



## Educational Technology

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### ICTs in the Field of Education in Bangladesh: some salient features

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#### ABSTRACT

The education system of Bangladesh is broadly divided into three stages. These are primary, secondary and higher education. To meet up the demand of education of the country, the government has the highest responsibility. The government of Bangladesh is trying to play her role since its inception. Doing her duty, many methods and techniques of providing education have been using. In the modern age of 21<sup>st</sup> century, Information Communication Technology (ICT) is one of the latest techniques around the world including Bangladesh to use in the field of education. It is said that the present time is the blessing of ICT. All the sectors of a country like, education, health, agriculture, business, travel, transport, industry etc. can't work properly with expected outputs without use of technology. Many applications are now being used in all those sectors. Bangladesh is also on the track to utilize the application of ICTs. As a matter of it, Bangladesh has established an ICT policy in 2009, to implement and engage ICTs for some definite purposes. In education sector of Bangladesh, ICTs have been using for many purposes. Computer and internet based technologies have been using in a scattered and limited way for e-learning & distance learning such as in storage of data, video documentary production etc. But the prospects of ICTs in education sector comprising primary, secondary and higher level are multidimensional. Establishing e-learning or online education system, adopting modern educational management, ensuring equal opportunity of education, increasing global connectivity among the educational institutions, providing education for distanced and distressed people etc. could be able to achieve with the help of ICTs. Bangladesh is far behind in the field compared to other countries in the world. Some problems are also identified in this regard. These are lack of computers and lab facility with internet connectivity, inadequate infrastructure, lack of fund and comprehensive policy etc. which hinders to get the maximum benefits from ICTs in education sector. If all these hinders would quickly be minimized, the education system of Bangladesh, especially the secondary and higher stage could be able to produce its outcomes quickly and the government would be able to manage all the education sectors very effectively and efficiently. The present article deals with all these factors and important issues in detail with due attention.

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#### Introduction

At the eve of the new millennium a revolution of entirely different kind is taking place across the globe - much more powerful and all pervasive - it is information technology revolution. No wonder that the present age is being called the information age. The information communication technology has been emerged with the development of technology as well as the speedy spreading of computer literacy.

The issue of 'computer in education' started to become popular in education policy making in the early 1980s, when relatively cheap microcomputers became available for the consumer market. In this process, some developed countries started to give the computers in their schools. Later, near at the end of the 1980s, the term 'computer' was replaced by 'IT' (information technology), signifying a shift of focus from computer technology to the capacity to store and retrieve information. This was followed by the introduction of term ICT (information and communication technology) which involves collection, storage, processing, presentation and distribution of

information, around 1992, when e-mail started to become available to the general public.<sup>1</sup>

Computers, internet and electronic communication are integral parts of ICT. Texts, numbers, audios and videos are being exchanged throughout the world without space and time barrier. So information communication technology consists of hardware, software, networks and media for the said purposes.<sup>2</sup> In the field of education, ICTs make the total system easy, effective and innovative.

The developing countries of the globe, prime areas to apply ICTs applications may be in education, health, agriculture, commerce and industry, family planning sector and so on. Similarly Bangladesh has been trying to apply ICTs application in those fields. Among these, in the field of education, ICTs can have a vital role to face the global challenges. Especially

<sup>1</sup> UNESCO, link: [www.unesco.org/iiep](http://www.unesco.org/iiep)

<sup>2</sup> WB, *Information and Communication Technologies: A World Bank Group Strategy*, Washington D.C, 2002, p.3.

secondary and higher stage need to prepare more since these two stages are the bases to provide skilled human resources through technical education or higher education. That is why, these two stages could be considered as an important stage among the existing three broader stages of education system of Bangladesh, viz., Primary, Secondary and Higher.<sup>3</sup> Not only this, primary level is also important in a sense that if the teaching materials would be developed with the help of ICTs, the primary sector could be able to ensure the quality and coverage. The present article deals with the ICTs application using in the mainstream education sector of Bangladesh like primary, secondary and higher education in terms of status, prospects and problems aspect.

### Objectives

The general objective of the article is to investigate the overall situation of applying the ICTs in the field of education in Bangladesh. Specifically the objectives are to:

- a) analyze the existing status of ICTs employing in the mainstream educational institutions of Bangladesh;
- b) explore the prospects of ICTs in the said field; and
- c) identify the problems of ICTs in education sector.

### Methodology

The article is mainly based on secondary data, but primary data is also used here to analyze the views of concern personalities and institutions as a whole. To achieve the above objectives of the article, the best suitable methods applying here are the qualitative content analysis or document analysis and case study method. The primary data has been presented here in the box format.

### ICTs in Education Sector: Existing Status

ICTs are playing an important role in the learning process, offering powerful tools for expanding educational access and improving skills and knowledge. The ability to connect PCs (Personal Computer) to local area networks and the internet makes remote information access and knowledge sharing possible. Online data bases maintained by governments, private companies, and universities contain enormous amounts of ready accessible information.<sup>1</sup> In Bangladesh, ICT usages in educational institutions are computer use in administrative and personal purposes like data storage and processing, internet using etc. The existing status can be discussed as follows:

### ICT Policy and Education Sector

The People's Republic of Bangladesh adopted the National Information and Communication Technology (ICT) Policy in 2009 and the government has been trying to implement it. In the vision of the policy, it is said that this policy aims at building an ICT-driven nation comprising of knowledge-based society. In view of this, a country-wide ICT-infrastructure is expected to ensure access to information by every citizen to facilitate empowerment of people and enhance democratic values and norms for sustainable economic development by using the infrastructure for human resources development, e-governance,

e-commerce, banking, public utility services and all sorts of on-line ICT-enabled services.<sup>2</sup>

In the section of training and human resources development of the policy, it is clearly identified that widespread introduction of ICT education in public and private educational institutions is a prerequisite for producing skilled ICT manpower. Facilities need to be built to promote ICT training and computer-aided training at all levels of education including Primary Schools and *Madrasahs*. Apart from this, there is also recognized that universities, technical institutions and colleges, both in the public and private sectors, would be strengthened to produce ICT graduates in four-year Computer Science and/or Engineering courses.<sup>3</sup>

Therefore, it is clear that without proper education on ICT and ICT applications, it is impossible to implement the government policy. At present government has been setting up more science and technology universities. In the meantime, six science and technology universities, five Engineering and Technology universities have been established. Computer science, engineering and electronics, ICT departments have been introducing in 31 public and 56 private universities of the country.<sup>4</sup> Many training institutes have been established. Fiber optic cable connectivity, mobile phone expansion, digital telephone line spreading out, telecentres setting up etc. are now increasing day by day. So the education sector of the country is being connected with the government ICT policy.

### E-learning

The e-learning is widely used in most of the developed countries to promote distance education (DE) and lifelong learning. It can be defined as an innovative approach for delivering electronically mediated, well-designed, learner-centered, and interactive learning environments to anyone, anyplace, anytime by utilizing the internet and digital technologies in concern with instructional design principles.<sup>5</sup> Applications and processes of e-learning include web-based learning, computer-based learning, virtual classrooms, and digital collaboration, where contents are delivered via the internet, intranet or extranet, audio and video tape, satellite TV and CD-ROM.<sup>6</sup>

The e-learning was first introduced in Bangladesh in 1956 by a radio-broadcasting program, and later expanded much by the establishment of Bangladesh Open University (BOU) in 1992. In Bangladesh, the only public sector university such as Bangladesh Open University offers distance learning. Facilities provided are: maintaining website; establishing Media Center responsible for content development (CD based; non-interactive) for secondary, higher secondary and postgraduate courses; broadcasting recorded lectures through television and radio etc.

In overall situation of e-learning in Bangladesh, learners still need to go to the class rooms, resource centers to appear at the examination. Integration of remote and virtual lab is totally absent and the relevant lab based courses are seldom conducted in the country. This type of e-learning system exists in a very narrow sense from the country point of view.

<sup>3</sup> MoE, *Educational System of Bangladesh: A Descriptive Details*, BANBEIS Publication No. 169, Dhaka, 1992, p. 1.

<sup>1</sup> Jeremy Grace, Charles Kenny, Christine Zhen- Wei Qiang, Jia Liu and Taylor Reynolds, *Information and Communication Technologies and Broad-Based Development: A Partial Review of the Evidence*, World Bank Working Paper No. 12, 2003, p. 25.

<sup>2</sup> <http://www.bcc.net.bd/html/itpolicy.htm>

<sup>3</sup> *Ibid.*

<sup>4</sup> *Bangladesh Economic Review 2009.*

<sup>5</sup> <http://www.thedailystar.net/2003/12/24/d312241601108.htm>

<sup>6</sup> M. T. Islam, "Educational technology for 21<sup>st</sup> century", *Observer Magazine*, Dhaka, May 9, 1997, pp. 3-4.

### Computer Use

Every educational institution such as university, college, school etc. have been using computer mainly for storage and printing purpose only. In primary level, computer use is very limited. But the primary education department at upazila level has the opportunity to use the computer only for secretarial purpose. Higher secondary level is alike of it. Some schools have computer lab, where computer education is made optional. Each department has computer facility in both public and private university. Computer facility has been expanded in college and also secondary level of education.

In university level, students have some opportunities to use computer in lab, on the contrary in college or secondary level, students do not have access in computer use except for the student of computer discipline. Some city based schools provide limited opportunity of computer use for the student, but in village level it is quite absent. So ICT in education sector in terms of computer use, there are two dimensions. Firstly computer is being used for the secretarial purpose in the office. Secondly, the students use the computer for their own demand or their learning purpose.

### Internet Use

Internet has been reaching at the very remote area of the country. It becomes possible for the sake of BTTB and also for the private mobile phone companies. The total number of ISPs up to September 2007 was 205 of whom 80 percent were located in Dhaka. BTTB has expanded the ISP service to all 64 districts headquarters. The countrywide internet users are three million.<sup>7</sup> The internet users are mainly export business men and students. The students use internet for various interests such as browsing, e-mailing, social networking, downloading etc. All private and public universities have the internet connectivity. Computer lab with internet connectivity is available for the student of the leading universities of the country. On the other hand, most of the public sector higher educational institutions (HEIs) do not adopt technology for the improvement of imparting quality education.

However, the necessity of technology based higher education is far reaching so far. The technology based higher education with the support of internet is supposed to provide some opportunities to their students such as authentic access to course material within and outside the campus, online submission of assignments and term papers, access of online transcript to the student and respective advisor, using log to monitor online activities of students, online discussion forum, providing digital library (own and professional like IEEEExplore, ACM digital library), etc. This is being felt, but there is much gap to take initiatives to implement it in the education system.

### E-mail, Browsing, Web Portal, Net-phone and Chatting

Generally it can be said that the major internet usages in education sector are e-mail to correspond and sharing experiences, browsing to collect data and search information, developing web portal to provide various information for home and abroad, net-phone to communicate easy, cheap and chatting to entertain and share. These are being used by both the students and teachers.

### Case Study-1

*Higher Secondary Training Institute, Comilla is under the Ministry of Education, has been established to increase the depth of knowledge and to develop the professional virtues of the teaching community. The institute has the course on computer training to secondary and higher secondary teachers. While talking to Director of the Institute, Professor Md. Iftekharul Islam, he informed that It has two computer labs with more than 40 computers. The institute uses computer both for secretarial jobs and the training purpose for multimedia to deliver the lecture. The labs also have the internet connectivity. But the faculty members and the trainees don't browse or use internet frequently. The internet has been using here only for the purpose of the training course for giving the practical idea on it. Almost all the faculty members have the basic knowledge on computer. They don't have the higher degree on computer. They have completed certificate course under the technical education board. E-mail, chatting, exchange views with others etc. are not performing with the help of internet.*

*The authority of the Institute feels that there is a huge prospect using ICTs in education sector. The 1<sup>st</sup> world has reached to the top position in ICT using. But the country is not so advance in this regard. Online education, computer based management, modern teaching application, and equal accesses to education etc. have the strong possibility to introduce in education sector with the help of ICTs.*

*The main problem is that the basic infrastructure and internet connectivity. The connectivity of internet of college, school level will not be able to find in the country except some exception. Lack of computer & lab is also a problem. The trainees identify this all times. Apart from these; the existing faculty of HSTTI doesn't have the proper idea about the full ICT based education. They need to be trained up. Policy makers should feel this with proper attention and interest as soon as possible.*

### Case Study-2

*The Cantonment Board High School, Comilla uses computer for mainly the purpose of giving practical class on computer learning to the students. Other secretarial works like, composing, printing etc. are also done with the help of computer. The school has a computer lab. The number of computer will be increased shortly. Presently the lab has no internet connectivity but shortly it will be connected and LAN also will be provided. The Head Teacher, Mr. Md. Nurul Islam Majumder expressed this with hopes. He also told that after the completion of installing the computers to the lab, the multimedia would also be used in the classroom if possible. But he is hopeful. Majority of the teachers know the basic of computer. The computer teacher has the higher diploma degree on computer. The Head Teacher also has obtained the certificate degree from India.*

*ICT is very much essential for both the secondary and also primary level, Mr. Md. Nurul Islam Majumder, the Head Teacher told giving emphasis. If it could be ensured, the students will be benefited from many corners of the learning. The students will be able to search knowledge according to their desire. They can know about the whole world sitting before a computer. They also could be able to introduce themselves worldwide. They will feel to acquire knowledge. Not only this, the teachers could also be able to improve themselves by using internet like browsing. He is also hopeful that if the total education system could be able to be computerized the management system, accountability, transparency would be ensured. The e-learning system is possible to introduce in the*

<sup>7</sup>GoB., Bangladesh Telecommunication Regulatory Commission (BTRC), 2007.

country as well. We should harvest the multiple benefits from ICT using it in education sector of Bangladesh.

To do so, there will have many problems, but we first need the infrastructure development, he expressed. Computer lack, electricity problem, sufficient skilled teachers' shortage etc. are the obstacles according to his expression. But we should have a comprehensive plan for 5 to 10 years to introduce ICT in education sector, he suggested. He also said that the schools that have the infrastructure, the ICT applications should be instilled on priority based.

#### **Multimedia Educating Material Production**

Now-a-days, multimedia educational materials are being produced more in the country. Education materials like word learning, informative games, videos, cartoons, etc. are being developed into CDs, DVDs, and web format. Children can learn and to be instructed many things from these multimedia materials.

#### **Online Services to the People**

Almost all universities, administrative departments of education sector such as education ministry, BANBEIS etc. developed websites. From these websites, everyone can have much necessary information according to desire. Various forms, data, messages, results can easily get through these websites. These are also interactive. Apart from this, with the help of the mobile phone, admission test forms, results of different public examinations are available now.

#### **Prospects of ICTs Engaging in Education Sector**<sup>11</sup>

The prospects of ICTs in education sector are much diversified in nature. All sectors of education system have the opportunity to perform with great efficacy with the help of ICTs. The education and ICT sectors are very closely linked. Most importantly, ICTs hold out the opportunity to revolutionize pedagogical methods, expand access to quality education, and improve the management of educational systems. A number of such technologies have roles as pedagogical tools, including interactive radio instruction, distance education through television and computer-aided teaching.<sup>12</sup> However, the prospects of ICTs are described below:

##### **Case Study-3**

*Gondhamoti Govt. Primary school, Comilla with about 400 students, is situated in Sadar South thana under Comilla district. Actually primary schools don't have any facility of computer and ICTs in the country. Internet facility is very far reaching matter. But the Upazilla Education Office, the local controlling and management authority of the Directorate has the computer facility for mainly the secretarial work. In the country there is no any government primary school that has the ICT facility so far. Naturally the teachers are not aware of computer and ICT application. But many of them have basic knowledge on computer. The assistant head teacher of the said school, Mrs. Akhter-Un-Nessa expressed her opinion in this way. She also told that she and more than two of her colleagues know the computer. She also said that so far her knowledge, the course curriculum of the Primary Training Institute (PTI) doesn't cover any topic on computer. They have computer in their own house. They know about computer and ICT from various corners.*

*The teachers of the school feel that ICT is very much needed in primary level since the children have the potentiality more than young aged and they can learn more about the worldwide knowledge. It also helps to improve the teaching capability of the teachers. The assistant head teacher of the said school, Mrs. Akhter-Un-Nessa and her colleagues hoped that computer and ICT might be used as a teaching tool. That is why, govt. should think about the ICT in primary level. Expanding the ICT facility in primary level, should be the principal motto, she expressed. So their need a comprehensive plan of how it could be implemented and brought the maximum benefits from ICTs.*

#### **On-line Education**

An important application area is on-line education system. In that system students can attend on-line classes when they remain free. So on-line learning system needs to give tremendous afford to prepare lectures based on multimedia system. One teacher can teach millions of students in on-line and they can access in lectures at any time from any place.<sup>13</sup> In this system, distance learning can be expanded with the help of ICTs. The village level student can be covered through this process. It has a strong possibility to work out in the country.

Examination can be held in on-line and examinees would appear in the examination and answer the questions in fixed time. This on-line system is a very popular all over the world. GRE and TOEFL examination are the best examples of on-line exam system. All people appreciate in this system and real learners can be identified through on-line exam system.

Printing materials, lectures in CD, and TV and radio are appropriate for distance learning but without on-line exam systems it is difficult to examine the learners. Proper guidelines for the adults may be provided about beautiful life in the right age through ICT based on-line education system at schools or colleges.

Through internet there has been an explosion of information, creation of transparency and a tremendous opportunity for acquiring knowledge and doing research in all disciplines. People have access to libraries, books and journals through internet. In Bangladesh education and research can get a strong boost by exploiting all these opportunities.<sup>14</sup>

On-line education system can reduce the expenditure of education management and quality of education can be enhanced through it. So, on-line education system has the potentiality to be introduced in the country.

#### **Education Management**

The education sector often suffers from the poor quality of data that hampers policy analysis, research and performance analysis. There is considerable fragmentation, duplication and waste in the data collected by various branches of educational institutions from poor and rigid means of organizing data and lack of decision support tools and management information system. The lack of information system on personnel, physical facilities, student records and performance contributes significantly to problems such as low efficiency, poor monitoring and evaluation of various policy measures, poor accountability and excessive centralization and rigidity. These problems exist in education sector of the country.

<sup>11</sup> Kazi Sonia Rahman and Jillur Rahman Paul, PROSHIKHYAN: A Journal of Training and Development, Vol. 19, No. 1, Dhaka: BSTD, 2011, pp. 44-48

<sup>12</sup> WB, *Op. Cit.*, p. 34.

<sup>13</sup> Prof. Dr. R I Sharif, *Op. Cit.*

<sup>14</sup> Dr. M. Aminul Islam, *The Daily Star*, Dhaka: 15 February 2005.

#### Case Study-4

*Rajshahi University is one of the oldest universities of the country. The university introduced computer science and ICT department. Almost all subjects included computer courses to be taught. It has own V-SAT for internet connectivity. LAN had been established about five years ago. All the departments, institutes, labs are networked. Internet connectivity is present in all its labs. But there is a scarcity of computer in the lab. Every section has the computer for secretarial jobs. However, each department's lab has the internet connectivity. Some department's students have the access to use the internet. But central library provides the access facility for the entire student in a systematic way and a central computer center offers the access of internet for the teachers and researchers of all levels without any fees. The teachers, students and employees of the university use internet for browsing, e-mail, downloading, chatting, jobs searching etc. purposes.*

*The university developed a complete website titled www.ru.ac.bd. The admission form, results and other information are available in this website. Through the library section of website of the university, one can get access of thousands of international journals, books and other publications. The management process is going into the computer-based system gradually.*

*The authority of the university thinks that there is a strong possibility to introduce ICTs in university level from all corners. Corresponding through mobile phone and e-mail, many teachers of the university expressed that video conferencing, e-learning, distance learning, management information system, sharing experiences with the university of home and abroad etc. could be launched since the world is rushing on ICTs application rapidly. So if the higher education will be based on ICT, the country must be benefited so far. ICT could also be used in teaching like lab-oriented lectures, participatory lectures, multimedia presentation etc. But according to the teachers many problems are there such as lack of computer, infrastructure problem, lack of labs, budget problem etc. Government should take the initiatives to utilize the blessings of ICTs in education sector, they told.*

However, the lack of information on labor markets and manpower requirements is also a major constraint to improving the quality and relevance of current education syllabus. ICTs can help the education sector to develop a market based syllabus by providing technical support of networking, management software development etc.<sup>15</sup> It offers new means for reorienting and improving public sector management. Data based management can be ensured by using ICTs in education sectors. All the secondary and higher educational institutions can be networked and connected by developing LAN (Local Area Network), MAN (Metropolitan Area Network) and WAN (Wide Area Network). If it is done, educational management would be more developed and then the transparency, accountability in this sector would be ensured. Therefore the total cost of education management would be reduced as well.

#### Innovative Teaching Application

Computer-assisted instruction can complement traditional teaching by providing individualized self-based instruction or by teaching subjects to students (mainly adults) who do not have

access to other means of instruction in these subjects. These are promising applications for remedial instruction and for teaching handicapped children, for simulation in several areas of applied science and vocational training, and for reaching distant subjects. ICTs have the potentiality to improve in this sector.<sup>16</sup>

#### Meeting the Educational Needs or the Growing Population

The density of population in Bangladesh is 993 per sq. km.<sup>17</sup> The population is growing rapidly and this has resulted in expanded school enrollments and strained the capacity of existing facilities. Frequently, students are forced to rely on inadequate school buildings and libraries continuous insufficient and outdated resources. The judicious use of ICTs can help alleviate shortages in teachers and physical materials and can be cost effective when compared to building new physical infrastructure.<sup>18</sup>

Distance learning through ICTs can help in this regard covering vast population under the learning process. Data based management can be helpful to meet the demand of growing population of the country. So ICTs can play a vital role for the growing populations' need for education.

#### Case Study-5

*Haratali Dakhil Madrasa, Comilla Sadar South is an old educational institute in the region which was established in 1978. The total student of the madrasa is about 550. Regarding the computer education, the madrasa does not have any computer and computer teacher. That is why, the authority does not offer the computer as subject in class ix and x class. The madrasa education board has already got the permission to appoint a computer teacher, but the authority does not find that one. While talking with the Superintendent of the madrasa Mowlana Md. Nagir Ahmed opined that statement. He also expressed that computer and ICTs are now very promising for all level of students since the age is the age of modern technology and computer. The madrasa has the electricity line. If the computer lab and computer teacher would be able to appoint, then they would be more benefited and they could learn and make them more compatible for the present job market, he expressed.*

*The madrasa does not feel any problem of introducing computer subject except the scarcity of skilled and learned computer teacher and inadequate computers.*

*The Superintendent is hopeful that he would be able to appoint the computer teacher and manage some computers. In this connection, he expected necessary helps from the government and donors as well.*

#### Equalizing Access to Education

One characteristic prevailing in the developing country like Bangladesh, the education system is a pervasive resource discrepancy between urban and rural schools. This in turn leads to lower student performance and achievement, with many rural areas facing a chronic information deficit. ICTs can alleviate these discrepancies, providing all the students with access to modern pedagogic methods and knowledge.

#### Individualized Interactivity

Traditional pedagogic methods focused on a passive one-way flow of information from the teacher to student. Recent trends towards a 'constructivist' approach to teacher student interaction, however, suggest that the learning process can be

<sup>15</sup> Nagy. K. Hanna, *The Information Technology Revolution and Economic Development*, Washington D.C. World Bank, 1991, p. 25.

<sup>16</sup> WB, *Op. Cit.*, p. 36.

<sup>17</sup> *Bangladesh Economic Review 2011.*

<sup>18</sup> WB, *Op. Cit.*, p. 25.

enhanced through the use of technologies which 'adapt the presentation to the user needs, preferences and requests.'<sup>19</sup> Due to the interactive nature of internet, it is well suited for a creative learning approach in which experimentation and critical thinking skills are emphasized.

#### **Access to Global Knowledge Base**

Perhaps the clearest benefit to education from ICTs comes from the ability to share knowledge and experiences with an emerging networked global community. By providing computer resource and training, internet connections and access to a global network of educational institutions, the better education, enhancing cultural understand and developing high-tech skills for its students can be ensured. It definitely creates the student's capacity to face the challenges of globalization.

#### **Acquiring the Skills Needed to Succeed in the Digital Age**

The emergence of the digital age requires a technologically competent work force. Education systems that ignore ICTs will fail to produce a technically literate population and hinder a country's ability to compete in the global economy. Evidence from East Asian suggests that large investments in education particularly technology training, were a major factor in the rapid economic growth in these economies from the 1970s to the mid 1990s.<sup>20</sup> Countries are realizing that teaching to improve the students' skills associated with acquiring, managing and communicating information is a basic pre-requisite for both innovative thinking and competing in a global information society. Access to ICTs from the earliest grade levels can enhance these skills, and ensure that populations are able to adapt to new technologies and remain competitive.<sup>21</sup>

#### **Tele or Video Conferencing**

To exchange views and experiences with the other resource persons, university professors, students, Tele or Video conferencing is one of the best techniques to be engaged. Teleconferencing refers to interactive electronic communication among people located at two or more different places. There are four types of teleconferencing based on the nature and extent of interactivity and the sophistication of the technology: 1) audio conferencing; 2) audio-graphic conferencing, 3) videoconferencing; and 4) web-based conferencing.

*Audio conferencing* involves the live (real-time) exchange of voice messages over a telephone network. When low-bandwidth text and still images such as graphs, diagrams or pictures can also be exchanged along with voice messages, then this type of conferencing is called audio graphic. Non-moving visuals are added using a computer keyboard or by drawing/writing on a graphics tablet or whiteboard. *Video-conferencing* allows the exchange not just of voice and graphics but also of moving images. Video-conferencing technology does not use telephone lines but either a satellite link or television network (broadcast/cable). *Web-based conferencing*, as the name implies, involves the transmission of text, and graphic, audio and visual media via the Internet; it requires the use of a computer with a browser and communication can be both

synchronous and asynchronous.<sup>22</sup> Any format of teleconferencing could be used in the country.

Teleconferencing could be used in both formal and non-formal learning contexts to facilitate teacher-learner and learner-learner discussions, as well as to access experts and other resource persons. In open and distance learning, teleconferencing is a useful tool for providing direct instruction and learner support, minimizing learner isolation. It is really a very potential field of ICTs to be used in education sector.

#### **E-Class Lectures**

The potential of each technology varies according to how it is used. Haddad and Draxler identified at least five levels of technology use in education: presentation, demonstration, drill and practice, interaction, and collaboration. Each of the different ICTs—print, audio or video cassettes, radio and TV broadcasts, computers or the internet—may be used for presentation and demonstration, the most basic of the five levels. Except for video technologies, drill and practice may likewise be performed using the whole range of technologies.

On the other hand, networked computers and the internet are the ICTs that enable interactive and collaborative learning. Their full potential as educational tools will remain unrealized if they are used merely for presentation or demonstration. In Bangladesh, it can be used in different levels of education. If this technology would be ensured to use, the more students would be able to learn attentively and effectively. In this process skills and knowledge will be increased.

#### **Setting-up of Community Resource Centre**

Computers in schools are usually only used during school hours (i.e. less than 6 hours a day). There is a scope of extending computer use to provide adult education and computer literacy classes on evenings, weekends, and during school vacation. This would bring benefits for individuals in the community as whole, and could reap a quick return on investment by charging a nominal fee.

#### **Creation or Expansion of ICT Service Sector**

Opportunities are created for companies and individuals to provide technical support and consultancy to schools or colleges or universities and the education ministry, thus resulting in job creation. There is also the opportunity to create new jobs in the software sector through the development and modification of educational courseware.

#### **Extension of Research Amenities**

There is a great opportunity to create the prospect to link schools, libraries, resource centers and research facilities locally and internationally. This link can be used to facilitate research and collaboration. Government, industry and research academia should coordinate their efforts to explore further domestic, regional and international opportunities, focusing specifically on the needs of the country.

#### **Virtual Learning System**

Online learning through virtual schools is one of the most important advancements transforming education in the U.S A and other parts of the world. For example VCR Wisdom Web, Turnkey Virtual Schools from Virtual EDU<sup>23</sup>, Michigan Virtual High School (MVHS) etc. are the online based virtual schools. The online course uses a combination of self-study and virtual meeting modules and is designed around four components: an e-

<sup>19</sup> Osin (1998) and Potashnik and Adkins (1996), in WB, *Information and Communication Technologies: A World Bank Group Strategy*, Washington D.C., 2002, p. 27.

<sup>20</sup> Hanna et. al., 1996 in WB, *Information and Communication Technologies: A World Bank Group Strategy*, Washington D.C., 2002, p. 28.

<sup>21</sup> WB, *Op. Cit.*, p. 28.

<sup>22</sup> www.adpid.net

<sup>23</sup> See details, Link: [http://www.virtualedu.org/Start-a-Virtual-School/turnkey\\_virtual\\_school.htm](http://www.virtualedu.org/Start-a-Virtual-School/turnkey_virtual_school.htm)

textbook, a group problem solving project, IP-based audio conferencing and discussion, and a group writing project. In an online class, the student must learn a host of technical skills such as posting to discussions, attaching documents, and accessing online whiteboards. This teaches self sufficiency and basic computer skills regardless of what class they are taking.<sup>24</sup>

#### **Problems of ICT Application in Education Sector**

Effective implementation of policies and ideas necessitates identifying and forecasting potential threats in the domestic environment. Some of these threats are cited below:

##### **Inadequate Infrastructure**

In many developing countries, ICTs play a key role in social development. It provides the community with the power to access virtually all kinds of information, knowledge, as well as communications services. But the opportunity fully depends on the expansion of ICT infrastructures all over the country. In the country like Bangladesh, the ICT infrastructure is still remain inadequate though it is expanding, but the expansion speed is not so much speedy as it could be expected earlier. The teledensity is 44.6 percent in 2011. The mobile phone users are 73.5 million (up to March 2011). Fixed phone users are 1.7 million (up to May 2010)<sup>24</sup>. Internet users are 3 million. The country is connected with the fiber optic cable.<sup>25</sup> However, the mobile phone users are increasing with a little bit of speed. But other infrastructural components are not growing fast.

University has the internet line, but higher secondary or the secondary or the primary level does not have the accessibility of internet. Even though, multimedia technology usage is very scarce in it.

Moreover, the electricity is far behind to reach all the villages. Though it is considered as the basic physical infrastructure of ICT, but the remote areas of the country or the most parts of the country don't have the electricity facility. So many educational institutions are behind the electricity facility.

##### **Lack of Computer**

Educational institutions are facing with the problem of computer lacking. Though at University level, it is not felt as a stronger problem since the computers are given to the departments gradually, but the college level or secondary level, there is a huge lack in computers. The primary level is kept fully aside by the computer facility. The students of university have a little opportunity to use computer but the students of higher secondary or secondary or primary level don't have the opportunity to use a computer. So it is considered a serious problem of ICT application in education sector.

##### **Insufficient Lab Facility**

Computer lab is very much essential for the educational institutions. With the help of a lab, students can learn computer application practically. In 2007-08 fiscal year, only 48 computer labs have been established in different educational institutions.<sup>26</sup> If ICTs are needed to apply in education sector, computer lab with internet connectivity is a must. But the computer lab is too scarce in this sector.

University has some computer labs with internet connection, but the proportionate is very poor as per total students. The higher secondary or secondary or primary level is

fully neglected with lab facility in regard to internet connectivity except some Dhaka city based schools and colleges and some of schools offering computer subject as optional. But the lab is lacking of adequate computers and trained personals. Internet connectivity is too scares as well. So this creates the obstacle to get the benefit through ICT use in education sector.

##### **Lack of Fund**

Bangladesh is a developing country. The total budget is dependent partly on foreign aid and help. So the country does not have much resource to engage in the sector. But the efforts have been taken in the meantime in a limited way. It is not possible for the government to provide ICT materials for all the educational intuitions. So fund insufficiency is a major problem in this regard.

##### **Slow Implementation of Policy**

The government has an ICT policy. But it is not implemented as quickly as it is in the policy. The hardware and software industry, quality of computer learning, training and human resource development, e-governance, e-commerce etc. of the said policy are not yet to be established and ensured with expected aspiration. The benefit of the ongoing policy implementation is not reached to the village level. The training of the teachers of educational institution is very slow and less. Bangladesh Computer Council (BCC) has been organizing training but in regard to quantity, it is not adequate.

On the other hand, the computer training is given by the six divisional institutions, which is mostly on introductory to computer and its percentage is 86 percent. Not only this, the speed of establishing a high-tech park at Jaydevpur is not so satisfactory. The first phase of this project is going on.<sup>27</sup>

##### **Gap among the Policy Makers and Experts**

It is generally said that the lack of adequate and proper knowledgeable and expertise on ICTs among education administrators and policy makers resulted in the incorrect approach. Many believe that merely purchasing computers for every school or college or university is sufficient. No attention is paid to important issues such as integration into curriculum and training teachers to use the technology effectively. In many situations, this results in equipment being under-utilized or not used at all.<sup>28</sup>

##### **Limitation on English Skills**

The dominance of English on the internet and general computer software makes it challenging for developing country like Bangladesh whose main language is Bengali, not English, to earn maximum benefits from existing software and internet resources.

##### **Limited Budget Allocation for Maintenance**

In cases where the investment is made, limited budget allocations usually make provisions for initial purchase and completely ignore later allocations for maintenance and upgrading. This eventually results in breakdown and shortened life span for the equipment, if an educational institution is unable to maintain them on its own.

##### **Shortage of ICT Skilled Teachers**

Low salaries paid to teachers coupled with poor working conditions make the teaching profession unattractive for trained IT personnel, who are in great demand elsewhere in other sectors. An ongoing project has been going on to train up 768

<sup>24</sup> See details, Link: [http://www.inacol.org/research/docs/NACOL\\_21CenturySkills.pdf](http://www.inacol.org/research/docs/NACOL_21CenturySkills.pdf)

<sup>24</sup> *Bangladesh Economic Review 2011*

<sup>25</sup> *Bangladesh Economic Review 2009.*

<sup>26</sup> *Ibid.*

<sup>27</sup> *Ibid.*

<sup>28</sup>

[http://www.ictdevlibrary.org/downloads/comnet-it\\_guidelines.pdf](http://www.ictdevlibrary.org/downloads/comnet-it_guidelines.pdf)

teachers and set up 128 computer labs with internet connectivity in 64 schools and 64 colleges of the country. If it is considered to quantity of the total teachers, students and institutes of the country, the effort is really inadequate.<sup>29</sup>

### Recommendations

Analyzing critically the existing situation of ICT application prevailing in education sector, some recommendations have been made. These are as follows:

- Infrastructure should be developed up to village and community level. All educational institutes should take under internet connectivity. Adequate computer lab facility, ICTs applications should be ensured as early as possible. The whole country should be brought under telecommunications network at the earliest possible time and cost should be minimized.
- Electricity should expand gradually to the village level. The schools, whose don't have the electricity, the solar system could be installed to generate the computer and internet.
- According to the computer policy two percent of ADP should be engaged in developing ICTs countrywide and the education sector would be provided fund with priority basis.
- Cheap internet connectivity should be expanded horizontally. University, college, school etc. should be given connection on very minimum charge so that all students will be able to get the internet access to learn more.
- Quality training and curriculum on computer could be established to produce skilled manpower for the meet the demand of the future challenges of the world. Policy changes must be effected to incorporate ICTs into the school curriculum, provide proper guidelines to teachers, and set national and regional standards.
- Changes in the curriculum should reflect a close alignment with the requirements of industry and foreign needs and prepare students to meet the demands of the world of work.
- On-line or e-learning or distance learning with the help of ICTs should be introduced from the university level. The country mobile phone network can be a very supportive to do it.
- Incentives in the form of subsidies, tax exemptions or special loan arrangement, should be provided to encourage teachers and students to purchase computers for personal use. This would foster familiarity and confidence with the technology, thus breeding positive attitudes. The experiences of Singapore<sup>30</sup> should be engaged in this regard.
- Initiatives to provide necessary software should be ensured. So the local software development companies should be established and need to link with the education system to provide country specific educational courseware and other learning materials. Though it is especially crucial for the country like Bangladesh, but it should be done with priority basis.
- There is an enough scope to make an comprehensive plan integrating the ICTs applications for all stages of education system keeping in mind to establish an ICT driven education system so that there will not be any missing link in the whole process.

### Conclusion

21<sup>st</sup> century is completely technology driven since the people around the world do not think their life without technology. Those who have the technology they are developed and control the whole world so far. That is why, first need to

utilize the existing available technology and also to invent new technology. In this regard, ICTs application in education sector is very much urgent. If the education sector uses ICTs in all possible aspects, the skilled, efficient and trained manpower will be produced who later on, will be able to engage them to produce more. To understand the pulse of the many countries of the world regarding ICTs, Bangladesh has already taken various steps to implement and establish ICT based nation. Education sector is given more attention to engage ICTs application. Computer facility to university, college and school level is expanding. Internet access is also given to the higher education level. Infrastructure is being increased. However these activities are not so sufficient. There need to generate more efforts and drive. Some hinders like, computer and lab inadequateness, connectivity problem, lack of comprehensive plans and efforts etc. make the journey difficult.

During the discussion with the different personalities of various educational institutions, which has been presented in the box form, the highly potentiality of ICTs application in the education sector has been identified. They also think that infrastructure lack is one of the main problems among the other problems in this regard.

They also expressed their opinion in such a way that there will be no alternative in education sector without introducing ICTs for the future of the nation. That is why they said obstacles are needed to minimize as soon as possible by using the existing limited resources in an effective way. 'ICTs for all' slogan should be kept in mind and accordingly, all should work together.

If education sector uses ICTs in an effective way, the students would be able to cope with the challenges of the 21<sup>st</sup> century and the globalization. In order to survive, Bangladesh should have to take immediate measures, some are articulated here, through which quality of education and finally poverty will be reduced as per the Millennium Development Goals (MDGs') indicators. The popular slogan of 'Digital Bangladesh' could be possible to establish.

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<sup>29</sup> *Bangladesh Economic Review 2009.*

<sup>30</sup> In Singapore, teachers were given special loans to purchase computers.



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