

INTEGRATIONS OF ICT IN EDUCATION SECTOR FOR THE ADVANCEMENT OF THE DEVELOPING COUNTRY: SOME CHALLENGES AND RECOMMENDATIONS-BANGLADESH PERSPECTIVE

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ABSTRACT

Bangladesh is a developing country with the literacy rate of 62.5%. Challenges in education sector are huge. There is no doubt that IT is going to bring about a tremendous change in education. The use of ICT in education was more student-centred learning. Because of the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important. In developing countries like Bangladesh, The implementation of ICT in education sector is a greatest challenge. In this paper, challenges are discussed and some recommendations are provided. The development of Bangladesh through the implementation of ICT in education also discussed here.

KEYWORDS

ICT, ICT in Education, Developing Country Education, Integration of ICT, Effects of ICT in Education.

1. INTRODUCTION

Education is a light that shows the right path to human being. The main purpose of education is making a student literate. Student can do rationale thinking. They have also the knowledge ability and self sufficiency by education. Willingness to change can make a hope for progress in any field. Both students and teachers can be benefited through creativity and innovation. The growth and progress of any society could be achieved by education. It imparts knowledge and skills and inculcates values. It is also responsible for building human capital. Technological innovation and economic growth could be raised, driven and set by the human capital. Information and knowledge are becoming a very important and critical input for growth and survival in today's era. Social improvement could be achieved by Education. In this information era, knowledge and research could lead the society towards the development. So education may be called an engine of advancement propelled by its wheels of knowledge and research.

Information and Communication Technologies have become an integral part in all aspects of life. Over the past twenty years, the use of ICT has given a drastic change in business and governance. ICT has begun its presence within education, but the impact has not been extensive as it is in other fields. The Government of Bangladesh (GOB) has an agenda to become Bangladesh a digital one. In this context, UNESCO has been providing support to the GOB to adopt ICT in education. In the context of growing demand of ICTs in everyday life, the GOB and NGOs are trying to integrate ICTs as innovative approach to education. Teaching learning materials

(multimedia CD/DVD, animation and audio/video) have been developed by using ICTs for recognizing the strength of digital media.

Challenges in education sector of Bangladesh are huge. And we should not become stuck by numbers. Once we get stuck by the number of challenges, it becomes really challenging task to achieve the ultimate goal. A large number of people of developing countries are far beyond the reach of higher education. The poor economic condition of those countries may be responsible for this. For the overall development and growth of those nations, education may be on the top list of challenges. For producing and offering goods and services at relatively low costs, Information, Knowledge, and Communication Technology also play a vital role. The GOB and NGOs have been made realization about the potential of ICTs in education. And some agencies have already undertaken different drives of using ICTs in increasing access to education and improving quality of it. The ICT in Education Master Plan are in the ongoing process. Accurate planning, resource organization and powerful leadership are needed for the preparation and implementation of the master plan.

Today's world could be organized by the availability of Information and Communication Technology (ICT). Technology, information and knowledge are becoming the driving force of the global economy. The education sector is thirst about this dynamic renovation. ICTs can empower teachers and students. The development of '21st century skills' could be promoted and forwarded. The whole world is now connected with the improvement of technology. With Information and Communication Technology (ICT), a significant change is happened in the way the world operates and communicates. In order to be with the rest of the world almost all developing countries are thinking to adopt ICT into Education. The Ministries of Education across the world are trying to integrate ICTs in Education. And they find the steadiness to optimize educational outcomes. Bangladesh has also made a vision of integrating ICT into its education system. The key issues underlying the problems could be understood and sensible strategies could be formulated. In this paper, some challenges are discussed and a few recommendations are provided. The development of Bangladesh through the implementation of ICT in education also discussed here.

2. THE IMPLEMENTATION CHALLENGES

Although the Government of Bangladesh is committed to implement ICT in education, the process is not so smooth. There are some implementation challenges. On the basis of our study, those challenges could be categorized as follows:

2.1. Strategic Challenges:

2.1.1. Lack of ICT Supported Infrastructure

Sufficient resources and appropriate infrastructure for implementing ICT in education in Bangladesh is absent. The effective use of ICT would depend not only the availability of equipment, like computers and other accessories but also their proper maintenance. The key feature of the diffusion of technology is the using of latest hardware and software resources [1]. But it is a rare experience in the educational institutions. High-speed internet connection is another essential for integrating ICT into the teaching-learning situation. But unfortunately internet access is very poor.

2.1.2. Funding Problem

Integrating technology into education systems effectively, substantial funding is needed. Many people are living below the international poverty line in Bangladesh. So it is very tough to manage any kind of fund. The availability of hardware and software are the major factor for the efficient and effective use of technology [2]. It is also important of accessing the resources by teachers, students and administrative staffs equally. Most of the developing countries, including Bangladesh in most cases distend and cannot provide these costs.

2.1.3. Proper vision and planning Problem

In developing countries, many stakeholders, educators, government, and business leaders consider that ICT investment enhances the instructional use of computers and improves teaching and learning. Even so, any desirable learning changes in education will be made by either providing computer tools in the classroom [3] or providing state-of-art technology [4]. A school's ICT vision is essential for effective implementation of ICT [5]. ICT into teaching and learning situations are not implemented in most of the educational institutions in Bangladesh. A few higher educational institutions have ICT facilities throughout the country. But due to lack of a proper vision and plan, those are not integrated effectively.

2.2. Social, Cultural and political Challenges

The most notable challenge is to use of ICT in education in developing countries seems to be the political will of the people who are in the power [6]. Half of the populations of Bangladesh are women who are relatively deprived of access to the advantages of technology. The low social status of women in Bangladesh and also other developing countries is one of the most significant social factors that influencing the use of ICT.

In Bangladesh, language and insufficient education and skills are the key barriers to the use of ICT. Effective use of ICT could be that facilitated them. In Bangladesh, Bangla is the mother language, whereas English is the governed language over the computer (software), internet and ICT supported tools. A wide range of choices in education and training courses will be offered by the English language. Teachers and students also face the difficulties for the shortage of developmentally-appropriate software (DAS) [7,8,9]. Since most of the software programs are designed in English and the scarcity of Bangla software is the main reason behind that. The popular knowledge products are available in English. So the emergence of English is essential.

An uncontrollable situation in Bangladesh is corruption; it is so pervasive that it has evoked widespread condemnation, both inside and outside the country [10]. So it could be identified as one of the strong barriers to the implementation of ICT in education. The misuse of government funds could have been used to develop other sectors like the integration of ICT in education is propagated in the other directions. A few of people benefited from those funds by pocketing the money [11]. The budget for the newer technology was misused and reduced due to corruption in the administration [12]. To buy modern teaching and learning materials for the improvement, huge budgets are passed. But in the end of the year only minor changes are found in the overall technical and vocational education sector.

2.3. Other challenges

2.3.1. Teachers' Attitudes and Beliefs about ICT

The attitudes and belief of teachers about ICT is also important for the successful use of ICT into classroom. Teachers with positive attitudes can learn the skills necessary for the implementation of ICT in their design activities into the classroom by less effort and encouragement. Therefore, teachers will be positively disposed to use the ICT in the classroom have the positive attitudes towards it [13]. It is found that participants with positive computer attitudes were more skilled in computer use and were therefore more likely to accept and adapt to technology than those with negative attitudes [14]. It could be summarised that for increasing computer skills, individuals' negative attitudes must be changed. Therefore, if teachers wish to use technology successfully in their classes, they need to have the quality of positive attitudes to the use of technology. Such attitudes are developed when teachers are sufficiently comfortable with technology and are knowledgeable about its use [2].

2.3.2. Lack of Knowledge and Skill

The educational innovations could be possible by the skills and knowledge of teachers [15]. The lack of knowledge and skills of teachers is one of the main hindrances to the use of ICT in education both for the developed and underdeveloped countries [12; 15; 16; 17]. Integrating technology in the curriculum requires knowledge of the subject area, an understanding of how students learn and a level of technical expertise [18]. Therefore, lack of knowledge regarding the use of ICT and lack of skill on ICT tools and software have also limited the use of ICT tools in teaching learning situation in Bangladesh.

2.3.3. Scarcity of Time

All the developing country like Bangladesh has a shortage of teachers. They are always burdened with heavy workload. Some of the institutions have introduced two shifts, without increasing the number of teachers. So teachers are having extra loads of classes for both the shifts. Beside this they are also involve in administrative jobs. In these circumstances teachers don't have time to design, develop and incorporate technology into the teaching learning situation [2; 16]. So the lack of time is one of the largest constraints to the integration of ICT into the education. Teachers need time to learn how to use the hardware and software, time to plan, and time to collaborate with other teachers. Time is also needed to improve their curriculum by using technology.

2.3.4. Lack of Convergence of technology and education

Access to school is not a problem. The core issue is unpreparedness of the school system for mass education, especially of marginalized. Schools are unable to retain students. Drop out continues to be high and learning level is abysmally poor. The number who have joined but left the school is much larger as compared to children who never joined school. It means they are not able to adjust. Almost 50% of students, who put in five years in school, are not able to properly read and write, they are not able to do simple mathematics. They are barely literate. The quality of education is the main issue for them. For long the entire discourse on drop out remained centred around parental poverty and disinterestedness rather than accepting it as failure of the school system.

3. RECOMMENDATIONS

a) To implement ICT in education, the teachers need to have ICT skills to create a powerful learning environment. The teacher's role shifts from transferring knowledge to guiding the learning processes. In today's knowledge-based society, information is growing rapidly and is becoming increasingly available. Thus education cannot merely focus on transfer of knowledge. The more important fact is that students learn how to find, select, process and use information. The teacher has to guide these processes.

b) Many developing countries are copying the approaches of developed countries. The Ministries of Education in least developed countries are faced with methodical deficiency. And ICTs have not usually been their core competence. Realizing the potential and benefits of ICTs in Education in improving access, quality and efficiency in a cost and educational effective manner, the developing countries urgently need to develop a clear understanding of it; develop, build and enhance the capacity within Ministries of Education to strategically plan for, set priorities and targets and effectively deploy ICTs for Education; clear leadership has been assumed for driving the ICT in Education; cooperation and coordination are needed between the NGO and private sector stakeholders; the government has to move beyond "pilot programs" to well thought out and planned, scalable, cost effective and sustainable national initiatives.

c) Some educational methodologies could be oriented in the education systems. Those can be as follows:

(i) *Building digital networks :*

Most of our education applications require the network to run in an efficient manner. So, education can take the root of digitalization, only when the network is available to each and every part of the country. A virtual classroom is being essential in each school or college. The entire set up of a virtual classroom consists of a projector, a LCD screen, computer, microphone, etc. A studio has to create in large cities. The best teachers can be teaching in the studio and the lessons will get digitally transmitted to all virtual classrooms located in different parts of country. By this way a much larger number of students will be able to tap into the teaching skills of the best teachers. It is possible that all the virtual classrooms could be simultaneously attending the same lecture. As the system is interactive, the teacher-student interaction will be possible in the system. The children will be able to ask questions and get answers from their teacher. By creating a network of virtual classrooms, quality lessons could be imparted from quality teachers to students across the country.

(ii) *Connecting schools :*

There are many difficulties in the digital system of integrating education. We have to solve those to bring perfection in the system. The main difficulty is to connect all the virtual classrooms with the studio. The National Optical Fibre Network (NOFN) is very important. As an initial step, we have to connect schools and colleges. Most of the schools require this kind of technological solutions. So we have to plan to do the job phase by phase.

(iii) *A dedicated IT group :*

The government has to create a dedicated IT group for the implementations of e-Governance. The private sector has lots of talents. How the government can take advantage of that talents. Let's say a very efficient model for virtual classroom is provided by a private company. The government can't straightway take that virtual classroom and start deploying it because the government works

are enormous. A transparent procurement process is needed. So it is much better to test their products with the private schools. Once the application gets popularized, the government can take steps through a transparent mechanism.

(iv) *Smart Teaching and Learning Inside the Classroom :*

Smart Class could be launched on a limited pilot basis. In the initial stages, it could be launched across a few select geographies. It has phenomenal acceptance amongst private schools. In day to day teaching and learning practices in schools, technology would become an integral part. Students and teachers spend most of their teaching learning time into the classroom. So technology could be needed to apply in to the classroom now.

d) A National ICT Policy is needed in Education for use by all stakeholders. To enhance the role of ICT in school education, a set of policy objectives, guidelines, practices and knowledge tools has been felt to develop. Particularly, it has been developed by following a consultative and a participatory process with Nations, academia, NGOs, civil society organizations, practitioners and stakeholders. In this regard, the mission of GeSCI's has to define the services and activities as per the needs of several developing countries. A well coordinated and structured policy can lead Bangladesh to achieve MDGs.

e) Motivation and participation at community level is the biggest challenge. Second, the focus now has to shift from excess enrolment retention to quality in learning levels. We have to address the excess part, and enrolment part. We need primary schools within every 1- 1.5 km radius. We have to reach in a stage where a sizeable number of children who are disabled and out of mainstream education system. The other challenge is with a very hard group of children like the migrant labour, very poor and marginalized or scattered in small habitations, who are not going to schools. So we have a mobile school for them, which keep on moving. We are also working out other strategies to handle this small but difficult group. The teacher-child ratio is also higher. It also could be minimized.

4. EFFECTS OF ICT IN EDUCATION

For developing countries like Bangladesh, ICTs have the potential for increasing access to and improving the relevance and quality of education. Thus a possibly similar strategy for developing countries has been represented. The acquisition and absorption of knowledge are facilitated. ICTs offer developing countries unprecedented opportunities to enhance educational systems. Policy formulation and execution could be improved by ICT. It widens the range of opportunities for business and the poor. The sense of isolation is one of the largest difficulties experienced by the poor, and by many other who live in the poorest countries. The new technologies have been promised to reduce that sense of isolation and to open access to knowledge in an unimaginable ways [19]. The reality of the Digital Divide will be a most challenging job. Failure to overcome the challenge could increase the knowledge gap further. And also the existing economic and social inequalities could be extended.

A rich global resources and collaborative environment could be provided by ICTs. It is essential for dissemination of ICT literacy materials, interactive discussions, research information and international exchange of ideas which are critical for advancing meaningful educational initiatives, training high skilled labour force, and understanding issues related to economic development. The innovative effort and partnerships can be highlighted by ICT. So the literacy of ICT could be promoted. All sectors of a national economy including external spheres could be interacted through ICT.

The appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century [20]. If designed and implemented properly, ICT-supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning. The following are the different types of learning derived from the use of ICT in education [21]:

- Active learning
- Collaborative learning:
- Creative Learning:
- Integrative learning
- Evaluative learning:

5. SOME INITIATIVES RELATED TO ICT IN BANGLADESH

The United Nations Development Programme (UNDP) supported project, *Access to Information Programme* widely known as **A2I** started in 2007 has launched dozens of citizen oriented e-services where pilots can be quickly implemented and successful ones scaled up[22]. Some of them are discussed as follows:

(A) Union is the lowest administrative division of Bangladesh. There are 4,498 Unions in the country. *Union Information Service Centre* (UISC) has been installed in all unions of Bangladesh.



Fig: 5.1 UISC offered services [22]

Internet access, e-mail, video calls, downloading forms, scanning, printing and digital photography etc. are the offered services by UISC. Some value-added services like mobile recharges and transfers via mobile phones are provided by the UISCs. Access to Bangla content increases day by day. The entrepreneurs charge a fee from the customer for services to ensure sustainability. The entrepreneurs have got the initial equipment and a room from the local governments. The average revenue for a UISC was USD40 in July 2011, a little less than the average per capita income. It is growing rapidly. Some three million people were served by the UISCs. There is also a target of 20 million people by 2016. About three quarters of the population of Bangladesh who live in the rural area are getting services by the UISCs. It is becoming the main source of information for them.



Fig: 5.2 Multimedia Classroom [22]

(B) The *Multimedia Classrooms* are introduced in secondary schools. A laptop with a projector and screen are used to assist teaching different subjects. In the case of shortage of science laboratories and illustrated textbooks, it is an ideal tool for illustrating topics. The Asian Development Bank was happy to see the quick achievement of the A2I staff and the Ministry of Education. They have become the partner to provide resources for teacher training. So far around 1,000 teachers have been trained with some 50,000 targeted over the next few years. The equipment is purchased by the schools. Bangladesh has the plans to eventually provide computer labs in all schools [22]. The Multimedia Classroom is the first step in it.

(C) There are 64 districts in Bangladesh. Various licenses and certificates of the citizens are provided in the District Headquarters. The *District E-Service Center* (DESC) is another innovative application introduced here. Citizens requests for their file online or directly at the District Centre under the DESC. The files are processed there. A receipt is given to them or a tracking number is sent by SMS. The DESC was started in the Jessore District and the results were impressive there. The office could be able to handle a greater number of requests much faster than before. Figure 5.3 gives a DESC report. The DESC had been planned to implement in all 64 districts.

Service Description	Before	After
Avg. number : requests received for certified copy of land records/day	150-200	230-240
Avg. number : requests processed for certified copy of land/day	120-130	180-200
Avg. time: Preparation of per Certified copy of land records	18-20 days	12-14 days
Avg. time : disposal of applications	3-4 hrs up to 1 day	Max 1 hr
Avg. time : decisions making (full cycle)	2-7 days	1 hr to 2 days
Total number: applications received by e-Service System	0 (No provision)	19,723 in 6 months

Fig: 5.3 DESC report [22]

(D) E-services are growing through mobile. There are 80 million subscriptions of mobile at August 2011 according to the Bangladesh Telecommunication Regulatory Commission. And according to the Bureau of Statistics, a household penetration rate of 64% in 2010 which one was 11% in 2005. By sending an SMS, students can do all the jobs related to university admissions. The SMS-based admissions results are also becoming popular. Around 1/2 million students a year take the Higher Secondary Certificate (HSC) examination. They just send their HSC results through a mobile phone and get a reservation for the university exam. Application fees could be

deducted from the applicant's mobile phone account. Following the success of the SMS registration, 28 post secondary educational institutions implemented the system in 2010 and others are encouraged to do so. People could pay their utility bills using their mobile phones.

(E) The first homemade laptop called the DOEL has been launched. The DOEL is priced in the range of Tk. 10,000 to Tk. 20,000 (US\$131-262) depending on configuration. Bangladesh has a growing software sector. Some 400 members of the Bangladesh Association of Software and Information Services (BASIS) generating US\$35 million of exports in 2009-10 are involved with this sector.

6. COMPARATIVE STUDY

The use of ICT has increased dramatically over the last few years. The percentage remains

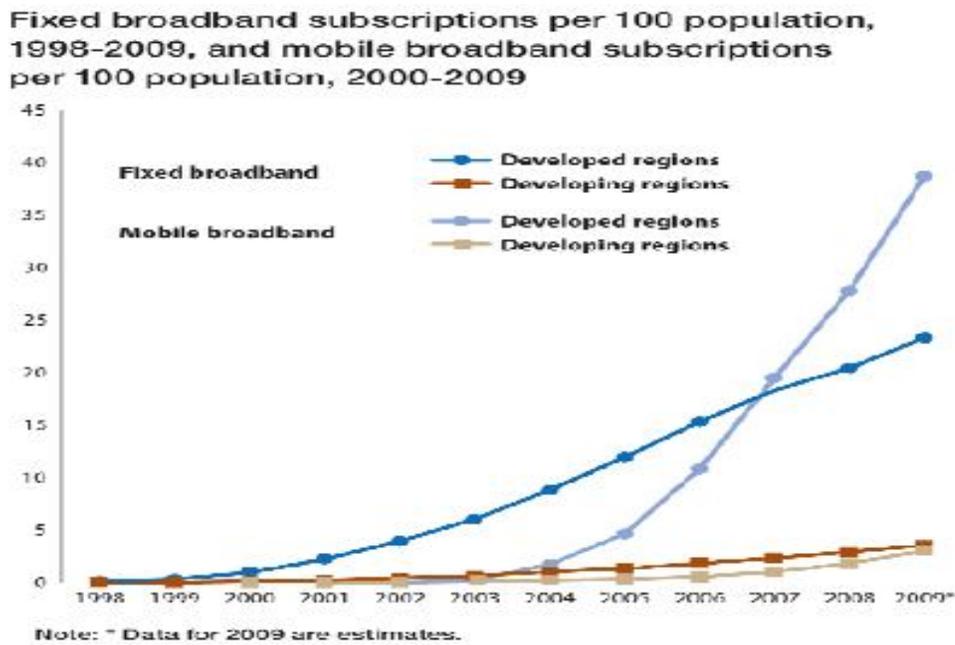


Fig 6.1 Comparison between developed and developing region over the last decade [21]. Bangladesh has moderately introduced ICT in the public sector. The following table (table 1) shows 2012 the statistics of the latest UN E-Government Readiness Survey. The EGDI consists of three components: online service, technological infrastructure and human capital. According to the latest Report (UN 2012), South Korea became the top performers.

Table 1: Ranking in the E-Government Development Index (EGDI) of some Asian countries

Country	2012 Ranking	2010 Ranking	2008 Ranking	2005 Ranking
Maldives	95	92	95	77
India	125	119	113	87
Bangladesh	150	134	142	162
Pakistan	156	146	131	136
Sri Lanka	115	111	101	94
Nepal	164	153	150	126

Source: Compiled from UN(2012), UN(2010), UN(2008) and UN(2005)

South Korea has one of the most advanced ICT infrastructures in the world [23]. The use of ICT is mostly spread into the higher educational system. There are currently 15 single-mode virtual universities. They offer only ICT-based courses. The Korea Cyber University, the Korea Digital University, and the Open Cyber University are the most popular among them. Lifelong learning and vocational education are the speciality of these universities. In 2002, the total enrolment of them is 17,200. A wide range of fields are offered by them. These include technology, management, law, languages, social sciences, education, and theology.



Fig 6.1 U-Learning Lab of Korea

Figure 6.2 shows a Robot teacher in the classroom of Tokyo in Japan. We have the dream for being our education sector as advanced as in the country we have discussed here.



Fig 6.2 Robot teacher in the classroom of Tokyo

7. CONCLUSIONS

Education is the backbone of a nation. Information could be created, processed and made available anywhere by the smart use of ICTs. But despite having relatively poor economic condition, Information and Communication Technologies (ICTs) in most cases have tremendous success in providing services at reduced costs to the people's door steps. It can make the higher education available to all classes of people throughout the country at a lower cost. As a result, people will gain the necessary knowledge, skills, and experiences to serve the nation and prosper accordingly. EFA (Education For All) is an international commitment to bring the benefits of education to "every citizen in every society". Many developing countries, including Bangladesh, have made the commitment to achieve the EFA targets by 2015. By the integration of ICT in education, the commitment will be achieved faster.

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