

Report of the Sub-Committee of Central Advisory Board of Education (CABE) on ICT in School Education

March, 2012

1.0 Introduction:

In the evolution of human civilizations, the industrial revolution that began about 250 years ago stands out as a major milestone that left nothing untouched – social, economic, cultural and political – both good and bad. The intensification of colonialism using new technologies of war and navigation would stand out as a negative aspect brought about by the industrial revolution, that mostly benefited Europe at the cost of colonies all over the World.

We are fortunate to be part of the next major revolution of human civilizations, sweeping the globe for about 25 years now, brought about by Information and Computing Technologies. Like the industrial revolution, it is leaving nothing untouched. It has penetrated all aspects of our lives and is still evolving. The pace at which it has affected the production and reproduction of knowledge, which manifests in terms of impacts on research, teaching and education, is particularly bewildering. Unless immediate and due attention is paid to its use and spread, the end results might not be as egalitarian and equitable as expected in a democratic set-up. The danger of creating disparities, though different from the colonial kind, are real, as evidenced by the new term that this revolution has already created, namely, the digital divide. Given the enormous pace with which newer ICT technologies are spreading, their appropriateness in terms of pedagogy, equity and larger public interest becomes a vital question, more so because information about these technologies is mostly spread by their vendors, whose major concern, understandably, is to sell them more and more. It becomes imperative therefore that for the benefit of governmental agencies working in education, and for larger public interest, the government lays down yardsticks and benchmarks through a public policy in the choice and use of ICT technologies, that can act as a guide for central and state government agencies and for the larger public purpose. This is particularly so since the governments are now spending significant amount of funds in bringing these technologies into education, particularly in schools.

With that in view, the Sub-Committee of the CABE was set up under the Chairpersonship of Secretary, Department of School Education and Literacy, Ministry of Human Resource Development, Government of India on the recommendations of the 56th Meeting of the CABE. A copy of the notification including the composition of the Committee is placed at Annexure 1.

Terms of reference:

- i. To suggest guidelines for the use of ICT in school education
- ii. To suggest possible role of public private partnership in use of ICT in education for ICT literacy as well as ICT aided education
- iii. To suggest the appropriate level for introduction of computer literacy among school students
- iv. To suggest the role of ICT in skill development at the school education stage
- v. To suggest appropriate pupil computer ratio in different stages of school education
- vi. To suggest strategies for teachers capacity building in ICT usage
- vii. To suggest strategies for development, dissemination and effective use of digital content

In addition to extensive informal interactions with various stakeholders, the Committee formally met four times and had wide ranging discussions on critical aspects of ICT in School education with special focus on themes identified in the terms of reference. The Committee took note of various presentations made before it (by States, experts etc.) on different models and flavours of implementation, challenges addressed, and consequent learning in schools. Minutes of the meetings are placed as Annexure 2.

The Committee, in its final meeting in Thiruvananthapuram, observed closely the Kerala Model of implementation of the ICT scheme. The members visited schools where the impact of the infusion of ICT into the activities of the school, its integration with the curriculum and the comfort levels with IT of both teachers and students was evident. The Committee observed that a series of actions taken towards the development of curriculum, use of Free and Open Source Software (FOSS) and organisation of State wide events, contests and festivals have contributed significantly to the development of an enabling environment for the infusion of ICT in education. The experiences of Andhra Pradesh and West Bengal were also discussed.

Based on these deliberations, the views and recommendations of the Committee with reference to the Terms of Reference are detailed below:

2.0 Guidelines for use of ICT in school education

ICT use is currently limited to ‘show and tell’ and there is an inappropriate emphasis on learning how to use computers. This limited view of ICT as a vehicle for computer literacy underplays the significance of the large investments and the potential of ICT in the school environment.

The Committee recommends a holistic and integrated view of ICT to improve overall efficiency and productivity of schools. Apart from its use as a teaching learning device, ICT should be leveraged to bring in efficiency and transparency in governance and management of schools through automation of school processes, libraries, etc. The use of ICT to enable networking amongst stakeholders encouraging collaborative creative efforts in content building and self-development must also be institutionalised.

A comprehensive set of guidelines to support States in steering their efforts to achieve these objectives is necessary. The Committee therefore considered the draft National Policy of ICT in School Education, which aims to provide a framework for ICT in Education and leverage its potential to realise the goals of the National Policy of Education and the National Curriculum Framework. The document addresses the substantive issues of design and implementation of ICT initiatives comprehensively. The Policy inter alia covers:

- ICT literacy and ICT enabled teaching learning processes;
- ICT for skill development, children with special needs, open and distance learning;
- ICT enabled school governance;
- ICT infrastructure including hardware and software;
- Development of digital resources, its sharing and dissemination;
- Capacity building of institutions and individuals; and
- Measures to implement and manage the Policy.

The suggestions of the Committee in relation to various aspects of the Policy have been incorporated. In its current form, the proposed policy will significantly and suitably reorient the ICT implementations across the country. The Committee recommends the Policy for consideration of the CABE. The Policy document is placed as Annexure 3.

3.0 Public private partnership (PPP) in use of ICT in education, ICT for literacy as well as ICT aided education

Enabling ICT implementation across schools, in the context of non-availability of trained human resources and technical support in far flung rural schools can be a severe obstacle. Given this challenge, coupled with rapid changes in technology making choices difficult, the States have done remarkably well. This augurs well for the benefits of the technological revolution reaching all students and teachers. The Committee was particularly concerned about the models of implementation, wherein sourcing of e-content and teaching-learning resources is being outsourced to private entities on a turnkey basis with negligible involvement of the State's own human resource.

Two alternate models of implementation, one exemplified by the Kerala experience and the other being the BOOT model were examined. While the BOOT model appears a convenient means of outsourcing the tasks of establishing the infrastructure and has been efficiently used in many States, the model suffers from limitations as it entails outsourcing the design and implementation of the educational programme. In some cases, States have allowed the BOOT agency to define its own syllabi and use unvalidated e-content, delivered using inappropriate methodologies defeating the spirit of the National Curriculum Framework.

The BOOT agencies deploy instructors to manage the system, which results in creation of systems dissociated from the rest of the school programme. Teachers in the school are not a part of the ICT programme process, barring a few isolated individual cases. They perceive the ICT inputs as external to their curriculum.

The Kerala experience, on the other hand, has helped individual schools to take charge of the programme. The hardware is directly procured and managed through a strong service level agreement and penalties. The entire process of development of curriculum and digital resources is taken up collaboratively by teacher groups supported by experts. The ICT curriculum is woven around a variety of Free and Open Source software applications, which extends the range and scope of the learning experiences of students and teachers. Teachers manage the ICT curriculum as well as the IT infrastructure. These practices have demonstrated a heightened sense of ownership and achievement. There is a significant integration of ICT into the regular curriculum.

The Committee therefore recommends that the process of outsourcing of digital content and resources should be discouraged and emphasises the need for development of e-content by the States through their own pools of teachers and teacher educators.

Further, the Committee recommends that software applications and tools that are freely shareable and can therefore be ubiquitously disseminated in the system should be promoted. Resources developed should also be shared in order to widen their adoption and adaptation.

4.0 Appropriate level for introduction of computer literacy among schools and appropriate pupil computer ratio in different stages of school education

Reacting to various notions of ICT and public aspirations, schools have tended to introduce computers at very early stages of schooling. It is not uncommon in well-equipped schools to find very young children whose motor skills and hand-eye coordination are inadequately developed staring at computer screens and wielding the keyboard or mouse. Research studies have established adequately that it would be inappropriate to introduce very young children to such activities.

Further, the range of software applications and electronic resources made available in schools are woefully inadequate and inappropriate. They tend to support non-constructivist methods and deny opportunities to children. The National Curriculum Framework clearly underscores the need for young children to deal with experiences derived from their immediate surroundings.

The Committee therefore is of the considered opinion that ICT, particularly computer literacy, should be avoided at the primary stage. ICT enabled teaching-learning should begin at the upper-primary stage of schooling, where students are in a position to independently explore the world of information.

The inability of the school system to provide adequate numbers of computers appropriate to class strength has led to situations where many students share the computer at the same time, denying them any opportunity to interact with the medium directly. Large numbers of students in a school also leads to inadequate number of computer sessions for each student. There is therefore a need to specify a minimum computer access time for every student. It is recommended that school strength be used as a criterion while deciding on the quantum of resources. States can explore current technological advancements and low cost options to facilitate better computer-student ratios.

5.0 Role of ICT in skill development:

ICT tools and resources can play a very significant role in enhancing skills and consequent productivity, enhancing self-esteem and preparation of youth for the world of work. Any implementation of ICT therefore should provide for skill development, simultaneously increasing awareness of students to the wide variety of technological applications.

The Committee observes that the proposed National Policy of ICT in School Education addresses this issue adequately highlighting job oriented courses in ICT for students of the vocational stream at the higher secondary level by linking them with the need of ICT enabled industries/establishments in the neighbourhood. The scope of these courses would not be limited to ICT based occupations, but will inform and enhance productivities in a wide range of other occupations (for example, accounting, office automation, office communication, data handling and data processing, desktop publishing, graphics and designing, music and video, etc.). Given the rapidly changing technological scenario and newer applications emerging by the day, the courses will have to be frequently revised and updated to maintain relevance and ensure compliance with the NVEQF.

6.0 Strategies for teachers' capacity building in ICT usage:

The Committee took note of the absence of institutional capacities both at the State and National levels. The ability of institutions to anchor ICT implementations and benefit from the potential of networks and information systems is very limited. Urgent measures need to be initiated to build capacities of these institutions to help them discharge their roles as nodal agencies and thereby catalyse the implementation of ICT across the school system.

Use of ICT, ICT delivered resources and ICT enabled teaching-learning have not become common amongst teachers. It is only recently that pre-service teachers have begun to be oriented to ICT practices. It is therefore essential to develop capacities of teachers to utilise ICT resources and facilities in schools.

Teachers need to be trained in a variety of applications of ICT enabling them to integrate ICT in teaching-learning, develop and use educational resources, participate in collaborative activities and develop their capacities. Such trainings should be regularly and repeatedly organized. There are resources within the States i.e. Universities, IITs, Engineering Colleges, NIT etc. which can play a major role in defining and enabling the training and retraining of teachers.

The Committee recommends that agencies like CIET, NCERT play a leading role in formulating a generic ICT curriculum, developing the capacities of educational institutions and functionaries, and function as a nodal agency in expanding ICT use. Such activities should involve SCERTs/SIEs as well. Open and distance learning institutions must play an important role in extending the outreach of ICT based interventions.

A dialogue with CBSE and State Boards of School Education needs to be initiated for implementation of these practices in both Government and Private schools across the country.

7.0 Strategies for development, dissemination and effective use of digital content

In most cases the software applications used in the ICT programme are restricted to the operating system, minimum security software (typically a virus scan) and an office suite consisting of software. The list signifies an extremely narrow definition of ICT glorifying computer literacy as the aim, and simultaneously conveying a restricted conception of what ICT can achieve in education.

Computer Assisted Learning (CAL) is generally an electronic version of the syllabus (sometimes textbooks). Further, restricting the use of CAL practices to particular versions of e-content, however good, denies students and teachers access to a wider variety of alternate resources severely limiting their experiences.

The Committee is of the view that there is an urgent need to open the access to a larger body of e-content, allowing greater choices to students and teachers. State education agencies must actively participate in the process of creating such access, helping teachers select the best resources and even create their own resources, and enable their sharing among peer groups.

NCERT/CIET should play a catalyzing role in enabling this shift in paradigm. They should develop repositories of educational resources. Enabling the participation of all stakeholders in maintaining, translating, sharing, validating and improving these resources is an important aspect. NCERT should develop an appropriate framework for the selection and evaluation of educational

resources and build capacities amongst the States in using the same. An appropriate regulatory mechanism for selection and use of digital resources must be established.

The Committee thanks the special invitees for their valuable inputs and insights. We also place on record our appreciation of experts and representatives of States who shared their rich experiences. The Committee specially thanks the Govt. of Kerala for co-hosting the last meeting of the sub-Committee. Finally, thanks go to NCERT for hosting the Committee and facilitating its work.