READINESS AND CHALLENGES OF USING INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) IN HIGHER EDUCATION OF BANGLADESH

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ABSTRACT
Integration of ICT in Education especially in higher education is the demand of time at present as ICT is being used in many other sectors all over the world. Regarding this Government of Bangladesh is working for using ICT and implementing the Digital Bangladesh. This study was conducted to explore the use of ICT in Higher Education of Bangladesh both in academic and administrative sector. Data was collected by interviewing the teachers, questioning the staff, Focus Group Discussion (FGD) with the students and by observing the classrooms of universities and colleges. Data revealed that, each and every institution was facing the infrastructural problems in using ICT such as lack of ICT equipment, lack of manpower, lack of training and so on. Students were more interested about ICT integration in Education than the teachers and staff. Recommendations have been made based on the findings emerged from the collected data and analysis that ICT facilities need to provide in classroom for teaching-learning activities and ICT based service system should be developed and practiced in administrative and academic purposes. It was concluded that teachers remain crucial importance for continuing the improvement of quality education. Given this importance, the study then focused on ICT training on multimedia classroom management and professional development of the teachers and staff.
Keywords: Teaching Pedagogy, ICT for Higher Education, ICT development

INTRODUCTION

Education is an important factor for social and economic development, and higher education is a key area to maintain a country's competitiveness in the global economy. The demands of the 21st century pressurize higher education institutions to modernize their systems and practices. Within these developments, information and communications technology (ICT) brings a new set of challenges and pressures. There is a global trend in both educational policy and research to recognize the need to reform education from traditional paradigms of teaching and learning into more innovative forms of pedagogical practice. These areas of practice and change are often described with concepts such as information or knowledge society, emerging pedagogy and 21st-century skills (Ottestad, 2010). The demand for higher education has accelerated worldwide. Governments and universities are looking for innovative ways to increase access to higher education and improve the quality of their programs and courses. Regarding this, governments and education systems around the world take the use of Information and Communications Technologies (ICT) in university very seriously. Bangladesh, like many other countries, is investing heavily in the education system considering as one of the core strategies to alleviate poverty and facilitate development including raise the ICT skills of Bangladeshis and move towards the information society (Rahman, 2010). This is the evidence of giving importance on using ICTs in education and training to improve learning outcomes and to prepare young people for the contemporary information economy. Moreover, with the development of ICT and its use in education, the developed countries of the world change its university teaching learning and administrative activities to make it more effective. To compete with this new situation, we must introduce and use ICT properly in the existing teaching-learning process especially in the field of higher

education in Bangladesh. No doubt, in recent years ICT application appears in pedagogy and administration with such an influential means that it can progress the quality of higher education in Bangladesh.

Statement of the problem

It is supported by a good number of researches that use of ICT requires positively for quality higher education. Before ensuring the use of ICT, it is important to explore the existing facilities and the challenges to use ICT in higher education level. This includes exploring the existing infrastructure of ICT, capacity of teachers & staff on using ICT, availability of ICT facilities in the institutions and future challenges. Therefore, the study entitled *"Readiness of Information and Communications Technology (ICT) integration in Higher Education of Bangladesh"* attempts to explore the situation.

Objectives of the study

The major objective of this study was to explore the use of ICT in academic and administrative activities in higher education for quality education of Bangladesh. The major focus points were:

- to investigate the current status of availability of ICT in higher education of Bangladesh
- to explore the volume of using ICT in higher education academic and administrative activities
- to ascertain the necessary measures for improving ICT capacity in academic and administrative perspective in higher education level

Conceptual Framework

The study was proceeding based on the conceptual development regarding the main focus of the study. The conceptual framework of the study was in the following Figure 1 which was guided the study properly:

Figure 1: Conceptual development
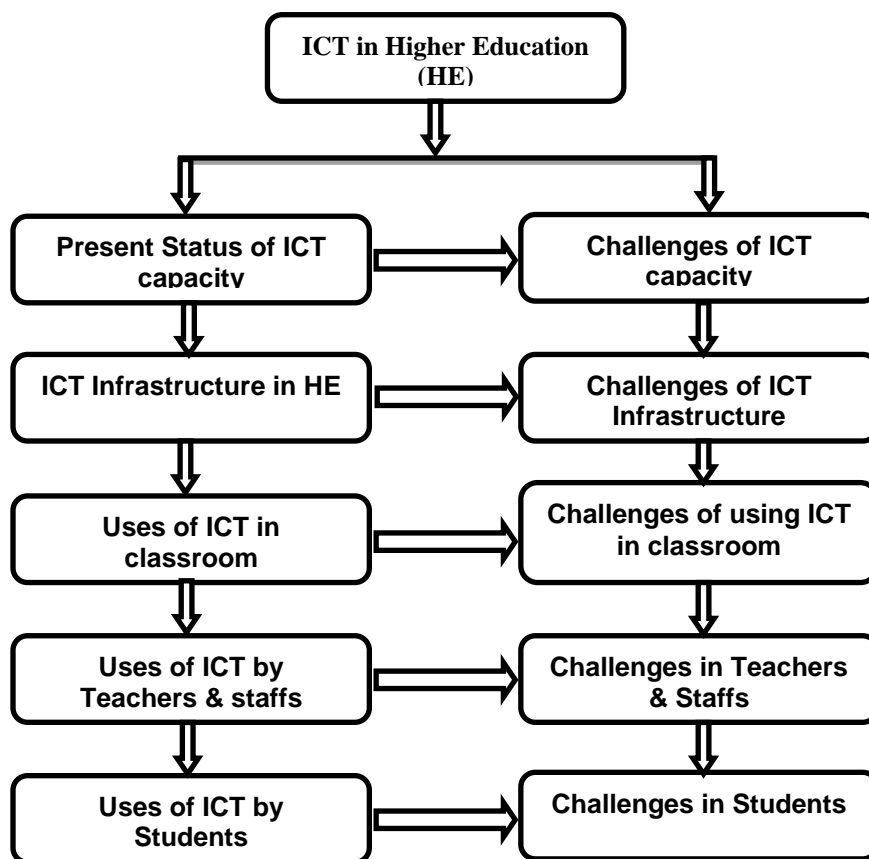
Methodology of the study

In this qualitative and empirical research, we conducted an intensive field study and, therefore, the information presented based on both primary and secondary sources of data. Primary data was collected through questionnaire, classroom observation, Focus Group Discussion (FGD) and semi-structure interview. Triangulation approach was employed to ensure the validity of data. Moreover, a special *emphasis* was given to

the participatory approaches in all aspects of primary data collection of the study. The researchers personally visited and collected data from field. The primary sources were the institution itself, teachers, students, staffs and classroom teaching learning activities of higher education institution. The prime method of data collection was mainly participatory field investigation. Questionnaire was distributed personally and collected from the informants. The semi-structure interview was conducted and recorded. Finally, the classroom observation was held on participation by the researchers. The different categories of respondents were selected for collecting primary data which were: University Teachers, administrative staffs, Classroom/teaching learning activities and Learners/Students. The secondary data was gathered through analysis of ICT documents, national and international agreements, research reports, seminar reports, articles and government documents. It was integrated methodological approach (combining both the qualitative and quantitative methods) to explore the study concern areas. There are two kinds of higher education providing institutions in Bangladesh e.g. a) Public University b) Government College under National University. The private university is also available in Bangladesh but the expenses/fees of this university are not payable by all citizens. Thus, the public university and the College under National University are considered as the core Higher education providers in Bangladesh. Therefore, this study focused on both Public University and College under National University for generalization of theme through collecting data. Thus, five (5) public universities (Autonomous University run by the different act of Government under coordination of University Grants Commission) and 5 post graduate government colleges (Government colleges run by the Ministry of Education under National University of Government of Bangladesh) were selected purposively as the sampled for this study. Moreover, these higher education institutions were selected with the geographic coverage of Bangladesh from 4 divisions namely Dhaka, Khulna, Rajshahi, and Chittagong. Two public universities and two Government Colleges had taken from Dhaka as there were some more public universities and Government colleges in Dhaka division than other divisions. Two teachers were identified from four designated post e.g. Professor, Associate Professor, Assistant Professor and Lecturer. The stratified sampling strategy was employed for teacher sampling. There were two strata; Strata-1: One of the teachers was selected who had 0 to >5 years teaching experience and Strata-2: One of the teachers who had more than 10 years teaching experience in the Department. Thus, both new in teaching and long experienced teachers were included in the study. One classroom /teaching-learning observation activity from each higher education institution had been selected purposively. Thus, a total of (10x1) =10 classroom teaching-learning activities had been observed for collecting data. Ten students were selected as sample conveniently from each institution. Those ten students were taken on availability and their interest. Those ten students were taken on availability and their interest.

The following Table-1 represented the sample:

Table-1: Sampling at a Glance

Category of Sample	*Higher Education Institution & Respondents*	*Number of respondents*
Teachers	10 x 2	20
Staffs	10 x 1	10
Students	10 x 10	100
Classroom/teaching learning observation	10 x 1	10
Total		140

Current status of ICT in Higher Education
Availability of Computers in Offices
Many reasons have been suggested for the failure of ICT to embed more completely in educational institutions. Pelgrum (2001) reports on an international survey of teachers' perceived obstacles to using ICT and identifies three major factors: lack of resources, lack of knowledge and skills and pedagogical difficulties to integrate technology in instruction. This study found that all of the universities in Bangladesh had computers more or less. For example, most of the universities (80%) had 1-10 computers whereas a few of the universities (15%) had 11-50 computers, and very few universities (5%) had more than 50 computers. But the numbers of computer in the colleges was different than the universities. Only half (50%) of the colleges had the computers though in most of the students were deprived of the facilities of those computers. However, the computers were poorly used for the class lesson teaching-learning. Surprisingly, in a substantial number of institutions, the computers were mainly used for office (100%), Head of the departments (100%) and other teachers for their personal works in colleges. It referred that the competence factor and teachers' confidence in their skills as a major factor that conditions teachers' willingness to integrate technology in their teaching is cited by other research (Williams et al. 1998; Mooij & Smeets 2001). Dawes (2001) identifies the critical importance of the following factors as perceived barriers in teachers' use of ICT: ownership of up-to-date technology; a sense of purpose for ICT use; adequate training; realistic time management; and inclusion in supportive communities of practice. Though, data revealed

that all public universities had computers in their offices though the purpose of use and range of the computers varies.
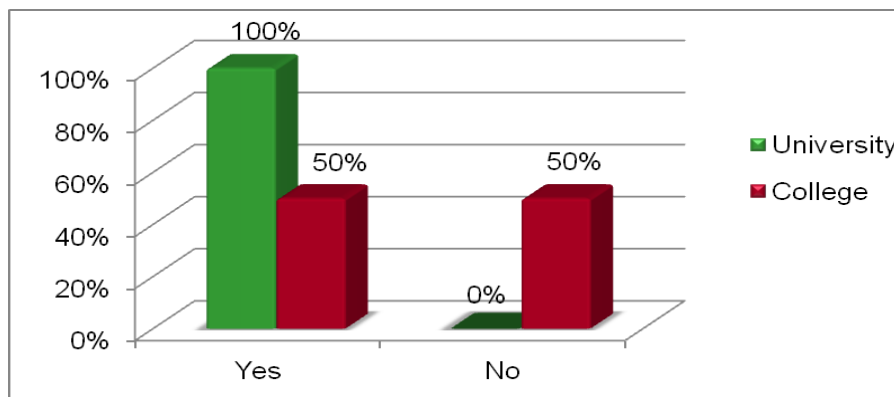

Figure 2: Current Status of Computers in the HE Institutes

Range of Computers in Department

Most of the public universities (70%) had 1-10 computers in the departments and institutes and rest of these departments of universities (20%) had more than 10 whereas only a few of the universities' (10%) institutes/departments had more than 50 computers. Specifically who had more than ten computers they had a computer lab in their departments/institutes. Some of the teachers claimed that they used their personal computer in the office. In the colleges, only a few (10%) had more than ten computers in their departments and obviously these departments had the computer laboratory. Recent research (e.g. Waite 2004) indicates that although teachers show great interest and motivation to learn about the potential of ICT, in practice, use of ICT is relatively low and it is focused on a narrow range of applications. Similarly, this study found lack of ICT infrastructure in higher education in Bangladesh.

Purpose of Computers use and keeping place

All universities had the computers but most often the students were not being benefited from available facilities. Because of, a few universities (30%) had computer laboratory for the students, and only a very few universities (10%) had computers in the classroom for teaching learning activities. This scenario was completely different for the colleges, only a very few colleges (10%) had computer laboratory for students though students reported that they could not get access to the computer laboratory, and they had no computers in the classroom. Most of the computers of all the universities were kept in the room of head of the departments (100%), head of the offices (100%) and teacher's own rooms (80%). Some university teachers reported that, sometimes they used their personal laptop in the teaching-learning activities. Whatsoever, international research suggests that ICT as a tool to promote learning is not generally well embedded in teachers' practice (Cox et al. 1999; Pedretti et al. 1999; Zhao & Cziko 2001) and that 'information technology in the classroom is used in an ineffective way and it has proven difficult to integrate within traditional curriculum settings' (Jules Van Belle & Soetaert 2001, p. 38) In the Scottish context, the evidence suggests a similar picture (Williams et al. 1998). Many teachers recognise a range of benefits for pupils and themselves in using ICT, but more often than not fail to integrate it in their teaching, continuing to 'teach ICT rather than teach with ICT'.

Integration of ICT Materials in the Class Lessons

Although around one-third (30%) of the teachers of universities stated that their universities had computers in the classrooms but during class lesson observation the researchers found only 10% had the computers in the class lesson. A few college teachers (10%) claimed that they had computers in the classroom whereas the researchers could not find any computers in the college class lessons. All university and college had electricity connection (100%), and only 20% of the university had an alternative power supply. All of the institutions (100%) both college and university had whiteboard whereas only 10% university had the computer, 30% university had the multimedia projector, and 10% had the internet connection. On the contrary, those facilities were unavailable in the colleges. Researchers could not find either Over Head Projector or smart board in any institutions. Researchers went to the renowned public universities and Colleges and found an unsatisfactory situation where as many universities and colleges were out of the consideration in rural or semi-urban areas. It has been suggested that using technology well in classrooms can even prepare students to be more effective citizens (John & Sutherland, 2004) in increasingly open and democratic societies. Research in West and Central Africa shows that, ICT for teaching and learning in university environments can contribute to developing a more student-centered approach to pedagogy (ROCARE, 2006). Teachers with pedagogical proficiency who are ready and willing to transmit knowledge and support students to construct knowledge will normally make a difference in

any learning process. In this age of ICT and its integration in the educational system, the role of the teacher, just like in the traditional classroom environment, should not be overlooked or underestimated (Boakye and Banini, 2008).

E-mail ID of the University and College Teachers
Available e-mail ID of the teachers of colleges and universities could refer that they possess a minimum ICT literacy, and it might claim of using technology in their professional and personal life. Data showed that around half (40%) of the college teachers did not have any e-mail ID, and a very few (5%) of the university teachers did not have the e-mail ID. Those who had e-mail ID, more than half of the teachers' of university (55%) and college (60%) had e-mail ID in other domain rather self domain (University 40% and college 0%). The self-domain e-mail ID proved the authorization of the teachers and staff; it is justified, trustable and permitted by the authority. This ID could enlarge the access of academic and professional activities throughout the world. However, the use of e-mail by the teachers reflects positive advancement of using technology in higher education. But the scenario was not satisfactory all over the country. The data reflected that most of the teachers (77%) had the e-mail ID (it varies from college to university) but this scenario was completely different among the staff. Only 10% staff in the universities and colleges had the email address. The volume of the using of ICT in higher education could be understood by this data. Data revealed that the use of ICT in academic purpose was quiet positive, but the administrative portion was not remarkable. More or less the teachers had the access to the internet but the staff could not get the opportunity of this service in the institutions.

Range of using Computer & Internet
Teachers used computer and internet for different purposes in the colleges (Government owned College run by the Ministry of Education under National University) and universities. Most of the teachers used the computer for printing documents and writing with MS word, and they used internet for browsing different web pages though the volume of using computer and internet varied from university to college. University teachers developed multimedia presentation whereas the college teachers did not do that though almost all the university teachers (80%) stated that they use MS-PowerPoint. The university teachers used to use YouTube, MS-Excel more than the college teachers. Surprisingly, more than half of the (60%) university teachers used Face book whereas a few portion of college teachers (20%) used to use Face book. Qualitative data further exposed that most of the university teachers used the computer for their personal purposes rather than the students' learning. However, research on ICT in education reveals that although teachers are gradually starting to integrate ICT into their teaching strategies, significant differences are observed in the way ICT is integrated in the classroom (e.g. Tondeur *et al*. 2008). Some teachers are intrinsically motivated to use ICT in educational practice, while others do not share this affinity. It has been suggested that using technology well in classrooms can even prepare students to be more effective citizens (John & Sutherland, 2004) in increasingly open and democratic societies.

Multimedia Presentation in Class lessons
Figure 3 presented that less than half of the university teachers (40%) perceived that they used the multimedia presentation in the classroom but the students claimed different from the teachers. The students stated that 20% teachers used the multimedia presentation in the teaching-learning whereas the researchers found only 15% classroom. Surprisingly, this scenario was different in the colleges (Government owned College run by the Ministry of Education under National University). Only 10% teachers replied that they used to use the multimedia presentation in the classroom, but the students and researchers could not find any. It might because of the ICT infrastructural limitation of Government Colleges. On the other hand, the skill of digital content development and pedagogical knowledge of the college teachers were not sufficient. In the Scottish context, the evidence suggests a similar picture (Williams et al. 1998). Many teachers recognise a range of benefits for pupils and themselves in using ICT, but more often than not fail to integrate it in their teaching, continuing to 'teach ICT rather than teach with ICT'. In primary schools, teachers tend to use ICT to support classroom practice, while university teachers use it more for professional development and personal use rather than for teaching. The same study showed that teachers who use a computer at home tend to use it more in classrooms and administration.

Challenges of Using Information and Communications Technology (ICT)
Usual constraints
Using ICT in the college and university was facing challenges in different ways. All the institutions faced the problems with lack of infrastructural development. The second challenge was the lack of training of teachers and staffs. Whatsoever half of the institutions did not have the access to ICT and half of the teachers and staffs stated lack of interest as another challenge. Teachers' skill and students' access were two more challenges for integrating ICT in higher education. Use of ICT in higher education was very much important, but there were so many barriers reflected through this data what need to be overcome.
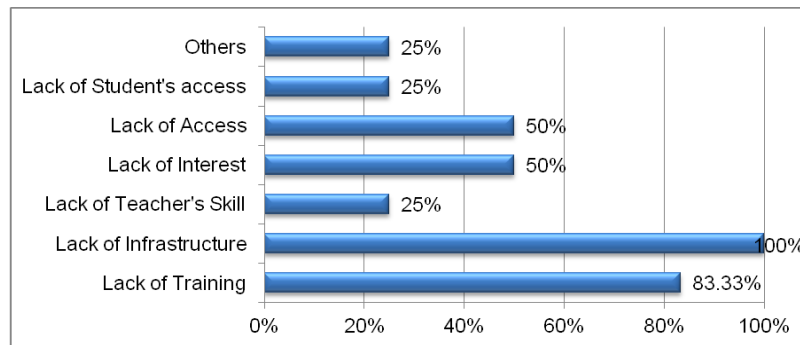
Figure 4: Challenges of Using ICT

ICT Related Teacher Training

University teachers were privileged than the college teachers in most of the cases. But interestingly university teachers were back footed in terms of teacher training than the college teachers. Half of the college teachers (50%) got ICT training whereas only one-fourth of the university teachers (25%) got this kind of training. Most of the aged teachers did not feel comfort with ICT so the situation might be lag behind. Cox et al. (1999) talk about a 'technology acceptance model', explaining the interplay between external factors and perceived usefulness and ease of use as conditioning the use of ICT. Teachers were reported to include mainly external factors (training, time to explore software, new computers, appropriate software) when discussing their progress with using ICT for literacy activities (Waite 2004). In the same study, almost 75% of the teachers considered that when using computers and the Internet, they had to change the ways in which they planned their teaching. This may suggest another factor that may act as a barrier in using ICT in classrooms, as teachers may require extra time to prepare a class.

ICT Training: Teacher and Staff

Data revealed that college teachers got ICT training (50%) that was more than the university teachers (25%) whereas the university staff received ICT training more (20%) in some extent than the college staff (10%). The teachers of the college explained that Government organized the ICT training for the teachers not for the staff; they had to get the training through individual initiatives. That explanation was also applicable for the University. All the staff replied that they had to get the training by individual initiative, and the university teachers did not feel interested in the ICT training for them.
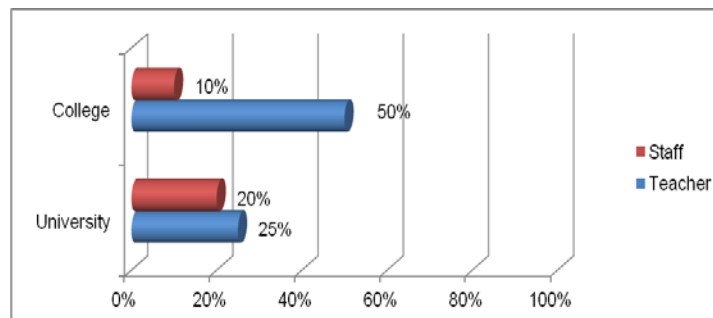

Figure 5: Status of ICT Training: Teachers and Staff

Volume of using ICT in Higher Education

All the teachers replied that they used computer in some extent in their professional lives. But data revealed that all the universities and colleges (100%) used computers always regularly for office works whereas only 50% university teachers used computer in teaching-learning process but college teachers did any. Surprisingly, these teachers used computer in their personal work in more extent (100% university teachers and 50% college teachers).
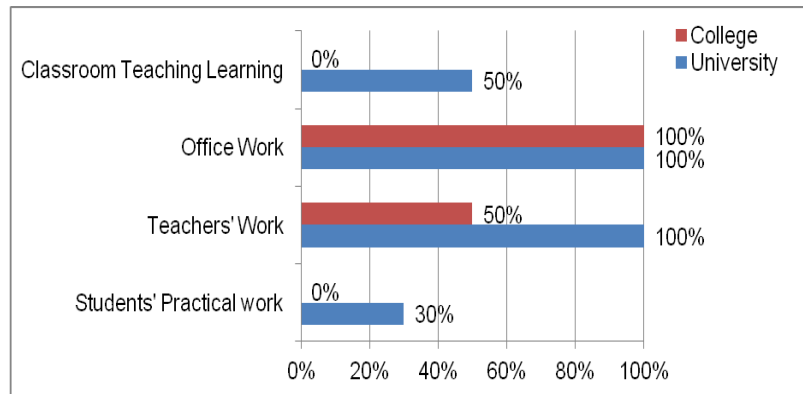
Figure 6: Uses of Computer

The practicality ethic may be strengthened, and teachers thus motivated to use ICT, when there exists a supportive community of users among practitioners who can learn collaboratively by exchanging ideas either in face-to-face discussions or in online communities, through emails, discussions, and online staff boards, etc. (Preston 1999; Leask &Younie 2001). Niederhauser and Stoddart (2001) differentiate between two main types of educational computer use: 'skill based transmission use' and 'open-ended constructivist use'. 'Skill-based computer use' aims at enhancing pupils' basic knowledge and skills by supporting drill and practice exercises and embraces two subtypes of traditional software: 'drill and practice' and 'keyboarding'. 'Open-ended computer use' presents computers as a tool for helping learners to construct their own knowledge.

Major Findings of the study
Present status of the use of ICT in Higher Education
Data revealed that every university and college had computers available for various purposes. Along with this, every university office had computers available whereas only half of the college office had the computers available. Most of the institutions were maintaining a range of 1-10 computers and more than ten computers in a very few of the institutions for their academic purposes. The computers were mainly placed in the computer laboratory where there were more than ten computers. Apart from that, there were some other places where computers were also placed such as a room of the head of the department, Teacher's room, Teachers' personal room, Office room, etc.

The computers were mainly used by the teachers in the universities whereas the computers were mainly used by the office staffs in the colleges. The other uses of computer could be described like by computer teachers, for students practical and classroom teaching-learning process. In the case of teachers' use, computers were used for their personal use only. It was also found in some extent that all the university teachers had the opportunity to use the computer. But in case of college teachers it was found that they only got the chance to use the computer in the laboratory, or they used their computer. Surprisingly, the study revealed that the majority of the teachers did not use the computer for classroom teaching-learning process. But in some cases teachers used computers for classroom teaching. It was found that various ICT facilities were available in the university classroom, but most of these ICT facilities were not found in the college classroom. The available facilities were mainly Whiteboard/Blackboard, Electricity, Computer, Alternative electricity and Internet facility. There were also some facilities available but in very few cases such as Over hade projector, Multimedia and Electric indicator, etc. These facilities mainly used by the teachers but sometimes students could also use those facilities though it was not found during classroom observation by the researchers. It was remarkable that almost all the teachers could use the computer. Among the classes observed, availability of electricity was found in all classes, white board/black board was found most of the classes, Multimedia, and overhead projector was found in few classes. It was noticeable that there was no internet connection in any classrooms that were observed.

The study showed that in most of the higher education institutions had computers and other ICT equipment available but they did not use it properly. Teachers used computers and other ICT related materials for their purposes and office staffs were doing their few official work.

Challenges of using ICT in class lessons
The study revealed the challenges of using ICT in classroom experienced by the teachers, office staffs, and students. Different types of challenges were identified for both the teachers and the students in using ICT in the classroom and the staffs in their administrative works. Some challenges were administrative, and some were from teachers and students.

The study explored that the problems of using ICT in the classroom were different in types. The problems were the lack of training, lack of ICT infrastructure, lack of teacher's skill, lack of teacher's interest and lack of interest of the authority etc. mentioned by teachers, staffs and students. On the other hand, teachers blamed others that they got enough motivation but not enough help from the others in using ICT.

The study also revealed that students' access to ICT equipment was limited to the computer laboratory only and a few universities had provided the Wi-Fi facility for the students. Students mainly faced problems such as barriers from the teachers, lack of enough computer, scorn from teachers, physical punishment from teachers, not having computer teacher for computer room, lack of teachers' interest and authority, lack of infrastructure, problems create by authority, large number of students, lack of teachers' training and skill and irresponsibility of the teachers etc.

Other Important Findings

- Data disclosed that most of the university teachers use computer in any purposes and the college teacher has the limited scope to do so. Most of them buy computers personally.
- All the department and office had computers more or less in all Universities and Colleges and computers were placed in head of the department and offices mainly. Along with this, the version/quality of available computers was very old version and there was no servicing opportunity institutionally. One of the teachers commented, *'We have computers in our office but most of them are half dead' (JUT1).*
- Teachers & Staffs used computer mainly for office work and often in classroom activities. Though all classrooms have white Board and Electricity rather than other ICT equipment e.g. Multimedia projector, Computers, Internet Connection etc.
- College teachers received ICT training more than University teachers. It was rare in case of staffs. One of the aged administrative officer claimed, *'Here more facilities for teachers so we have very limited scope for ICT training.'(RUIO2)*
- All the University and college have online based admission system no other activities. One of the students claimed, *'Now a days every administrative and academic activities (e.g. registration, transcript, certificate, classroom teaching etc.) should be ICT based in HE in lieu of traditional pen and paper based.'* (DUSFF3)
- Data revealed that ICT infrastructure was very weak in the classroom of HE institutions.

Necessary measures for improving ICT capacity of teachers and staffs

The study explored that both the teachers and the staffs suggested some necessary measures for improving ICT capacity. The suggestions include institutional infrastructure development, ICT training for teachers and staffs. The motivation of the teachers and staffs to the uses of ICT in academic and administrative activities was also included in their suggestions.

The suggestions were at least one computer in every classroom, one computer laboratory in each department for the students, internet connectivity and Wi-Fi zone in the campus, online service system for the students, ICT-based administration, awareness of the authority and staffs, having more computers in the computer laboratory, use projector for teaching learning in classroom, arrange teachers' training, creating multimedia classroom, e-learning materials, access to the e-library in the institutions' library, ensuring ICT facility by curriculum, making sure about ICT facility, improving ICT facilities, make opportunity for students to use smart board by authority, use of overhead projector, alternative electricity in classroom, opportunity for teachers and students to use ICT, government's support by providing reward for ICT skill, supplying computer in reasonable price for the teachers, encouraging students about computer studies in classroom, creating post for ICT based teachers, developing GO monitoring system, by developing infrastructure of classroom and laboratory and arranging internet facility etc.

In summary, there seem to be four major issues identified by research for introducing technology in higher education practices in Bangladesh. These are:

- *Beliefs:* personal ideas about the contribution that technology can make to the processes of teaching and learning and classroom management;

- *Experience:* own training and ICT skills, abilities to control ICT use in the classroom and cope with technical failure;

- *Resources:* available technologies in schools and ownership of own computer at home;

- *Community:* membership to a network of colleagues who can provide support, encourage use and constitute a learning community.

Recommendations

The following recommendations have been made based on the findings emerged from the collected data and analysis:

- ICT facilities need to provide in classroom for teaching learning activities including PC, laptop, internet, multimedia projector, sound system, digital content etc.
- ICT based service system should be developed and practiced in administrative and academic purposes in the higher educational institutions.
- ICT training on multimedia classroom management needs to ensure for the teachers.
- Computer based training should be provided to the staffs for efficient administrative activities.
- National central e-library needs to develop under UGC for the HE students and teachers.
- ICT infrastructure might develop strongly in every higher educational institutions including provide sufficient computer for teachers every university and college, internet facilities, provide computers in classroom so that every classroom have at least one computer, multimedia projector and develop alternative power supply for teaching learning activities.
- Government can supply computer in reasonable price for the institutions and for teachers and students.

CONCLUSION

The modern world is changing rapidly with the help of technology that is obvious and expected to all. Along with this, changes in education system happened tremendously from last few decades. Developed countries have accepted technology as tools for their furthermore development in each and every sector, but the developing countries are hesitating whether they will use it for changing the future or they will stay at the comfort zone. It is already proved by the research works that ICT can be used for positive change and for ensuring joyful learning. Integration of ICT in the education makes learning of the students visible and sustainable. ICT helps people to get world class education whenever and wherever they are. Like many other countries Bangladesh understands the emergence of using ICT for development and starts integrating with all aspects of development. Bangladesh government made ICT policy for the better use of it and it's a part of Digital Bangladesh: Vision 2021. Though the primary education sector and secondary education sector are getting the ICT facilities from the government but the higher education sector is still not getting the proper attention of the authority. To survive in this competitive world, universities are trying to cope up with ICT but the colleges are suffering still. In this 21st century, proper attention and care are needed in this level of education. Otherwise, the total education sector will suffer in the long run.

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