

Shikshak Sammelan 2009
Information and Communication Technology for Quality Education
Academy of Fine Arts, Kolkata

“The illiterate of the 21st century, will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.”

Alvin Toffler

One of the many challenges facing developing countries today is that of preparing their societies and governments for globalization and the information and communication revolution. Policy-makers, educationists, non governmental organizations, academics, and ordinary citizens are increasingly concerned with the need to make their societies competitive in the emergent information economy. Globalization and innovations in technology have led to an increased use of ICTs in all sectors - and education is no exception. Uses of ICTs in education are widespread and are continually growing worldwide.

The emergence of this new global economy has serious implications for the nature and purpose of educational institutions. As the access to information continues to grow, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time.

Concerns over educational relevance and quality however, coexist with the expanding educational opportunities to those made most vulnerable by globalization—developing countries in general and low-income groups, girls, Scheduled Castes and Scheduled Tribes in particular. Global changes also put pressure on all groups to constantly acquire and apply new skills.

Information and communication technologies (ICTs)—which include radio and television, as well as computers and the Internet—have been touted as potentially powerful enabling tools for educational change and reform. When used appropriately, different ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life.

However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic. The effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology, but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing, among others.

There are four broad issues in the use of ICTs in education—effectiveness, cost, equity, and sustainability. Further, the policymakers in developing countries must reckon with various issues while making decisions about the integration of ICTs in education, such as, educational policy and planning, infrastructure, capacity building, language and content, and financing.

In recent years there has been an upsurge of interest in how computers and the internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings. But ICTs are more than just these technologies; older technologies such as the telephone, radio and television, although now given less attention, have a longer and richer history as instructional tools. For instance, radio and television have for over forty years been used for open and distance learning, although print remains the cheapest, most accessible and therefore most dominant delivery mechanism in both developed and developing countries. The use of computers and the Internet is still in its infancy in developing countries, if these are used at all, due to limited infrastructure and the attendant high costs of access.

The International Labour Organization defines the requirements for education and training in the new global economy simply as “Basic Education for All”, “Core Work Skills for All” and “Lifelong Learning for All”.

- ILO, ‘*Learning and Training for Work in the Knowledge Society*’

The reality of the Digital Divide—the gap between those who have access to and control of technology and those who do not—means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities.

Some Glimpses into the minds of the teacher community-

Prior to the Shikshak Sammelan, on “ICT in Quality Education” a short survey was carried out to determine the need and usage of ICT in schools where such interventions have been made and some where interventions have not taken place. A general opinion of teachers was taken on computer education, computer aided learning, most effective form of ICT, use of technology in classroom lessons and related issues.

The sample consisted of 20 government and government aided schools of Kolkata, Burdwan and Barrack pore, reaching out to approximately 60 secondary school teachers. Some were schools where some kind of ICT intervention had taken place, while a few were selected which had no ICT intervention whatsoever.

A short interview schedule¹ was prepared prior to the survey which was administered to the Head Teacher and some subject teachers of the schools by the Vikramshila staff. We thank all the schools and the teachers for taking out time and interacting with us, presenting their views and opinions and taking an interest in this discourse.

¹ (*Annexure of Interview Schedule attached below*)

Some of the discussions and responses with the teachers together with some current debates on the following issues are captured below-

Can the use of ICTs help improve the quality of education?

Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment. ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process.

The teachers strongly felt that the visual aural combination if integrated judiciously with the textbook and syllabus, can work wonders in getting across abstract concepts and logics to the children in a short span of time.

The potential of each technology varies according to how it is used. Haddad and Draxler (see references) identify at least five levels of technology use in education:

a) Presentation b) Demonstration c) Drill & Practice d) Interaction e) Collaboration

Does ICT-enhanced learning really work?

The educational effectiveness of ICTs depends on how they are used and for what purpose. And like any other educational tool or mode of educational delivery, ICTs do not work for everyone, everywhere in the same way. It is difficult to quantify the degree to which ICTs have helped expand access to basic education since most of the interventions for this purpose have been small-scale and under-reported. Further, as the Head Teacher of one of the schools added, any thing has its “uses and abuses” and the same holds for ICT in education.

Most Effective form of ICT in Education

The use of videos came across as the most effective ICT component in our teacher interviews. It was stressed by those using and wanting to use videos in educations that creativity in presentation is just as important as the use of innovative media.

Educational videos now encompass multimedia CDs, interactive games, flash and 3-D animation, slide-shows (like PowerPoint), video books, digital story-telling and many other forms that imaginatively combine visuals with text and audio that can be delivered on a range of platforms. Following current discussion forums on ICT in education, it is seen that videos can be used in a range of learning environments, such as to enhance learning in classrooms, train illiterate women on basic life skills, teach children from nomadic tribal communities, and encourage children to make their own video films on

local issues of concern. Moreover, videos can also be made accessible to the blind, as some organizations are doing using 'audio description.' Various organizations have produced videos on a range of topics including disaster management, child rights, forced migration, adolescent and gender issues and HIV and reproductive and sexual health topics.

Commenting on the ability of video to simplify complex subjects and engage children, teachers pointed out topics with strong visual contexts – like scientific evolutionary theories, planetary movements and geographical topography, geographical phenomena, biological phenomena – which can be quite difficult to grasp if taught using conventional methods – or 'hard spots' in the curriculum that can be brought to life through videos. Additionally, they shared examples of films being used in regular school syllabi subjects like for social studies, science and Maths that have proved effective.

While noting the positive impact videos can have on education, it was felt that educators often view the use of videos as an alien feature outside the regular curricular teaching and thus the challenge is to integrate videos into day-to-day teaching. They contended a clear policy emanating from a broad consultation on using ICT in education is necessary. If ICTs are used, teachers and schools need capacity building to recognize educational videos as an extension of the experiential aspect of learning and not merely as a visual alternative to textbooks. Teachers also identified obstacles like the lack of computers, TV sets and video playback systems in most schools and argued that a whole transformation is needed at the grassroots, requiring the collaboration of multiple agencies.

Computer Education or Computer Aided Learning?

In determining which was more important in the context of school education, Computer Education (CE) or Computer Aided Learning (CAL), most of the teachers felt that CAL was more important than CE, as the latter can be picked up by children easily with a few special classes devoted to it, as young people have a knack to grasp new technology. It was more important they felt to integrate the computer with classroom teaching through CAL. Some also felt that with a basic understanding on computers generated through CE, the effectiveness of CAL and TAL will increase.

CE was seen to be extremely important for children in the school context as computer education and its knowledge is necessary in all walks of life today. To keep pace with the changing world the students need to have a basic know how. Further, the teachers felt that most of the children in their schools came from very economically challenged situations with their parents working as vegetable sellers, rickshaw pullers and household help. For them such opportunities of computer education are not possible outside the school though a private course, as such these needs should be provided for within the school itself.

In addition, to CE, to improvise classroom teaching learning, the teachers felt that CAL and TAL were extremely important. A lesson if introduced with audio visual media and then taken back to the text book, or the textbook be interjected with audio visual media would prove to be extremely useful in teaching learning processes. They opined that not

only does CAL improve student teacher relationship and peer learning; it also makes the class a lot livelier.

Does ICT impact learning and achievement?

It is generally believed that ICTs can empower teachers and learners, making significant contributions to learning and achievement. Of the teachers interviewed on the effectiveness of ICT in education majority of them felt that introduction and use of ICT adequately will be extremely effective in children's learning and achievement.

However, current research on the impacts of ICTs on student achievement yields few conclusive statements, pro or con, about the use of ICTs in education. Studies have shown that even in the most advanced schools in industrialized countries, ICTs are generally not considered central to the teaching and learning process. However, there appears to be a mismatch between methods used to measure effects and the type of learning promoted. Standardized testing, for example, tends to measure the results of traditional teaching practices, rather than new knowledge and skills related to the use of ICTs. It is clear that more research needs to be conducted to understand the complex links between ICTs, learning, and achievement. Again, on the question of impact of audio visuals, research shows that surprisingly little documentation is available on the use and impact of video in education, barring one or two video projects like UNICEF's animation series, 'Meena', which has become a key weapon in the battle against gender and social inequity in South Asia.

Will ICTs Replace the Teacher?

The answer is a resounding "No", in majority of the responses, though a very small percentage of interviewed teachers felt that in some ways, the teacher's role would be undermined. Most felt that, with the introduction of ICTs in the classroom, the teacher's role in the learning process becomes even more critical. What can and should change is the kind of role that the teacher plays. The role of students, in turn, also expands. And since ICTs can open up the classroom to the outside world, the community can also play a new role in the classroom. Some teachers have cited from experience that the use of Audio Visuals in the classroom has actually enhanced the teacher student relationship. The computer, they feel is only an instrument; the human touch can only be given by the teacher. Further, decisions pertaining what to learn, when to learn, how to learn can only be taken by the teacher. As such, the computer can in no circumstance over ride the place of the teacher in the classroom.

As learning shifts from the "teacher-centered model" to a "learner-centered model", the teacher becomes less of an authority and more the facilitator, mentor and coach. The teacher's primary task becomes to teach the students how to ask questions and pose problems, formulate hypotheses, locate information and then critically assess the information found in relation to the problems posed. As one teacher mentions, since ICT-

enhanced learning is a new experience even for the teachers, the teachers become co-learners and discover new things along with their students.

Teachers' comfort with ICT

Many teachers are reluctant to use ICTs, especially computers and the internet. Some of the reasons for this reluctance include poor software design, skepticism about the effectiveness of computers in improving learning outcomes, lack of administrative support, increased time and effort needed to learn the technology and how to use it for teaching, and the fear of losing their authority in the classroom as it becomes more learner-centered. These are all issues that must be addressed by both pre-service teacher education and in-service teacher professional development programs if schools and other educational institutions are to fully exploit the potential of computers and the Internet as educational tools.

In terms of using internet and other ICT as a resource for lesson preparation, most of the teachers interviewed, admitted to never or rarely using it, while very few used the internet to gather information sporadically or regularly. The teachers particularly felt that they had both access and training inadequacy and hence were unable to utilize internet and other facilities. More teachers were comfortable however, with using computers as an individual than as a teacher. A positive find is that all those teachers who are not well versed with the computer and other technology, expressed keen interest in undergoing training for the same. They felt that if trained, they would be in a position to make use of resources available in the school.

Support of school administrators and, in some cases, the community, is critical if ICTs are to be used effectively. In addition, teachers must have adequate access to functioning computers (or other technologies) and sufficient technical support. Shifting pedagogies, redesigning curriculum and assessment tools, and providing more autonomy to local schools all contribute to the optimal use of ICTs in education.

The Stages of ICT Usage

If we look at the scope of ICT use in education and break it into stages, the matrix would roughly read as given below, in 7 stages.

Today, most of the schools in developing countries can be mapped somewhere along the stages 1, 2 and 3. Most schools use computers (if any) for administration purposes and to impart computer education, through a computer teacher. Very few strong examples of integration of ICT into classroom teaching learning is visible, though some schools do use the audio visual aids and integrate teaching of some lessons. Largely however, even where ICT is used in the classes, it is usually as an information source and not a part of core learning process. As the stages below 3 suggest, ICTs can be further used for lesson preparation, as a teaching tool, for students learning and there are also avenues to measure the impact.

Stage Number	Stage Descriptor
Stage 1	ICT not present or ICT present but hardly used
Stage 2	ICT used in planning/admin purpose and/or in providing Computer education
Stage 3	ICT used as an information source in teaching learning, but not a part of core learning processes
Stage 4	ICT used by the teachers for lesson preparation
Stage 5	ICT used in the classroom as a teaching tool (integrated with text learning)
Stage 6	ICT used for student learning, impact not measured
Stage 7	ICT used for student learning, impact measured

Themes for discussion- ICT and Education

ICT and Policy-

ICTs can be important drivers for educational reform. They can aid in decentralization, and play a key role in data collection and analysis. Still, there are many policy questions around the use of ICTs in education. Some of the key policy questions revolve around access, equity, finance, and best practices in scaling-up.

- a) what kind of policies would prove enabling for ICT integration in education
- b) what kind of policies would act to ensure that the introduction of ICT in education does not accentuate the already existing digital divide and does not become a source of further inequality

ICT and Teaching Learning- Making appropriate use of ICT in formal and non formal education-

- a) How can computers be used in the classroom? For instance as - Research tool, gaming tool, teacher tool, communication tool
- b) New Pedagogy- Instruction vs Construction, teacher centered vs learner centered, didactic vs interactive, memorization vs inquiry and invention, accumulation of facts vs transformation of facts, drill and practice vs communication and collaboration.

ICT and Teacher Training- ICT supporting teachers and new ways of teaching learning-

- a) teachers are no longer dispensers of knowledge but proactive facilitators
- b) redefining the role of the teacher in the new information age
- c) the quality of teachers as a predictor of student learning therefore the importance of teacher training is heightened- in this light what is the role of ICT as a tool facilitating teacher training

- d) bringing teachers to ICT rather than taking ICT to teachers- relevance in developing nations

ICT and Measurement Indicators- Developing performance indicators to monitor the outcomes of the use of technology in education

- a) Importance of monitoring and measuring use and impact of ICT intervention
- b) How to undertake this measurement- what will be the indicators for the measurement- e.g. infrastructure, joy of learning, teacher confidence, student participation etc

ICT and Equity-It is clear that there are equity issues related to the uses of ICTs in education. There is a real danger that uses of ICTs can further marginalize groups already excluded or on the edge of educational practices and innovations. On the other hand, with supportive policies and careful planning and monitoring, ICTs hold out the promise of facilitating greater inclusion of such groups.

ICT and Costs- Little is known about the true costs of ICTs in education. There have been few rigorous costs studies, particularly in developing countries. Given current budgetary and resource constraints, a widespread investment in ICTs in education is probably not possible in most developing countries. It is, therefore, critically important to better understand the costs and benefits associated with ICT types and uses in various educational situations in order to effectively target scarce resources. There is some evidence, for instance, that computers may be most cost-effective when placed in common areas such as libraries and teacher-training institutes

ICT and Content & Curriculum- Accessing information is the main use of ICTs in education. While ICTs, and the internet in particular, provide access to a world of educational resources, those resources are rarely in a format that makes them easily accessible and relevant to most teachers and learners in developing countries. Simply importing educational content through ICTs is fraught with difficulties, as well as questions of relevance to local needs. Experience shows that unless electronic educational resources are directly related to the curriculum, and to the assessment methods used to evaluate educational outcomes (especially standardized testing), ICT interventions may not have positive educational impacts.

Annexure- Interview Schedule

Name of School-
Additional Information-

Name of Teacher-

1. General Information:

1.1. No. of computers-

1.2 Since when-

1.3 Where are the computers kept-?

2. What do you think is the most effective medium for using ICT in education?

- a) computers
- b) internet
- c) video films
- d) radio
- e) Any other.....

3. What do you think about the use of ICT in education?

- a) not effective
- b) moderately effective
- c) extremely effective

4. What is more important in the context of school education?

- a) Computer Education
- b) Computer Aided Learning/Technology Aided Learning

5. Are you comfortable working with the computer?

- a) As an individual? Yes..... No.....
- b) As a Teacher? Yes..... No.....

6. Do you use the internet as a resource for preparing for lessons?

- a) Never c) Sporadically
- b) Rarely d) Regularly

7. Who uses the computer in the school?

- a) Head Teacher only b) Head Teacher and Staff
- b) Staff and children d) Computer Teacher
- e) Any other

8. Do you think computers can undermine the role of teachers?

Yes..... No.....

9. What is your opinion on use of ICT in education?

References:

- 1) Teachers Interviews and Discussions in Kolkata, Barrackpore and Burdwan
- 2) Solutions Exchange Website- <http://www.solutionexchange-un.net.in/>
- 3) Potashnik, M.and J.Capper, “Distance Education: Growth and Diversity;” available from <http://www.worldbank.org/fandd/english/pdfs/0398/0110398.pdf>
- 4) Haddad,Wadi D. & Alexandra Drexler (2002),“The Dynamics of Technologies for Education”, in Haddad,W. & Drexler, A. (eds.) *Technologies for Education: Potentials, Parameters, and Prospects* (Washington DC: Academy for Educational Development and Paris: UNESCO), p. 9.