



Realistic Perspectives to the Implementation of Information and Communication Technologies (ICT) in Education System of Bangladesh

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Authors' contribution

This work was carried out in collaborative contributions of the authors. Author MAK designed the study, reviewed existing literature, managed the methodology aspect of the study and drafted the manuscript first. Authors SKB and MFB discussed the findings, conclusion and recommendations. All authors evaluated and approved the final manuscript.

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ABSTRACT

In only a few years, information and communication technology (ICT) has become an important education technology that can underpin some big changes in the teaching process. Technology makes students more effective than ever, but the position of teachers in high-tech classrooms is more challenging than ever before. ICT has the power to change the essence of education (Improving teacher design, enhancing the role of learners and involving them in the teaching process and attempting to develop a collaborative culture, etc.) While information and communication technology has the great potential to improve the system of education, due to certain impediments, emerging economies are indeed a long way from reaping such advantages. The aim of this study is to have a coherent approach to worldwide issues pertaining to barriers encountered in the implementation of ICT in the classroom setting. The study-room assessment and documents evaluation make the study realistic, which were used as methodological approaches for building effective analysis and reaching reasonable conclusion. It is found that the

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analysis must assist to find factors affecting the decision of teachers to integrate ICT in teaching. Links to existing literature will be developed to explore various challenges to the implementation of ICT.

Keywords: implementation; student; teachers; ICT; education.

1. INTRODUCTION

The development of information and communication technology (ICT) has greatly reshaped the teaching process of higher education [1]. Nowadays, ICT is more important in education than ever, the strength and capability of ICT continue to grow, creating changes in the educational learning environment [2]. ICT creates a dominant education experience that can change the way students learning and teaching by allowing them to process information in a meaningful, self-directed, and productive manner[3]. Currently, ICT is regarded as a significant tool for promoting modern instructional approaches (teaching and learning) and it can be used to foster student teamwork, collaboration, problem-solving abilities, and lifelong learning [4],5]. Though information and communication technologies are very crucial to our daily work, due to certain obstacles, developing countries are far from benefiting from them [6].

Bangladesh is a developing country and its GDP growth rate is about 5.6%. Its ICT technology is similar to that of other developing countries [7]. Bangladesh has recently made great progress in introducing ICT into the public sector, although Bangladesh is a weak performer in the south based on the “2008 United Nations e-Government Readiness Survey” [8,9]. This global survey report ranked Bangladesh 142th out of 189 countries, with an index value of 0.2936 [10]. Although it may be lower compared to some other researched countries, it is a significant improvement compared to the 162 positions in the 2005 survey [9]. International Telecommunication Union developed the ICT Development Index (IDI) to measure the ICT progress of more than 150 countries around the world and compare the progress made between 2002 and 2007 and using this new benchmark tool, ITU ranked Bangladesh 138 with an IDI of 1.26 in its survey that shows Bangladesh is one of the lowest among all South Asian countries [10].

In the context of the aforementioned ICT situation, the political agenda of the new

democratically elected Bangladeshi government established in January 2009 is to digitize the country to accelerate the “Digital Bangladesh” to achieve the “Vision 2021” [8]. The Bangladeshi government emphasizes the implementation of information and communication technology in all sectors including education. Despite these attempts and programs, the successful use and distribution of ICT also have certain drawbacks. Poverty is the primary cause since it inhibits the free flow of information. Due to corrupt practices, the government either has no right to provide information or has no intention of providing information and “conflicts” may also impose restrictions on free access to information [11]. Before identifying the various barriers that prevent the effective application of ICT to education, we need to clarify the meaning of ICT in this article.

1.1 Study Objectives

The objective of this article is to discover a detailed review of using ICT comparing with international articles about the difficulties that teachers face while applying ICT in the classroom. It is capable to identify the aspects that affect teachers' assessments about whether to implement information and communication technologies in teaching. Connections will be built with current literature in order to investigate potential obstacles to the adoption of ICT in education in Bangladesh. Understanding the successful use of information technology in teaching, psychological and cognitive barriers may be an important prerequisite for increasing the application of computers as well as ICT and other technical means in the educational process [12]. We hope this article must be helpful to educators, policymakers and other actively interested decision-makers in the introduction of ICT into education in Bangladesh.

1.2 Literature Review

In the last two decades, the use of information and communication systems in education has been a major focus of ICT educational study [13]. The findings of two decades of research show that the use of information and communication technology (ICT) has a significant effect on

student performance [14,15]. According to Sanyal, ICT will help basic education in four ways (i) promoting school education; (ii) offering non-formal education for out-of-school children and adults (iii) supporting pre-service distance teacher education and on-the-job professional development and (iv) strengthening school administration [16] and he made a careful observation that "Placing computers in the classroom and writing lecture documents to show on the board instead of using chalks or markers and dusters does not create exciting new learning situations, but it is changing the atmosphere of the classroom and institutional culture" [16].

Ehrman identified four different aspects of quality education, which can be supported by ICT: learning by doing, real-time dialogue, delayed dialogue and targeted teaching that's why by implementing ICT, we could provide qualitative education and a qualitative environment for the learners [17]. ICT will increase efficiency in teaching and administration, which has a positive effect on education as a whole, and support deprived communities to build specific skills, all of which contribute to liberation and change [18].

The Dakar Programme of Action also emphasized the application of information and communication technologies to accomplish the aim of "Education for All," and it is proposed that using information and communication technology to afford the starting price advances the goal of education for all [19]. These innovations have an enormous capacity for sharing awareness, facilitating meaningful learning, and improving educational facilities.

Drent, M. and Meelissen, M. (2008) found that technology can be used to promote enlightening aims such as the ability to find and interpret content, as well as the ability to collaborate, interact, and solve problems, which are critical for children to be prepared for a knowledge society [13].

Margaret J. Cox conducted a study that examined factors related to the use of ICT in teaching [20]. The results show that teachers who are already ordinary users of ICT are confident in using ICT, believe that it is beneficial to personal work and teaching, and plan to further expand its use in the future. It was found that the most important factor for the teaching of these teachers is to make the courses more

interesting, relaxed, interesting, and diverse for them and their students, and to give students more motivation and fun. In addition, more personal factors include: improving the display of materials, allowing more personal use of computers, providing more power to school teachers, giving teachers more prestige, making teacher management more effective and providing professionalism Supporting the Internet, ICT has enhanced higher education in many ways [20].

It can effectively store/categorize information and provide new fast communication methods and also reduce the amount of information hazard by improving excellence and arrangement. ICT may be used to promote similar learning philosophies and incorporated into teaching techniques and this can be used to create new interactive learning media to improve the quality, fairness and access to higher education [21].

Computers also improve teaching and learning by offering tools for practice and study, as well as greater access to relevant papers and teaching and learning resources, according to researchers. Every teacher should use learning technology to enhance students' learning in various subjects in the classroom because it can enhance students' thinking level, decision-making power, and problem-solving way and reasoning behavior [22].

2. ICT IN EDUCATION MEANS

ICT regulates online networks, telecommunications facilities and services, information technology infrastructure and services, radio and television, libraries and documentation centres, and other relevant information and communication practices, as seen in a survey. It also acts as a private information provider, and web-based information services and other related information and communication activities [9]. The definition of ICT gave a more comprehensive and detailed description of the technical scope of ICT and it encompasses a wide range of computing instruments, from portable calculators to supercomputers [23]. Both monitor and projector systems used to screen machine output are included. It consists of both local and wide area networks that enable computers and people to connect with one another. Digital cameras, video games, CDs, DVDs, smartphones, cellular satellites, and optical fibers are among the items

used and computerized machines and computerized robots are also included. In short, the application of the term “information and communication technology” in education refers to computers, the internet, broadcasting technologies (radio and television) and telephone technologies, which not only promote the delivery of teaching content but also promote the development of the learning process itself.

These technologies are considered to be important tools for the realization of a new learner-centered education paradigm that better supports learner needs through differentiated and personalized teaching [24]. Digital technologies can promote learner-centric diversity by offering multimedia content, instant reviews, diagnosing student needs, providing appropriate remedial strategies, monitoring learning, and storing student job samples (such as portfolios) and other components [25,26]. In addition, international collaboration and networking in education and career growth may be facilitated by ICT. From video conferencing to multimedia delivery to websites, there are a variety of ICT options to choose from to meet the challenges facing teachers today. In fact, ICT will be able to provide today's teachers with more flexible and effective lifelong career development methods. Thus, the empowerment and advancement of both teachers and students would be of great value.

2.1 Obstacles to use of ICT in Education

Though the government in Bangladesh is committed to ICT in education, several obstacles that impede the process barriers are categorized as externally or internally, the first-line obstacles include insufficient equipment, unreliable equipment, insufficient technical support, and other resource-related problems, secondary barriers include both school-level factors (such as organizational culture) [27]. These external and internal barriers have a negative impact on the use of ICT in education and teacher-level factors such as belief in teaching and technology, and openness to change [28].

2.1.1 Inadequate resources and infrastructures

Bangladesh is a developing country lacking the means and adequate ICT facilities for schooling. Efficient use of ICT means that supplies, computer supply and adequate servicing are available (including other accessories). Much of

Bangladesh's rural areas have no electricity, so at first, a machine could not even operate it. The development of a country's information and communication technology infrastructure depends on a reliable power supply. Implementing ICT includes other tools not accessible in all educational institutions such as laptops, printers, video projectors, scanners, etc. The use of the latest hardware and software resources is a key feature of technology dissemination and high-speed Internet connection is another prerequisite for integrating ICT into the teaching environment but it is rarely seen in educational institutions [29]. Unfortunately, internet access is also very poor in rural areas in Bangladesh.

2.1.2 Insufficient funds

The efficient introduction of education technologies needs a great deal of financing, which is difficult to manage in developing countries like Bangladesh, where many people live below the international poverty line. ICT-supported hardware, software, internet, audio-visual aids, teaching aids and other accessories require a lot of money. Many scholars have found out that a shortage of funds to access the requisite hardware and software is one of the reasons why teachers do not use technology in the classroom, according to [14]. The effective use of technology depends on the availability of hardware and software and the fairness of resources by teachers, students and administrative staff [30]. These costs are in most cases exaggerated and cannot be provided by most developing countries, including Bangladesh.

2.1.3 Vision and plan

Many investors, educators, policymakers and business leaders in developed countries agree that ICT investment can expand computer usage in teaching and enhance educational attainments. Nevertheless, neither providing classroom computing resources nor offering its own technical degree would lead to promising educational progress [31,32]. The obstacles fall into two main categories: (i) government visions and plans, and (ii) school visions and plans.

The Bangladesh government emphasizes the implementation of ICT in education through the “Vision 2021” in order to improve the quality of the education system and create a better teaching environment to enhance and enhance

the capacity of teachers and students in Bangladesh. It is not about a hope for the successful application of ICT in education and it is also needed for good planning, strategy and enforcement, as well as surveillance for a nation like Bangladesh. The vision provides us with a starting point, an attainable goal, and a guide along the way, according to [33]. The school's ICT view, according to several scholars, is critical for successful ICT integration [34]. In Bangladesh, most educational institutions are far from applying ICT to the teaching environment. In addition, in large cities, there are few higher education institutions with ICT facilities, but they cannot be effectively integrated due to a lack of appropriate vision and plans. Information and communication technologies integration is therefore directly linked to school-level actions such as ICT plans, ICT funding and training, whereas most ICT educational institutions in Bangladesh lack the information and communication technologies required [35].

2.1.4 Political factors

The most significant obstacle to the use of ICT in education in developing countries seems to be the political will of the people in the power corridor and allocating sufficient funds for the education sector and information and communication technology does not seem to be very attractive to leaders [36]. It can be seen from the budget allocations of the third world countries that more allocations may be used for national defense forces rather than education. If political leaders prefer technology, it will flourish and India and Bangladesh are worth noting here. As a result, today, most schools (urban areas) are equipped with computers and can be well connected to the network. The slogan of the new Bangladesh government is "Digital Bangladesh". The Prime Minister hopes to build Bangladesh into a digital country with all sectors. Therefore, they are also trying to implement information technology in education. Unfortunately, if this political government is to be changed due to democratic elections in five years, then the "Vision 2021" may change due to the hostile attitude among the political parties in Bangladesh.

2.1.5 Social factors

Half the population of Bangladesh is female, who are comparatively unable to use technology and almost all ICT implementation work in

Bangladesh, women are underrepresented [36]. In Bangladesh, Malaysia and other developing countries, one of the most important social factors affecting the use of ICT is women's low social status [36]. Therefore, it is not important to provide education or use ICT to women. Women should be mainly responsible for the family and children. The proportion of males in academics, management and technology is disproportionate, depending on the nature of the job, making it easier for people to access the Internet and related technologies. Even if women have the hardware and computer software required, they can hardly use them because they're working at home. Participants from Pakistan, Bangladesh, Malaysia, and Sri Lanka participated in the conference and discussed the challenges and opportunities of ICT for women in distance education. In Bangladesh, people feel that language and a lack of training and the ability to use ICT efficiently are the principal barriers to the use of ICT. In Bangladesh, Bengali is the main language, while English is the main language on computers (software), the Internet and ICT-supported tools.

The emergence of English as the main second language in science, technology, business and interactive relationships, as well as education and training, will ensure the availability of knowledge products available globally [37]. In turn, this will also provide more opportunities for more education and training courses. But at present, language seems to be one of the main social barriers to the use of ICT in Bangladesh. English is not widely used in the country Wims and Lawler found that there is a lack of suitable development Software (DAS) is considered one of the difficulties faced by teachers and students [38]. The reason behind this may be due to the scarcity of Bengali software because most software programs are designed in English, which is the second language of the country.

2.1.6 Corruption

The situation in Bangladesh represents a clear example. Despite the vigilance of the control mechanism, corruption has found a very safe space to spread. Corruption is ubiquitous and has caused widespread condemnation at home and abroad [39]. As a result, Bangladesh has been ranked as one of the weakest countries in the research by Transparency International [19]. Mostly as consequence, one of the major impediments to the application of ICT in

education is corruption. Misuse of government funds that could have been used to develop other sectors, such as integrating ICT into education, is carried out in other directions, that is, few people benefit from these funds by using all funds in cash [16]. Due to government corruption, budgets for new technologies have been abused and reduced [40]. The acquisition of new teaching materials through a huge budget was possible, but only small changes were noticed for the whole field of technical and vocational formation in the final analysis.

2.1.7 Teachers' response to ICT use

It was found that the attitude of teachers is the main predictor of the use of new technologies in the teaching environment [37]. Teachers' beliefs about using ICT for teaching and learning are essential to integration [14]. In order to succeed in the use and integration of computers, teachers need to "transform their concepts to change the nature of learning, the role of students, and their beliefs as teachers [41]. Therefore, the successful use of ICT in the classroom largely depends on the attitude and beliefs of teachers. In reality, attitudes to computers have been suggested that affect computers used by teachers and their chance to take advantage of training [42]. Research has found that teachers with weaker technical capabilities who have a positive attitude towards ICT require less effort and encouragement to learn the skills needed to implement ICT in classroom design activities.

Therefore, teachers who have a positive attitude towards ICT itself will actively use it in the classroom [43]. Moreover, Harrison and Rainer found that participants with a negative attitude towards computers are less proficient in computer use than participants with a positive attitude towards computers, so they are less likely to accept and adopt technology [44]. They concluded that changing personal negative attitudes is essential to improve their computer skills. Therefore, if teachers want to use technology successfully in the classroom, they need to take a positive attitude towards the use of technology. This attitude will be formed when teachers are familiar enough with technology and understand the use of technology [30].

2.1.8 Insufficient knowledge and skills

The success of educational innovation largely depends on the skills and knowledge of teachers

[45]. Whether in developed or underdeveloped countries, the lack of knowledge and skills of teachers is one of the main obstacles to the use of ICT in education [45,46]. Integrating technology into the curriculum requires knowledge of the subject area, understanding of student learning styles, and certain technical expertise [47]. In addition, Teachers' belief in computer abilities is the biggest predictor of their use of computers in the classroom [48]. Thus, the lack of understanding of ICT use and the absence of ICT equipment and applications also restricts the use of ICT instruments in Bangladesh's teaching.

2.1.9 Inadequate time

There is a shortage of teachers in Bangladesh, a developing country, and they are already burdened with a heavy workload. Some institutions have introduced a two-shift system without increasing the number of classes. Therefore, since both classes are in class, the teacher's teaching burden increases. In addition, most teachers are also responsible for administrative work. In this case, teachers do not have time to design, develop and integrate technology into teaching [30]. These research reports point out that lack of time is one of the biggest obstacles to integrating ICT into the teaching environment. Teachers require time, time and time to work with other teachers and learn how to use hardware and apps.

Teachers also need time to build and integrate technologies into their curriculum. Some teachers cannot use technology correctly in their classes, others are unable to try because of fear, lack of confidence or lack of motivation [49]. In addition to the above factors, there are other factors that directly or indirectly affect the effective implementation of information and communication technology in education in Bangladesh. In this country administrative support is weak and lack of appropriate personnel training and quality training for teachers and school principle [27] but a qualified ICT coordinators will assist teachers to integrate ICT into classrooms and laboratories and create a good school culture [30].

3. METHODOLOGY

Lecture-room observation and documents evaluation are the two prime methods, which are the main basis of the study analysis and by

which the study reaches a reasonable conclusion and recommends some ways out of ICT improvements. The researchers conducted a formal study-room assessment to learn more about the practices of teachers who use ICT in teaching and learning. A planned observation has been used as it is a method of behavior lessons and of recording documents wherein the observer follows a set of specific laws. The rules instruct observers on what to watch for and how to keep track of actions. It was a non-participant observation, meaning the observer simply watched the class and did not participate in all of the events. Using pen and paper, the researcher studied the lecture room and took notes according to the observation guide. The researcher also noticed the institutional readiness for ICT, such as classroom infrastructures, teachers-learners participations and ICT laboratory. Moreover, documents evaluation, some social records which are made, exchanged and exercised socially has been used by the researchers because it is considered as a social science approach and an essential studies device, which is a useful part of maximum blueprint triangulation, the mixture of methodologies within the look at of the identical phenomenon.

4. RESULTS & DISCUSSION

The study states that certain restrictions mentioned in section two impede the successful application of IT in education in Bangladesh and proposes the following recommendations to improve the current situation: The Bangladeshi government, managerial staff, teachers, parents, students and the community have to make the ICT work effectively in education. In other words, all stakeholders and responsible departments, including teachers and other staff, should be aware of the importance of technology in the development of student learning, and should strive to overcome obstacles that hinder the use of technology in the classroom environment so that students can effectively benefit from ICT.

It is crucial to involve those involved in the outcome, including teachers, parents, students, and the community, and allow them to contribute their knowledge to help create vision, skills and positive attitudes [30]. Therefore, a clear ICT integration vision shared by all members of the school community can promote the effective use of ICT in the classroom. The lack of resources in

educational institutions is another major obstacle to the implementation of ICT in developing countries like Bangladesh. The lack of computers (including hardware and software) and other ICT-supported tools in classrooms may severely limit teachers' use of computers. Limited resources lead to a lack of computer integration, which leads to a lack of adequate computer experience for students and teachers [50-52]. Sufficient facilities and resources need to be provided to stakeholders and school authorities to effectively implement ICT.

Bangladesh's government has also taken some required measures to raise the number of girls attending school. As a result, initiatives and policies to encourage the adoption of ICT by women and girls should be produced and ICT cannot be implemented in education without women's proper empowerment. In preparing for ICT implementation, policymakers must take greater care to meet all industries (and even rural areas, women and people with disabilities) [36].

In order to create educational software systems that are suited for teachers and students who don't know English, local Software providers should be allowed to co-operate with teachers and include the Bangla language. In this regard, software designers and teachers should work together and critically observe a series of how teachers teach in the classroom, and how to better develop appropriate forms for teachers to support different skills and teaching methods that used for subject teaching [14].

5. CONCLUSION

In order to install computers in classrooms, teachers should consistently use computers for teaching activities to make them feel confident and comfortable. Teachers must understand the value of computers in education to benefit students and support meaningful learning [53]. Therefore, changing the teacher's negative attitude is essential to improve their computer skills. Therefore, if teachers want to use technology successfully in the classroom, they need to be positive about using technology. This approach would be shaped by the knowledge and awareness of technology by students. Schools should only promote the use of ICT, the practical approach is largely based on the personal feelings, qualifications, and behaviors of students. While teachers have the newest

technologies and network resources, they do not choose to use it in classrooms but teachers must be participated in the use of new technologies. ICT is a relatively new field in the education system of Bangladesh and it should be researched on the integration of ICT into the classroom environment how ICT can make their courses more interesting, relaxing and efficient. As the allocation to the ICT sector in Bangladesh has increased in recent years, the sector continues to see success, and in order to keep pace with this and the outside world, it needs to expand further in the field of education. Teachers and students need to be provided easy access to computer loans so that they can easily adapt to the ICT sector.

6. RECOMMENDATIONS

In addition, the effective implementation of information and communication technology in educational institutions in Bangladesh depends largely on teachers and principals, who need in-depth professional development due to lack of knowledge and skills. Before joining a regular class, it is necessary to be vigilant about in-service teacher training for teachers and principals and pre-service training for new teachers, so that they understand the important role of technology in the school environment and train them on how to adequately prepare and use ICT. The professional development of teachers is essential to enable them to effectively use technology to improve student learning. Based on the opinions of faculty and staff and the needs of the school, a staff development plan should be jointly created. It must prepare teachers to use technology effectively in teaching [30]. However, such training should not consist of only short workshops or training, which are not sufficient to build appropriate knowledge and skills. Regarding this argument, training should not be a once-and-for-all workshop, but a continuous experience so that the learner/teacher can grasp the ever-changing technology at any time [54]. In the teacher training program, teachers need to be given opportunities to practice the use of technology more practically so that they understand the ways of using technology to enhance classroom activities [55].

COMPETING INTERESTS

Author has declared that no competing interests exist.

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