this process.

12.1   Monitoring

12.1.1   The Advisory Group constituted by the States will identify criteria, performance measures, periodicity of monitoring/ measurement, methodology to be adopted and reporting mechanism. Should consist of educationists mainly

12.1.2   Monitoring of progress and achievement of physical targets will be an ongoing activity built into the ICT programme. In addition to the national level monitoring of targets and objectives, the respective States would have an internal mechanism for overseeing the implementation of the programme through a monitoring committee constituted for the purpose. While the School Education Management Information System (SEMIS) and DISE would be a part of the monitoring tool, the State Govt. shall develop and undertake a

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monitoring mechanism, mapped at each level I.e. local, district, and State level to feed into the national web based MIS for the progression of ICT in the schools and to suggest mid course corrections.

12.2	Evaluation

12.2.1	An independent third party evaluation of the programme will be undertaken at

appropriate stages in the project. The States will identify a suitable agency to carry out the evaluation as per the requirements of the project.

12.2.2	The criteria for evaluation will include various aspects related to each of the

segments of the policy, viz., the ICT programme, infrastructure, digital resources, capacity building and the overall management of the programme.

12.2.3	University Departments of Education, Educational Technology or ICT related

departments will be encouraged by the States to take up research studies on various aspects, like impact assessment studies of the ICT programme, in order to inform and correct the process. also from the civil society organizations working for decades with Indian public education system – Digantar, Ekalavya are amongst hundreds of NGOs that have done valuable work with education systems and the policy should encourage their participation

12.3	Sharing of Results and Findings

12.3.1	The results and findings from the monitoring, evaluation and research will be widely

disseminated and used to make mid course corrections in each aspect of the ICT programme.

13. Public Private Partnership

13.1	States and local bodies will encourage the participation of individuals and institutions

from the private and non-governmental sectors, particularly through their corporate social responsibility programmes in development of infrastructure, development and/or supply of software and content, informing technology choices and capacity building. Their participation will be guided by standards and norms evolved by the Department of School Education & Literacy as well as by the States.

13.2	States and local bodies will create the mechanisms to utilise the talents and facilitate

the utilisation of voluntary services of professionally qualified youth in the school ICT programme, development of e-content and software tools, and research and evaluation.

13.3	States will maintain a directory of volunteers, resource persons and support

institutions for facilitating their participation in the ICT programme.

14. Policy Review

14.1	The ICT Policy for School Education recognises the need for frequent review of its

provisions. A suitable mechanism to revisit each segment of the Policy will be evolved. The policy should ideally be revised every two years.

14.2	A broad mechanism for consultations with all stake holders will be evolved. Inputs

from the inter ministerial group, the State advisory groups, the monitoring and evaluation

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findings, the programme monitoring and evaluation group will be utilised for informing the revision.

15. Time Line

Activity	Action by	Time frame
1. Implementation and Management		
Constitution of inter Ministerial Group at GOI	MHRD	1 month*
Constitution of advisory group by the States	State/UTs	1 month*
Drawal of a national plan of action through inter sectoral consultations	MHRD	3 months*
Drawal of programme of action by the States	States/UTs	3 months*
2. ICT Infrastructure		
Coverage of all Govt and Govt aided secondary and senior secondary schools through change in affiliation bye-laws.	MHRD/States/UTs	XI Plan
Coverage of all private secondary and senior secondary schools	States/UTs/respective Boards	XI Plan
Roll out & Implementation for all Govt and Govt aided upper primary schools	MHRD/States/UTs	2009-10 to 2013-2014
3. Digital Resources		
Development of IMMP for Sciences, Maths, Geography, languages for Classes IX -XII	CIET/SIETs/ RIEs/ States	XI Plan
Establishment of national repository for e content	MHRD/CIET/NIC	2010-11
Establishment of state level repositories	States/ Uts/SIETs/SCERT/ NIC	2010-11
4. ICT Literacy and competency		
Basic IT literacy to students of Classes IX -XII	States/UTs	XI Plan
IT related electives in higher secondary classes	CBSE/State Boards	XI Plan
Basic IT literacy to students of upper primary classes	States/UTs	XII Plan
Capacity building of teachers		
I) Induction training	States/UTs/NCTE	XI Plan
ii) Refresher trainings	States/UTs/NCERT/SC ERT/RCI	Annually

Capacity building of officials and staff   States/UTs   Annually

5. Policy Review   Inter ministerial group Every 2 years

    in   association   with State advisory boards

    *With reference to the date of notification of this Policy 21

Please send your comments and suggestions by 29th July 2009 to:

1. ictpolicy.edu@nic.in

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