

Modeling E-Learning Assisted Distance Education System for Bangladesh

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Abstract

Distance Education is a very important instructional delivery for higher education in the 21st century. Along with the rapid development of computer related modern technology such as Internet, videoconferencing, Web conferencing etc., distance education is playing an increasingly important role in schools, colleges and other educational institutes. The advancement of information and communication technology (ICT) has brought revolutionary changes to the mode of distance education. Distance education in the form of E-learning can play a crucial role in broadening access to education for the whole society. The framework of this research focuses on the trends and issues of existing Distance Education in Bangladesh and explores the opportunities as well as the challenges of E-learning to develop a modern distance education system for the disadvantaged people of the country. Considering all issues and challenges this research proposes a model of E-learning assisted distance education system for Bangladesh. This paper also intends to suggest some recommendations for facing the challenges and strengthening infrastructures to implement the system for quality education.

Keywords: *E-learning, Distance Education, Social Interactive Education, ICT*

1. Introduction

Two broad categories of education include: Distance Education (DE) and Social Interactive Education (SIE). Distance Education is a method of teaching where the instructor and learners are separated by time and or physical distance. Students typically use various materials like books, references, CD-ROMs and electronic media to replace direct face-to-face learning. Social Interactive Education refers to conventional face-to-face learning [1].

Technological advancement has given new life to distance education. In distance education, technology such as satellite, television, telephone, radio, mail, or computer are used to complete instructions. Distance Education, or Distance Learning aims to deliver education to students who are not physically “on site”. Rather than attending courses in person, teachers and students may communicate at times of their own choosing by exchanging printed or electronic media, or through technology that allows them to communicate in real time [2].

The types of available technologies used in Distance Education can be divided into two groups: synchronous and asynchronous. Synchronous technology is used in distance education lessons in which learning is occurring in different places but at the same time. Asynchronous technology is used in lessons in which learning is occurring in different places but also at different times. Synchronous technologies include: Telephone, Videoconferencing, Web Conferencing and so on. Asynchronous technologies are: Audiotocassette, E-mail, Message Board Forums, Print Materials, Voice Mail, Fax, Videocassette etc. [3].

Distance education has traversed four to five generations of technology in its history. These are: print, audio/video broadcasting, audio/video teleconferencing, e-learning or online-learning, and computer broadcasting/webcasting [4]. Yet the radio remains a very viable form, especially in the developing nations, because of its reach. In India the FM Channel is very popular and is being used by universities, to broadcast educational programs of variety on areas such as teacher education, rural development, programs in agriculture for farmers, science education, and mass communication [5]. The increasing popularity of mp3 players, Smart Phone *etc.* has provided an additional medium for the distribution of distance education content.

2. E-Learning and Distance Education

Electronic learning or E-learning is a type of education where the medium of instruction is computer technology. No in-person interaction may take place in some instances. E-learning is used interchangeably in a wide variety of contexts. In companies, it refers to the strategies that use the company network to deliver training courses to employees. In the USA, it is defined as a planned teaching/learning experience that uses a wide spectrum of technologies, mainly Internet or computer-based, to reach learners at a distance. Lately in most universities, E-learning is used to define a specific mode to attend a course or program of study where the students rarely, if ever, attend face-to-face for on-campus access to educational facilities, because they study on-line [6].

E-learning is naturally suited to distance learning and flexible learning. Distance Education in the form of E-learning is the only way to stay current. E-learning can also be used in conjunction with face-to-face teaching, in which case the term Blended learning is commonly used. E-learning pioneer Bernard Luskin argues that the “E” must be understood to have broad meaning if E-learning is to be effective. Luskin says that the “E” should be interpreted to mean Exciting, Energetic, Enthusiastic, Emotional, Extended, Excellent, and Educational in addition to “Electronic” that is a traditional national interpretation. This broader interpretation allows for 21st century applications and brings learning and media psychology into the equation. Figure 1 shows the relationship between E-learning and distance education.

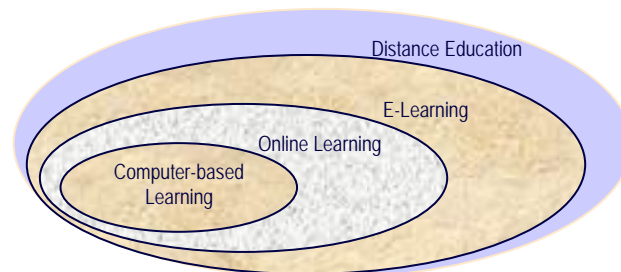


Figure 1. E-learning as a Subset of Distance Education

In higher education especially, the increasing tendency is to create a Virtual Learning Environment (VLE) in which all aspects of a course are handled through a consistent user interface standard throughout the institution. In many countries, a growing number of physical universities have begun to offer a select set of academic degree and certificate programs via the Internet at a wide range of levels and in a wide range of disciplines. While some programs require students to attend some campus classes or orientations, many are delivered completely online. In addition, several universities offer online student support services, such as online advising and registration, e-counseling, online textbook purchase, student governments and student newspapers [7].

3. Benefits of E-Learning Assisted Distance Education

The purpose of implementing E-learning assisted Distance Education in Bangladesh is to take education to the doorsteps of the rural poor, the disadvantaged and marginalized people of the society. The people should be given the opportunity to master the skill to use technology to their advantages without feeling threatened to build a better tomorrow [8]. E-learning assisted distance education enables people to have:

- Strong academic skills
- Better thinking
- Reasoning
- Teamwork skills
- Proficiency in using technology
- Meeting challenges, and
- Enhance learning.

The benefits that can be achieved by the E-learners include:

- Training facilities at off-hours or from home.
- Less academic stress.
- Interactivity engages users, pushing them rather than pulling them through training.
- Availability of quick reference materials.

4. Current Distance Education Practice in Bangladesh

Bangladesh Open University is the only public university in Bangladesh that is offering distance education. Established in 1992, it has opened up new vistas in distance education in the country. The objectives of Bangladesh Open University (BOU) are: i) to expand all levels of education, knowledge and science by a diversity of means, including the use of any communication technology and to improve the quality of education, ii) to provide opportunities for education to the general public through mass-orientation of education, and iii) to create efficient and skilled manpower by improving the quality of education in general [9]. With financial assistance from Asian Development Bank (ADB) and the government of Bangladesh, BOU's programs are aimed at everyone, particularly working people, women and those socially disadvantaged. In addition to that, some other private universities like South East University, Brac University have also initiated some academic and research programs through distance education, but these are very limited.

The novel laureate on peace, Dr. Muhammad Yunus in his key note speech at North America Tech Transfer Conference 2000 pointed out that, "The Information and Communication Technology (ICT) revolution brings particular challenges to education systems around the world" [10]. The Internet can play an important role in Distance Education. Therefore, in addition to the policy focused on the telecommunications infrastructure supporting the internet, the policies and laws directly regulating the internet have an impact on the potential of ICT-based distance education.

But lack of infrastructure remains a big obstacle, especially for telecommunication and networking. Bangladesh remains the most expensive place in the world to subscribe to a local telephone service. This can hurt the growth of internet and E-learning enabled modern distance education in general.

The government of Bangladesh took some initiatives to enhance and modernize distance education system, but these were not sufficient. The education directorate distributed about 200 radio receivers to different institutes that led to establishment of audio-visual education

center (AVEC) in 1962. School broadcasting program (SBP) was a pilot project undertaken during 1978-1980. Bangladesh Institute of Distance Education (BIDE) was established in 1985 to offer different academic courses through distance learning. But lack of infrastructure for telecommunication and networking is still a big obstacle on the way to establish ICT based distance education. Bangladesh remains the most expensive place in the world to subscribe telephone services. However, we are hopeful that the present government has declared to build “Digital Bangladesh” to connect rural and urban areas with high speed broadband internet connectivity. A number of telecommunication operators like Grameen Phone, Banglalink, Airtel, City Cell, Robi are increasing their ICT services throughout the country by introducing mobile internet.

5. Methodology

The research was conducted in two phases. The first phase focused on the collection of data from different sources, study of the survey reports of different groups, depth interviews with key informants and informal focus group sessions. In the second phase, a draft report was prepared and a qualitative design was employed supported by the case study approach. The overall research work employed the following steps:

- Study on the past and ongoing projects reports on distance education
- Surveys to mass people expectations towards distance education
- Focus group discussions
- Key informant interviews
- Draft reports on all the studies and surveys
- Development of an effective model for implementing distance-learning system
- Final conclusion.

The field work and survey was conducted to find the appropriateness of the distance learning method required by the users. The questionnaire for mass people survey was designed to get the idea about the capacity of the users and what are their wants and needs in terms of distance education. In addition, a survey was conducted with a view to analyze the existing education systems, ICT infrastructure and connectivity status.

6. Findings from the Survey and Study

This section presents the findings of the research based on the study of different survey reports [11-13] and field works conducted within 200 different agencies.

6.1. ICT Infrastructure in Bangladesh

The ICT infrastructure of Bangladesh is summarized bellow:

Hardware Infrastructure

- PC-Employee ratio at Ministry/ Division level is 0.22
- PC-Employee ratio at Department/ Corporation is 0.065
- PC-Employee ratio in Academic Institutions is 0.23

Connectivity Infrastructure

- 79% of Ministries/Divisions are currently connected to the Internet

- 76% of Departments/ Corporations are currently connected to the Internet
- 75% of Academic Institutions are currently connected to the Internet
- At the Ministry/ Division level, about 11.6% of the offices have broadband and about 7% have radio-link connectivity.
- At the Department/ Corporation level, about 10% of the offices have broadband and about 4.2% have radio-link connectivity.
- At academic institutions, 8.3% of the offices have broadband, and about 12.5% have radio link connectivity.
- At the Ministry/ Division level, about 40% have LAN.

Use of Cellular Phones

Cellular Phone has revolutionized the telecommunication infrastructure in Bangladesh. It is really amazing that, according to the Fifth National Census 2011 taken by Bangladesh Bureau of Statistics (BBS) total number of mobile phone active subscribers has reached 76.434 million at the end of June 2011 which accounts to roughly 53.71% of population. Currently, more than six mobile phone operators are providing mobile phone services in our country. Table 1 shows the overall figures of mobile phone users in Bangladesh. Figure 2 represents the number of mobile phone subscribers versus their operators.

Table 1. Figures of Mobile Phone Subscribers for Different Operators

| Operators | Active Subscribers (millions) |
|---|-------------------------------|
| Grameen Phone Ltd. (GP) | 31.982 |
| Orascom Telecom Bangladesh Limited (Banglalink) | 20.126 |
| Robi Axiata Limited (Robi) | 13.259 |
| Airtel Bangladesh Limited (Airtel) | 4.607 |
| Pacific Bangladesh Telecom Limited (Citycell) | 1.787 |
| Teletalk Bangladesh Ltd. (Teletalk) | 1.198 |

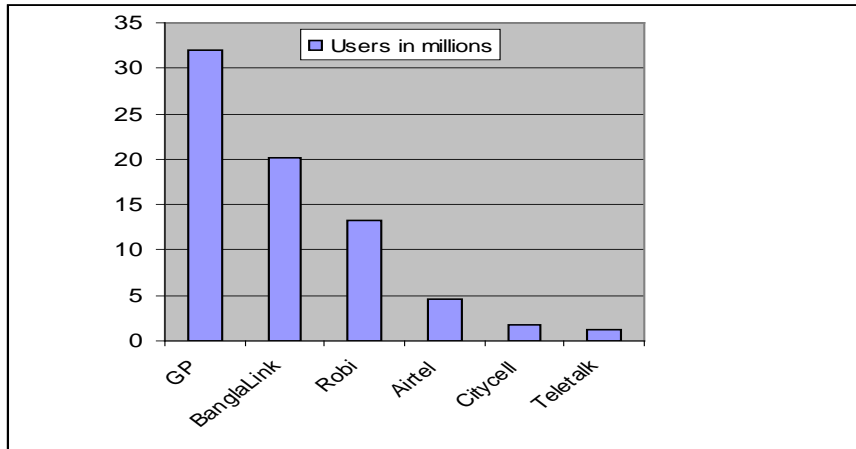


Figure 2. Mobile Phone Subscribers vs Operators

Use of ICT

- At the Ministry/Division level, about 30.64% officers and about 32.64% staff use PCs.
- At the Department/ Corporation level, about 20.6% officers and about 6.49% staff use PCs.
- In academic institutions, about 40% officers and about 7.4% staff use PCs.
- At the Ministry/Division level, more than 88% of the offices that are connected to the Internet use it for purposes of official e-mail, about 80% for information search and more than 52% for downloading files.
- At the Department/ Corporation level, about 50% use the Internet for official e-mail purposes, about 42% for searching information and about 32% for downloading files.
- In academic institutions, about 21% use the Internet for official e-mail purposes, about 25% for searching information and about 25% for downloading files.
- At the Ministry/Division level, a little more than 8% of the officers use e-mail directly and about 5% of the officers use e-mail through computer operators.
- At the Department/Corporation level, on an average, 6.5% officers use e-mail directly while about 5.75% officers use e-mail through the help of computer operator.
- In academic institutions, 42.4% of the officers use e-mail directly and about 38% of the officers use e-mail through computer operators.
- Percentage of offices with websites: Ministry – 24%; Division – 50%; Department – 14%; Corporation – 14%; Academic Institution – 25%.

Maintenance of IT Systems

- About 56% of Ministries/Divisions have outsourced maintenance.
- About 51% of Departments/Corporations have outsourced maintenance.
- About 46% of Academic Institutions have outsourced maintenance.
- About 16.3% of Ministries/Divisions have no mechanism for IT Maintenance.
- About 15.7% of Departments/Corporations have no mechanism for IT Maintenance.
- About 15.2% of Academic Institutions have no mechanism for IT Maintenance.
- About 18.6% of Ministries/Divisions have maintenance being handled under projects.
- About 7.6% of Departments/Corporations have maintenance being handled under projects.

IT Training

- At Ministry/Division level, percentage of officers trained in IT is 28% and percentage of staff trained is 29%.

- At Department/Corporation level, percentage of officers trained in IT is 23% and percentage of staff trained is 7%.
- In Academic Institutions, percentage of officers trained in IT is 6% and percentage of staff trained is 4%.
- About 28% of the Ministries/Divisions have in-house IT training facilities.
- About 27% of the Departments/Corporations have in-house IT training facilities.
- About 50% of Academic Institutions have in-house IT training facilities.

Human Resource

- About 58% of the Ministries/Divisions have no IT human resource.
- About 65% of Departments/Corporations have no IT human resource.
- About 35% of Academic Institutions have no IT human resource.
- At Ministry/ Division level, the number of IT trainers stand at 11% of IT Human Resource
- At Department/ Corporation level, the number of IT trainers stand at 28% of IT Human Resource

6.2. Implementation Challenges of E-Learning assisted Distance Education

Bangladesh, one of the most densely populated countries in the world, extends over an area of 147,570 sq km with a population of around 140 million. Most of the people live in rural and remote areas. In rural and remote areas of Bangladesh, financial viability becomes a problem in providing for a small number of residents the same depth and range of education opportunities as the capital Dhaka enjoys. Distance education can enhance and complement local resources. Also, the need for economic development in rural areas makes education all the more crucial. Unfortunately, in terms of telecommunications infrastructure, rural and poor areas are the most neglected part of the country, making E-learning associated modern distance education difficult.

The government of Bangladesh with the help of donors and NGOs desires to establish tele-centers in each village, but that would require huge investment and better infrastructure. Without them, effective distance education using internet is not feasible in Bangladesh for the rural community.

What is missing is a dedicated view and approach from the government to take advantage of technologies for distance education. As a low income country, Bangladesh has hardly any funds to equip and sustain its traditional educational institutions. But this overview shows that there seem to be considerable willingness and self-interest in the local private sector to sponsor E-learning projects.

There are a lot of challenges to implement E-learning associated Distance Education in Bangladesh. Only few are mentioned here:

- **Inadequate ICT Infrastructure and Planning:** There is no solid ICT infrastructure in Bangladesh. Lack of complete road map is suffering the nation. Government has no specific long-term plan on the basis of which short term plan should be implemented.
- **Lack of Awareness of government officials:** Very unfortunately, there are serious

lack of awareness on government officials about Distance Education and E-learning. Creating a national distance education policy, which can channel and incentives the private sector to place money into appropriate projects is what is needed from the government. A need-based, clear policy on how Bangladesh can overcome its educational problems would also entice more international public and private sponsors to help Bangladesh.

- **Lack of proper training programs:** Many ICT-based projects suffer gravely from lack of adequate training programs. Training is of vital necessity in familiarizing users with computers and breaking their fears.
- **Inadequate human resource capacity:** For a country of more than 160 million people, the number of IT-trained people in the country is meager with about 1,630 incoming students at public universities, 2,370 at private universities and 1,120 at polytechnics. On top of that, most of the well trained IT graduates of the country leave since there is little scope for them in Bangladesh in terms of professional development.
- **High-cost, low-reliability of Internet access:** Internet access cost in Bangladesh is very high and highly unreliable. There are virtually no dial-up options outside major cities since long distance calls are exorbitantly expensive. Internet access and availability of PCs are disproportionately concentrated in Dhaka. Most ISPs are dependent on VSAT transmission and the bandwidths being used varies from 64Kbps to 4Mbps. 60% ISPs are between 128Kbps and 1Mbps in this concern. This is far below what is required even by current demand.
- **Lack of regulatory/legal framework:** The regulatory/legal framework in Bangladesh has not yet been modernized to accommodate the growing needs of the electronic world. There is no law to protect against cyber-crime, neither are there any laws for electronic authentication.
- **Expensive:** Most people particularly those who would most benefit from distance education, cannot afford it.
- **The lack of locally produced software:** Most local software companies still have not developed the level of expertise or professionalism needed to handle large-scale integrated projects.
- **Unskilled Faculties:** Many Distance Education teachers lack specific training.

7. Proposed Model of E-Learning Enabled Distance Education System

This research proposes a model of E-learning enabled distance education system called “Virtual Classroom Everywhere (VCE)” based on mobile technology and Internet/broadband connections for live telecasting of class lecture presentation especially in the rural villages of Bangladesh where the need for distance education is the most. Figure 3 shows the proposed model considering all issues and challenges for its implementation. A student can attend at the virtual classes at any place through this E-learning system VCE. This virtual situation in a distance education can be implemented both in urban and remote areas using the Internet/mobile Internet due to the advent of mobile phone communications.

Due to the lack of network infrastructure in the rural and remote areas of our country, mobile phones could be the easiest medium to bridge the learners with teachers. Mobile

phone has got the tremendous popularity and become the most usable communication tool in our country. A student can access or virtually attend in the class from remote areas by calling an IP-Phone number through his mobile phone. Students can join the class virtually using computers, laptops or mobile phones with internet facilities through video conferencing. Some cyber centers or regional classrooms can be established with internet and multimedia facilities to attend in the class. The lectures will be lively telecasted by the presenters/teachers from the media centers and the students will enjoy the lectures sitting at their respective tutorial centers and also can ask their questions to the lecturer/teacher through video conferencing or mobile phones directly. They can also download the lectures at any time from the respective websites of the educational institutes. Moreover, a student having a mobile phone with FM radio can hear the lectures at his home without attending at the classes physically. Thus we can create a virtual class room environment not only at the tutorial centers but also at any places.

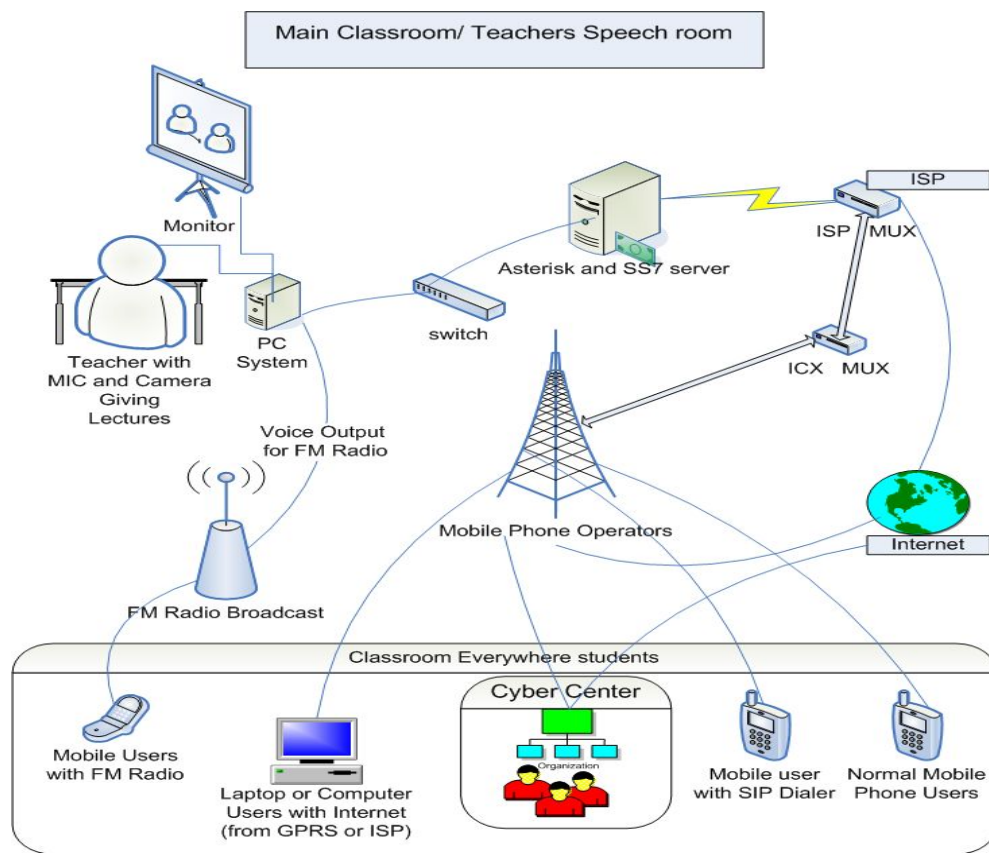


Figure 3. Proposed Model of E-learning Enabled Distance Education System

8. Recommendations

This research intends to recommend that the following policy initiatives are important conditions and facilitators to implement E-learning associated Distance Education in Bangladesh:

- Facilities should be built to promote computer aided distance education in all levels (primary to post-graduate). In this regard, steps can be taken through Bangladesh

National University by enhancing its technical setup with modern technology. Donor agencies, non-government organizations and other development partners of the country should participate in building up the necessary capacity in this area.

- Teachers are the most vital resource in promoting modernization and higher standards; their recruitment, training, deployment and appropriate incentives are critical to distance education system in Bangladesh. Since there is an acute shortage of qualified teachers, short-term intensive training on ICT may be arranged. Wherever necessary an international faculty or expatriate Bangladeshis working abroad may be invited as visiting faculties at least once a year.
- Modern and effective ICT networks need to be built to support traditional methods of teaching and learning and to increase the quantity and range of distance learning and training.
- The promotion of the study of foreign languages (mainly English) to increase the understanding of different cultures and enhance mobility in a globalize ICT world.
- Everyone should have access to ICT learning and training, not just those who are intellectually gifted or economically privileged. Special attention should be given to the needs of the disadvantaged. The use of ICT as a teaching tool and for delivery of distance learning can help stretch our limited teaching resources and provide a high quality education to all.
- Everyone should be encouraged and enabled to continue ICT learning throughout their lives.
- For elementary level, general science textbooks should adequately cover fundamental concepts on computers and their numerous applications. Differences between hardware and software, history of computers and their use, classification of computers, concept of computer network, internet and emails, introduction to computer peripherals and input/output devices should be introduced.

The recommendations for strengthening ICT infrastructure include the followings:

- In order to encourage BTTB to improve its services in an open competitive environment, the private sector should be encouraged to invest in and operate tele/data-communication infrastructure.
- In order to have access to global communication network, Bangladesh should be connected with submarine cable.
- IT parks with all necessary facilities should be established in strategic locations of the country. Entrepreneurs, both local and overseas, would be allocated space at a very low rental in such IT parks.
- Capacity of power plants needs to be increased to take care of the total national requirement with emphasis on rural areas.
- Necessary organizational structure should be created exclusively for the ICT industry to consolidate the various aspects of ICT now being handled by the ministries of science & technology, commerce, industries, cultural affairs, law, post & telecom, and others.

- The bandwidth capacity and availability needs to be ensured all over the countries at a reasonable cost to encourage the growth of the internet, IT-related industries, e-commerce and e-governance and will also help facilitate video conferencing.
- An integrated flexible and reliable nation-wide transmission system capable of voice, audio, video, data and graphics transmission should be ensured. National Information Infrastructure should be developed and it should be connected to Global Information Infrastructure through an information superhighway to create, collect and sell software and provide IT-enabled services to the world market.

9. Conclusions

Distance Education in the form of E-learning can play a crucial role in broadening access to education for the whole society. Most of the people living in rural and remote areas of Bangladesh are deprived from the education opportunities as the urban people enjoy. People will be benefited through distance education where physical traveling is costly and time consuming. E-learning associated Distance Education can enhance literate and skilled personnel and can enrich the economic condition of the country. Distance education can play a vital role to help girl's education as girls are having problems in attending schools in some cases. In Bangladesh, especially in rural areas, it becomes difficult for the female students to have on campus education after their marriage or after having children. Since female students usually get marriage at early age, they can no longer go to schools though they are very much eager to continue their study. In that case, distance learning can open a way to them for having education. Government should develop telecommunications infrastructure so that E-learning based distance education could be implemented. It is obvious from this study that Bangladesh has not yet gone far enough as far as distance education is concerned even though quite a number of institutions are involved. To meet the country's social and economic development targets ICT-enhanced distance education must be exploited for access and quality education. However, some modest gains have been recorded. If the issues identified under the way forward are vigorously tackled we hope to catch up with others very soon because we are convinced that e-learning and distance education will help us address the problem of all.

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