STATUS AND ROLE OF ICT IN EDUCATIONAL INSTITUTION TO BUILD DIGITAL SOCIETY IN BANGLADESH: PERSPECTIVE OF A DIVISIONAL CITY, KHULNA

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ABSTRACT

Education is one of the main keys to economic development and improvements in human welfare. As global competition grows sharper, education becomes an important source of competitive advantage and appears to be one of the key determinants of standardization of life. Information and communication technology (ICT) is playing a central role in the development of modern economies and societies. As the world is going through the technological revolution, adoption of new technologies in the education system is the most important. This has profound implications for education, both because ICT can facilitate new forms of learning and because it has become important for young people to master ICT in preparation for adult life. The use of ICT has the potential to enhance the real world experiences, the educational institutions should emphasize on the use of ICT for both administrative and academic efficiency. This study investigates current status of ICT in educational institutions and educational organization related activities and provides comprehensive recommendations to build a digital society in Bangladesh in the near future.

KEYWORDS

Competitive advantage, ICT, Technological revolution, digital society

I. INTRODUCTION

The UNESCO uses the term ICTs to describe: "…the tools and the processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV programs, database programs and multimedia programs" (UNESCO Bangkok, 2003).

Any kind of technology can be understood as a tool or technique for extending human capacity. In this sense, ICTs extend our human capacity to perceive, understand and communicate. The mobile phone enables us to speak from wherever we are to others thousands of kilometres away; television permits us to see what is happening on the other side of the planet almost as it happens; and the Web supports immediate access to, and exchange of, information, opinions and shared interests. In the field of formal education, ICTs are increasingly deployed as tools to extend the learner's capacity to perceive, understand and communicate, as seen in the increase in online learning programs and the use of the computer as a learning support tool in the classroom. Although universities were certainly leaders in engineering the Internet and interoperable computer systems to connect researchers for e-mail and data exchange, the use of ICTs for education and training has lagged behind other sectors in society.

In order to best use these technologies in education, new pedagogies and learning assessment methods may, and probably will, be required. In this rapidly advancing field, it is worth reviewing the history, current uses and trends in ICTs that will further influence how education practices may be changed in

future. Educators are continuing to develop new applications and online resources to support learning objectives in all disciplines.

Skilled manpower is an enormous foundation of a country to compete with competitive world and the teachers and institutions are the builders of them. Some universities of Bangladesh are trying to develop a better shape in their educational system by proper utilization of ICTs for learning system. Better policies and standards always support new learning environments, which are very much needed to build up the digital society in Bangladesh. The focus of the research is the level of ICT that the educational institutions (secondary, madrasha, college and university) are using now and what should be the future strategy to cope with upcoming opportunities to build the nation in digital way.

II. LITERATURE REVIEW

The history of the use of ICTs in education is relatively short. Before 1979, computers existed primarily in tertiary level educational institutions. Then, in the eighties, microcomputers began to be distributed to schools, and teachers began to grapple with the question of how to use computing for education rather than simply educating about computing. Starting from the mid-nineties, the use of ICTs in schools rapidly expanded in developed nations through curriculum support, networking, the professional development of teachers and software improvements [1]. A growing number of researchers and educators began to develop applications that used hypertext, multimedia and networking to build cognitivist and constructivist learning environments aimed at improving learning [2], [3], [4]. However, these applications were initially found to be ineffective in attaining better results as compared to learning outcomes achieved through traditional pedagogies and assessed against traditional metrics. This finding may be largely influenced by teachers' and learners' lack of familiarity with ICTs as well as the inappropriateness of the traditional metrics in and of themselves [5].

In recent years, bandwidth has greatly increased and user familiarity with the Web and ICTs in general has evolved, contributing to an evolution of the Web. Policy based on the prevailing ideas about ICTs has also been a major driver shaping the adoption of ICTs in education. For example, the late 1980s and early 1990s were dominated by rhetoric surrounding the idea of the transition from the Industrial Society to the Information Society, where managing, generating and sharing information would be key to national economies maintaining the cutting edge in an increasingly globalized market [6]. This idea promoted the concept that the education system would need to create a "learning culture," which would prepare citizens for lifelong learning in an information society; which is the prime necessity for building digital society.

The accelerated adoption and use of Information and Communication Technology (ICT) has resulted in the globalization of information and knowledge resources [7]. That is why it has become very important to adopt the technology for the betterment of the education system. ICT is a term used to describe a range of equipment (hardware: personal computers, scanners and digital cameras) and computer programs (software: database programs and multimedia programs), and the telecommunications infrastructures (phones, faxes, modems, video conferencing equipment and web cameras) that allow us to access, retrieve, store, organize, manipulate, present, send material and communicate locally, nationally and globally through digital media [8]. ICT are a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information [9].

Bangladesh, located in South Asia is one of the overpopulated, underdeveloped and technologically backward countries in the world but the higher academic institutions of a country are pioneers in adopting and using Information and Communication Technologies [10]. Universities around the world are developing digital strategies to support education in the 21st century. The focus of these strategies is to enable countries to realize their economic, social and cultural capital; to keep pace with rising expectations and technological advancements; to develop creative, thinking people who can solve problems in new ways and within multi-dimensional learning environments [8]. The higher academic institutions of a country are pioneers in adopting and using ICT [10]. Moreover, efforts to connect educational organizations to the ICT are being driven by societal pressure [9].

Effective higher education plays a central role in promoting productivity, innovation, entrepreneurship, gender mainstreaming and overall socio-cultural advancement [11]. Moreover, ICT

revolution imposes particular challenges on education systems in Bangladesh [13]. Now private universities are making praiseworthy contributions in development of ICT in Bangladesh [12]. Around 40% of the private universities of Bangladesh are using ICT at a large extent for administrative purposes and around 35% of the universities are using ICT for teaching at a large extent and 55% of the universities use ICT at a moderate level [19].

Higher education institutions are becoming more reliant upon ICT as a means of providing enhanced learning and teaching. The university administration and academic support services particularly require the use of ICT to provide effective and excellent services [14]. The ICT tool must be central to and through the various levels of university administration. ICT also can enrich the teaching methods, which ultimately facilitates the learning process [15]. ICT is a medium for teaching and learning [16]. This refers ICT as a tool for teaching and learning itself, the medium through which teachers can teach and learners can learn. There are two reasons for which ICT in teaching is important (i) first is, as ICT is everywhere that is why it should present in the university education also so that the students can use enter in their future working life with the enriched knowledge of ICT and (ii) second is, ICT can improve the effectiveness of university education [17]. ICT can solve problems pertaining to quality, equity, and access to higher education and can also promote resource sharing and therefore improve efficiency and productivity while at the same time open up access to global resource of knowledge and information [18].

III. BACKGROUND

The government is looking at implementing ICT initiatives to revolutionize the education system. With the successful implementation of ICT in the education system, the government can look at a greater participation of the country in the global information society. It is hoped that ICT will impact the access, cost-effectiveness and quality of the education system too. The increasing digital divide needs to be addressed by the uniform and well-administered implementation of ICT. The demographical picture that shows a relatively lower participation of the female population in the ICT education process also needs to be revised through initiatives and programs.

Bangladesh has made significant progress, especially with regard to increasing access and gender equity, both at the primary and secondary levels. Gross enrolment rates at the primary level rose from 90% in the late 1990s to 98% in 2003, while the enrolment rates at the secondary level rose to 44%. Gender parity in access to primary and secondary education has also been achieved to an extent. These achievements are particularly spectacular when compared to countries in the South Asia region and other countries at similar levels of per capita income. Some of the key education indicators for the country are shown in the Table 1.

The ICT industry in Bangladesh has been making steady progress with rapid growth in mobile telephony and Internet usage. The Ministry of Science Information and Communication Technology is tasked with the responsibility of providing the policy framework and institutional mechanism for the development of a robust ICT sector in the country. Further, the Bangladesh Computer Council (BCC), set up by the Ministry in 1990, is an autonomous body responsible for encouraging and providing support for ICT-related activities in Bangladesh. Some of the key ICT-related indicators for the country are shown in Table 2.

Table 1. Key Education Indicators of - Bangladesh.

Education parameter		Value	Year
Adult literacy rate	Male Female	53.9 31.8	2000–2007 2000–2007
Youth literacy rate	Male Female	71 73	2000–2007 2000–2007
Gross enrollment ratio (%): Primary education	Male Female	101 105	2000–2007 2000-2007
Gross enrollment ratio (%): Secondary education	Male Female	43 45	2000–2007 2000-2007
Expenditure on education (% of GDP)		2.7	2003–2006

Source: www.unicef.org; www.cia.gov

Table 2. ICT Indicators - Bangladesh

ICT parameters	Value	Year
Internet users (per 100)	0.3	2008
Internet subscribers (per 100)	0.1	2008
Broadband subscribers (per 100)	0.03	2008
Mobile coverage (%)	90	2007
Mobile subscribers (per 100)	21.7	2007
Personal computers (per 100)	2.42	2006–2007
Internet affordability (US $/month)	22.1	2007
Mobile affordability (US$/month)	2.6	2007
Radio subscribers (per 1000)	42.6	
Households with TV (%)	22.9	

Source: www.itu.int; www.mdgs.un.org; World Development Indicators Database; www.cia.gov

IV. ICT POLICY FRAMEWORK

The Government of Bangladesh in an effort to harness the power of ICT formulated its National ICT Policy in year 2002. A revised National ICT Policy was passed in 2009. The National ICT Policy 2009 has incorporated all the components of the National ICT Policy 2002 in a more structured manner. Some of the specific policy statements relevant to education are stated below:

- Assess skills of ICT professionals and meet gaps with targeted training programs to overcome the short-term skills shortage in the ICT industry and adopt continuing education and professional skills assessment and enhancement programs.
- Encourage closer collaboration between academia and industry to align curriculum with market needs.
- Establish an ICT Center of Excellence with necessary long-term funding to teach and conduct research in advanced ICTs.
- Enhance the quality and reach of education at all levels with a special focus on Mathematics, Science, and English.
- Boost use of ICT tools in all levels of education, including ECDP, mass literacy, and lifelong learning.
- Ensure access to education and research for people with disabilities and special needs using ICT tools.
- Establish multimedia institutes.
- Initiate diploma and trade courses to enable ICT capacity building for teachers. Teacher training institutes to be empowered with ICT capacity to meet the challenges.
- Create reliable and accessible national databases.
- Promote the use of ICT for the purpose of training in the public sector.
- Initiate development of a sizable resource of globally competitive ICT professionals in order to meet local and global market requirements.
- Administer the successful enactment of laws and regulations that conform to World Trade Organization stipulations to allow for consistent ICT growth.
- Promote distance education, set up institutes and infrastructure for e-learning training programs.
- Develop seamless telecommunication network for the unhindered implementation of ICT policy.
- Ensure public access to information through setting up of kiosks. Encourage the participation of private sector for ICT implementation.

- Work toward setting up a Ministry of ICT, by merging MOSICT and MOPT. The "Science" part from MOSICT can be transferred to MoE and be renamed as the Ministry of Education and Science. BTRC should be brought under the Ministry of ICT.
- Create an e-Education Cell for coordinating and mainstreaming ICTs in education system.

V. OBJECTIVES

Now a day ICT is the essential parts for participatory teaching system, the objective of the study is to find out the status of ICT use in the educational institutions (secondary school, madrasha, college, university). Specifically the objectives are to identify how the institutions are using ICT for both administrative and academic purposes to increase their efficiency and taking pioneering role to build the digital society in Bangladesh by producing ICT concerned people.

VI. METHODOLOGY

Questionnaires offer a method of conducting a survey where all respondents are asked exactly the same questions in the same circumstance. In this research, questionnaire survey was conducted to identify the status of use of ICT in the educational institutions of Bangladesh. Structured questionnaire were formulated in order to identify different uses of ICT and the efficiency of using the ICT. Total of 25 educational institutions (5 university/same level institute, 5 colleges, 5 polytechnics, 5 secondary schools and 5 madrashas) were surveyed in Khulna city, Bangladesh. The respondents were employees, students and teachers of those institutions who were representing their institutions and the number of respondents were 4450 (130 employees, 370 teachers, 3950 students). The sampling technique was random sampling. Finally, the study considered both quantitative and qualitative analyses. The statistical package used to conduct the various analyses is the SPSS.

VII. RESULTS AND DISCUSSION

- We find that only 44% of the institutions have their own web page and 56% of them have no web page. But no secondary school and madrasha have their own web pages (shown in Table 3).

Table 3. Presence of Web in the institution

Institution Type	Presence of Website (%)	
	Yes	No
University/University Equivalent	80	20
College	60	40
Polytechnic Institute	80	20
Secondary School	0	100
Madrasha	0	100
Total	44	56

- We find that 51.60% of the teachers have ICT knowledge and only 36.43% of the teachers have their e-mail address. But the higher education institutions are forward in this regard but mid-level institutions (secondary school, madrasha) are lagging in the regards. Detailed statistics has been provided in Figure 1.

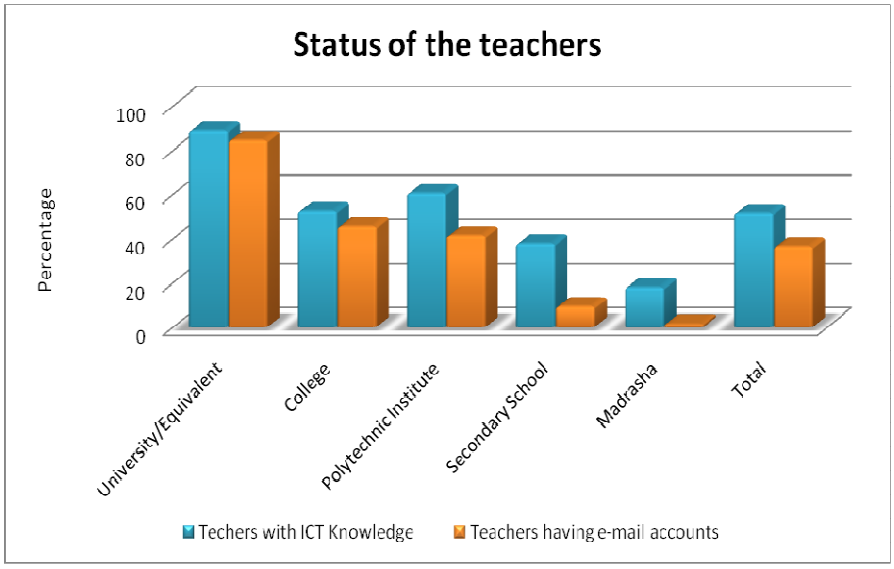

Figure 1. Status of the teachers

- We find that only 39.37% of the supporting staffs have basic ICT knowledge. The staffs of higher education and polytechnic institutions are somehow satisfactory level but colleges, secondary school and madrasha staffs are not in satisfactory level (presented in Table 4).

Table 4. Status of the staffs

Institution Type	**Staff with ICT Knowledge (%)**
University/University Equivalent	55.87
College	37.64
Polytechnic Institute	64.00
Secondary School	27.33
Madrasha	12.00
Total	39.37

- We also find that among the students 52.97% have basic ICT knowledge, 21.67% have e-mail address, 28.19% have personal computer and 25.72% are used to internet. The students of the higher education institutions are in satisfactory level in all the regards but all other students are not in satisfactory level especially in owing e-mail, personal computer and use of internet as provided in Figure 2.

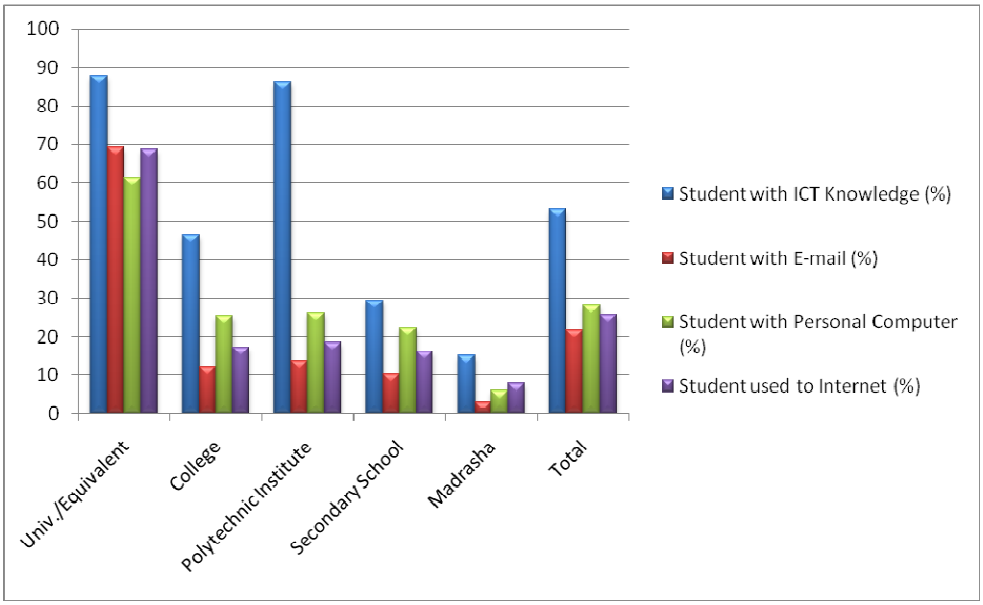

Figure 2. Status of the students

- We find that 50.83% of the class/department/discipline have basic computer course in their syllabus. Only polytechnic institutes have compulsory computer curse in all departments but the same factor for secondary and madrasha level are not satisfactory (shown in Figure 3).

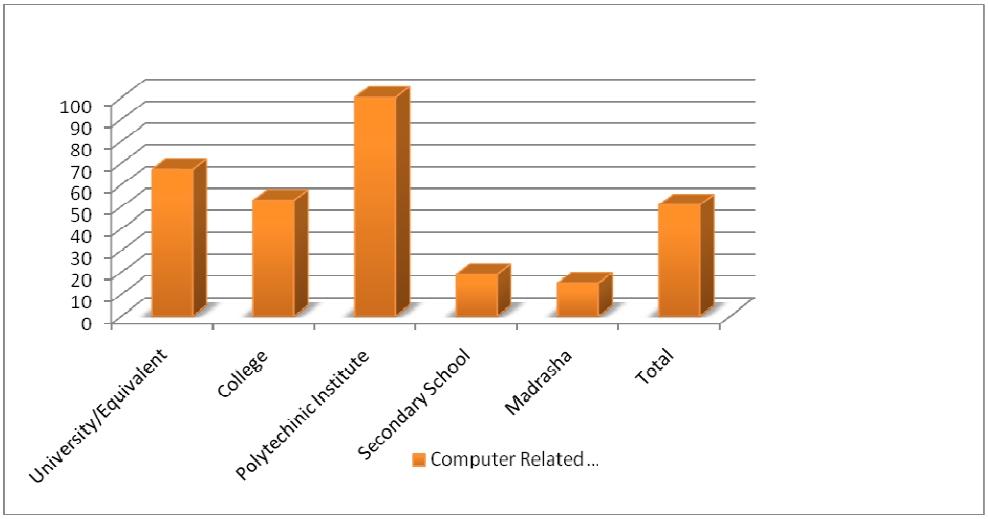

Figure 3. Status of computer related courses

- It has been found that only 32% of the institutions have their own LAN and 60% of the institutions have internet facility. But most of the institutions have internet facilities not for the vast people or students (shown in Table 5).

Table 5. Status of LAN and internet

Institution Type	**Availability of LAN (%)**		**Availability of internet (%)**	
	Yes	No	Yes	No
University/University	80	20	80	20

Equivalent				
College	20	80	100	0
Polytechnic Institute	60	40	40	60
Secondary School	0	100	60	40
Madrasha	0	100	20	80
Total	32	68	60	40

- Our findings implies that, 48% of the institutions use multimedia in with their educational program and only 15.67% of the teachers use the multimedia in the class or laboratory as presented in Table 6.

Table 6. Status of multimedia use in education

Institution Type	**Multimedia Used in Education (%)**		**Teacher used to Multimedia (%)**
	Yes	No	
University/University Equivalent	100	0	62.97
College	40	60	2.13
Polytechnic Institute	80	20	11.59
Secondary School	20	80	1.67
Madrasha	0	100	0.00
Total	48	52	15.67

- It has been noticed that no institutions have digital library and only 16% of the institutions have student database and 8% of the institutions have automated accounts. So administrative duties can be hazardous in the institutions. The statistics has been conveyed in Table 7.

Table 7. Status of multimedia use in education

Institution Type	**Digital Library (%)**		**Student Database (%)**		**Automated Accounts (%)**	
	Yes	No	Yes	No	Yes	No
University/University Equivalent	0	100	20	80	20	80
College	0	100	0	100	20	80
Polytechnic Institute	0	100	60	40	0	100
Secondary School	0	100	0	100	0	100
Madrasha	0	100	0	100	0	100
Total	0	100	16	84	8	92

VIII. CONCLUSIONS AND RECOMMENDATIONS

Undoubtedly, ICTs are potentially a useful tool both for managing education and teaching. Application of ICT in managing educational institutions should be encouraged, as should use by instructors to gain access to educational materials. By teaching computer skills to youngsters, they may influence inward investment for the future society as well. ICTs are most likely to be cost-effective when used to reach very large numbers of students; when used for research; and when used by administrators irrespective of time and place.

This study reveals that the level of use and infrastructure of ICTs is not highly satisfactory in all forms of educational institutions to meet the current demands of ICT. But their efforts in this regards will help to build a digital society in Bangladesh in the near future as well.

Some of the recommendations that can be followed in the educational institutions to build digital society in Bangladesh:

- Training for all levels of teachers, assistants who are involving in educational institutions. Universities -> Colleges/Polytechnics ->School/Madrasha and from school and madrashas, general people can get trained. They are also modified themselves in this way.
- Establishment of lab facilities and internet availabilities for all the students, teachers and assistants.
- Basic ICT course should be compulsory in all form of educations.
- Personnel with basic ICT knowledge should be appointed in all form of educational institutions.
- Use of ICT and multimedia in the education makes it interesting and fruitful
- Website of the institution should be compulsory along with regular updates.
- Central registration system for the students should be implemented mandatorily.
- Use of student database, automated account in the institutions for faster administration should be employed.
- Facilitating electronic professional research journal and periodicals access to foster the level of technology savvy mind of the people and more importantly featuring the educators and students to access the emerging arena of knowledge.
- Making an open platform to share the academic and other relevant thoughts among vast people which would dimensionalize the incepted concepts.
- Establishment of digital libraries or information repository may also be done by the educational institutions which may provide invaluable materials to the researchers, educators and students as well as other interested people.
- In disseminating ICT and new technologies which may improve the overall life style of the mass people may be acquainted through conferences, workshops and other technical gatherings arranged by the educational institutions in collaboration with other agencies

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