Government of the People's Republic of Bangladesh
Ministry of Education
Secondary and Higher Education Division

Study on

"Effectiveness of Teacher's ICT Training of BANBEIS in Conducting online classes at Secondary Level of Education in Bangladesh"

Bangladesh Bureau of Educational Information and Statistics
(BANBEIS)

Effectiveness of Teacher's ICT Training of BANBEIS in conducting online classes at Secondary Level of Education in Bangladesh

July 2021

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LIST OF CONTENT

Contents

ABBREVIATION

A2I   : Access to Information

ADB   : Asian Development Bank

AUSEO   : Assistant Upazila Secondary Education Officer

BANBEIS   : Bangladesh Bureau of Educational Information and Statistics

CAI   : Computer Assisted Instruction

COVID-19   : Infectious disease caused by the most recently discovered
                          coronavirus *('CO' stands for corona; 'VI' for virus; '19' the year
                          in which it appeared)*

DCI   : Data Collection Instruments

DEO   : District Education Officer

FGD   : Focus Group Discussion

GOB   : Government of Bangladesh

ICT   : Information Communication Technology

KEDCF   : Korea Economic Development Cooperation Fund

KII   : Key Informant Interview

LQA   : Lot Quality Assurance

LQAS   : Lot Quality Assurance System

PSU   : primary sample units

QCO   : Quality Control Officer

TQI-SEP   : Teaching Quality Improvement in Secondary Education Project

UNESCO   : United Nations Educational Scientific and Cultural Organization

USEO   : Upazila Secondary Education Officer

ACKNOWLEDGMENTS

EXECUTIVE SUMMARY

Bangladesh Bureau of Educational Information and Statistics(BANBEIS) has turned itself from data collection and information management to a dynamic role of sponsoring both quantitative and qualitative researches, studies, various trainings for teachers capacity development, school improvement, examinations, evaluations and other related fields in general, technical, vocational and Madrasa education. Under that broader arena the present study on "Effectiveness of Teacher's ICT Training of BANBEIS in conducting online classes at Secondary Level Education in Bangladesh" has been sponsored.

The objectives and purpose of the study are to explore the effectiveness of the teachers' ICT Training of BANBEIS in conducting online classes at the secondary level of education in Bangladesh. The main purpose is to explore and assess the reflection of key learning skills of the participants (teachers) of these training programs in actual classroom practices both during and after the COVID-19 situations. Also to know how ICT is being used in learning assessment and to determine what needs to be done to ensure effective ICT system in education as a whole.

The scope of the study covered 384 different types of secondary level educational institutions and a sample of teachers of 08 Divisions who received training on ICT. The methodology was mixed but mainly qualitative. Information has been collected from headmasters, subject teachers, students, representatives of the education administration, members of the school management committee, and parents in different methods, i.e. In-depth interviews, KII, FGD etc. Some data was collected online in addition to direct data collection, but separate tools were set up for data collection in each method.

The main findings are: relatively young teachers have received training at a higher rate, which is a positive in terms of making the training purposeful. This study reveals that 100% of the secondary educational institute have ICT devices, notwithstanding these are not sufficient to conduct regular classes in all classrooms. Besides, among the existing ICT devices in the school, 72% of devices have been found functional, while, only 15% were out of order/non-functional, and 13% of devices are not in use after the purchase/installation. However, a positive aspect is that sometimes personal ICT devices of teachers' are used in teaching at the institutions.

Devices other than Smart Phones and Mobile data are owned by the institution but they have been purchased/collected from external sources/funds besides institutions' own funds/source. These have been obtained from the LGSP and ADP funds of the local government in addition to the assistance of various projects of the Department of Education, and the A2I project.

There are 25 key skills were in BANBEIS's ICT training. 89.56% of the teachers have acquired the skills that were prescribed in BANBEIS's ICT training fully. 10.44% of the trained teachers have achieved less than the target. This study identifies the reasons that those who did not have access to ICT before training are lagging behind in acquiring skills. On the other hand, those who have acquired all the skills were already accustomed to ICT.

Conduction of digital classes/sessions has started in 27.25% of the educational institutions. Various government initiatives such as setting up school-based ICT labs, providing ICT devices, launching teacher-window (Shikkhok Batayon) web portals, rewarding teachers for creating the best content, etc. have brought about ground breaking changes in digital classrooms management.

This study discovers that no institution has been able to ensure live online learning sessions. However, lesson-wise videos of class conduction have been uploaded on specific websites of the institutes' and notices have been made among the students in 60% of the institutions.

The number of ICT-based classes has increased during COVID period. Online sessions during the COVID situations are being conducted in 60% of the educational institutions, which was only 27.25% at normal times. On the other hand, the deviation of the frequency of subject-wise sessions has decreased. Each of the nine subjects studied in total has been prioritized at almost the same level. However, Mathematics, Chemistry, and Physics have got slightly higher priority than other subjects.

The irony is that although the average number of online classes increased during the COVID period, the picture is different in rural and urban areas. Areas outside the city that were included in the study saw a decrease in the number of online classes.

No institution in the research area has assessed the learning of students through ICT. Especially during the COVID period, no assessment was made. However, ICT devices have been used in various ways to assess the learning of students before the COVID situation (in a normal situation).

In a country like Bangladesh, inadequacy of devices in the secondary level institutions are very much expected. Regarding disinterest of the students in ICT use in classroom teaching-learning, teachers reported that their Institutions have the highest number of students who have no interest in ICT usages.

In light of the findings, some recommendations have been made in this study, such as:

All the teachers of the secondary schools should have ICT Training. The focuses of ICT Training might be given to teacher's basic ICT skills and their application in classrooms irrespective of subjects. An increase in awareness at the Institutional level needs to be ensured. Authorities-Heads of the Institutions, local Education Officials, SMC members, Parents/guardians about using ICT in the classroom should be made aware and sensitized about the benefits and needs of ICT-based online classes for ensuring quality education during this pandemic situation.

Finally, this study suggests that more extensive research is needed on all these issues. In particular, it is important to do research on the introduction of online-based assessment systems. If this can be ensured, it will be possible to build an effective education system for children, especially during special disasters, or reaching out to children.

CHAPTER: ONE
Introduction and background

1.1. Introduction

As in many other developing countries, the core issue for education policymakers in Bangladesh has been to increase access and retention to education and boost educational attainment rates. Tremendous progress has been made in these areas over the past decades. The net enrollment ratio in elementary education, for instance, now stands at more than 90 percent compared with 60 percent in the mid-1980s (as per UNESCO data). The adult literacy rate, likewise, surged from 35 percent in 1991 to 73 percent in 2017. To further increase participation and improve learning outcomes, the Bangladeshi government in 2010 adopted an ambitious new National Education Policy that introduced one year of compulsory preschool education and extended the length of compulsory education from grade five(V) to grade eight (VIII). Other changes include the introduction of a common elementary core curriculum and national examinations at the end of grades five (V) and eight (VIII).

However, while the government has recently built thousands of schools, notably in remote rural areas, and supplied considerable available ICT devices into improving education, implementation of many of the reforms remains a work in progress hampered by funding problems and inadequate school infrastructure. Many classrooms are overcrowded, and teachers are often poorly prepared. Dropout rates are high with nearly 20 percent of pupils not completing elementary school in 2016. At the lower-secondary level, the dropout rate stood at 38 percent in 2017 with fully 42 percent of girls leaving school before completing grade Ten(10) (BANBEIS), due to factors like poverty and child marriage. Teacher-to-student ratios, meanwhile, remain well above the official target ratio of 30:1 (42:1 in secondary schools in 2016).

However, the introduction of ICT has added another milestone in the field of education in Bangladesh. The Ministry of Education plays a significant role in pursuing this transformation and achieving the vision of building a Digital Bangladesh by 2021. Leveraging Information and Communication Technologies (ICT) to achieve this transformation by enhancing the quality of education and by making learning more relevant and more accessible through technology, the Ministry of Education formulated the Master Plan for ICT in Education in Bangladesh (2012-2021) in 2012 with support from UNESCO and in cooperation with concerned officials from the Ministry of Primary and Mass Education (MoPME), all

educational Programs of SDGs and other relevant agencies. The comprehensive review of the Master Plan for ICT in Education (2012-2021) in 2018 was an important initiative to review progress in the implementation of the Master Plan and to make adjustments where necessary ensuring that learners of all ages and socio-economic statuses are not only a part but are enabled to actively contribute to Bangladesh becoming a knowledge society. The review further ensured that the Master Plan is aligned with and contributes to the achievement of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals *(Progress Review Report 2019, Master Plan for ICT in Education in Bangladesh, 2012-2021).*

Bangladesh Bureau of Educational Information and Statistics (BANBEIS) is the only government organization responsible for the collection, compilation, and dissemination of educational information and statistics. From the beginning, this institution successfully contributing to different multidisciplinary development in the education sector through preparing and providing necessary information and statistics. BANBEIS is using modernized ICT to initiate and establish an educational database program for documentation and provide WiFi/ internet/on-line facilities to authentic educational information which is playing a major role to initiate different projects/programs. In the education sector different International organizations, Development partners particularly engaged in the activities of education & culture are fully dependent on statistics & information produced by the Bureau. This Bureau is playing an important role by conducting a computer Training course for the teachers, officials, and staffs of govt. and non-govt. organizations and implementing ICT initiatives of the government.

In fact, the government has taken some initiatives to use ICT in Education. For example, the government published 61 million results of public exams over the internet, 37.4 million over SMS in 2012, and 63 million results of public exams over the internet, 38 million over SMS in 2013. Moreover, last year 2.7 million admission applications were received through SMS. On the other hand, the government introduced Multimedia Classroom at 503 secondary schools in 2012 and 20500 secondary schools in 2013 to ensure ICT in classrooms (BANBEIS). Furthermore, the government arranged ICT Training for secondary school teachers through the A2I project, TQI project, and other projects.

Access to Information (A2I)

This project is organizing a Twelve (12) days of ICT Training program for secondary school teachers. This Training program will try to develop the ICT teaching-learning process in the classroom, increase the ICT usability of secondary teachers and develop the ICT skills of the teachers'. The Training is being conducted following the participatory method. The main objective of this program is to find out "How to develop digital content and how it will be applied in the secondary classroom." The major area of contents is the use of MS work, use of MS PowerPoint, Internet browsing, Picture download and use in PowerPoint, Video cutting, clipping, Joining and convert, use of the multimedia projector, use of Shikkok Batayon, necessary software downloading and installing, etc.

TQI-SEP

The Teaching Quality Improvement (TQI) II in Secondary Education Project provides mainly subject-based and Continous Professional Development (CPD) Training for secondary teachers. Furthermore, in 2014, this project introduces similar Training programs of A2I with its regular Training. The ICT capacity of teachers and their ability to prepare digital content for improving teaching quality are emphasized along with other aspects in the Training programs. A series of Training programs have been arranged already and also going on across the country through the Teachers' Training Colleges.

Tec e j g t d Training of BANBEIS

BANBEIS is implementing the 'Establishment of Upazila ICT Training and Resource Centre for Education (UITRCE)' program in selected 125 Upazila of Bangladesh by the Soft Loan (0.01 % interest) from Korea Economic Development Cooperation Fund (EDCF) through Korea Exim Bank, repayment in 40 years (15 years grace period) and GOB Grant.

Through this program, teachers of primary, secondary, and higher secondary level institutions will be modeled in ICT within a short span of time through the Upazila ICT Training & Resource Centre for enhancing IT literacy of the teachers' community and ICT education of the students will be harmonized at the grass-root level. More specifically—

- ‹ ICT based education and learning process will be extended and implemented;

- ‹ Internet access of teachers and citizens at the local level will be available through the Upazila resource center;

- ‹ Databases of BANBEIS will be updated regularly through the Upazila data management center;

- ‹ To establish Digital Bangladesh of the Government, access to information of the citizens at the grassroots level will be ensured.

Basically, these three notable initiatives continue to play a pivotal role in the ICT-based online teaching-learning for secondary level teachers in Bangladesh.

Teaching-learning during Covid-19 in Bangladesh

The COVID-19 pandemic in Bangladesh is part of the worldwide pandemic of coronavirus disease caused by severe acute respiratory syndrome coronavirus. The virus was confirmed to have spread to Bangladesh in March 2020. The first three known cases were reported on 8 March 2020 by the country's epidemiology Institute, IEDCR.

On March 16, 2020, the Government of Bangladesh declared closures of all academic institutions, dormitories, and coaching centers as well, considering the devastating spread of the coronavirus. With the growing public concern, the closure period got extended from time to time, and till now it is continuing. According to different sources, ICT devices are available to around 30 million students in all categories of institutions and close to a million teachers as well as education personnel in Bangladesh. The government also argued the public to confine themselves in homes by maintaining social distancing. These prolonged closures are not only affecting the academic career of these students, but it is also hampering their mental health as well.

Considering the reality, On April 30, 2020, the government asked the public and private universities to continue their curriculum through online classes and start their academic activities online. At the same time, arrangements are made for delivering curriculum-based teaching-learning through television and radio for secondary and primary students. In addition to television and radio-based learning, teachers at the secondary level are instructed by the Department of Secondary and Higher Secondary Education (DHSE) to take online sessions. Since then, secondary school teachers across the country have been conducting online teaching and learning program.

1.2. Background of the study

The Bangladesh Bureau of Educational Information and Statistics (BANBAIS) is an attached department of the Ministry of Education and is mainly responsible for providing educational information and statistics for planning, management, and decision-making process in the education sector. BANBEIS is now focusing on the qualitative survey and socioeconomic research in addition to regular quantitative survey activities. Government allocates a budget for research in each fiscal year. The proposed research were conducted under this budget. The areas of the study/research assignment covered whole Bangladesh.

1.3. Scope of the study

According to the agreement signed between BANBEIS and Samahar Consultants Ltd., the study (Research Assignment) is being conducted covering 384 different types of secondary institutions covering different 08 divisions of Bangladesh. The scope of the study and tasks are given below:

- š Study team mobilization and review of secondary data;
- š Kick-off meeting with BANBEIS;
- š Develop inception report including detailed work plan, methodology, sample size, and data collection tools;
- š Arrange a workshop and share the inception report and data collection tools with BANBEIS;
- š Finalize data collection tools incorporating comments from meeting and submit to BANBEIS for approval;
- š Recruit data collectors;
- š Develop a Training schedule and share it with BANBEIS;
- š Impart Training to data collectors;
- š Conduct field test for questionnaire validation and submit the outcome of field test for review;
- š Finalize data collection instruments incorporating feedback from field test and submit to BANBEIS for approval;
- š Conduct interpersonal interviews with Students and Teachers;
- š Conduct FGDs (Focus Group Discussions) with teachers, students, and guardians;
- š Conduct in-depth interviews with teachers (who are involved in ICT based

teaching-learning) and program personnel;

- š Oversee all data collection including piloting, supervision, and spot-checking;
- š Recruit coders and data entry operators and oversee coding, data entry, and data entry quality;
- š Analyze data;
- š Develop draft report;
- š Arrange a workshop to present a draft report for comments and suggestions;
- š Finalize the report incorporating comments/observations of the participants of the workshop;
- š Submit final report to the Director, BANBEIS.

1.4. Objectives and Purposes of the Study

The aim of the study was to explore the effectiveness of the teachers' ICT Training of BANBEIS in conducting online classes at the secondary level of education in Bangladesh. The main purpose was to explore and assess the reflection of key learning skills of the participants (teachers) of these Training programs in actual classroom practices both during and after the COVID- 19 situation. The objectives are as follows:

I. To identify the key learning skills intended to deliver through ICT Training of BANBEIS:

II. To determine the reflection of these acquired skills in conducting the online classes at the secondary level in normal as well as COVID-19 situations:

III. To determine the reflection of these skills in assessing student's learning at the secondary level; and

IV. To identify the challenges/limitations in using these skills in online classroom teaching and students learning assessment at the secondary level.

1.5. Study Area

This study is being conducted covering 384 institutions from 16 Upazilas under 16 districts of different 08 divisions of Bangladesh. The administrative location of this study/Research assignment is indicated in Figure -1 below:

Figure-1: Sample Division of the Study.

The sample institutions has been chosen considering plain land, coastal area, Barind area and hill areas. However, the sample districts and upazilas had been finalized during preparatory phase (Inception Report period) in consultation with BANBEIS.

Review of Literature

This literature is focusing on that contains the processes of the extent of ICT that has been followed by GOB to make an effective ICT integration in Bangladesh's education sector. The literature has been narrowed down from global aspects to a more country-specific context while maintaining a focus on ICT implementation in education. It has tried to give an idea about the process of ICT implementation of the countries that have different and similar socioeconomic backgrounds to Bangladesh, thus and helped to compare and contrast these situations with the one in Bangladesh.

2.1. Initiatives to ICT extension

In Sweden, there is an information center for teachers including library and news agency called 'ICT for Pedagogues.' The Swedish education ministry created this center in 1994 to create a connection among all teachers and to provide them pedagogical services as they needed (Gutterman, Rahman, Supelano, Thies, & Yang, 2009). European teachers can share their available ICT devices in different languages, and they can give their feedback about shared available ICT devices from another teacher. According to Cachia, Ferrari, Ala-Mutka, and Punie (2010) "European eLearning portal (elearningeuropa.info) provides some of the desired functionalities, but does not provide specific support for linking practitioners in the classroom practitioners with those developing projects."

In Finland, the education policy is coordinated with the national vision of an information society (Kankaanranta & Linnakylä, 2004; R. B. Kozma, 2008) which generated the schools to buy computers, link them with the internet, and endorse ICT as a tool for teaching-learning. This policy also brings out the in-service Training for teachers to provide the knowledge and skills they needed to reform their pedagogical practices especially regarding the collaboration of technology, teamwork, and teaching-learning (R. B. Kozma, 2005). Establishing students as members of the modern information society is the primary goal of the Finnish strategy of ICT integration in schools. The Information Society Program for Education is aimed at developing all citizens' information society knowledge and skills (Castells & Cardoso, 2006).

Radio, television, computers, and the internet in classrooms, computer laboratories, and other locations, as well as developing a structure to support mobile learning using smartphone and

tablet devices are the available ICT device used to integrate ICT in schools in Asia (Valk, Rashid, & Elder, 2010). Economically developed countries in Asia like South Korea, Singapore, and Japan have ICT facilities in almost all of their classrooms (ADB, 2012). Japan has started the implementation of the "e-Japan Strategy" in 2001. To enhance intellectual ability and creativity, Japan has encouraged people to bring a proactive approach to teaching-learning activities through ICT. They recognized ICT as a medium of high-level communication skills that helps students to express their ideas and impel them towards innovation (Law, Pelgrum, & Plomp, 2008). Successful integration of ICT in education has been done by Singapore in two phases. In 1997, they took their first master plan to incorporate technologies into the school system (Mui, Kan, & Chun, 2004). This idea was focusing on installing computers in schools with high-speed internet and Training the teachers to use the technologies correctly. Later, in 2002 they came up with a second master plan which was more systemic and had a holistic approach to integration. ICT, curriculum, assessment, instruction, professional development, and school culture: all these components were integrated into this system. The curriculum was reduced by 10 to 30 percent to allow the technology integration in subject areas (R. B. Kozma, 2005; Law et al., 2008).

The government of Malaysia has started a project named the Smart School project which contains browser-based teaching-learning materials for language, science, and mathematics education. They have made a connection between smart school management and classroom teaching. The school management also connected with the Ministry's data center and Ministry's helpdesk using a Local Area Network. The Ministry's helpdesk also provides maintenance and support to the pilot schools for better involvement of ICT in classroom practices (El-Halawany & Huwail, 2008). Malaysia desired to move towards a knowledge-based industrial nation. To achieve this goal they have punctuated on ICT-based education in a different level of schools (Hassan, 2011). Thailand's ninth "National Economic and Social Development Plan" (2007-2011) focuses on the development of people's quality of life in a knowledge-based society through a "sufficiency economy" philosophy. This issue is vastly associated with implementing and using ICT in education. Besides thinking of skills and the traditional learning process, Thailand is giving importance to the use of technology to improve student's achievements in different international competitions (Anderson & Plomp, 2008). Being an emerging economy of the world, Brazil still hasn't ensured ICT integration in all levels of education. It is massive geographical is a considerable obstacle to enrolling all students and provide a quality education through ICT. However, in recent years Ministry of

Education and municipal secretaries of education have taken many initiatives to accomplish ICTE (ICT in Education) such as Training the teachers and lab coordinators for long time success (Mori & Assumpção, 2007).

ICT vision-2010 has adopted by the Mongolian government to ensure and spread ICT-related or ICT-based activities among all people in the year 2000. Hi-tech centers for supporting educators and teachers had also been established in Ulaanbaatar. Moreover, structural facilities were made to ensure that students and teachers can access different ICT based activities like e-library, images for learning, leisure, and entertainment (Uyanga, Chimedlham, Tsogtbaatar, & Choijoovanchig, 2004)

According to ADB (2012) "Countries that do not have objectives or courses on necessary computer skills (or computing) at all levels, the emphasis is placed on secondary education. For instance, in India, they are focusing more on secondary education to implement ICT in schools. 45% of secondary schools have computer laboratories compared to 17% of primary schools (India, 2012). On the other hand, Cambodia, Myanmar, Nepal, and Sri Lanka included primary computer skill development in upper secondary education. In Kyrgyzstan, a course in necessary computer skills or computing occurs precisely at the lower secondary level (Wallet, 2014). Similarly, in the Philippines, Computer Assisted Instruction (CAI) is present in 41% of secondary schools but only in 17% of primary schools. In Bhutan, despite having relatively high levels of electricity almost in all schools of the country, they don't have a formal policy on ICT in education. No computer laboratory has been established in primary schools whereas two-thirds of secondary schools have computer laboratories (ADB, 2012).

Countries like Hong Kong, Macao, Japan, Kazakhstan, Malaysia, the Philippines, Singapore, Sri Lanka, and Thailand, who have more capacity to provide ICT, are trying to implement ICT integration in all subjects at all levels. Moreover, Kazakhstan has planned for a more ambitious project to apply ICT at every level by covering all schools in their language. They also ensured 100% connectivity to diminish the digital divide. In some countries, a good number of schools developed their digital communication system for contacting the parents of students, for assessing exam papers, and even for taking attendance of students (Cachia et al., 2010).

Using computers in schools tends to be concentrated only in laboratories in many developing countries in South and West Asia and Central Asia (ADB, 2012; Bank, 2016). Most of the

countries find it as a viable solution due to a lack of available ICT device. Countries like Kyrgyzstan, Azerbaijan, and the Maldives entangled computer-assisted education and laboratories in all levels of education whereas Bhutan and the Philippines have done it only in most of their secondary schools (Wallet, 2014). In India, however, computer provision is increasingly going to be linked up with library facilities, teachers' common room, and official activities of the school's head office (ADB, 2012).

In Egypt, the pedagogy, curriculum, and textbooks were designed to urge students to memorize the topic (L. Kozma, 2004). They planned to integrate technologies to reform their education system to both improve their education and economy through knowledge-based service and software production. This reformation included the improvement of the curriculum which matches the capabilities of subject areas and turns students into human capital. Government organizations, NGOs, and transnational organizations have launched different ICT-based educational programs to support this reformation (Bransford, Brophy, & Williams, 2000; Chudowsky, Glaser, & Pellegrino, 2001; R. B. Kozma, 2005).

The Government of Bangladesh (GOB) has declared a vision named "Vision-2021" to incorporate significant digitization of public services in Bangladesh (this effort is successfully and smartly called 'create Digital Bangladesh') as well as to improve the quality of education through ICT. Though implementing ICT in education is not merely a vision, it instead needs planning, policies, execution, and monitoring. GOB also introduced its latest education policy in 2010 by focusing on ICT as a medium of instruction. Still, there is a long way to go to implement the strategy throughout the country as most of the schools are not ready to integrate ICT into their classroom activities (Khan, Hossain, Hasan, & Clement, 2012).

2.2. Teacher Training and attitudes to increase the extent of ICT

It is widely acknowledged that teachers' educational beliefs are reliable indicators of their planning, instructional designs, and classroom practices (Bandura, 1989; Pajares, 1992). In other words, Training for teachers is one of the essential elements to implementing ICT in the teaching-learning process. It also solves the pedagogical issues for the teachers. Changing attitudes to using ICT in classroom activities can be influenced by some other factors like ICT competence, computer self-efficacy, government policy on ICT literacy, and infrastructure facilities. Besides these, teaching experience, educational level, professional development, accessibility, technical support, the leadership of the head teacher, the pressure to use ICT also can play a vital role in implementation. (Ali, Haolader, & Muhammad, 2013).

In developed countries teachers and experts are giving more importance to using ICT in classroom practices than the developing nations. Their adoption and usage policy are much broader than developing nations. Thus, students are getting better at technology-based learning opportunities in developed nations and performing well in the job sector (Hamidi, Meshkat, Rezaee, & Jafari, 2011). Besides, most of the teachers use the internet to get access to information to upraise their knowledge which they can use in their lessons or prepare handouts and materials for class. More than 50 % of teachers in EU believe that mobiles, digital games, and social technologies are important for teaching and teach (Cachia et al., 2010).

Almost two-thirds of teachers agreed that they found appropriate support for combining ICT and innovative teaching. While teachers are not using the computer as standard tools of teaching, some teachers gave an example of using Google map to teach geography which shows that the scenario is changing rapidly towards ICT integration. Still, the sharing of ideas between teachers and students regarding using technology in the same flow is rare in some places in Europe. (Cachia et al., 2010; Csikszentmihalyi, 1996). In Ireland teachers often use ICT to develop students' writing and presentation skills; sometimes they even use ICT in problem-solving and evaluative skills-related activities. But it is hardly used to build the teamwork and collaborative skills of the students. Some schools have the facilities to handle ICT for every subject in the classroom, and some schools use the common room like a computer lab to conduct a class with ICT facilities (Flanagan, 2008).

In search of teacher's proficiency and motivation towards using ICT in the classroom, it has been seen that most of the teachers can use word-processing and the internet in post-primary schools in Ireland. On the other hand, a relatively low level of use of e-mail, spreadsheets, databases, and graphics does not reflect the teacher's high proficiency in using applications. So, the teacher's motivation to use ICT in the classroom highly depends on their competence in the particular application (Flanagan, 2008). Jimoyiannis and Komis (2006) found that although most of the teachers in Greece have a lack of confidence in their skills and abilities to use ICT, they have positive attitudes towards the importance of their Training on ICT, the role of ICT in education, and also the application of ICT tools in the instruction process.

Though many of the countries in the Asia and Pacific region have developed policies on teacher Training on ICT, they need to be looked at more carefully to link them with the broader perspective of ICT for development and education goals (UNESCO, 2004).

Malaysia's ministry of education uses a cascade model to solve this kind of problem, they Modem teachers who are genuinely interested in using ICT in classroom practice. These teachers share their idea and learning with the other teachers of the school and motivate them continuously to integrate ICT in the teaching-learning process. Sometimes, one school Modems another school's teachers, which is more convenient in the same area (Gutterman et al., 2009).

Teachers' confidence concerning their pedagogical use of ICT mostly depends on finding related and useful materials for class; it may be taken from the internet or any other available ICT device. Teachers' competence in using ICT also affects the adoption of classroom practices (Law & Chow, 2008).

Male teachers tend to be more technologically nous, confident, and willing to learn a new technology than female teachers (Yuen & Ma, 2002); they also have lower flutter levels than female teachers (Bradley & Russell, 1997). It shows the intention of gender biases in ICT usage in some parts of the world.

2.3. ICT in bringing interactivity in the classroom

Classroom interaction is one of the leading challenges for effective teaching-learning. Without sufficient participation and engagement from students in classroom activities, learning cannot be fulfilled anyway. Mutual opportunities to talk about the classroom, proper guidance, creating an environment for participation, and increasing students' autonomy level can make an impactful interaction in classroom learning (Burns* & Myhill, 2004). On the other hand, interactivity is the most perceived advantage of using ICT in the classroom regarding supporting teaching (Beauchamp & Kennewell, 2010). Moreover, Kennewell, Tanner, Jones, and Beauchamp (2008) states that "The term 'interactivity', therefore, can be used to describe technical interactivity as technology serves as an interface between the user and the material, and pedagogical interactivity, which is itself a teaching strategy." Beauchamp and Kennewell (2010) classified interactivity into five categories: no interactivity with ICT, authoritative interactivity, dialectic interactivity, dialogic interactivity, and synergistic interactivity.

The potential of innovative and interactive education was the focal point to provide access to technology especially in schools in Europe from the last decade (Blandow & Dyrenfurth, 1994). The majority of schools in developed countries are equipped with PCs, interactive

whiteboards (IWBs), and internet connections. Moreover, some schools already provide extensive area networks (WAN) for better interaction between pupils and teachers even outside the classroom (Cachia et al., 2010). Though replacing traditional tools with digital equipment cannot ensure creativity or innovation in education, most of the schools have access to technologies for their teachers. These techniques are based on notions of networking which allow teachers to develop collaborative forms of learning. Schools in Europe have their website where they share their information regularly, and teachers use platforms like Moodle, wikis, and blogs to teach in the classroom. Nonetheless, textbook remains the primary resource for teaching. It is essential to make a suitable combination of pedagogy and technology which can bring more creativity to teaching and learning (Cachia et al., 2010).

Students need to understand or realize the primary and innovative use of technology if we want to ensure sustainable, innovative knowledge generation. Without the proper concept of using technology, there is a high probability of using familiar forms and ideas in using the tools. It can make an obstacle to exploring new connections and different ways of creating things (Loveless, 2008).

2.4. Effective and quality education

By improving quality of the education and instruction, enriching the assessment system, and reducing dropouts from class, ICT has introduced a new era globally. It has transformed the education system from a teacher-centered system to a student-centered one in a very smooth way. This transformation empowers students towards better problem-solving abilities, more creative thinking, better communication skills, and other improved higher-order thinking (Trucano, 2005). Many nations believed in this transformation, and they re-introduced their policy on reflecting on this issue (ADB, 2012), while it may also be reflected in national educational targets.

On the other hand, the conventional and rigid, face-to-face classroom system makes students bored, and they lose their interest to attend classes. This boredom causes dropouts from the different levels of the educational system. Students from wealthier families go for private tuition to increase the chances for a better result in school; this is not possible for students from comparatively poor backgrounds. Using ICT in classroom activities can make these classes more exciting and can increase the attention of students easily (Haddad & Draxler, 2002).

ICT is treated as an essential driver of innovation and growth in modern society. ICT for education enhances the support of development by creating a skilled workforce. It also has an immense effect on research and development activities (ADB, 2009). ICT use in education increase students' technical and cognitive proficiency to access, create and develop. It also enhances the potential of teaching-learning activities (ADB, 2009). Moreover, a technology-enabled environment ensures the effective flow of information, and using technology in school makes it more accessible and usable (Mohd & Zainab, 2002). Also, to move up the next rungs of the development ladder, it is essential to integrate ICT in teaching-learning situations which can improve the quality of a country`s human capital and student`s capability of using information (ADB, 2009).

Grimus (2000) stated that "By teaching ICT skills in higher educational institutions the students are prepared to face future developments based on proper understanding." Additionally, to support this statement Yelland (2001) mentioned that "Traditional educational environments do not seem to be suitable for preparing learners to function or be productive in the workplaces of today's society. Organizations that do not incorporate the use of new technologies in institutions cannot seriously claim to prepare their students for life in the twenty-first century."

2.5. Teacher modeling making an impact

Although home access and infrastructure capability have increased noticeably over the last few years, teachers do not appear to make practical use of ICT in their instruction because of their attitudes towards ICT as well as a lack of skill in this area(Cox et al., 2003).

According to Williams, Coles, Wilson, Richardson, and Tuson (2000), "Teachers' attitudes towards ICT in education have a significant influence on ICT adoption and implementation behaviors in the classroom. Teachers, in general, agree that computers constitute a valuable tool and they are positive about students' attainment of ICT knowledge and skills. In many cases, they perceive ICT as a new subject matter in education rather than a new way of teaching and interaction between learners and knowledge". Moreover, even though teachers are concern about the importance of ICT in education, they tend to be less interested in its extensive use in classroom activities. Teachers are more doubtful about ICT's potential to improve the teaching system (Higgins, 2003).

When teachers get more engaged with computers, their attitude also starts to convert in the direction of more excellent use of ICT in their lessons (Sang, Valcke, Van Braak, & Tondeur, 2010). Besides, a teacher's pedagogical culture shapes their demonstrations of ICT use in the classroom (Ruthven, Hennessy, & Brindley, 2004), and in most cases, they are likely to adopt practices that reflect their beliefs about teaching and learning (Drenoyianni & Selwood, 1998). Similarly, a teacher's trust and confidence in using ICT efficiently in the classroom play a significant role in implementing technology in teaching-learning activities (Sime & Priestley, 2005).

There are claims that the presence of technology creates pressure on teachers to make classroom activities more efficient. But, technology does not have an educational value itself.

Technology becomes essential when teachers use it efficiently in the pedagogical process. Technology brought innovation and development in teaching-learning process in education, but it must be implemented by teachers (R. B. Kozma, 2003). So, teacher's attitude and readiness to use technology are vital in achieving ICT in education successfully (Garland & Noyes, 2004; W. J. Pelgrum, 2001).

2.6. Government's vision and plan

According to an Asian Development Bank Report (ADB, 2009), some countries have plans of ICT integration; but these ideas are isolated from their national policies. ICT for education plans are often disjointed, as they are developed without considering the infrastructure, finances, and development as defined by the domestic ICT policy. ICT for education is a part of the national education plan. It must be associated with education development objectives and merged with the sector plan of education. National ICT policy must also be incorporated with the parameters of the education system, and there should be a technology-enabled environment.

Basic computer literacy needs to be initiated to integrate into teaching-learning. Many countries also realized that they need to revise their policy to make a favorable pedagogical perspective through ICT and according to that they are giving more importance to teachers' training now (UNESCO, 2004). The government of Malaysia wanted to reduce the digital partition between the schools, increase the usage of ICT tools in the teaching-learning process, and integrate different subjects through ICT. School management will also be more effective and productive (Said et al., 2013). To achieve these goals they started with a smart

school project in four phases from 1999 to 2020. They changed their medium of instruction from the native language to English to teach mathematics and science in 2003. It encouraged more students to use ICT outside of schools. Ministry of education has distributed almost 3778 titles of ICT-based teaching materials to the schools from 1999-2008. It encouraged teachers to use ICT in classroom activities (ADB, 2009). The Government of Malaysia took necessary steps to conquer the challenges on the way of ICT integration in education. It can be an excellent example to follow for different Asian countries that are still struggling to implement ICT in their education sector.

Political parties and their views have an immense impact on integrating ICT in all sectors of developing countries. If they have no interest in ICT, it is not possible to collaborate all stakeholders together and inform them about the blessings ICT usage can bring (Sharma, 2006). The present ruling party of the Government of Bangladesh had declared their vision of a digital country in 2021 before they constituted this government. As a consequence, they emphasized the implementation of ICT in education not only for the improvement of the quality of education but also for increasing pupils' skills according to the job market. By publishing a new education policy in 2010, the government has shown its motive to redact its vision throughout the country (Khan et al., 2012).

2.7. Teachers' beliefs and readiness

Despite so many benefits of using ICT in education, in many cases learning the potential of ICT is dispossessed as teachers are still not fully ICT literate and they do not use any technology in their teaching. A study in teachers' readiness in ICT shows that there is still a long way to go before schools will be able to take the full advantages of ICT use in education (So & Swatman, 2006). Teachers' attitudes and beliefs are one of the main generators of the use of technologies in instructional settings (Almusalam, 2001). According to Mumtaz (2000) teachers' belief about integrating ICT in teaching-learning is the core part of ICT implementation in education. Conceptual change in the nature of learning is vital to change the attitude of teachers and to generate belief in ICT as an instructional tool. They will able to determine the extent of their engagement with ICT and also will find out how engaged the students can be in using technology. Besides, teachers also need to bring a positive attitude to handle ICT regularly. This belief will allow them to gain a sufficient level of understanding to implement it successfully. When teachers become knowledgeable about ICT use in the

classroom, this efficiency encourages them to integrate ICT in a more significant scope into all aspects of education (Afshari, Bakar, Luan, Samah, & Fooi, 2009).

Teachers become more cautious to use ICT in schools when they utilize ICT for their learning. Sometimes, they also think that ICT is not relevant in class-based instruction for promoting cooperation and reflection in learning as they recognize ICT can drive students easily to real-life learning (Barak, 2006). Without understanding the usefulness of ICT, teachers do not become interested in using ICT instead of their traditional teaching strategy (Sang et al., 2010).

Most of the countries across the world struggle to find out efficient ways to prepare teachers to adopt ICT as an integral part of their everyday teaching strategies. Therefore, a thorough analysis of a teacher's perception about integrating ICT can give an idea about the rudiments of their effective grounding (Hennessy et al., 2010). To explore the factors deterring teachers' readiness and confidence in using ICT in teaching, Tella, Tella, Toyobo, Adika, and Adewuyi (2007) found that "inadequate knowledge to evaluate the role of ICT in teaching and learning, lack of skills in the use of ICT equipment and software had resulted in a lack of confidence in utilizing ICT tools." Lack of technical support and expectation of making mistakes while using technology in the classroom during teaching have reduced teacher's confidence and caused teachers to avoid its use (Khan et al., 2012).

On the other hand, some teachers have high interest and motivation on using ICT in classroom activities, but their resource is limited. Most of them use technology for low-level supplement tasks. A significant number of teachers use the computer only for simple tasks like word processing, spreadsheet, and registration of grades (Higgins, 2003; Rosenthal, 2004). Moreover, the majority of the teachers prefer to get ready-made available ICT device that are specifically designed for their lessons. Most of them confess that they do not get enough time to prepare digital content for every lesson (Cachia et al., 2010).

In Europe, most of the countries have available facilities of ICT, but still, they need more Training for teachers to ensure the proper use of it. Teachers still lack the knowledge to implement ICT in adopting creative and innovative learning environments. Most of the schools use interactive whiteboards and projections in the classroom to give students more space and time to explore themselves in improving the interaction between teachers and students. In that case, teachers need to be more competent in ICT use as they could work in

partnership with their students (Cachia et al., 2010). Few teachers are skilled in integrating ICT into their teaching and can motivate students, enrich their learning outcomes and stimulate higher-level critical thinking in their minds.

Teachers' proficiency in ICT is still a big concern in some European countries where 85% of teachers believed ICT had improved their teaching and 91% thought ICT enhanced creativity in their teaching (Cachia et al., 2010). Teacher's ability to use technology in teaching-learning is mostly limited to some necessary programs. Most of the teachers are accustomed to some primary use of computer like the browsing the internet, using e-mail and word processing. As teachers cannot confidently use ICT effectively in the classroom, ICT use in the school, as a whole, is deficient. Lower knowledge about computers or other technology is correlated with lower exposure to using technology. Teachers with previous experience with ICT do use technology frequently in their teaching. They think ICT has made their instruction process more manageable and smoother (Garland & Noyes, 2004; İşman, Evirgen, & Çengel, 2008; Tondeur et al., 2007). Balanskat (2009) found that lack of expertise in using technology pushes teachers to compromise their authority in class; Almost 56% of teachers rate themselves as reasonably confident in using ICT, such as in using power-point to create presentations with texts and images.

2.8. Infrastructure and other available ICT devices

Generally, in a developing country, the government wants to invest more money in defense or agriculture compared to education. Bangladesh is not isolated from this strategy. It seems difficult for developing countries to ensure an excellent financial allocation for education or ICT implementation in education. Afshari et al. (2009) stated that efficient and effective use of technology depends on the availability of hardware and software and the equity of access to available ICT devices by teachers, students, and administrative staff. These costs are in most cases inflated and cannot be provided by most developing countries, including Bangladesh.

In Myanmar, electricity in schools is infrequent, and as a reason, only 1% of primary schools can use technology compared to 15% at the secondary level. Similarly, in Cambodia and Nepal, computer-assisted instruction is available in 3% and less than 0.5% in primary and secondary schools, respectively (ADB, 2009). That is to say, balancing priorities of integrating ICT among institutional subsectors is vital for educational development. Investment in ICT for education also depends on these preferences. A plan should be made

which includes the available ICT device and the proper use of it. It will create a technology-enabled environment. As an example, if all the available ICT devices are brought into the classroom, and they require electricity then continuous power wife should be the priority for that school area. Similarly, it is no help to teachers if the e-available ICT device they rely on is available on the internet, but there is no connectivity (ADB, 2009).

As an example, lack of available ICT devices and insufficient suitable infrastructure are one of the most challenging problems to tackle regarding implementing ICT in education in a developing country like Bangladesh. The practical use of ICT depends on the availability of technological devices, supplies of computers, and their proper maintenance including other accessories (Khan et al., 2012). There are some barriers like technical support, unbalanced maintenance of software and hardware, and slow connection speed, which are interrupting proper use of ICT in teaching. Both teachers and education stakeholders approve that poor internet connection is a significant obstacle to getting access to online materials. The substantial cost of interactive whiteboards and the way of using them raised questions about the relevance of ICT for innovative teaching practice (Cachia et al., 2010). Gülbahar (2007) also added that "ICT requires modern hardware and software. Using up-to-date hardware and software available ICT devices are key factors in the diffusion of technology, but it is a rare experience in educational institutions. A high-speed internet connection is another prerequisite for integrating ICT into the teaching-learning situation. But unfortunately, internet access is poor in most of the developing countries." In Bangladesh, though multimedia education materials are available from the government and private sources, most of the schools are not well equipped with infrastructural facilities, as well as with teachers. Teachers' attitude towards using ICT in the classroom is also low, especially in rural areas (Khan et al., 2012).

2.9. The interest of School administration

The vision of school leaders is essential to make successful integration of ICT in school-level education. School leaders underscored the importance of using ICT for pedagogical approaches which can create a barrier to lifelong learning for the students. In some cases, school leaders seemed relatively inactive to make an influence on teachers' motivation to use ICT in classroom activities. It has already been proved that the more active school leaders lead, the more active ICT integration in the teaching-learning process is (W. Pelgrum, 2008). Alternatively, if teachers think that this policy is imposed from outside without consulting

with them or if they do not have enough Training or instructional practice, any policy will be challenging to implement at the field level. Instructional complications and lack of programs and resource alignment hinder the implementation of the process (Cohen & Fink, 2001).

As an overpopulated developing country, Bangladesh has a considerable number of youth who are going to schools now. Besides this, the state does not have enough qualified teachers to educate them, and teachers are already burdened with heavy workloads. Moreover, most of the teachers are doing administrative works alongside teaching in the classroom. In these circumstances, it is almost impractical for teachers to design and develop their classes by using technology (Afshari et al., 2009; Beggs, 2000). Some teachers are unable to practice teaching by using ICT, and some are unwilling to try because of anxiety, time shortages and lack of motivation (Duhaney, 2001). In this situation, the administration needs to take more responsibility for encouraging teachers in integrating ICT.

2.10. Social- Cultural challenges

R. Sharma (2003) states that one of the most significant social factors influencing the use of ICT in Bangladesh, Malaysia, and other developing countries is the low social status of women. Providing education or incorporating women's role in the use of ICT is not considered necessary. As teachers are not often compensated for the extra time they need to integrate ICT, they lose their interest in using technology in their class. Bangladesh had consistently ranked as one of the most corrupt countries for few years according to Transparency International (Bhuiyan, 2011). Corruption is widespread here and is one of the identifiable reasons behind the slow or no integration of ICT in education (Zafarullah & Siddiquee, 2001). Mamun and Tapan (2009) stated that "The budget for the newer technology was misused and reduced due to corruption in the administration. Huge budgets are passed to buy modern teaching and learning materials for the improvement of the teaching and learning process, but in the end, only minor improvements are found in the overall technical and vocational education sector." The misuse of money and by thieving government allocation to personal accounts, few people makes an obstacle to proper development in different sectors, including education. This money could have used in implementing ICT in every level of education (Kessy, Kaemba, & Gachoka, 2006).

As most people and students use Bangla (mother tongue) as their medium of communication and instruction, English is not spoken widely throughout Bangladesh (Turbill, 2001). On the other hand, almost all of the software which is used in ICT is in English, and this language

barrier creates problems to use ICT for most school teachers. The scarcity of Bangla software creates a mental obstacle for almost all people when English is used as the second language in Bangladesh (Sultan, 2010).

2.11. Lack of Knowledge and skills

According to W. J. Pelgrum (2001), the success of educational innovations depends mostly on the skills and knowledge of teachers. Teachers' lack of knowledge and skills is one of the main hindrances to the use of ICT in education both for the developed and underdeveloped countries (Ihmeideh, 2009; Mamun & Tapan, 2009; W. J. Pelgrum, 2001).

Berner (2003) found that the faculty's belief in their computer competence was the most significant predictor of their use of computers in the classroom. 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 a teaching-learning situation in Bangladesh.

2.12. Summary of literature

In sum, from the literature, it has been found that western and developed countries have implemented ICT in education more significantly. They have introduced ICT in their education system long before the developing countries have done. Developed countries have built infrastructures, skilled teachers, and ensured internet access to schools, and made collaboration among the teachers of the nation to achieve the goal of ICT integration in teaching-learning. As a result, they are already getting positive feedback on their successful implementation of ICT in education.

On the other hand, ICT integration is a comparatively new idea in developing countries like Bangladesh which has recently formed a new policy and plan for the inclusion of technology in its education system. Though they are trying to follow the way introduced by western and developed countries, it is becoming challenging for them because of various socio-economic factors. From previous literature, it can be seen that the culture of using ICT in education is building up throughout the world and the approach is pretty positive towards technology inclusion in education.

There are some studies done on account of ICT implementation in the education system of Bangladesh. Most of the studies tried to find out the barriers to implementing ICT successfully. Some of these studies only mentioned the government's vision on including ICT

in education, but none of the studies analyzed the education policy to figure out GOB's plans and objectives of ICT integration in education. These studies presented the data about present difficulties, but there was no guideline to solve these problems and fulfill the aspirations of ICT integration according to the national education policy. In previous studies, some researchers focused only on higher education of the country, and some concentrate on the overall situation. There were no studies found in Bangladesh's perspective where researchers have conducted studies on the condition of ICT integration in secondary education. Moreover, no study has been found on teachers' readiness on integrating ICT in the secondary schools of Bangladesh.

In this study, the research team had tried to make a correlation between national education policy and ongoing practices in secondary schools of Bangladesh. It would help to figure out how secondary schools are adopting ICT usage according to the theory in their teaching and learning process. The researcher did analyze the situation with the data which would indicate the extent of ICT usage in schools, teachers' attitudes towards ICT integration, the impact of ICT in teaching and learning, and the challenges facing the integration of ICT in education. As there were no previous studies that made a comparison between education policy and ongoing practices in schools, the researcher has attempted to figure out how secondary schools are incorporating ICT into their medium of instruction.

At the same time, this study would determine the reflection of these acquired skills in conducting the online classes at the secondary level in normal as well as COVID-19 situation.

<div align="center">**CHAPTER: THREE**</div>

Research Methodology

Both qualitative and quantitative methods have been followed to fulfill the objectives of this research study. Information is being collected from both primary and secondary sources. A rapid background document/literature review has been conducted that presents an overall idea about the assignment. Samahar Consultants Limited conducted the whole study with the guidance and supervision of BANBEIS. The Research Team has developed detailed methodology, selected sample area, developed data collection instruments as per objectives of the assignment; collected data from sample area, processed data (coding, editing and entry), developed a report, and shared it with BANBEIS. The research was being done following the processes of document search, field visit, quantitative and qualitative data collection, data analyze and report writing. Details methodology of the study is given below:

3.1. Desk Review

The research team conducted a thorough review of the secondary data from available publications. Secondary information was collected from existing data available ICT device through a desk review. A rapid desk review were conducted to present an overall idea about the assignment.

3.2. Sample Size of Different Schools

According to the requirement of BANBEIS data from at least 384 institutes from different administrative divisions both in the rural and urban areas in Bangladesh were collected. Besides, the sampled institutions have been selected considering plain land, coastal area, Barind area and hill areas.

The sample size was n=384 institutes. Different types of institutes were considered as primary sample units (PSUs) for this research study. For this research assignment 384 Secondary Schools were taken as sample covering different types *(General High School, Madrasa including Boys, Girls, and Combined; Government and Non-Government categories).*

3.3. Sampling Procedure

It has been planned to follow a multistage sampling technique to get the required number of secondary schools (PSUs), as below stages:

STAGE-01

There are 8 divisions in Bangladesh and from each division 02 districts were selected. So from 08 divisions total 16 districts were selected. Mentionable that of the selected 02 districts, 01 district has been selected at the divisional head quarter (HQ) and other 01 would be selected randomly.

STAGE-02

Among the selected 16 districts, 01 upazila from each district were selected. Thus a total of (1×16)=16 upazilas were selected randomly from the selected 16 districts.

STAGE-03

Then, among the selected 16 Upazilas, 24 secondary institute were selected randomly. Among 24 seconary institute under each upazila, 14 general school and 10 Madrash have been ensured to selec select randomly. Thus, the total number of selected secondary institutes stood at 16×24=384 (Three hundred Eighty Four). Among the 384 secondary institute, Head Teacher from each institute (384), and 02 Assistant teacher (384×2=786) who has received BANBEIS's ICT ICT training, and 01 Assistant teacher of each institute, who has not received BANBEIS's ICT training from have been interviewed. Thus a total of (384+786+384) 1535 teachers haved been interviewed.

STAGE-04

32 FGD were held among 384 institutions included equal number from each of 08 divisions. 15-20 students/gardian/SMC member took part in each FGD. Thus, the total participant in FGD were 544. Besides, KII was conducted among 40 officials from 8 administrative divisions under the study area.

Figure-1: Multistage Sampling flowchart of the Study.

Table 2.1: Distribution of Sample mobile data by Division, District, Upazila and Schools.

Division	District selected from each division	Upazila/Thana has been selected	No. of institute has been selected	No. of Questionnaire Survey conducted			No. KII conducted	No. FGD conducted
				H.T.	**A.T. (TR)**	**A.T. (NTR)**		
Dhaka	Dhaka	Gulshan	24	24	48	24	05	04
	Manikganj	Ghior	24	24	48	24		
Chittagong	Chandpur	Haziganj	24	24	48	24	05	04
	Khagrachhari	Dighinala	24	24	48	24		
Rajshahi	Joypurhat	Panchbibi	24	24	48	24	05	04
	Nawabganj	Shibganj	24	24	48	24		
Khulna	Satkhira	Kalaroa	24	24	48	24	05	04
	Narail	Lohagara	24	24	48	24		
Barisal	Jhalokati	Kathalia	24	24	48	24	05	04
	Patuakhali	Bauphal	24	24	48	24		
Sylhet	Sunamganj	Bishwamvarpur	24	24	48	24	05	04
	Moulvibazar	Kamalganj	24	24	48	24		
Rangpur	Rangpur	Rangpur Sadar	24	24	48	24	05	04
	Panchagarh	Tetulia Upazila	24	24	48	24		
Mymensingh	Netrokona District	Madan Upazila	24	24	48	24	05	04
	Jamalpur District	Melandaha Upazila	24	24	48	24		
Total number:		**16**	**384**	**384**	**786**	**384**	**40**	**32**
HT= Head Teacher, AT= Assistant Teacher, TR= ICT training recipient, NTR= ICT training non-recipient.								

The sample districts has been selected considering plain land, coastal area, Barind area and hill areas. However, the sample districts and Upazilas were finalized during preparatory phase (Inception Report period) in consultation with BANBEIS.

3.4. Samples for Qualitative In-depth Investigation

◉ **In-depth Interview:** A total of 1536 in-depth interviews were conducted with 384 Head Teacher, 768 Assistant teachers who received BANBEIS's ICT Training, and 384 Assistant Teacher who has not received BANBEIS's ICT Training. . A *questionnaire* was used for conducting this in-depth interview.

◉ **KII:** Valuable information, comments, and opinion relevant to this study were collected from secondary educational administrative officers and educationists

through Key Informant Interview (KII). A total of 40 people from 8 administrative divisions of Bangladesh participated in this KII. A *checklist* was used to conduct KII.

⦿ **FGD:** Information was collected through FDGs with students to verify the effectiveness of the online session. A total of 32 FGD sessions were arranged in 08 administrative divisions of Bangladesh. 12-20 students/Parents/SMC members took part in each FGD. Thus, the number of students participating in FGD were 544. An *FGD guideline* was followed for conducting the FGD session.
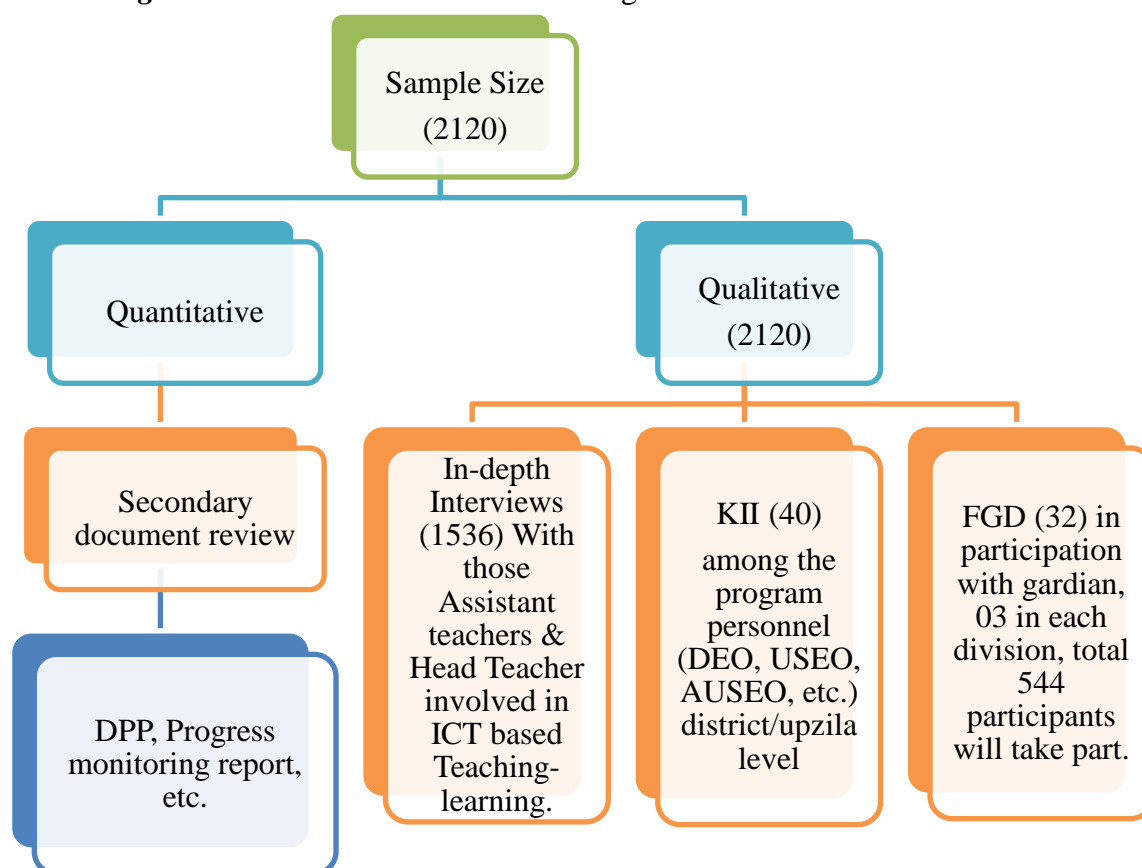
Figure 2: Sample Size of the Study.

3.5. Summary of Sample Size

3.5. Inception Workshop for development of data collection tools

Draft questionnaires and checklists were developed by the study team members and shared in the inception workshop at BANBEIS with relevant stakeholders through Zoom meetings. The feedback was incorporated in the survey questionnaire and guideline/checklist (FGDs and In-depth Interview). After incorporation and improvement of the questionnaires and checklists, further, the questionnaires and checklists were shared in an Inception Workshop for the second time. The understanding of the proposal and study implications were presented

at the seminar by the study team leader. Again, some feedback was received, incorporated, and finalized the questionnaires and checklist. Before beginning the data collection, the survey questionnaire, and FGD,

Photo- 1: Inception workshop for finalizing data collection tool.

and In-depth Interview guidelines/checklists were further shared with BANBEIS people personally.

3.6. Recruitment of data collectors

A total of 32 data collectors and 08 Supervisors were recruited and engaged in the data collection and supervision of the assignment, respectively. The Data Collectors and supervisors were mostly graduates having experiences of data collection of similar nature. They were given 02 full days' Training on the questionnaires and checklist to have a better understanding of the study objectives and their importance and data collection tools and techniques.

3.7. Data Collection

Data collection activities emphasized on two important aspects:

Ø Ensure data quality through recruitment of competent and experienced data collectors; Training of field staff, pretest of data collection tools; supervision of data collection, monitoring, and spot checking randomly for data quality;

Ø Ascertain comprehensive and valid data collection: obtain recompile dataset consent, gain recompile dataset empathy and reliability ensuring anonymity of data analyses and reporting.

The table below delineates the methods of data collection, samples, and instruments of data collection.

Table 2.2: Data Collection Methods and Samples (Mixed)

Types of Investigations and Data Collection	Data collection methodologies and sample	Instruments
Qualitative Survey		
A literature review of all existing	‹ Through review	Relevant study

Types of Investigations and Data Collection	Data collection methodologies and sample	Instruments
documents, publications, and databases of Teachers' ICT Training of BANBEIS.		reports, Journal articles, different publications have been reviewed.
Quantitative and Qualitative In-depth Investigation		
In-depth Interviews (1536) with those teachers who are involved in ICT-based Teaching-learning.	A total of 1536 In-depth Interviews has been conducted (1 in each institute) to assess the activities performed by the teachers who are involved in ICT-based Teaching-learning.	A standardized checklist has been used.
Focus Group Discussions (FGDs) by using a guideline with guardians.	A total of 32 FGDs have been conducted. Of these, 21 have been held online due to COVID lockdown. A total of 544 people participated in these FGD. Among them 361 were students; 107 guardians and 76 SMC members.	FGD has been conducted using a checklist approved by BANBEIS.
KII with program personnel (DEO, USEO, AUSEO, etc.).	KII has been conducted for 48 people holding the administrative position of secondary education level in district and Upazila level.	Semi-structured open-finished questionnaires (well-proven) have been used.

3.8. Data Consolidation and Analysis

3.8.(1). Data Consolidation and Processing

Every filled-in questionnaire were thoroughly edited and checked before the schedule is coded for computer entry when data consistency checks would run generating frequency distribution using SPSS. Data processing work was consist of registration of all completed schedules and editing, coding, cross-check, data entry, and matching of data. Researcher-3 cum statistician oversees the data processing activities.

Registration of Documents: There was one registration section in the Samahar Consultants Limited office and the main responsibility of this section was to keep track of the filled-in

interviewing documents, information schedules, performance reports, and other necessary papers.

Data Editing: The information collected during fieldwork had scrutinized 100% of each interviewer's interview schedule to check the quality of the raw data. The Supervisors and QCO were involved to edit data at the field level.

Coding: A coding system was established and all data have been coded. An individual coding manual was developed for individual questionnaires by the experts.

Data Entry: Data entered by data entry operator under the supervision of researcher-3 cum statistician. Before data entry, a data entry software/program was developed in SPSS.

Data Cleaning: Data cleaning has played an important role when the data were inspected, and erroneous data has been corrected. Data cleaning were done during the stage of data entry.

Data Consolidation and Processing				
Registration of Documents	Data Editing	Data Coding	Data Entry	Data Cleaning
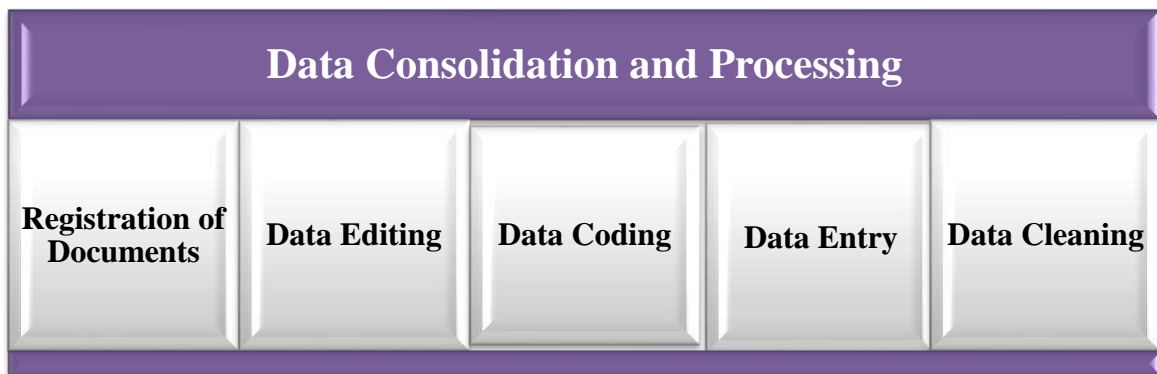
Figure 4: Stages of Data Consolidation and Processing.

3.9.(2) Data Analysis

Data analysis was undertaken after rigorous editing, transfer of data through coding and data entry into the computer using computer software (SPSS) and analyze data using statistical tools both for bi-variety and multi-variety analysis reflecting efficiencies and effectiveness of project inputs;

Quantitative data has been analyzed considering divisions, districts, types of secondary level institutions (Madrasha, Vocational, Government, and non-government schools), and also urban, rural, plain land, Haoor, Barind, hill, etc.

The analysis of qualitative research involved aiming to uncover and/or understand the big picture by using the data to describe the phenomenon and what this means. It began in the field, at the time of observation, interviewing, or both, as the researcher identifies problems and concepts that appear likely to help in understanding the situation. Simply reading the

notes or transcripts is an important step in the analytic process. It was in mind that data analysis and interpretation requires to bring order and understanding of qualitative data. This requires creativity, discipline, and a systematic approach. There is no single or best way. That's why the below technique has been followed in data processing and analysis procedure:
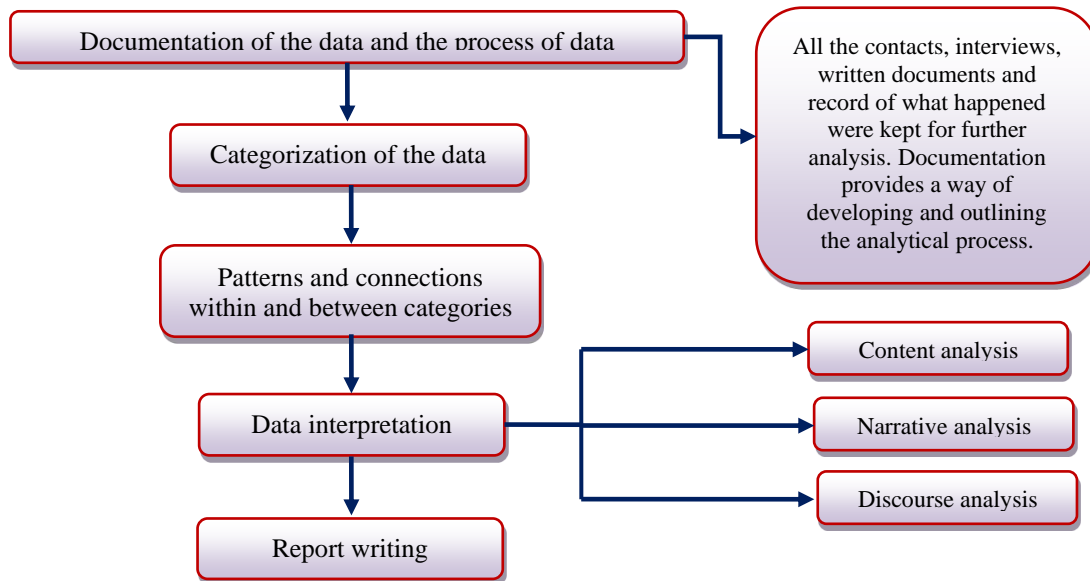
Figure 5: Data processing and analysis techniques followed for the study.

CHAPTER-IV

Findings and Interpretations

The secondary educational institutions (General schools and madras) were the study units. Thus, along with the institutional representatives (teachers), relevant stakeholders like students by gender, members of school management committees, parents, representatives of Educational Administration (DEO/USEO/AUSEO from districts/Upazilas), etc. had been covered under the study as appropriate respondent.

4.1 Basic and Demographic Information

4.1.1 Number and Types of Secondary Institutions

Out of 384 institutions, there were 60 % general secondary schools, 40% Madrasas, which is shown in Graph-1. This was selected based on the pre-determined sample size. From all 08 (eight) administrative divisions, an equal percentage of general schools and madrasas *i.e.* 60%:40% for each division were selected. The number of intuitions, for general high schools was 28 and madrasas was 20 by each division.

Graph-1: Number of sampled schools and madrasa
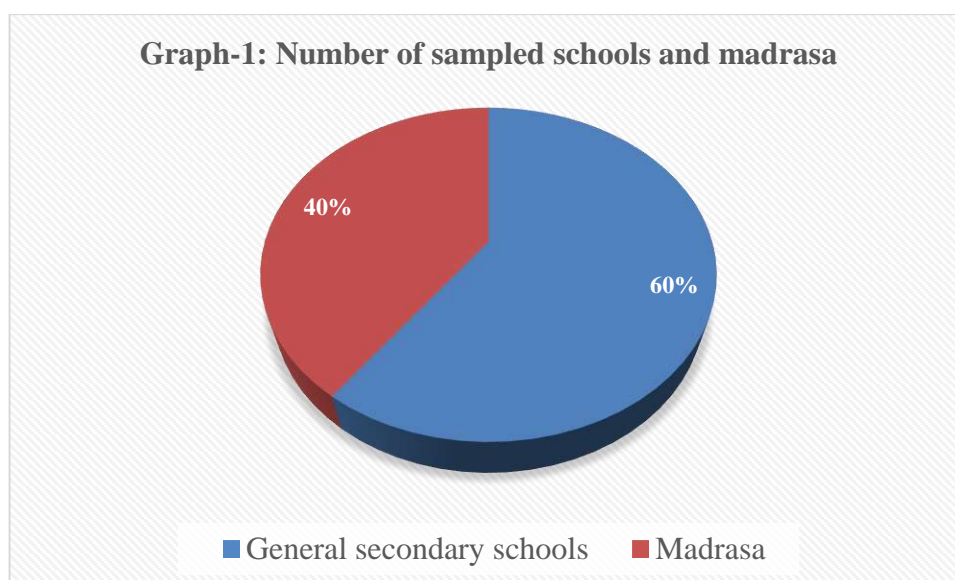
4.1.2 Number of the sampled respondent by Gender

A total of 1536 teachers were selected as sampled from the 384 secondary level educational institutions. The average number of teachers of the 384 institutions are 9600, which, is 5760 for schools, 3840 for madrasa approximately. Of those teachers, the ratio for the female teacher was 27% and for male teachers was 73%), shown in Figure-2.

Graph-2: Sampled Teacher by gender.

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                  2592                             │    │
                 ┌────┐                            │    │
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       Female Teacher                    Male Teacher
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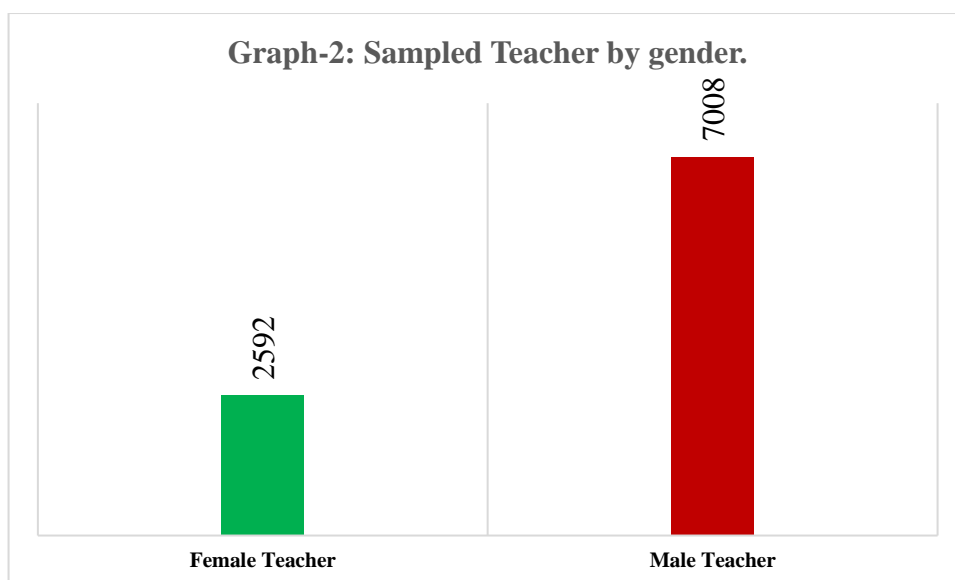
Besides the ICT training recipient Assistant Teachers, ICT training non-recipient Assistant Teachers and Head Teachers have also been covered under the study. Further, a total of 544 respondents participated in the FGD (among them 361 were students; 107 guardians and 76 SMC members), and KII were conducted for 48 people holding the administrative position of secondary education level in district and Upazila level. However, the data for FGD and KII have been discussed separately. See Graph-3 below to show the overall number of respondents, and the ratio of females to males at this stage.

Graph-3: Rate of participation of Female and Male in the different methods used in the study

■ Female ■ Male

Method	Female	Male
Indepth Interview	27%	73%
FGD	49%	51%
KII	19%	81%
Total	32%	68%
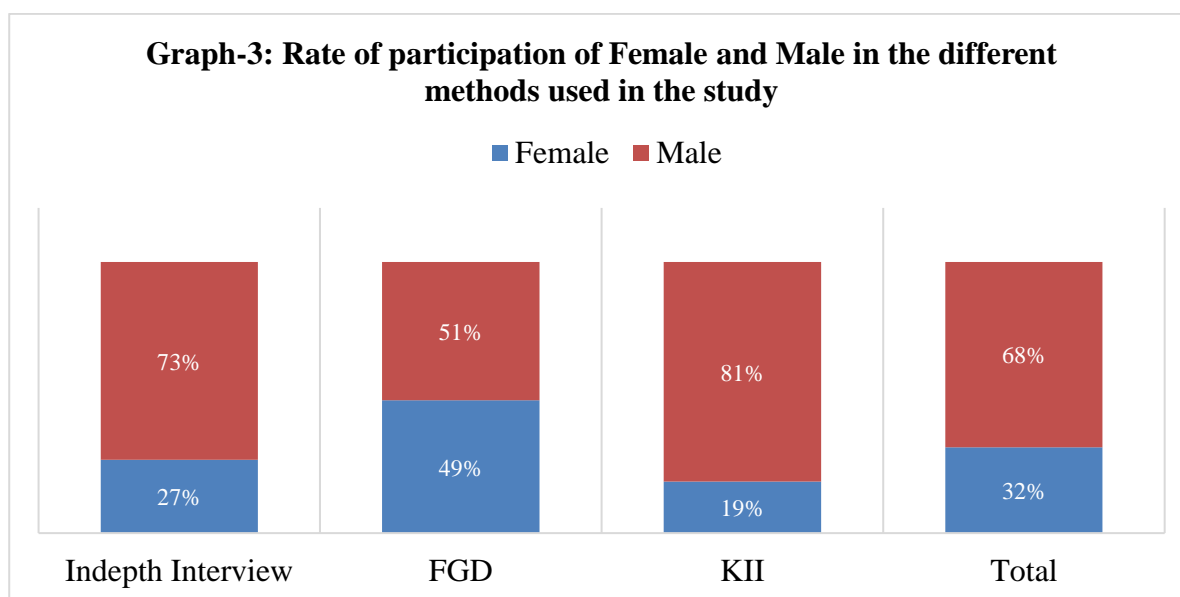
The distribution of teachers was the same percent in each division. But, the number of sampled Male and Female teachers was not equal, but varied to some extent by gender and also by division. The data depicted in the table shows clearly that the distribution of teachers

of surveyed institutions varied by gender from 46% with little exception. Table (4.1) shows the detailed information on the number of male and female respondents by gender and division below.

Table 4.1: Number of respondents by Gender and Division.

District	Male						Female						Total					
	No.			%			No.			%			No.			%		
	Interview	FGD	KII	Interview	FGD	KII	Interview	FGD	KII	Interview	FGD	KII	Interview	FGD	KII	Interview	FGD	KII
Dhaka	124	37	4	8.1	6.8	10.0	68	31	1	4.43	5.7	2.5	192	68	5	12.5	12.5	12.5
Chittagong	136	36	4	8.9	6.6	10.0	60	32	1	3.91	5.9	2.5	196	68	5	12.8	12.5	12.5
Rajshahi	144	34	4	9.4	6.3	10.0	48	34	1	3.13	6.3	2.5	192	68	5	12.5	12.5	12.5
Khulna	148	35	3	9.6	6.4	7.5	40	33	2	2.60	6.1	5.0	188	68	5	12.2	12.5	12.5
Sylhet	136	32	4	8.9	5.9	10.0	56	36	1	3.65	6.6	2.5	192	68	5	12.5	12.5	12.5
Barisal	136	34	4	8.9	6.3	10.0	56	34	1	3.65	6.3	2.5	192	68	5	12.5	12.5	12.5
Rangpur	144	36	4	9.4	6.6	10.0	48	32	1	3.13	5.9	2.5	192	68	5	12.5	12.5	12.5
Mymensingh	152	33	4	9.9	6.1	10.0	40	35	1	2.60	6.4	2.5	192	68	5	12.5	12.5	12.5
Total	**1120**	**277**	**31**	**72.92**	**50.92**	**77.5**	**416**	**267**	**9**	**27.08**	**49.08**	**22.5**	**1536**	**544**	**40**	**100**	**100**	**100**

Source: ICT-based class and online class in Covid period survey in secondary level institutions, May 2021.

The above analysis and the data of Table (4.1) show clearly that the distribution of respondents of surveyed institutions was more or less similar by percentage and gender. But the number varied by gender and division because of the variation of sample size. The male sampled teachers were higher in number than that of the female sampled teachers, with some little exception.

4.1.3 Number of Head Teachers and Assistant Teachers

This study included mainly ICT training recipient assistant teachers, and partially some head teachers of the sampled institute. The ratio of the head teacher to the assistant teacher was 1:3. Thus the assistant teachers were 1152, and the head teachers were 384. The table below shows the ratio of the head teachers to the assistant teachers.

Graph-4: Ratio of Assistant Teacher and Head teacher included in this study.
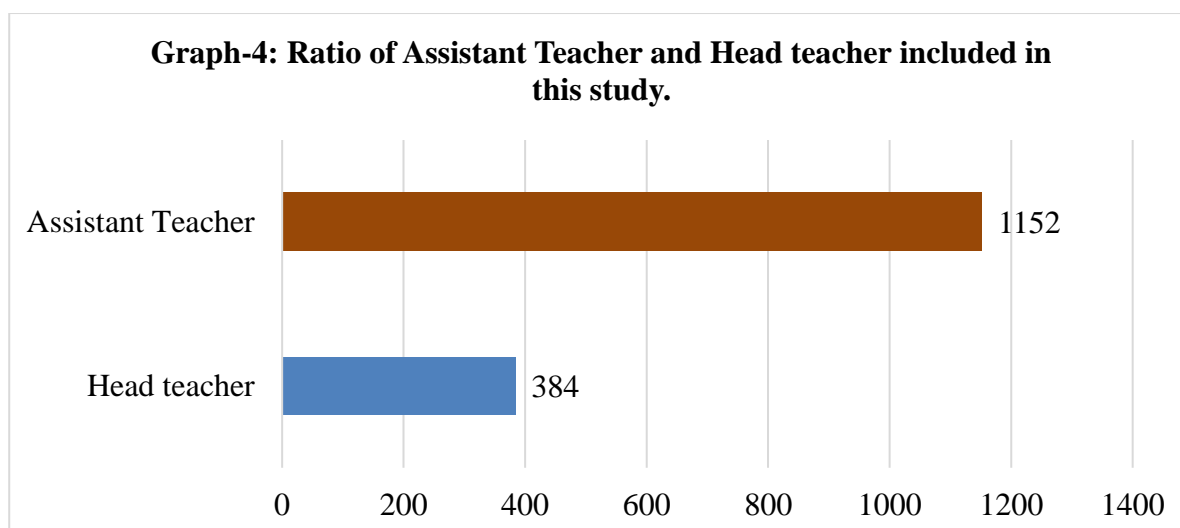
4.1.4 Number of Teachers received ICT training from BANBEIS and other Institutions

This study also investigated whether secondary level teachers have received ICT training from any institution other than BANBEIS. It reveals that 66.80% of secondary school teachers received ICT training in addition to BANBEIS. However, all teachers included in this study were trained from BANBEIS. At the same time, they have received ICT training from other institutions besides BANBEIS. The status of division-wise ICT training received by teachers teaches in secondary level education is presented in the table-4.2 below.

Table 4.2: Number of Respondents (Teachers) by Gender and Divisions.

Division	No. of the Teacher received training from BANBEIS			No. of the Teacher received training other than BANBEIS			% of teachers trained more than once		
	H.T.	A.T.	Total	H.T.	A.T.	Total	H.T.	A.T.	Total
Dhaka	48	96	144	24	45	69	6.25	5.86	12.11
Chittagong	48	96	144	18	18	36	4.69	2.34	7.03
Rajshahi	48	96	144	12	27	39	3.13	3.52	6.64
Khulna	48	96	144	15	18	33	3.91	2.34	6.25
Sylhet	48	96	144	21	54	75	5.47	7.03	12.50
Barisal	48	96	144	15	9	24	3.91	1.17	5.08
Rangpur	48	96	144	18	36	54	4.69	4.69	9.38
Mymensingh	48	96	144	12	36	48	3.13	4.69	7.81
Total:	**384**	**768**	**1152**	**135**	**243**	**378**	**35.16**	**31.64**	**66.80**

4.1.5 Number of Teachers by educational qualification

A total of 1536 teachers have been covered under the study in secondary educational institutions (Madrasa, General Schools, and Vocational Institute). The information of the survey shows that the highest number of teachers (68%) were graduates, while, only 32% were post-graduate teachers. Further, over 79% of the sampled teacher had a professional degree B.Ed. followed by about 12 % had M.Ed. degree and 09% of the teacher had no professional training. Table (4.3) shows the distribution of teachers by education and training below:

Table 4.3: Distribution of Education degree holding Teachers received BANBEIS's ICT training.

Class	No. and percent of Respondent teachers holding Education degree	
	No. of teacher	% of Teacher
Graduate	1044	68%
Post Graduate	492	32%
Total:	**1536**	**100**
Have B.Ed. Degree	1212	79%
Have M.Ed. Degree	184	12%
Have no professional training	144	09%
Total:	**1536**	**100**

Source: ICT-based class and online class in Covid period survey in secondary level institutions, May 2021.

From the above table it became apparent that most of the teachers (91%) have professional degrees, expected them to perform better pedagogically and improve the quality of secondary level education. Analysis and interpretation of the foregoing paras, tables, figures and charts in this chapter revealed the present scenario of teachers, Head teachers having required educational degrees and also training on ICT provided by the BANBEIS and other Institutions. It needs to be mentioned here that secondary educational institutions *(General school 60%, madrasa 20% and 20% Vocational Institute)* have been covered by the study maintaining an equal ratio based on the total number of institutions. Under eight divisions, 16 districts and 32 Upazilas have been selected following stratified and purposive sampling procedures. Both gender *i.e. male'* and female' teachers of which female teacher 32% and

male 68% were covered along with Assistant teacher 90% and 10% Head teacher of Institutions.

Apart from this, 66% student, 20% guardian, 14% SMC members took part in FGD. On the other hand, 40 personnel of educational Administration has participated in KII, of which 19% are women.

4.1.6. Duration of teaching experience among the interviewed teacher

Analysis of the revealed data of the teachers included in the quantitative data collection part shows that most of the teachers receiving BANBEIS's ICT training have more than 07 years of teaching experience. The number of teachers having teaching experience of over 15 years was very low. The table below shows the duration of teaching experience of BANBEIS's ICT training Recipients.

Table 4.4: Distribution of Teachers' years of teaching experience received BANBEIS's ICT training.

Experience range	No. of teacher received BANBEIS's ICT training			
	Teacher (Female)	Teacher (Male)	Total No. of Teacher	% of Teacher
1-5 years	56	144	200	13.02
6-10 years	203	522	725	47.20
11-15 years	133	342	475	30.92
15+ years	39	97	136	8.85
Total:	**431**	**1105**	**1536**	**100.00**

Source: ICT-based class and online class in Covid period survey in secondary level institutions, May 2021.

The above table (4.4) shows the range of experiences. among the BANBEIS's ICT training recipient teachers: 47.20%, teachers have 6-10years of experience, and the teachers have 10-15 years of experience are in the second position (30.92%), 11% of teachers with five years and less experience; and only 8.85% of teachers with 15+ years of experience. This shows that young teachers have received BANBEIS's ICT training mostly.

4.1.7. Geographical diversity of the institutions surveyed under the study

This study cover diversified geographic location in selecting the sampled secondary institutions (Madrasha, and general high schools). In addition to the plains, the Haur, Barind,

hill, etc. area were included in this study. Geographical diversity is described in the table (4.5) below—

Table 4.5: Distribution of Geographical diversity of the institutions were covered in the study.

Geographic types	Number of Institution				Total	(%)
	Urban		Rural			
	School	Madrasa	School	Madrasa		
Plain land	101	63	89	63	314	81.87
Haur	2	2	5	2	12	3.13
Barind	2	2	10	5	19	5.00
Hill	7	5	5	2	19	5.00
Char	2	5	7	5	19	5.00
Total:	**115**	**77**	**115**	**77**	**384**	**100.00**

According to the table (4.5) above, among the institutions studied, 81.88% were in the plains land, 3.13% in Haur, and 5% were in each of Barind, Hill and Char.

4.2. Status of Available ICT device

4.2.1 Available ICT device in Institutions

As per study data, four types of ICT devices are available in secondary educational institutions. The available ICT device included Laptop/Desktop, Multimedia, Printer, and Scanner. Online related ICT devices are much less noticeable in institutions. However, ICT devices and necessary ICT devices of secondary institutions are mainly used in Official/administrative work. They are rarely used in teaching and learning. The internet modem was found to be used in the urban areas mainly. Generally, necessary ICT device was not used in the rural area's institutions, while the internet was used in a few rural area's institutions, though the number was negligible.

This chapter has discussed the overall available ICT device uses in Secondary Educational Institutions by Divisions. It should be noted here that at least 09 types of different ICT devices (*Desktop computer, Laptop, Tablets, Smart phone, Multimedia projector, Internet Broadband connection, WiFi, Mobile data, Computer lab, Modem*) are necessary to conduct a successful ICT-based class/teaching-learning. These devices are also useful for conducting online classes. According to the information provided by the teachers, the status of ICT devices of 384 educational institutions included in this study has been highlighted here. The table-4.6 shows the availability of ICT devices in institutions covered under the study.

Table-4.6: Availability of ICT devices in Sample Educational Institutions.

Types of ICT devices	No. of institution have ICT devices	No. of ICT devices available
Desktop computer	137	422
Laptop	225	310
Tablets	10	10
Smart phone	227	3023
Multimedia projector	227	316
Internet Broadband connection	27	27
WiFi	58	58
Mobile data	34	34
Modem	108	455
Computer lab	18	33
Total:	**384***	**4688**

Source: ICT-based class and online class in Covid period survey in secondary level institutions, May 2021.
***Note:** Total survey institutions 384 and each institute has some ICT device.*

The inclusion of ICT in education requires the availability of ICT devices. This study shows that 100% of secondary educational institute have ICT devices. Though these are not enough to ensure 100% coverage to conduct ICT based teaching-learning for all learner, these are helpful for meaningful productive work.

The study found differences in the availability of ICT devices in sample institutes among different divisions. The table-4.7 below shows the division wise distribution of ICT Devices in institutions.

Table 4.7: Division wise distribution of ICT Devices in Institutions.

Types of ICT devices	Total Device	(%) of institutions have ICT devices							
		Dhaka	Chitt.	Rajshahi	Khulna	Sylhet	Barisal	Rangpur	Mym.
Desktop computer	422	100	100	100	100	100	100	100	100
Laptop	310	100	100	100	100	100	100	100	100
Tablets	10	03	02	00	00	00	00	01	00
Smart phone	3023	100	100	100	100	100	100	100	100
Multimedia projector	316	100	100	100	100	100	100	100	100
Internet Broadband connection	27	46	34	12	09	05	00	02	01

Types of ICT devices	Total Device	(%) of institutions have ICT devices							
		Dhaka	Chitt.	Rajshahi	Khulna	Sylhet	Barisal	Rangpur	Mym.
WiFi	58	21	19	17	14	23	10	14	08
Mobile data	34	27	23	11	19	16	09	10	02
Modem	455	100	100	100	100	100	100	100	100
Computer lab	33	12	06	04	03	05	02	02	01
Total:	**4688**	**60.9**	**58.4**	**54.4**	**54.5**	**54.9**	**52.1**	**52.9**	**51.2**

Source: ICT-based class and online class in Covid period survey in secondary level institutions, May 2021,
Note: *No well (kua), fountain, and ICT device block in any institution.*

Division-wise analysis revealed that the major ICT Devices (Desk-top, Laptop, multi-media, smart phones) are available in the secondary educational institutions in all the 8 divisions covered under the study. Internet, Wifi, Mobile data, Modem and other devices related to online teaching-learning are available but limited within a few number of institutions. The study found a total of 4688 different types of ICT Device are available in the 384 institutions under the study in eight division of Bangladesh. The average number of ICT Device is ±12 in each secondary institution.

Of the overall ICT device in the secondary institutions, the distribution of number of available ICT device altogether varied from 60.9 to 51.2%. The number of institutions studied in each division is 20. The highest number of ICT Device are used in Dhaka division-60.9%, followed by Chittagong-58.4%, Sylhet-54.9%, Khulna divisions-54.5%, Rajshahi-54.4%, Rangpur-52.9%, Mymensingh-51.2% and Barisal-52.1%.

4.2.2 Status of ICT Device (Functional or non-functional)

Out of total institute equipped with ICT Device, 72% devices have been found functional, while, only 15% was out of order/non-functional, and 13% devices not used after purchase/installation. The below table-4.8 shows the current situation of availability of ICT devices, activeness/inactiveness of ICT device and devices not used yet.

Table-4.8: Availability of ICT devices in sampled Educational Institutions.

Types of ICT devices	No. of the institution have ICT device	No. of ICT devices available	No. of ICT devices active	No. of ICT devices inactive	No. of ICT devices not used yet
Desktop computer	137	422	274	102	46
Laptop	225	310	282	27	1
Tablets	227	316	10	0	306
Multimedia	27	27	241	20	-234

Types of ICT devices	No. of the institution have ICT device	No. of ICT devices available	No. of ICT devices active	No. of ICT devices inactive	No. of ICT devices not used yet
projector					
Internet Broadband connection	58	58	22	35	1
WiFi	34	34	4	11	19
Modem	108	455	355	53	47
Computer lab	18	33	4	0	29
Total:	**384**	**1655**	**1192**	**248**	**215**
		(%)	**72%**	**15%**	**13%**

But this overall information is not a reflection of the actual situation. Because, there are many ICT devices that are personal to teachers. That is, they are useful for teaching and learning, but it depends on the willingness of the teacher who owns the device.

In fact, the availability of ICT devices suitable for teaching and learning in the sample Institutes is given in Table-4.9.

Table-4.9: Availability of ICT devices (including Teacher's own) in sample Educational Institutions.

Types of ICT devices	No. of the institution have ICT device	No. of ICT devices available	No. of ICT devices active	No. of ICT devices inactive	No. of ICT devices not used yet
Desktop computer	97	298	187	102	9
Laptop	159	219	192	27	0
Tablets	7	7	7	0	0
Smart phone	160	2134	2134	0	0
Multimedia projector	160	223	164	0	59
Internet Broadband connection	19	19	15	4	0
WiFi	41	41	24	11	6
Mobile data	24	24	9	7	8
Modem	76	321	221	28	72
Computer lab	13	0	0	0	0
Total:		**3286**	**2953**	**179**	**154**
		(%)	**89%**	**6%**	**5%**

The inclusion of ICT in education requires the availability of ICT devices. This study shows that all (100%) of secondary educational institutions have ICT devices. However, 89 % of ICT devices are used actively, 6% of ICT devices are defunct and 5% of ICT devices are not used yet.

However, the activeness and inactiveness rates of ICT devices varied in divisions. The distribution of functional ICT Device varied from 88-94.3 % by divisions. Hundred percent functional ICT devices were not found. The distribution of functional ICT Device were 94.3% in Dhaka, followed by 93.6% in Sylhet, 93.5% in Rangpur, 92% in Barishal, 88.1% in Rajshahi, 88% in Mymensing, 86.3% in Khulna, and 84.5% in Chittagong. The Table (4.10) shows the functional status by division.

Table-4.10: Division-wise Functional status of ICT devices.

Divisions	Functional (%)	Non-functional (%)	Not in use (%)	Total
Dhaka	94.3	1.7	04	100
Chittagong	84.5	08	7.5	100
Rajshahi	88.1	07	4.9	100
Khulna	86.3	4.8	8.9	100
Sylhet	93.6	4.3	2.1	100
Barisal	92	05	03	100
Rangpur	93.5	04	2.5	100
Mymensingh	88	09	03	100

Source: ICT-based class and online class in Covid period survey in secondary level institutions, May 2021.

Division-wise functional status revealed that Dhaka ranks highest in ICT device functionality followed by Sylhet (93.6%), Rangpur and Barisal. Distribution of ICT Device not in use *varied from* 2.5% to 8.9%, Chittagong 7.5%, Rajshahi 4.9, the specific number of ICT Device not in use by division—Sylhet ranked highest 2.1%, Rangpur and Barisal (2.5% and 3% respectively) indicating higher functionality than Khulna, Chittagong, Rajshahi and Mymensing and others.

4.2.3 Ownership of ICT Device

It has been found that all sampled teachers (100%) are the owners of Smart Phones and Mobile data (counted as ICT devices in this study). Although personal to the teachers, these are used by the teachers for teaching and learning. Devices other than Smart Phones and Mobile data are owned by the institution but they have been purchased/collected from external sources/ funds besides institutions' own funds/source. These have been obtained from the LGSP and ADP funds of the local government in addition to the assistance of various projects of the Department of Education, and the A2I project. The table (4.11) below shows the source from where the schools gain these devices:

Table-4.11: Division-wise sources of ICT devices found in educational institutions.

Divisions	ICT devise in (%)					Total (%)
	Different Project of DSHE	A2I	Institutions itself	ADP	LGSP	
Dhaka	79	14	2	4	1	100
Chittagong	89	9	1	1	0	100
Rajshahi	85	7	4	3	1	100
Khulna	91	6	1	2	0	100
Sylhet	81	15	2	2	0	100
Barisal	86	6	3	4	1	100
Rangpur	79	16	1	3	1	100
Mymensingh	89	9	1	1	0	100

According to the table above the ICT Device supplied/installed by a number of agencies like local government-Union Parishads (UPs) and Upazilas (UZs), Access to Information (A2I), Education Department, and the institutions itself. Of those, the survey found that the highest number of ICT Devices installed by the institutions itself e.g. 04% in the Rajshahi division, followed by 03% in Barisal, 02% in Sylhet and Dhaka, 01% in Rangpur, Mymensing, Chittagong and Khulna division respectively.

4.3. Findings following the research objectives

4.3.1. Identifying the key learning skills intended to deliver through ICT training of BANBEIS

4.3.1.1. Identifying key learning skills through ICT training of BANBEIS

One of the four objectives of the study was to identify the key learning skills intended to deliver through ICT training of BANBEIS. In determining this, it is seen that the basic training of BANBEIS has covered a lot of content, among which—

1) ICT Basics and its Components (File/ Folder Create);
2) Introduction to' MS Word, Introducing Menu Bar Options (Select, Copy, Move, Delete, Cut and Paste, Save, alignment etc.),
3) Print Setup;
4) Introduction to Avro Keyboard Layout, Avro Phonetics, Exercise: Type a Paragraph of your own institution using Avro Phonetics.
5) Formatting Paragraph (Line spacing & Indenting) Insert Table;
6) Internet, Web browser, using search engine Download Image (JPEG, GIF, PNG, Outline), Download and Insert Picture;

7) Introduction to MS Excel (Cell, Row & column, Worksheet, Workbook, Editing & Saving, Insert, delete row& column, wrap text, merge cell, chart), Exercise-Salary Sheet;

8) Formatting values in MS-Excel, Using of Functions SUM, AVG, MAX, MIN, COUNT, ROUND etc. Exercise- Creating Result Sheet;

9) Introduction to MS Power Point (New Slide), Layout, Changing the slide design, Formatting;

10) Insert Shape, smart art, text box, word art, chart, table;

11) Insert an image with caption, heading and animation (Entrance and exit), Image editing (using PowerPoint and paint), Drawing with PowerPoint;

12) Advance animation (effect option, timing, Trigger, Emphasis, motion path);

13) Ink tools (pens), picture (outline effect, fill color, crop, rotate).

14) Drawing with shapes and scribble Equation, Screenshot, and Screen recording. convert PPT to video;

15) Download Video from YouTube (Without any Software) and edit video with any free video editing tool;

16) Insert Video to the PowerPoint Presentation. Create a group Content Using Power point;

17) Planning (TRACK, Model content, Poster work, Presentation) Individual content development (according to plan), Presentation;

18) Creation of e-mail id, Send E-mail (With Attachment) and Receive (attachment Download and save);

19) Google Services (Google Map Navigation, Google translator, Google Drive, Google Docs);

20) How to Conduct class using Zoom with Desktop and Mobile;

21) Home Practice for Preparing Content Development using PowerPoint;

22) Education Policy, Vision 2021, SDG-4, Values, and Ethics;

23) Control Panel, Task Manager, Device Manager, Troubleshooting Virus Scan, Bijoy to Unicode and Unicode to Bijoy conversion;

24) Digital content;

25) Visit important Govt. sites- (www.bangladesh.gov.bd, shed.gov.bd, tmed.gov.bd, banbeis.gov.bd, teachers.gov.bd, muktopaath.gov.bd) Plagiarism, ethics, digital footprint, and digital identity can be included instead of yellow marked portion.

4.3.1.2. The level of achieving the intended key learning skills set out in this BANBEIS's ICT training

There are 25 key skills were in BANBEIS's ICT training. The level of achievement of the said component among teachers is explored in this study. The below table (4.12) is presenting that information respectively.

Table-4.12: Level of achievement of intended training competencies by the teacher.

Learning content	Level of achievement of intended competencies by the teacher (%)	Division wise (%)							
		Dhaka	Chittagong	Rajshahi	Khulna	Sylhet	Barisal	Rangpur	Mymensingh
1) ICT Basics and its Components (File/ Folder Create);	78	81	79	77	78	76	78	79	77
2) Introduction to' MS Word, Introducing Menu Bar Options (Select, Copy, Move, Delete, Cut and Paste, Save, alignment etc.),	88	91	89	90	88	86	89	87	88
3) Print Setup;	90	93	91	92	90	88	91	89	90
4) Introduction to Avro Keyboard Layout, Avro Phonetics, Exercise: Type a Paragraph of your own institution using Avro Phonetics;	93	96	94	95	93	91	94	92	93
5) Formatting Paragraph (Line spacing & Indenting) Insert Table;	98	100	98	99	98	96	100	98	99
6) Internet, Web browser, using search engine Download Image (JPEG, GIF, PNG, Outline), Download and Insert Picture;	99	100	98	98	99	97	100	98	98
7) Introduction to MS	78	81	79	80	78	76	79	77	78

Learning content	Level of achievement of intended competencies by the teacher (%)	Division wise (%)							
		Dhaka	Chittagong	Rajshahi	Khulna	Sylhet	Barisal	Rangpur	Mymensingh
Excel (Cell, Row & column, Worksheet, Workbook, Editing & Saving, Insert, delete row& column, wrap text, merge cell, chart), Exercise-Salary Sheet;									
8) Formatting values in MS-Excel, Using of Functions SUM, AVG, MAX, MIN, COUNT, ROUND etc. Exercise-Creating Result Sheet;	64	67	65	66	64	62	65	63	64
9) Introduction to MS Power Point (New Slide), Layout, Changing the slide design, Formatting;	99	100	98	100	99	97	100	98	100
10) Insert Shape, smart art, text box, word art, chart, table;	95	98	96	97	95	93	96	94	95
11) Insert an image with caption, heading and animation (Entrance and exit), Image editing (using PowerPoint and paint), Drawing with PowerPoint;	99	100	100	100	99	100	100	100	100
12) Advance animation (effect option, timing, Trigger, Emphasis, motion path);	81	84	82	83	81	79	82	80	81
13) Ink tools (pens), picture	86	89	87	88	86	84	87	85	86

Learning content	Level of achievement of intended competencies by the teacher (%)	Division wise (%)							
		Dhaka	Chittagong	Rajshahi	Khulna	Sylhet	Barisal	Rangpur	Mymensingh
(outline effect, fill color, crop, rotate).									
14) Drawing with shapes and scribble Equation, Screen shot and Screen recording. convert PPT to video;	89	92	90	91	89	87	90	88	89
15) Download Video from YouTube (Without any Software) and edit video with any free video editing tool;	96	99	97	98	96	94	97	95	96
16) Insert Video to the PowerPoint Presentation. Create a group Content Using Power point;	91	94	92	93	91	89	92	90	91
17) Planning (TRACK, Model content, Poster work, Presentation) Individual content development (according to plan), Presentation;	83	86	84	85	83	81	84	82	83
18) Creation of e-mail id, Send E-mail (With Attachment) and Receive (attachment Download and save);	87	90	88	89	87	85	88	86	87
19) Google Services (Google Map Navigation, Google translator, Google Drive, Google Docs);	80	83	81	82	80	78	81	79	80

Learning content	Level of achievement of intended competencies by the teacher (%)	Division wise (%)							
		Dhaka	Chittagong	Rajshahi	Khulna	Sylhet	Barisal	Rangpur	Mymensingh
20) How to Conduct class using Zoom with Desktop and Mobile;	76	79	77	78	76	74	77	75	76
21) Home Practice for Preparing Content Development using PowerPoint;	96	99	97	98	96	94	97	95	96
22) Education Policy, Vision 2021, SDG-4 ,Values and Ethics;	100	98	98	99	99	98	100	100	100
23) Control Panel, Task Manager, Device Manager, Troubleshooting Virus Scan, Bijoy to Unicode and Unicode to Bijoy conversion;	94	97	95	96	94	92	95	93	94
24) Digital content;	99	97	97	98	99	99	98	99	99
25) Visit important Govt. sites-(www.bangladesh.gov.bd, shed.gov.bd, tmed.gov.bd, banbeis.gov.bd, teachers.gov.bd, muktopaath.gov.bd) Plagiarism, ethics, digital footprint, and digital identity can be included instead of yellow marked portion.	100	100	98	100	98	97	99	100	99
Average Total (%)	89.56	91.4	89.66	90.54	89.44	87.72	90.02	88.54	89.22

As can be seen in the table above, 89.56% of the teachers have acquired the skills that were prescribed in BANBEIS's ICT training. The division-wise rate of this skill is shown in graph (5) below.

Graph-5: Division-wise rate of BANBEIS's ICT training skills obtained by the trained teachers.
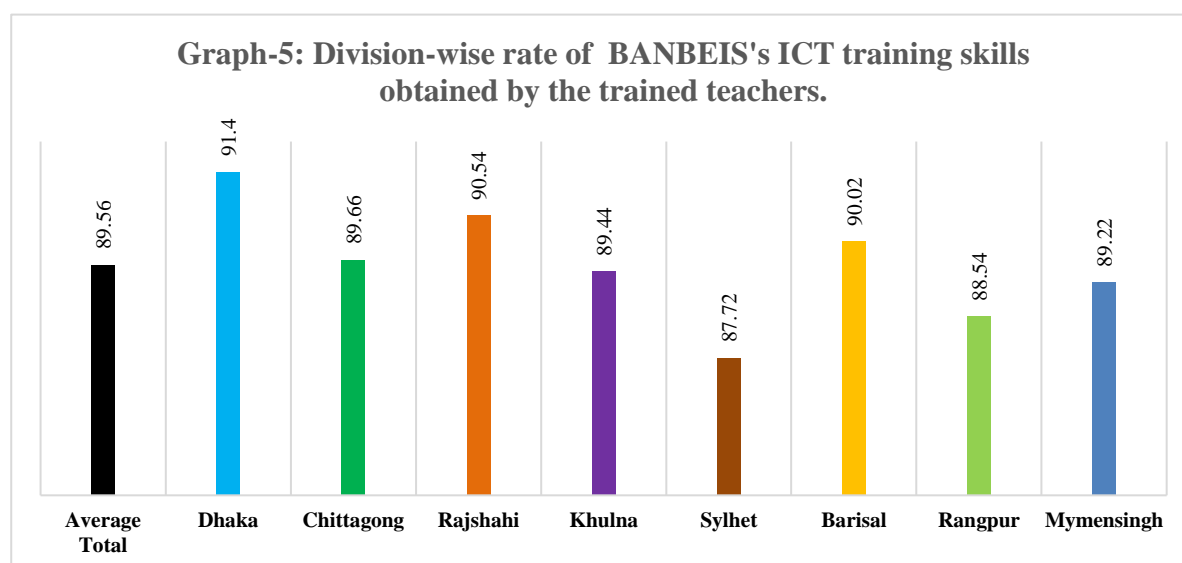
The in-depth interview determined that 10.44% teacher among training recipients was not able to achieve the all targeted skills under the BANBEIS's ICT training. However most of the teachers (on average 89.56%) i.e. training recipient teachers acquired learning skills defined by BANBEIS's ICT training course. Highest number of teachers received training in Dhaka division(91.4%), while the percentage of teachers trained was 89.66% in Chittagong, 90.54% in Rajshahi, 89.44% in Khulna, 87.72% in Sylhet, 90.02% in Barishal, 88.54% in Rangpur, and 89.22% in Mymensingh.

4.3.2. Reflection of acquired skills in conducting the classes

The ultimate goal of BANBEIS's ICT training was to teach school students through ICT-based learning so that they can fully understand the learning competencies. Therefore, this study has tried to search out the reflection of what was taught practically in teaching following the BANBEIS's ICT training goals. In line with the specified objectives of this study, the findings are presented in two points, (1) how much reflection has occurred in the general situation, and (2) how much reflection has occurred in the COVID-19 situation.

4.3.2.1. Reflection of acquired skills in conducting the online classes in the general situation

It is evident that in recent times, the interest of secondary education institutions in conducting ICT-based classes has increased. Various government initiatives such as setting up school-based ICT labs, providing ICT devices, launching teacher-window *(Shikkhok Batayon)* web

portals, rewarding teachers for creating the best content, etc. have brought about groundbreaking changes in digital classrooms management. Conduction of digital classes/sessions has started in 27.25% of the educational institutions involved in this study. Conducting Digital classes/sessions have been introduced in all classes (Class-VI to Class-X) and at least 05 (five) classes being conducted in a week in 21.5% of institutions, respectively at least 04 (Four) classes being conducted in a week in 26% of institutions, at least 03 (Three) classes being conducted in a week in 34% of institutions, at least 02 (Two) classes being conducted in a week in 25.5% of institutions, and at least 01 (One) class being conducted in a week in 38% of institutions. The number of institutions conducting digital classes of more than 5 (five) classes is 8.5%. The frequency of the digital session conduction is shown in graph (4.13) below.

Table-4.13: Frequency of the digital session conduct in normal situations.

Frequency of the digital session conduct	% of institute		Total (%)
	School	Madrasa	
More than 05 sessions in a week	12	5	8.5
At least 05 sessions in a week	28	15	21.5
At least 04 sessions in a week	39	13	26
At least 03 sessions in a week	51	17	34
At least 02 sessions in a week	53	18	35.5
At least 01 sessions in a week	57	19	38
Total on average (%)	**40**	**14.5**	**27.25**

The study investigated at which subjects were given priority among the classes that were conducted digitally. It can be said that the number of classes on science was more and the number of classes on religious education was the lowest. The finding gained through the study has focused below table.

Table-4.14: Subject gets priority in conducting digital session at studies institutions.

Subject	Priority given in Normal situation (%)	Priority given in COVID period
English	8	11
Mathematics	15	12
General Science	21	11
Social Science	7	11

Subject	Priority given in Normal situation (%)	Priority given in COVID period
Religion Study	3	10
Physics	9	12
Chemistry	8	12
Biology	10	11
ICT/ Agri. Studies	19	10
Total:	**100**	**100**

The graph below (6) shows the number of digital classes conducted on different subjects.

Graph-7: Subject-wise priority given in digital class during normal situation.
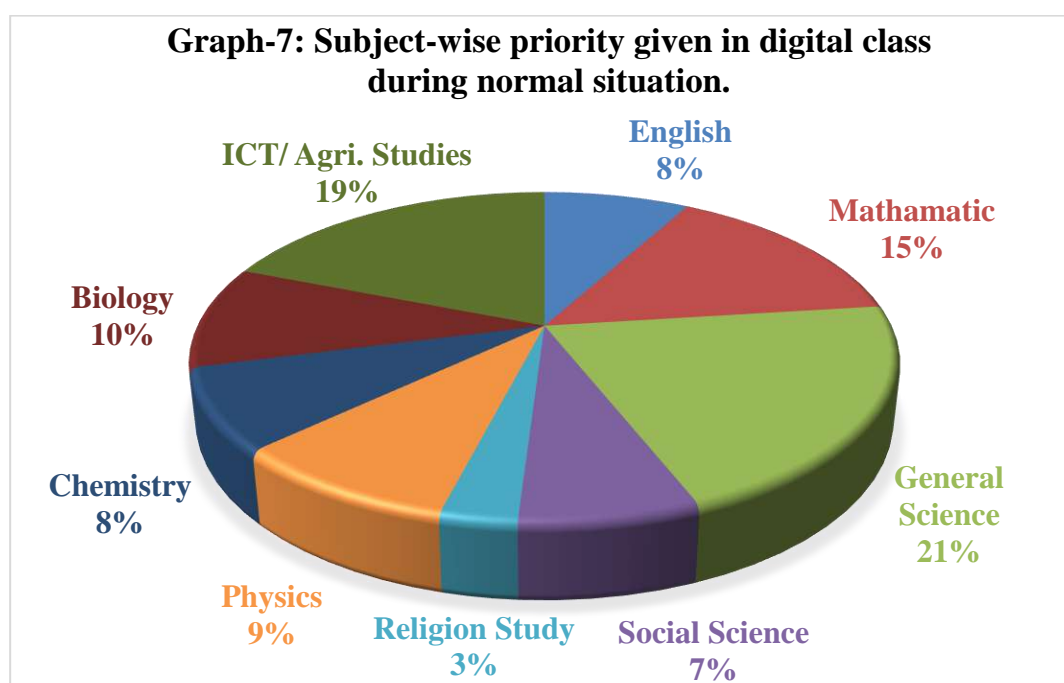
The graph-6 above shows that digital classes regarding General Science were got top priority (21%) in the study-covered institutes. The ICT & Agriculture Studies were second (19%) priority. Then respectively Mathematics 15%, Biology 10%, Physics 9%, Chemistry & English 8%, Social Science 7%, and Religion Study got priority of 3% only.

4.3.2.2. Reflection of acquired skills in conducting the online classes in the COVID-19 situation.

The COVID-19 pandemic in Bangladesh is part of the worldwide pandemic of coronavirus disease caused by severe acute respiratory syndrome coronavirus. The virus was confirmed to have spread to Bangladesh in March 2020. On March 16, 2020, the Government of Bangladesh declared closures to all academic institutions, dormitories, and coaching centers as well, considering the devastating spread of the coronavirus. With the growing public concern, the closure period got extended from time to time, and till in it continuing.

The Bangladesh government initially introduced television-based online classes to continue the learning process among students. In addition to television and radio-based learning, teachers at the secondary level are instructed by the Department of Secondary and Higher Secondary Education to take online sessions. Since then, secondary school teachers across the country have been conducting online learning.

This study explored information on online learning during the Covid-19 period. As it turns out, no organization has been able to ensure live online learning sessions. However, lesson-wise videos of class conduction have been uploaded on specific websites of the institutes' and notices have been made among the students in 60% of the institutions. The following table (4.15) provides information on the matter.

Table-15: Frequency of conducting online classes in the Covid-19 period.

Frequency of the online digital session conduct	% of institute		Average (%)
	School	**Madrasa**	
More than 05 sessions in a week	36	15	25.5
At least 05 sessions in a week	76	23	49.5
At least 04 sessions in a week	83	43	63
At least 03 sessions in a week	91	51	71
At least 02 sessions in a week	96	54	75
At least 01 sessions in a week	98	57	77.5
Total on average (%)	**80**	**40**	**60**

Online sessions during the COVID situations are being conducted in 60% of the educational institutions. On average 49.5% of the institute are conducting at least 05 (five) online sessions in a week. Respectively at least 04 (Four) classes being conducted in a week in 63% of institutions, at least 03 (Three) classes being conducted in a week in 71% of institutions, at least 02 (Two) classes being conducted in a week in 75% of institutions, and at least 01 (One) class being conducted in a week in 77.5% of institutions. And 8.5% of institutions have conducted more than 5 (five) online classes in a week.

On the other hand, it was found that the number of online classes has increased during the Covid period, as well as the deviation among the subject-wise session has decreased. The practical situation is presented in the below graph-8.

Graph-8: Subject-wise priority given in online class during COVID period.
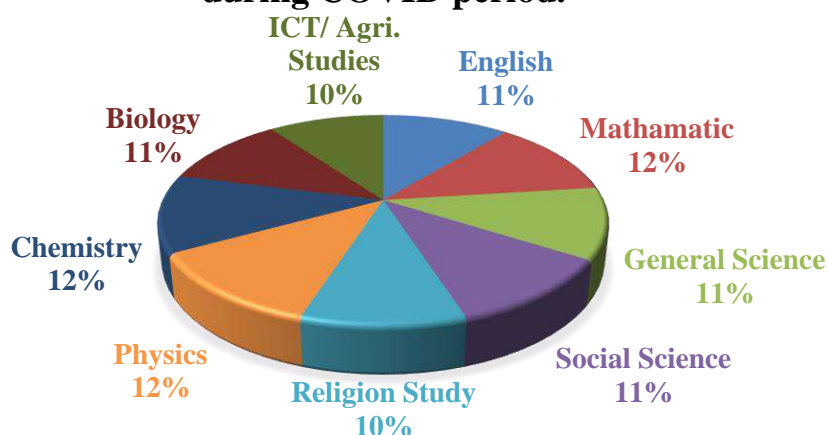
The above graph shows each of the nine subjects studied in total has been prioritized at almost the same level. However, Mathematics, Chemistry, and Physics have got slightly higher priority than other subjects.

One thing to note is that although the average number of online classes increased during the Covid period, the picture in rural and urban areas is different. Areas outside the city that were included in the study saw a decrease in the number of online classes. Before looking at it, the data of urban and rural areas are shown together in the table (4.16) below for comparison.

Table-4.16: Scenario of conducting online sessions in the urban and non-urban areas during the Covid period.

Frequency of the online digital session conduct	% of institute				Average (%)
	Urban/City area		Outside of urban areas (Char, Barind, Hil,)		
	School	Madrasa	School	Madrasa	
More than 05 sessions in a week	36	15	00	00	25.5
At least 05 sessions in a week	76	23	00	00	49.5
At least 04 sessions in a week	83	43	00	00	63
At least 03 sessions in a week	91	51	00	00	71
At least 02 sessions in a week	96	54	00	00	75
At least 01 sessions in a week	87	52	11	05	77.5
Total on average (%)	**78.17**	**39.67**	**1.83**	**0.83**	**60**

4.4.4. Reflection of ICT training skills in assessing student's learning

Assessment of learning refers to strategies designed to measure and evaluate what students know, demonstrate whether or not they have met curriculum outcomes or the goals of their individualized programs, or certify proficiency and make decisions about students' future programs or placements. In the case of secondary level education in Bangladesh, two types of assessment are generally followed. (1) Formative assessment, and (2) Summative assessment.

Formative assessment: Formative assessment refers to assessments that provide information to students and teachers that are used to improve the gaps in teaching and learning. These are often informal and ongoing, though they need not be. Data from summative assessments can be used in a formative way.

Summative assessment: Summative assessment refers to the cumulative assessments, usually occurring at the end of a unit or topic coverage, that intend to capture what a student has learned, or the quality of the learning, and judge performance against some standards. Although we often think of summative assessments as traditional objective tests, this need not be the case. For example, summative assessments could follow from an accumulation of evidence collected over time, as in a collection of student work.

No institution in the research area has assessed the learning of students through ICT. **Especially during the Covid period, no assessment was made.** However, ICT devices have been used in various ways to assess the learning of students before Covid situation (in normal situation). The areas in which ICT devices have been used to assess students' learning are described below.

4.4.4.1. Use of ICT in designing the assessment plan

In designing assessment strategies—plan, types of questions, moderation and creation of question bank, examining, evaluating can be made easier and effective by using ICT. Table (4.17) shows the division wise snapshots of ICT usages in assessment plan.

Table-4.17: Division-wise rate of institutions uses ICT in making assessment plan.

Divisions	% of institution uses ICT in making assessment plan		Total (%)
	Uses ICT	**Does not use ICT**	
Dhaka	79	21	100
Chittagong	89	11	100

Divisions	% of institution uses ICT in making assessment plan		Total (%)
	Uses ICT	Does not use ICT	
Rajshahi	85	15	100
Khulna	91	9	100
Sylhet	81	19	100
Barisal	86	14	100
Rangpur	79	21	100
Mymensingh	89	11	100

Using ICT in making assessment plan Khulna division is ahead followed by Chittagong and Mymensingh (89% each). It is quite striking that Dhaka ranked lowest along with Rangpur (79% each) compared to other divisions.

4.4.4.2. Use of ICT in preparing the assessment tools

Planning results in preparation of assessment tools to measure the students learning achievements. Table- (4.18) reveals the percentage of secondary level educational Institutions in using ICT in preparing assessment tools, revealing discrepancies even having training and ICT devices.

Table-4.18: Division-wise rate of institutions uses ICT in preparing the assessment tools.

Divisions	% of institution uses ICT in preparing the assessment tools		Total (%)
	Uses ICT	Does not use ICT	
Dhaka	59	41	100
Chittagong	69	31	100
Rajshahi	65	35	100
Khulna	71	29	100
Sylhet	61	39	100
Barisal	66	34	100
Rangpur	59	41	100
Mymensingh	69	31	100

The Table-4.18 revealed that in Dhaka and Rangpur Divisions more than 40% schools did not use ICT in preparing assessment tools compared to other divisions. Data clearly showed that Khulna division was much ahead (29% not use) in digitalizing teaching-learning including assessment of students.

4.4.4.3. Use of ICT in measuring learners' competency

Students/learners competency in using ICT showed variation though it was not investigated on rural-urban and gender differences.

Table-4.19: Division-wise rate of institutions uses ICT in calculating learners' competency.

Divisions	% of institution uses ICT in measuring learners' competency		Total (%)
	Uses ICT	Does not use ICT	
Dhaka	46	54	100
Chittagong	56	44	100
Rajshahi	52	48	100
Khulna	58	42	100
Sylhet	48	52	100
Barisal	53	47	100
Rangpur	46	54	100
Mymensingh	56	44	100

Data in the Table- 4.19 showed that even in Dhaka division 54% of Educational Institutions did not use ICT in measuring learners ICT competencies. Khulna, Rajshahi, Barisal and Mymensingh are in better position in measuring learners ICT competencies. It needs further investigation why Dhaka, being the centerplate for all programs and facilities remained behind compared to other faraway divisions.

4.4.5. To identify the challenges/limitations in using these skills in online classroom teaching and students learning assessment at the secondary level.

4.4.5.1. Problems faced in using ICT Device

In response to facing problems in using ICT devices, most of the teachers informed that they did not face any problem in using the ICT device, while only 25% of teachers mention the problem in using ICT devices. Table (4.20) shows the division wise problems the teacher faced in using from ICT Device below:

Table 4.20: Problems faced by students in using ICT Device by divisions.

Division	Faced problems (%)	Not faced problems (%)	Total (%)
Dhaka	10	90	100
Chittagong	22	78	100
Rajshahi	28	72	100
Khulna	32	68	100
Sylhet	35	65	100
Barisal	29	71	100
Rangpur	17	83	100
Mymensingh	27	73	100
Total	**25**	**75**	**100**

Source: ICT based class and online class in Covid period survey in secondary level institutions, May 2021

The teachers mentioned almost similar types of problems in using ICT devices though the percentages varied to a significant extent. In case of whether they faced problems in using ICT devices, the responses from both the Head Teacher and Assistant teachers were almost the same. But, concerning facing the type of problems, the responses of the two groups varied significantly in some cases. The Head Teacher and teachers identified the type of problems faced in using ICT device was not enough in school. Besides, they mention other reasons like network disruption; the disinterest of students; power outages etc.

4.4.5.2. Inadequacy of the devices

In a country like Bangladesh inadequacy of devices in the secondary level institutions are not unexpected which have been reflected in the following table-4.21.

Table-4.21: Division-wise teachers' opinion regarding the inadequacy of the ICT device.

Divisions	(%) of Teachers provided the opinion		Total (%)
	Have an adequate no of ICT devices	Have not adequate no of ICT devices	
Dhaka	44	56	100
Chittagong	56	44	100
Rajshahi	51	49	100
Khulna	57	43	100
Sylhet	44	56	100

| Divisions | (%) of Teachers provided the opinion | | Total (%) |
	Have an adequate no of ICT devices	Have not adequate no of ICT devices	
Barisal	58	42	100
Rangpur	50	50	100
Mymensingh	65	35	100

More than half of the schools in Dhaka, Sylhet do not have adequate number of ICT devices. In Rajshahi and Rangpur divisions nearly 50% school reported they did not have not have adequate ICT Devices.

4.4.5.3. Network disruption

Evidences suggest that Network disruption is a common problem all over Bangladesh. Following Table indicated that issue identified in the teachers opinions:

Table-4.22: Division-wise teachers' opinion regarding the disruption of Network.

| Divisions | (%) of Teachers provided the opinion | | Total (%) |
	Have disruption of Network	Have not disruption of Network	
Dhaka	57	43	100
Chittagong	88	12	100
Rajshahi	79	21	100
Khulna	84	16	100
Sylhet	74	26	100
Barisal	81	19	100
Rangpur	78	22	100
Mymensingh	82	18	100

According to the teachers' opinion Chittagong, Barisal, Rajshahi, Mymensingh, Rangpur and Dhaka had to face Network disruption problems mainly due to power outages.

4.4.5.4. Disinterest of the students

On the question on why students are not interested division wise findings also varied. Though reasons of 'not-interested in digital learning' were not investigated but future study may be carried out to identify the causes instead of majority of the students possess phones, smart phones and internet facilities. It may be assumed that easy availability of on-line recreational and other cheap and socially unacceptable programs, blog, Facebook, YouTube, etc might have disrupted their attention on studying school subjects.

Table-4.23: Division-wise teachers' opinion regarding the disinterest of students.

| Divisions | (%) of Teachers provided the opinion | | Total (%) |
	Have disinterest of students	Have not disinterested of students	
Dhaka	53	47	100
Chittagong	84	16	100
Rajshahi	75	25	100
Khulna	80	20	100
Sylhet	70	30	100
Barisal	77	23	100
Rangpur	74	26	100
Mymensingh	78	22	100

Regarding disinterest of the students in ICT use in classroom teaching-learning, teachers in Chittagong (84%) and Khulna division (80%) reported that their Institutions have highest number of students who have no interest in ICT usages. Except Dhaka division (53%) al other 07 divisions have more than 70% disinterested students ranging between 70-78%.

4.4.6. Comparison of effectiveness of BANBEIS's ICT training between COVID period and beyond COVID period

The coronavirus disease (COVID-19) pandemic has caused an unprecedented crisis in all areas of Bangladesh like other county of the world. In the field of education, this emergency has led to the massive closure of face-to-face activities of educational institutions in order to prevent the spread of the virus and mitigate its impact. This study provided a great opportunity to assess the comparative impact of BANBEIS ICT training during and outside the COVID period. The findings of the research are highlighted below.

4.4.6.1. No of Teachers uses ICT in teaching learning has increased

Analyzing the data of this study, it is seen that the number of teachers taking ICT based classes has increased during the COVID period. The following table shows division wise comparative information of teachers taking ICT based classes.

Table-4.24: Frequency of conduct ICT based class between COVID and outside the COVID period.

Divisions	Frequency (%) of conduct ICT based class (per teacher per week)			
	Beyond COVID period	**During COVID period**	**No. of increased**	**% of increase**
Dhaka	3	6	3	50
Chittagong	2	4	2	50
Rajshahi	1	3	2	33.33
Khulna	1	3	2	33.33
Sylhet	1	3	2	33.33
Barisal	1	2	1	50
Rangpur	1	3	2	33.33
Mymensingh	1	2	1	50
Total:	**11**	**23**	**12**	**47.83**

As can be seen from the list above, each teacher who have received ICT training from BANBEIS have conducted more class during COVID period on an average 47.83%. In this case, teacher of Dhaka, Chitagong, Barisal and Mymensingh division performed more classes than average rate.

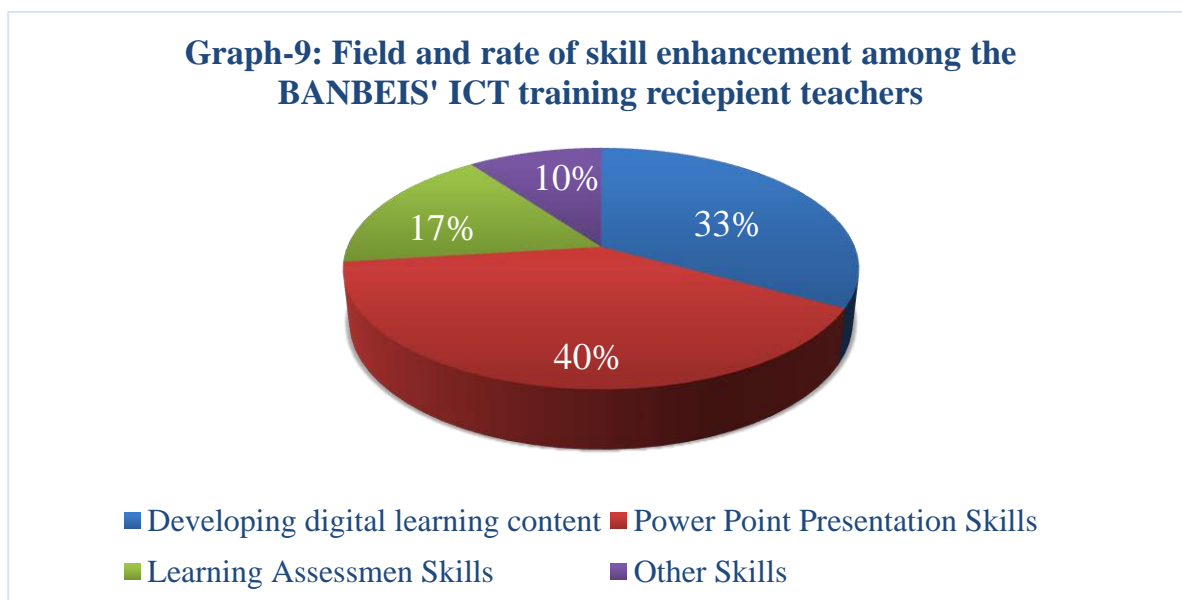## 4.4.6.2. Skills of conducting ICT based class is increased

The study also found that teachers' skills to conduct ICT classes increased significantly during the COVID period. During the COVID period, they had the opportunity to apply most of the skills they had acquired from BANBEIS training. The opinions of the teachers of the studied institutes are given below.

Table-25: Opinions of the teachers regarding obtain the ICT Skills through BANBEIS training.

Area of Skills on using ICT in Teaching Learning	No. of teachers seems to increase efficiency	% of teachers seems to increase efficiency
Developing/preparing digital learning content	380	33
Power Point Presentation Skills	461	40
Learning Assessment Skills	196	17

Area of Skills on using ICT in Teaching Learning	No. of teachers seems to increase efficiency	% of teachers seems to increase efficiency
Other Skills	115	10
Total:	**1152**	**100**

The below graph shown in which skills of BANBEIS ICT training recipients' teacher's has developed:

Graph-9: Field and rate of skill enhancement among the BANBEIS' ICT training reciepient teachers

- Developing digital learning content
- Power Point Presentation Skills
- Learning Assessmen Skills
- Other Skills

4.4.6.3. Learning Outcomes has increased

According to the research data, Learning Outcomes have increased as a result of conducting digital classes. The reflection of the opinion of the teachers, learner and guardian in this regard is shown in the graph below.

Table-26: Opinions of the teachers regarding level of learning outcomes after BANBEIS' ICT training.

Division	Opinion giving in favor of increased Learning Outcomes after receiving BANBEIS's ICT training		
	% of Teacher	**% of Guardian**	**% of Learner**
Dhaka	50	33	78
Chittagong	40	45	50
Rajshahi	27	12	32
Khulna	33	18	39

Division	Opinion giving in favor of increased Learning Outcomes after receiving BANBEIS's ICT training		
	% of Teacher	% of Guardian	% of Learner
Sylhet	26	21	42
Barisal	34	28	55
Rangpur	21	21	34
Mymensingh	29	26	40
Average %:	**32.5**	**25.5**	**46.25**

The following graph illustrates the views of teachers, parents and students.

Graph-10: Rate of teachers, parents and students is thought to have increased Learning Outcome during the Covid period.
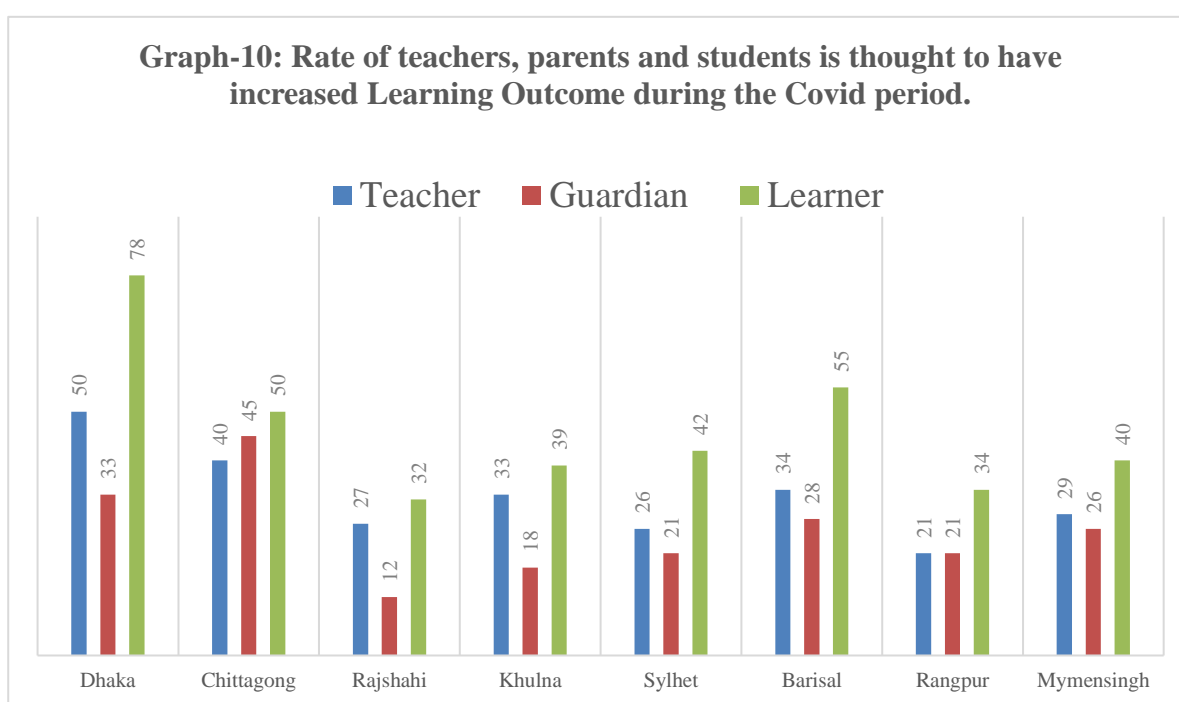
The graph above clearly shows that teachers, learners and guardians of all departments think that learning outcomes in ICT classes have increased during the COVID period. Of these, the Dhaka division has the highest increase.

CHAPTER: FIVE

Major Findings of the study

Introduction

As per study design, a total of 384 educational institutions among which 60% general, 40% Madrasas were selected for carrying out this study. These were under the selected 16 Upazilas, of 16 districts in 08 administrative divisions. Twenty-four secondary education institutions from each of the 18 upazilas were selected randomly for the study. Thus, the total number of selected secondary institutes stood at 16×24=384 (Three hundred Eighty Four). Among the 384 secondary institute, Head Teacher from each institute (384), and 02 Assistant teacher (384×2=786) who has received BANBEIS's ICT ICT training, and 01 Assistant teacher of each institute, who has not received BANBEIS's ICT training from have been interviewed. Thus a total of (384+786+384) 1535 teachers have been interviewed.

Besides KII, FGDs were used to collect data and information regarding ICT based teaching-learning situation in the sample educational Institutions in 08 divisions. In total 544 persons (361 students, 107 parents/ guardians, 76 SMC members, 144 teachers, 16 Head teachers and 48 administrative officials) participated in 32 FGDs.

Analysis and interpretation of data collected from the secondary level educational institutions in the previous chapters has provided the Key major findings.

Major/ Key Findings are as follows:

1) Among BANBEIS's ICT training recipient teachers, relatively young teachers have received training at a higher rate. This study found 48% training recipient teachers have 6-10years of teaching experience, and the teachers have 10-15 years of experience are in the second position (34%), 11% of teachers with five years and less experience; and only 07% of teachers with 15+ years of experience.

2) This study reveals that 100% of secondary educational institute have some ICT devices, but these are not sufficient to conduct regular classes in all *(class six to class ten)* classrooms.

3) In addition to the school's own devices, the personal ICT devices of teachers' are used in teaching at the institutions. Of the devices commonly used for teaching and learning in schools 60.9% of the devices in the Dhaka division are school-owned, and followed

by Chittagong 58.4%, Sylhet-54.9%, Khulna divisions- 54.5%, Rajshahi- 54.4%, Rangpur -52.9%, Mymensingh 52.2% and Barisal- 52.1%.

4) Among the existing ICT devices in the school, 72% devices have been found functional, while, only 15% was out of order/non-functional, and 13% devices not used after purchase/installation.

5) The inclusion of ICT in education requires the availability of ICT devices. This study shows that all (100%) of secondary educational institutions have ICT devices. However, 89 % of ICT devices are used actively, 6% of ICT devices are defunct and 5% of ICT devices are not used yet.

6) This study were not found cent percent ICT devices in functional. The rates of functional and inactive ICT devices are varied in divisions. Functional ICT Device were 94.3% in Dhaka, followed by 93.6% in Sylhet, 93.5% in Rangpur, 92% in Barishal, 88.1% in Rajshahi, 88% in Mymensing, 86.3% in Khulna, and 84.5% in Chittagong.

7) It has been found that all sampled teachers (100%) are the owners of Smart Phones and Mobile data (counted as ICT devices in this study). Although personal to the teachers, these are used by the teachers for teaching and learning.

8) Devices other than Smart Phones and Mobile data are owned by the institution but they have been purchased/collected from external sources/funds besides institutions' own funds/source. These have been obtained from the LGSP and ADP funds of the local government in addition to the assistance of various projects of the Department of Education, and the A2I project.

9) This study found that the highest number of ICT Devices installed by the institutions itself e.g. 04% in the Rajshahi division, followed by 03% in Barisal, 02% in Sylhet and Dhaka, 01% in Rangpur, Mymensing, Chittagong and Khulna division respectively.

10) There are 25 key skills were in BANBEIS's ICT training. 89.56% of the teachers have acquired the skills that were prescribed in BANBEIS's ICT training fully. 10.44% of the trained teachers have achieved less than the target. This study identifies the reasons

that those who did not have access to ICT before training are lagging behind in acquiring skills. On the other hand, those who have acquired all the skills were already accustomed to ICT.

11) It is evident that in recent times, the interest of secondary education institutions in conducting ICT-based classes has increased. Various government initiatives such as setting up school-based ICT labs, providing ICT devices, launching teacher-window *(Shikkhok Batayon)* web portals, rewarding teachers for creating the best content, etc. have brought about groundbreaking changes in digital classrooms management.

12) Conduction of digital classes/sessions has started in 27.25% of the educational institutions. Among them, at least 05 (five) classes being conducted in a week in 21.5% of institutions, respectively at least 04 (Four) classes being conducted in a week in 26% of institutions, at least 03 (Three) classes being conducted in a week in 34% of institutions, at least 02 (Two) classes being conducted in a week in 25.5% of institutions, and at least 01 (One) class being conducted in a week in 38% of institutions. The number of institutions conducting digital classes of more than 5 (five) classes is 8.5%.

13) In conducting ICT Base classes, text-based differences have been observed in this study. It has been noticed that, in normal situation *(before the COVID situation)* digital classes regarding General Science were got top priority (21%) in the study-covered institutes. The ICT & Agriculture Studies were second (19%) priority. Then respectively Mathematics 15%, Biology 10%, Physics 9%, Chemistry & English 8%, Social Science 7%, and Religion Study got priority of 3% only.

14) This study discover that no institution has been able to ensure live online learning sessions. However, lesson-wise videos of class conduction have been uploaded on specific websites of the institutes' and notices have been made among the students in 60% of the institutions.

15) The number of ICT based classes has increased during COVID period. Online sessions during the COVID situations are being conducted in 60% of the educational institutions, which was only 27.25% at normal times. During COVID period, on average 49.5% of the institute are conducting at least 05 (five) online sessions in a week. Respectively at least 04 (Four) classes being conducted in a week in 63% of

institutions, at least 03 (Three) classes being conducted in a week in 71% of institutions, at least 02 (Two) classes being conducted in a week in 75% of institutions, and at least 01 (One) class being conducted in a week in 77.5% of institutions. And 8.5% of institutions have conducted more than 5 (five) online classes in a week.

16) On the other hand, the deviation of frequency of subject-wise session has decreased. Each of the nine subjects studied in total has been prioritized at almost the same level. However, Mathematics, Chemistry, and Physics have got slightly higher priority than other subjects.

17) The irony is that although the average number of online classes increased during the COVID period, the picture is different in rural and urban areas. Areas outside the city that were included in the study saw a decrease in the number of online classes.

18) Two types of assessment are generally followed in the case of secondary education level, i.e. (1) Formative assessment, and (2) Summative assessment. No institution in the research area has assessed the learning of students through ICT. **Especially during the Covid period, no assessment was made.** However, ICT devices have been used in various ways to assess the learning of students before Covid situation (in normal situation).

19) The issues that need to be considered in this study in the case of student assessment under normal circumstances are mentioned below—

‹ Using ICT in making assessment plan Khulna division is ahead followed by Chittagong and Mymensingh (89% each). It is quite striking that Dhaka ranked lowest along with Rangpur (79% each) compared to other divisions.

‹ The Table revealed that in Dhaka and Rangpur Divisions more than 40% schools did not use ICT in preparing assessment tools compared to other divisions. Data clearly showed that Khulna division was much ahead (29% not use) in digitalizing teaching-learning including assessment of students.

‹ Even in Dhaka division 54% of Educational Institutions did not use ICT in measuring learners ICT competencies. Khulna, Rajshahi, Barisal and Mymensingh are in better position in measuring learners ICT competencies. It

needs further investigation why Dhaka, being the centerplate for all programs and facilities remained behind compared to other faraway divisions.

20) In response to facing problems in using ICT devices, most of the teachers informed that they did not face any problem in using the ICT device, while only 25% of teachers mention the problem in using ICT devices.

21) More than half of the schools in Dhaka, Sylhet do not have adequate number of ICT devices. In Rajshahi and Rangpur divisions nearly 50% school reported they did not have not have adequate ICT Devices.

22) In a country like Bangladesh inadequacy of devices in the secondary level institutions are not unexpected.

23) Evidences suggest that Network disruption is a common problem all over Bangladesh.

24) On the question on why students are not interested division wise findings also varied. Though reasons of 'not-interested in digital learning' were not investigated but future study may be carried out to identify the causes instead of majority of the students possess phones, smart phones and internet facilities. It may be assumed that easy availability of on-line recreational and other cheap and socially unacceptable programs, blog, Facebook, YouTube, etc might have disrupted their attention on studying school subjects.

25) Regarding disinterest of the students in ICT use in classroom teaching-learning, teachers in Chittagong (84%) and Khulna division (80%) reported that their Institutions have highest number of students who have no interest in ICT usages. Except Dhaka division (53%) al other 07 divisions have more than 70% disinterested students ranging between 70-78%.

CHAPTER: SIX

Conclusion and Recommendations

The Ministry of Education is the main portfolio for providing ICT training through BANBEIS. The study deliberately collected data from BANBEI's ICT-training recipient teachers as well as untrained teachers who are employed in secondary education institutes. A total of 1536 teachers were interviewed and among them, 384 were untrained on ICT Training of BANBEIS. Based on the findings found in the study, the study makes the following recommendations:

‹ Since the learning outcome of ICT based Teaching-Learning is more than traditional teaching-learning, the number of ICT-based classes should be increased in secondary education institutes.

‹ All the teachers of the secondary schools should have ICT Training. The Ministry of Education should take initiatives to cover ICT Training for all teachers employed in secondary level education institutes through existing UITRCE.

‹ BANBEI's ICT training course should have more sessions on digital content development. In particular, PowerPoint presentation sessions need to be lengthened to ensure that every teacher can obtain sufficient skills in making interesting teaching material.

‹ The focuses of ICT Training might be given to teacher's basic ICT skills and their application in classrooms irrespective of subjects. The most relevant and necessary aspects should come first and then the supplementary components would come. Teacher's motivational development would also be considered while designing the Training programs.

‹ A multimedia projector needs to be set up in every class from sixth to tenth class. In addition, it is necessary to ensure the establishment of IEC labs in every school.

‹ Steps should be taken to provide sufficient computer/laptop for every school so that every subject teacher has at least one. In this regard Govt. might take necessary initiatives through its different projects for improving secondary education quality.

‹ Increase in awareness at the Institutional level needs to be ensured. Authorities-Heads of the Institutions, local Education Officials, SMC members, Parents/guardians about

using ICT in the classroom should be made aware and sensitized about the benefits and needs of ICT-based online classes for ensuring quality education during this pandemic situation.

‹ The computers should be used for classroom teaching-learning not for official purposes only. In this case, innovative approaches need to be found to ensure ICT based Teaching-Learning environment by utilizing existing resources, e.g. if it is not possible to set up a separate computer lab in each institution, computers can be arranged in the teachers' common room, and the library. So that teachers can make learning content while sitting here.

‹ There should be an opportunity for the student to use computers so that they can use the ICT materials for their learning. A specific time schedule might be designed for these purposes considering the school's schedule.

‹ Government can available Wi-Fi at a reasonable price for schools and also for teachers and students. It would be feasible to wife necessary computers through the A2I project to each and every school.

‹ However, like most teaching methods or dynamics that are in the process of being tested and implemented, a lack of knowledge about the proper use of ICT can lead to gradual imperfections. In order to avoid and correct these in a timely manner, both the teaching institution and the students need to undergo special training to serve as a guide for their behavior while using ICT.

‹ Online sessions conduction similar with the Covid period should continue in the next Covid period. This will allow the students to get additional learning on the subject of interest even after the scheduled class time.

‹ Steps need to be taken at the policy level to make the local corporate sector interested in localizing the digital system of teaching and learning to secondary schools.

‹ Rewards can be arranged for inter-school teachers, inter-Upazila teachers, inter-district teachers for creating digital content, conducting more digital sessions, etc. It will bear the efficiency in creating digital content and successful session conduction among the teacher.

- The Secondary education administration should play a cautious role so that there is no dissimilarity between the use of ICT in teaching-learning between the general educational institutions and the madrasa teachers in the secondary level educational institutions. Similarly, it needs to ensure fairness in the selection of training teachers, provision of supply ICT devices in the institution, etc., taking into account on geographical differences, gender differences, etc.

- Above all, more extensive research is needed on all these issues. In particular, it is important to research the introduction of online-based assessment systems. If this can be ensured, it will be possible to build an effective education system for children, especially during special disasters, or reaching out to children.

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