

From Gurugriha to Smart Class Rooms: Technology Shapes Education

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A Paradigm Shift

We have come a long way since the days of yore, when a student (*shishya*) had to stay with the teacher (*guru*) and help with household chores to receive an education. Elite few had access to education then. Today it is common to acknowledge education as a basic right of citizenry. Advances in technology have played and continues to play a crucial role in this evolving democratization of education. A supernova of such technological advances was the advent of the printing press in Europe in the mid-15th century. The mass production of books that followed not only helped bring education to masses, but also went on to take center stage in the subsequent social and industrial revolutions. We are in the midst of a technological revolution of similar magnitude that will shape the mode of instruction and way we learn for the foreseeable future.

This new revolution is being brought about by the developments in computer, communication, and information technologies. Personal computers, with ever increasing capabilities, are rapidly proliferating in every sphere of life. The Internet with its mammoth maze of information from multitude of sources is connecting people and organizations around the globe as never before in human history. While these developments started out as scientific endeavors, it is the demand of the global marketplace as well as communications and entertainment industries that drives their rapid advances. As industrial society gives way to information society and globalization takes hold, countries are becoming more linked financially, economically, politically, socially, and culturally than ever before. The workplace of tomorrow will be increasingly global, and it is not a matter of choice but an imperative that the education system prepares the students for navigating in a complex, intricately linked world, and instills in them a global perspective.

Implications for Education

What are the implications of above-mentioned technological advances for primary, secondary, and higher secondary education? Advances in computation and communication are giving rise to new media, such as, the World Wide Web and virtual realities. These new media in turn can make many of the available educational contents, books and information accessible in any remote corner of the world that is digitally connected. What is even more important these new media enable messages, experiences, and visualizations that can support a paradigm shift from traditional “*teaching by telling*” to “*distributed learning*” where “*learning by doing*” can play a more dominant role. Multimedia technology can combine computers and voice, pictures, animated images, music, words, video, simulation and databases. Exposure to multimedia presentations helps student grasp contents and concepts better than from listening to lectures only, and active participation enables superior assimilation.

The “tools of the trade” and forms of expression that are already available, or will evolve in not-too-distant future, include, in addition to the personal computer, *educational compact discs* (CDs), *Internet*, *knowledge webs*, *virtual communities*, *synthetic environments*, and *sensory immersion*. Educational CDs can bring together sight, sound, and animation to be played on the computer. CDs on a variety of topics are widely available, much more in the developed countries than in the developing world, and can be a simple but effective learning tool. Knowledge webs have the potential to complement textbooks, libraries, and even teachers as information sources. Communications in virtual communities could complement face-to-face interactions in classrooms and learning groups. Synthetic environments that mimic distant and/or not-readily-

accessible real world settings will enable and widen learning-by-doing. Experts further maintain that sensory immersion in artificial realities will help students understand reality through illusory experiences. While some of these forms of expression may seem to be futuristic to belong in the realm of science fiction, those are attainable given sufficient resources.

The Internet: Possibilities and Potential Pitfalls

As an illustration of the potential of these evolving technologies to transform education one may consider the Internet, a storehouse of enormous amounts of information, which is more readily accessible. Educational technology researchers identify the Internet as a provider of three fundamental types of educational tools: tools for *inquiry*, tools for *communication*, and tools for *construction*. As a provider of tools of inquiry, the Internet helps find sources of information that are relevant to a task. Students gain access to resources from outside world including experts in the field, and may interact directly with them. These exposures enhance students' acquisition of knowledge. The Internet is a versatile resource for rapid communication in a variety of forms, such as, e-mail, face book, newsgroups, mailing lists, chat, videoconferencing, and webinar. In making available the tools for communication, the Internet thus enables communication with students, teachers, and professionals from different parts of the world with different cultures and traditions. As a provider for tools for construction, the Internet fosters student learning by scaffolding various learning activities that can be tailored for both individual and group learning. The students can pursue these activities at their own pace, accessing a wealth of information, evaluating those, and developing end products, a process that is highly likely to promote their thinking skills.

Even with all these beneficial attributes of the Internet, there are potential pitfalls and caveats in Internet-based instruction that one needs to be aware of and avoid. First, students need to be properly guided as to how to navigate the web and retrieve information pertinent to their tasks. Second, the students should be taught how to distinguish between genuine websites and sites that provide inaccurate, incomplete, or biased information. It is important to remember that anybody can post information on the web, and the authenticity and quality of the content depend on the knowledge, motivation, ability and integrity of the person making the posting. Third, the Internet-based lessons, like the conventional ones, are required to be carefully planned so that learning experience is stimulating, meaningful, and engaging for students. Practical considerations, such as, availability of computers with Internet access, the amount of time students may be able to spend on the Internet in the classroom may limit the use of Internet-based lessons. Finally, on the flip side web surfing can be addictive and may become detrimental instead of being beneficial to learning.

'Vision 2021' and a Student in Rural Bangladesh

Where does an underprivileged student in rural Bangladesh stand in relation to these technological advances, and fascinating educational tools? It is quite likely that she does not even have access to a computer *yet*. 'Digital divide' could be crippling for her. Fortunately, compared to other disparities in life the digital divide is more amenable to remedy. Remedy may be forthcoming as the Government implements the policies it has announced. What is even more intriguing is that in 119 Computer Literacy Centers (CLCs) and 38 associate CLCs run by the Computer Literacy Program (CLP) in rural Bangladesh her peers are becoming computer and information technology literate!

The Government has floated the lofty vision of a Digital Bangladesh by 2021, also known as *Vision 2021*. The National Information and Communication Technology (ICT) policy (*Jatiyo*

Tathya O Jogajog Prajukti Neetimala – 2009) has been approved, which lists the tasks assigned to different ministries and the anticipated outcomes. The salient tasks for the Education ministry include: to update the ICT curricula for secondary and higher secondary education on a regular basis to meet the needs of a knowledge-based society; to ensure that primary school and middle school students and teachers are ICT literate; to provide all primary, secondary, higher secondary educational institutions, teacher training colleges, as well as, technical and vocational education and training (TVET) institutions with computers, high-speed Internet connection, and necessary resources for multi-media based instructions; to establish, in every union, a model school with ICT resources to serve as the information access center of the union so that students from neighboring schools can use those as well; to ensure appointment of IT trained teachers in secondary and higher secondary educational institutions; and to encourage development of Bangla text processing tools and software for preparing audio from printed materials for the visually challenged and/or illiterate individuals. Substantial tasks have been outlined for higher education, ICT manpower development, enhancing participation of female students in ICT courses, and related areas. The policies and tasks put forward are ambitious, and if properly implemented will be a bold step in digitizing the education landscape of Bangladesh.

The 2010-2011 budget allocates Tk 3.12 billion for the ICT sector, which is respectable, but much lower than the expected total of Tk 28 billion. That expectation was built on the ICT policy mandate that 5% of Government's development budget, and 2% of the revenue budget be allocated for the ICT sector. In his budget speech the finance minister announced that steps have been taken to establish computer laboratories in 1,200 educational institutions at the upazila level in 7 divisions and in 200 educational institutions in 6 metropolitan cities. ICT enthusiasts in Bangladesh eagerly await the implementation of these proposals.

Steps Towards Realization: Computer Literacy Program and Smart Class Room

Government involvement is indeed crucial for introducing computer and ICT in classrooms throughout the country. However, it is heartening to note that CLP has made an impressive groundwork, providing hands-on basic computer training to 39,000 students in mostly rural areas of 52 districts of Bangladesh, and training 322 teachers (17% female) as of September 2010. Volunteers Association for Bangladesh, New Jersey (VAB-NJ) launched the program in 2004 with the mission of “*Empowering underprivileged youths of Bangladesh through computer literacy.*” VAB-NJ is the New Jersey Chapter of Volunteers Association for Bangladesh (VAB), a US philanthropic organization dedicated to promoting quality high school education in Bangladesh through a combination of scholarship, tutoring, teacher training, and educational facilities improvement programs. The focus of VAB-NJ is computer and information technology literacy and e-education. CLP is implemented in partnership with D. Net, a pioneer non-government organization devoted to spreading of information technology in Bangladesh, particularly in the rural areas, and the local school administration where a CLC is established. Each CLC is equipped with a minimum of four computers, one printer, other accessories and requisite furniture, and Internet connection where available.

CLP is now exploring the next prudent step in its evolution, which is to leverage on the computer, Internet, and human resources in the CLCs to initiate *e-learning*. The long-term goal of the initiative is to enhance the quality of education in Bangladesh through integration of the educational technologies mentioned earlier to transform the way students are taught. The planned first step in that long journey is to establish “*smart class rooms (SCRs)*” in some of the existing CLCs, and to develop contents and technical know-how for eventual propagation of SCR in

schools throughout the country. Every SCR will be equipped with a computer, one large screen monitor (32" inch), other peripheral hardware as required, and a back-up power supply.

While it is desirable to integrate computer and ICT in teaching of every subject, the focus at the initial stage will be on complementing the instruction of English, Science, and Geometry in secondary schools. The choice of the three subjects is motivated by the following considerations. English has evolved as the *lingua franca* of the world, and the contents available through the Internet are overwhelmingly in English. So learning English is crucial for interacting with the rest of the world, and for benefiting from and contributing to the developments in the ICT sector. While students in Bangladesh start learning English early on, the crucial areas of comprehending spoken English and carrying out a conversation in English are not sufficiently emphasized. So, the English instruction will focus on "teaching of everyday English" dedicated to filling this void in the current English education in our mainstream secondary schools, and will be an important addition for enhancing its quality and utility. Geometry is selected because it helps students develop their analytical skills, and instill in them deductive reasoning ability. Recent statistics depict an alarming trend that the number of students taking secondary school certificate (SSC) examination from Science group is diminishing significantly every year. Making teaching and learning interesting through the use of ICT may be one of the possible ways to reverse this alarming trend. What is also noteworthy is that there is a paucity of qualified English, Science and Mathematics teachers in many schools in rural areas of the country. The planned multi-media presentation in a SCR will play the role of teacher's aide, and substitute, in part, the traditional lecture given by the teacher.

To begin with, three instructional CDs for the three subjects have been identified. The CD on English is an outgrowth of the "*Computer Teaches Everyday English (CTEE)*" pilot program that VAB-NJ is pursuing. The science and geometry CDs were developed by experts in Bangladesh keeping the curriculum and preparation of students under consideration.

The "*smart class room*" experiment is currently being pursued at the Uddipan Badar-Shamsu Biddya Niketon in Bagerhat using the three CDs as sources for contents. The initial feedback is overwhelmingly positive. The students are fascinated by the multi-media mode of presentation of the contents, and claim to gain a better understanding of the subject matter when they learn it in their SCR. The teachers are also highly appreciative of these new tools, as those are getting their messages across to students and making their job more enjoyable.

Recently, a pilot program to establish 100 CLCs and 100 SCRs throughout rural Bangladesh as a first step towards e-education has been launched under a Private-Public Partnership Initiative (see box insert).

Our Journey Begins

Education system all over the world is up for change, with globalization as the driving force and technology as the catalyst for that change. The traditional views of society on which the current educational paradigms are based are no longer valid in this age of globalization. Societies that can adapt to or better yet can control these changes will thrive and those who fail will lag behind. In order to prosper as a society we have to harness the new technology to provide our students with an engaging, interactive, and dynamic system of education. It is a journey we ought to embark up on, and there are no retreats.

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Introducing Smart Class Rooms and Computer-Aided Education in Rural Bangladesh

A Private Public Partnership (PPP) between VAB-NJ (Volunteers Association for Bangladesh, New Jersey Chapter, and USA), D.Net (Development Research Network, Bangladesh), and the Government of Bangladesh has initiated an innovative computer literacy training and computer-aided education program focused primarily on secondary schools in rural Bangladesh. The program will establish 100 *Computer Literacy Centers* (CLCs) and 100 *Smart Class Rooms* (SCRs) in sponsored schools across Bangladesh over a three-year period. An attractive feature of the program is that it provides a sponsor the opportunity to establish a CLC and a SCR at a secondary school in Bangladesh at one third of the total cost, the remainder being paid by the program.

The new CLCs will emulate the 119 CLCs and 38 Associate CLCs that VAB-NJ and D.Net established across Bangladesh (see map) and used to train over 39,000 students as a part of the Computer Literacy Program (CLP) that they launched in 2004. Each CLC is equipped with a minimum of four computers, a printer and other pieces of peripheral equipment. Two CLP trained teachers use a hands-on curriculum developed by experts to teach the students outside their regular school hours. Students in a batch of 2 per computer receive 40 hours of hands-on training in basic computer operation, Microsoft Word, Excel spreadsheet, Paint programs, and the use of Internet free of charge (for further details please visit www.vabonline.org/vabnj).

The SCR is a new initiative that will build on the skills in computer literacy, leverage the resources of a CLC, and add a large screen monitor for the entire class. In a SCR, students will learn through the use of interactive educational CDs and the Internet. The CDs prepared by experts will allow quality classroom education for the students, and at the same time, become useful tools for training local teachers in better teaching methods. Initial focus will be on teaching of English language, Science and Geometry. It will also leverage on the *Computer Teaches Everyday English* (CTEE) program that teaches spoken English with proper pronunciation. VAB-NJ and D. Net has introduced CTEE at five CLCs as a pilot project, and so far results are highly encouraging.

Salient Program Features

CLC Resources

- 4 new laptop computers, 1 printer, and peripherals
- Internet with 1-year prepaid fee where available
- Structured curriculum with teachers' guide
- Training of two teachers and incentive remuneration
- One-year maintenance contract

SCR Resources

- A laptop and a 32 inch or larger monitor with an IPS
- Interactive CDs for English, Geometry & Science lessons
- Training of the teachers
- One year maintenance contract

For further details and/or to *sponsor a CLC* or a *CLC and SCR*, please contact Dr. Mohammad Farooque in USA by e-mail at vabnj@hotmail.com; or by phone at (732) 972-8362, (732) 829-0341(mobile); or, Mr. Ajoy Bose in Bangladesh by phone at 01712412881, or by e-mail at ajoy@dnet.org.bd; or Dr. Ananya Raihan, Executive Director, D.Net by email: ananya@dnet.org.bd.

