

Research Report

On

**Institutions Evaluation of Trainee Teachers' participated in NACTAR
provided 30 days ICT training according to ICT Curriculum of Secondary
Education in Bangladesh**



Submitted to

Director

National Academy for Computer Training and Research (NACTAR), Bogura



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Dedication

To the frontier soldier, who always fight against COVID-19 to make a Corona free world.

Declaration

I, undersigned, as the principal researcher would like to declare that this is an original research report of our research work and it has been written by the researchers of this research study and has not been submitted for any previous degree or project. Due references have been provided on all supporting literature and resources.



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Abstract

ICT integration in education brings an innovative change in education system of Bangladesh aiming to prepare the teachers and the students providing ICT knowledge and skills, so that they can cope up with the rapid changing 21st century's job world. Accordingly, the government has adopted different policies and strategies for integrating ICT into education system and emphasized on boosting the use of ICT tools in educational institutes, improving the quality of education through ICT, more access to education and resources, ensuring ICT tools for special needed students etc. Approximately 106 textbooks of primary and secondary levels are converted to e-books, an electronic version of textbooks and published by the National Curriculum and Textbook Board (NCTB). Government is also establishing digital classroom and ICT laboratories in educational institutes. Education wing has been established under the a2i (Access to Information) project to support the digitalization of the schools and to organize more training and providing instant facilities.

Although the Government of Bangladesh is trying to integrate ICT in education almost for a decade but still the result of the integration of ICT is not that extensive like other sectors. There are both external and internal obstacles that GOB has been facing to implement ICT in classroom practice. Infrastructure, unavailability of equipment, lack of technical support, etc. are considered as external obstacles. Most of the educational institutions had not managed to implement ICT in teaching-learning activities because of their lack of resources, training, and motivation. Though some institutions in big cities have the ICT facilities in the classroom, but still, they cannot implement it successfully because of the lack of vision and planning. Moreover, most of the educational institutes do not have a proper plan, support or essential training for implementing ICT in the classroom and they don't have the vision to make school digitalized through the integration of ICT. ICT implementation in education is an on-going process, so it can be re-examined that are there the same loopholes remaining in the application or are there some new problems emerged in this issue. Focusing on this point this research study aims to assess the 30 days ICT training provided by NACTAR following the implementation of ICT Subject as per the prescribed curriculum at secondary level (VI-XII) of education in Bangladesh. In order to address the research aim following objectives are examine in this research study.

1. To review the curriculum of ICT subject at grade VI-XII of the secondary level of education;

2. To analyse the teachers' concept of ICT curriculum and whether they follow the curriculum while teaching ICT;
3. To find out the suitability of ICT curriculum in the classroom at grade VI-XII of the secondary level of education;
4. To evaluate institutions situation for ICT teaching from the teachers' view according to curriculum of ICT subject at grade VI-XII;
5. To identify the gaps in teachers ICT teaching practice following the curriculum ICT subject at grade VI-XII;
6. To evaluate the impact of 30 days training provided by NACTAR on teachers skill to reduce the gaps in teachers ICT teaching practice;
7. To identify the challenges of implementing ICT curriculum at grade VI-XII; and recommendations to uplift the situations.

The researchers manipulated a mixed method research approach in this study, where qualitative and quantitative data was collected to gain in-depth information from the key informants. The research study was evaluative and descriptive in nature and used survey design to generate data. The sample comprised of 216 ICT trainee teachers for the study chosen purposively. Besides, 10 key informants (that include head teachers, principle and NACTAR officials) and 10 curriculum experts were chosen through convenient sampling process. Two different types of data were generated for the study that is, primary and secondary data. In this study, different data collection tools were used for data triangulation, such as-questionnaire, semi-structured interview schedule and documents analysis checklist. Two types of analyses were manipulated in this study, i.e. quantitative analysis was used for quantitative data and qualitative approach was used to analyse qualitative data.

Some remarkable findings are achieved from the study, which might have policy implications. Findings of this study clearly identified the need of female teachers' more participation in ICT training, equal training opportunity for all teachers. ICT class, in fact, is particularly interrupted due to lack of ICT infrastructure as evident from the findings of the study. Some other salient findings are lack of teachers ICT knowledge and skill, inadequate ICT infrastructure that include lack of computer, multimedia projector and facility of electricity and internet. For effective ICT teaching only infrastructure is not sufficient, the authority of educational institutes must ensure that they have trained teachers from computer science background and computer lab demonstrator, and institutes also have sufficient budget and personnel for repairing computer, which are fundamental need for teaching ICT. Focusing on this drawback, some vital measures are suggested, such as- maintain right

teacher-student ratio for ICT class, sound ICT infrastructure, for example, sufficient electricity supply, multimedia projector, sound system, microphone, adequate number of computer for the students, CD-ROM, computer lab, lab assistant and free broadband internet connection with sufficient speed. Further, all secondary institutes should have their own websites, so that teachers and students can get any information easily from their website. Besides, many teachers in the sample suggested establish NACTER in every district of Bangladesh.

From the findings of curriculum review, it is observed that though the learning objectives, learning outcomes, contents, teaching methods and finally, the evaluation methods are well organized but there are many areas identified that need to be reorganized to maintain strong logical alignment among the learning objectives, learning outcomes, contents, teaching methods and the evaluation methods. As ICT is more practical oriented, therefore, it is crucial to emphasize more on students' practical skills and its application. Further, the teaching materials also need to think more critically for effective implementation before incorporating in the curriculum matching with teaching methods. Interestingly, ICT curriculum from grade VI to X contains the suitable teaching and evaluation strategies separately, which haven't found in ICT curriculum of grades XI-XII albeit there were some general guidelines for different evaluation techniques.

The findings grasp from the review of training manual prescribed by NACTAR for ICT training of secondary level ICT teachers is significant as the content information of the manual are reflected the learning outcomes of the subject ICT. Although the learning outcomes or objectives aren't mentioned separately in the manual but incorporated within the content. In content part, some issues of grade XI-XII ICT curriculum are found missing in the manual like, nano-technology, bioinformatics etc. Therefore, careful integration of the content and content information in the module is highly expected for better understanding of the contents by the trainee teachers. Further, the training manual must be arranged following the principle of TPACK (Technical, Pedagogical and Content Knowledge) for the trainee teachers, which is the demand of modern teaching.

Finally, it is expected that the findings of this research study can show some new ideas and direction for the people of different training organizations (i.e. NACTAR,) and programs (a2i), educational researcher, educationalist, curriculum experts, ICT experts and policy makers, who are involve in ICT related research, programs and curriculum development at secondary education.

List of Acronyms

4IR	: Fourth Industrial Revolution
a2i	: Access to Information
ADB	: Asian Development Bank
BBS	: Bangladesh Bureau of Statistics
BCS	: Bangladesh Civil Service
CMC	: Computer Mediated Communication
CPD	: Continuous Professional Development
FYP	: Five Year Plan
GOB	: Government of Bangladesh
HSC	: Higher Secondary School Certificate
IDEB	: Institute of Diploma Engineers Bangladesh
ICT	: Information and Communication Technology
IT	: Information Technology
MMC	: Multi-media Classroom
NACTAR	: National Academy for Computer Training and Research
NCTB	: National Curriculum and Textbook Board
NEP	: National Education Policy
NICTP	: National Information and Communication Technology Policy
MoE	: Ministry of Education
MOEBD	: Ministry of Education Bangladesh
MOSICTBD	: Ministry of Science and Information and Communication Technology of Bangladesh
NGO	: Non-government Organization
NTRAMS	: National Training and Research Academy for Multilingual Shorthand

PPPs	: Public Private Partnerships
SDGs	: Sustainable Development Goals
SMART	: Specific, Measurable, Achievable/attainable, Realistic
SSC	: Secondary School Certificate
SWAps	: Sector Wide Approaches
TQI-SEP	: Teaching Quality Improvement in Secondary Education Project
UEO	: Upazilla Education Offices
UNESCO	: United Nations Educational, Scientific and Cultural Organization
UN	: United Nations

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Chapter-1

Introduction

1.1 Background of the Study

Bangladesh, as a newly declared middle-income country is now going through a target to achieve the vision of the father of the nation, Bangabandhu Sheikh Mujibur Rahman's 'Shonar Bangla' and its identity as develop country by 2041. Government has already been taken lot of initiatives to attain UN declared sustainable development goals by 2030. To attain the goals of SDGs as well as to raise the economic strength up to the standard of a develop nation there is no alternative of education. Education is the single most powerful weapon of a nation which can enhance the labour force towards the most productive directions (Harris, 1965).

Bangladesh, at present passing through demographic transition generally referred as demographic dividend. It is such a state when within a country the working age population in the workforce increases and dependency rate decreases accordingly. Bangladesh has about more than five corer of population below 30 years. This is high time to transform this huge young labour force into productive human resource which can contribute to huge economic growth (Hossain & Nurunnobi, 2018). Education has the power to transform its people into productive form. But, what types of education is needed?

Twenty first century is known as the era of science and modern technologies (Saha & Rahman, 2015). Considering the perspective of modern era, the importance of education for sustainable national development the Govt. of Bangladesh, in order to provide computer related literacy and skills, has already been taken the steps of incorporating ICT as a core and compulsory subject of teaching-learning for secondary level learners since 2012 (Jabbar, 2015). Primarily, ICT (Information and Communication Technology) as a complete course was first introduced for grade VI in 2012 and gradually it was being included for other grades of secondary and higher secondary levels in Bangladesh.

The issue ICT in Bangladesh for quality education was first discussed in the national education policy 2010 (National Education Policy, 2010). According to Norris (2001), modern economy is a knowledge-based economy, which depends on peoples' knowledge and information which increase their skills, productivity and finally the growth rate of the country. ICT can increase peoples' knowledge and information that why it's being considered as the most powerful means of development throughout the world (IICD, 1998). Given importance on its applicability, the ICT subject is considered as compulsory for secondary (SSC-2017) and higher secondary levels (2013, HSC-2015) in Bangladesh. Therefore, the

subject ICT was introduced at all level govt. and non-govt. secondary schools, madrasah and technical education institutions equally. The course curriculum and textbook was developed as titled ‘Information and Communication Technology (ICT)’ instead of ‘Computer Education’.

According to Mark (1992), curriculum is being considered as the complete plan of education to guide one’s life to be a good and productive human being. Modern curriculum is outcome based, which enhance learners’ behavioural change positively as expected. According to Taba (1962, cited in Samad, 2015), “the amorphous product of generations of thinking is called curriculum”. Therefore, curriculum is the plan, which helps to answer some questions of any education program like: what to teach? Why to teach? Who will teach? How to teach? How long the program will run? What materials will use? What methods will apply? How to assess the performance? How to provide feedback? etc. (Samad, 2015). Curriculum has four basic elements as: objectives, contents, methods and evaluation (Ehsan, 1997), which guides the complete education process of any level or subject area. Based on the prescribed curriculum, textbooks for different subjects been designed and used in the classroom to attain their educational objectives. It is important to mention that, curriculum development is never static rather its’ always dynamic. It depends on outcomes. Textbook is the main teaching materials, which is used in the classroom. The basic elements of education are as: teacher, learners, textbook and environment (Malek, *et al.*, 2014) through which the education continues hence the curriculum being implemented.

Curriculum implementation means the real/actual use of educational plan prescribed in the curriculum with real students in a real classroom by a real teacher with the use of textbook and other related teaching aids and supplementary materials (Marsh, 2005). During implementation of the curriculum the teachers as a facilitator has the fundamental role to reduce the gap between practice and expectation (Leithwood, 1981). Modern teaching-learning theories suggested for two way participatory classroom communications, where the role of the students will be the active participants and teachers will be the passive facilitator (Hossain & Rahman, 2015). In the real classroom, during facilitating the teacher should ask some questions for himself for the fruitful implementation of any subject’s content. Like: How will I facilitate or support my learners? Do my learners are getting benefitted? etc. (Marsh, 2005).

Teaching a subject like ICT, requires multiple support. Teacher, who will facilitate must have good command over subject knowledge of ICT as well as training on that particular subject teaching (Ray, 2012). Ornstein & Hunkins (2009) predicts that, the quality implementation of any course depends mostly on the teachers' performance including their dedication, patient, training, service length (experience), motivation, confidence, attitude, modesty and honesty. Teachers must go through the curriculum to know about the expected outcomes, which must be SMART, i.e. specific, measurable, achievable/attainable, realistic, time bound, of the contents and methods of teaching as well as to know about the ways of assessment (Marsh, 2005).

Contents of the course for any particular level should be selected and organized accordingly both logically and psychologically (Samad, 2015). Like a quality teacher, ICT teaching-learning requires number of materials, such as hardware and software for quality implementation of course according to the curriculum to help the learners for better learning (Roy, 2012). Basically here for this technical subjects the learner will learn practically through laboratory work as Edgar Dale (1969) in his book, namely '*Cone of Experience*' suggested for '*Learning by doing-Go through the real experience*' for sustainability of the achieved knowledge and skills where in people remember 90% generally. Therefore, it requires computer, internet, laboratory, different software etc.

Development of checklist was suggested to get update of curriculum implementation during 1980s (Marsh, 2005). Hord and Huling-Austin (1987) suggested that, a good checklist for a course implementation could be supportive to point out the scenario of the contents (ideal, acceptable, unacceptable, up-to-date, difficult, available, accessible etc.). This checklist will provide the success and failure story of learners about any particular subject. At the same time it could be used as an assessment tool both for the learners and the subject's textbook and curricula.

Every year about two (2) million of learners are appeared for SSC examination from general govt. and non-govt. secondary schools, secondary level madrasah and from technical education institutions (Rahman, 2017). The subject ICT is compulsory for all. Definitely, the govt. has a great intention to incorporate this subject to make its population productive through IT skills. For many learners, secondary level is their last stage of formal education and they get involve in different earning process. Therefore, govt. is trying to disseminate IT

knowledge among it's people so that they can cope up with the modern ICT based society of 21st century.

This study has taken an attempt to investigate what actually happening at present in the real situation of ICT teaching-learning. Jabbar (2015) predicts that in the most secondary schools there are no expert/trained teachers for teaching ICT. Most of the schools are supporting the course by their science or math teachers. They are not skilled to teach ICT, therefore it hampers the students and the actual purpose of the subject ICT remains in the dark. He also expected that, government will develop some master trainer to facilitate other ICT teachers for effective classroom facilitation to implement the course fruitfully but no initiative was seen of that time (ibid, 2015). But at present different organization like NACTAR are providing computer training for the ICT teachers of secondary level for their teaching skills development.

The purpose of this research is to explore the existing situation of the implementation of the subject ICT at secondary level in Bangladesh generating information from different perspective like: curriculum, textbook, teacher, teacher training, materials, environment etc. to get the clear scenario about purpose, practice, achievements and limitations/gaps. It is expected that the findings of the study may help the policy makers, NCTB experts, trainers and the teachers as well as the learners and their parents to develop their attitude towards ICT subject, its curriculum and other required components for fruitful implementation.

1.2 Rational and Significance of the study

We are living in the era of science. Delor commission, who have been suggested for four (04) pillars of education (1993) that are as: 1. Learning to Know, 2. Learning do, 3. Learning to be, and 4. Learning to live together; is now being extended as five pillars of education by UNESCO where the newly added pillar is 'Learning to empower and helped to be empowered'. The last pillar is very important as here the emphasis has been given on the contemporary ICT skills of the learners essential for their day-to-day life. Roberts (1982), suggested for seven core emphases for science curriculum development among them 'Science for everyday copying' 'The scientific skill development' and 'The science, technology and decision' are very closely related to ICT course curriculum and teaching materials. Besides Fensham (1994), suggested for another important three (3) emphases for science curriculum where 'science for application' and 'science for making things' is related to ICT course (Tithi

& Hossain, 2013). Truly, if we want to empower our learners through ICT skills for twenty first century then the ICT curriculum must have the above mentioned emphases. The study will explore the curriculum whether it covers the suggested emphasis as learning outcomes and contents to enhance learners ICT skills properly. Besides, this study will also explore the real scenario of the ICT teachers, their classroom facilitation, picture about related materials and resources, laboratory facilities, learners' interest and benefit, and the existing gap between practice and instructions, limitations of the curriculum and supportive materials will also be identified through the study.

The findings of the study may contribute to find out the underlying gaps in the process of implementing the subject ICT at secondary level in Bangladesh and further, it may help the concern authorities to develop their prevailing system of teaching ICT subject stronger as well as to develop its associated materials. Finally, the learners will be benefitted for their future life when the gaps will be identified.

1.3 Research objectives

The cardinal intention of this study is to evaluate trainees' educational institute who received 30 days ICT training from NACTAR following the implementation of ICT Subject as per the prescribed curriculum in secondary schools, colleges, madrasah and technical educational institutes of Bangladesh in a holistic approach. From that point of view, the specific research objectives of this study are:

1. To review the curriculum of ICT subject at grade VI-XII of the secondary level of education;
2. To analyse the teachers' concept of ICT curriculum and whether they follow the curriculum while teaching ICT;
3. To find out the suitability of ICT curriculum in the classroom at grade VI-XII of the secondary level of education;
4. To evaluate institutions situation for ICT teaching from the teachers' view according to curriculum of ICT subject at grade VI-XII;
5. To identify the gaps in teachers ICT teaching practice following the curriculum of ICT subject at grade VI-XII;
6. To evaluate the impact of 30 days training provided by NACTAR on teachers skill to reduce the gaps in teachers ICT teaching practice;

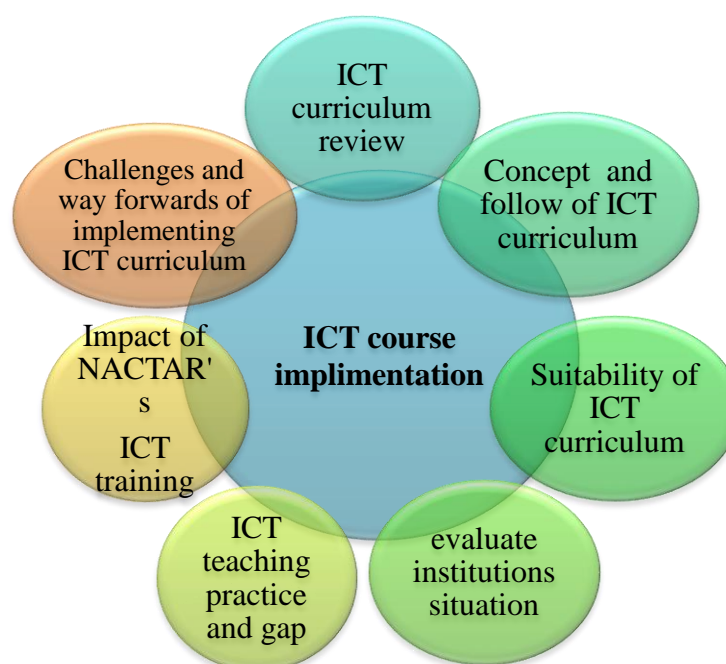
7. To identify the challenges of implementing ICT curriculum at grade VI-XII; and recommendations to uplift the situations.

1.4 Conceptual Framework of the Study

According to Pinar and Irwin (2005), instrumental action and situational practice are the basic two fundamental issues for curriculum or any course implementation. Instructional actions should be properly developed by the curriculum and subject experts, where the situational practice happens through teaching-learning in the real classroom with proper human resource and suitable materials. Here, efficient teacher interact with students with interesting techniques to attain their combined objectives. All the components of teaching-learning, that is curriculum, textbook, teacher, students, materials, environment, parents etc. are interconnected and effective implementation mostly depends on the role of each component (Bodiuzzaman, 2011). Based on the previous study and reviewed literature the following conceptual framework was used for the study:

Figure 1.1:

Conceptual framework of the study



This interrelated conceptual framework was used throughout the study to obtain the real data regarding the current research problem. Within the framework there were seven interrelated themes, collectively they implement the subject ICT fruitfully at any grade of secondary level. During research, from each theme of the framework different issues were investigated for picking out the necessary data for the study. Like, within curriculum analysis the following issues were investigated: (i) What to teach? (ii) Why to teach? (iii) To whom the program is being designed? (iv) How to teach? and (v) How to evaluate? etc.

This chapter discussed about the background, perspective, rationale, significance and objectives of the current research. In the next chapter literature review of the study will be discussed.

Chapter-2

Literature Review

2.1 Introduction

A literature review is one of the crucial elements of research. It gives an idea about already known affairs connected to research area and also build a thought about the methodological and theoretical approaches has been used in this particular area (Imon, 2017). The literature review also helps to interpret the findings as well as help to learn from previous mistakes (Bryman, 2015 as cited in Imon, 2017). The researcher has tried to review research studies on ICT integration in education carried out throughout the world. In this chapter, researcher has attempted to bring out the exemplary implementation processes applied in western developed countries, as well as the method being used in developing countries with a same socio-economic background like Bangladesh. Moreover, literature about ICT integration in Bangladesh has also been reviewed to find out the gaps that both future researchers and this research can study. The researcher has reviewed a selective literature according to the goal of the research.

This literature review section is used to outline existing literature concerning the study area. Viewing the previous studies and related literature is important for providing scientific facts and basement for any research. A number of researchers have worked on this field. Some of the most important studies are presented here for understanding deeply about the current topic.

2.2 The Structure of the Education System in Bangladesh

Bangabandhu identified education as a pre-condition for emancipating the down-trodden. Hence, he worked to ensure pro-people education system. With a view to translate his own thoughts on education, Bangabandhu formed the Education Commission and prioritised technical, vocational and ICT education in the first Five Year Plan. Education in Bangladesh has three major stages - primary, secondary and higher education. Primary education is a 5-year cycle, while secondary education is a 7-year one with three sub-cycles: 3 years of junior secondary, 2 years of secondary and 2 years of higher secondary. The entry age for primary is 6 years. The junior secondary, secondary and higher secondary stages are designed for age groups 11-13, 14-15 and 16-17 years respectively. Higher secondary is followed by higher education in general, technical, technology and medical streams requiring 5-6 years to obtain a Master's degree. There are basically three different types of education in Bangladesh namely general education, madrasah education, technical and vocational education. Another types of education namely English medium based education also existed

up to higher secondary level. The entire education system of Bangladesh has presented in the following diagram-

Figure 2.1:

Education structure of Bangladesh

THE PRESENT EDUCATIONAL STRUCTURE OF BANGLADESH															
Age	Grade														
26+															
25+	XX					Ph. D(Engr)		Ph.D(Medical)							
24+	XIX			Ph. D	PostMBBS Dipl						Ph. D (Education)				
23+	XVIII		M.Phil		M.Phil(Medical)										
22+	XVII	MA/ MSc/ MCom/ MSS/ MBA			LLM	M B B S BDS	MSc(Engr)	MSc.(Agr)			MBA	M.Ed & M A(Edn)	MFA	MA(LSc)	
21+	XVI	Bachelor (Hons)	Masters (Prel)	LLB(Hons)		BSc.Eng BSc.Agr BSc.Text BSc.Leath	BSc.Eng	BSc (Tech.Edn)	BBA	B.Ed Dip.Ed & BP ED			Dip.(LSc)	Kamir	
20+	XV		Bachelor (Pass)					Diploma (Engineering)			BFA				
19+	XIV														
18+	XIII														
17+	XII	Secondary	Examination				HSC			HSC Voc, C in Ag	C in Edu.	Pre-Degree BFA	Diploma in Comm	Allim	
16+	XI		HIGHER SECONDARY EDUCATION												
e15+	X		Examination				SSC		TRADE Certificate/ SSC Vocational		ARTISAN COURSE e.g. CERAMICS				Dakhil
14+	IX		SECONDARY EDUCATION												
13+	VIII		JUNIOR SECONDARY EDUCATION												
12+	VII														
11+	VI														
10+	V		PRIMARY EDUCATION										Ebtedayee		
9+	IV														
8+	III														
7+	II														
6+	I														
5+	PRE-PRI MARY EDUCATION														
4+															
3+															

(Source: BANBEIS, 2010)

2.3 ICT in and for education

Government of Bangladesh, as per its “Vision 2021” is committed to ensure application of Information and Communication Technology (ICT) in all spheres of development. To this end, the Ministry of Education (MoE) put forward the Master Plan for ICT in Education in Bangladesh (2012-2021) with the intention of “modernizing and revolutionizing Bangladesh’s education system through the use of ICT, promoting technology-based teaching and learning as a strategic lever to achieving Bangladesh’s Vision 2021” (MoE, 2019). The latest progress report regarding implementation of the said master plan has pointed out key achievements, as presented below:

Table 2.1:

Achievements in implementing the Master Plan for ICT in Education in Bangladesh (2012-2021)

ICT aspect	Achievements in Brief
ICT-enabled teaching-learning environment	Progress has been made in enhancing the teaching and learning environment by using ICT in classrooms (one laptop and one projector per classroom). In addition, a limited number of teaching institutions have been equipped with computer labs.
Dissemination of quality learning material using ICT	Awareness raising campaigns are to be initiated to spread information about the digital portal developed as part of the Access to Information (A2I) Programme as well as about the digital content developed by the National Curriculum and Textbook Board (NCTB).
Rural-urban disparities in ICT capacity and awareness	Limitations faced by learners and teachers in semi-urban and rural areas due to lack of infrastructure facilities as well as due to inadequacy in terms of internet connectivity have been identified.
ICT role in monitoring and reporting capacity	Need for improving the monitoring and reporting capacities of education managers have been mapped and directives to strengthen accountability and transparency have been put forward.

(Source: Ministry of Education, 2019)

2.4 21st century skills and the 4th industrial revolution

Closely related to the challenges and potentials presented by ICT are questions about the educational responses to the imperatives of two interconnected concepts – the 21st century skills and the 4th Industrial Revolution. The honourable prime minister of Bangladesh Sheikh Hasina recently said, "It is not only Bangladesh, the whole world will need skilled manpower... and for that we have reformed our education system, giving priority to vocational training" (Chowdhury, 2012:37). She told at the international conference on "Skills Readiness for Achieving SDG and Adopting Industrial Revolution 4.0" on February 2, 2020. The event was organised by the Institute of Diploma Engineers Bangladesh (IDEB) and the Colombo Plan Staff College in Manila, Philippines. The Prime Minister indicated an important priority for national education development. The question is: how are buzzwords such as the "21st century skills" and the "Fourth Industrial Revolution"

understood by the education stake holders and what is happening on the ground in the thousands of institutions at all levels across the country? Klaus Schwab (2016) the founder of the World Economic Forum and the organiser of the annual Davos Summit, is credited with popularising this term. As Schwab explains, the First Industrial Revolution started in the 1760s, using water and steam power to mechanise production. The second, beginning in the 1870s, used electric power to create assembly lines and mass production. The third, starting from the 1960s, used electronics and information technology, also known as digital technology, to automate production. The Fourth Industrial Revolution (4IR) now builds on the digital revolution (Schwab, 2016) The latest industrial revolution blurs the lines between the physical, digital and biological spheres in an unprecedented way. The 4IR is radically different, since it is more than only a technological shift in economic production, as the previous three were. Through the potential combination of physical, digital and biological technologies, it opens unlimited possibilities for addressing critical challenges of poverty, inequality and sustainable development. However, beyond the hype surrounding 4IR, the potentials and challenges have to be seen from the perspective of the real world, especially from the point of view of low income countries like Bangladesh, where the majority of the world's people still live. The prospects and problems are spectacularly different for most people in these countries when compared to those in wealthier countries. Over 80% of the Bangladesh workforce is employed in the informal economy, which is not regulated by worker welfare and rights standards. A third of the workforce has no education, 26% have only primary education and 31% have only up to secondary education, according to a 2017 Labour Force Survey. Over 40% of workers are engaged in the low-skill and low-wage agricultural sector. The concept note for the Eighth Five Year Plan (FY2021- 25) that is under preparation says that the overall quality of the labour force is much below the level that is needed to achieve the planned 15% growth in manufacturing, to expand the organised service sector, and to facilitate the transition to an upper middle income country (Ahmed, 2020). Life and the livelihoods of the majority of people in Bangladesh are largely characterised by the use of the second or even the first Industrial Revolution technologies. At the same time, ironically, most people are also touched by the third Industrial Revolution through the penetration of mobile phone technology. The features of 4IR can be found in some of the activities of a handful of the better educated and privileged population who benefit from or contribute to its development at home or abroad. What this means is that simultaneously, technologies and people's skills, as well as their attitudes and aspirations, have to be lifted across the board in all phases of industrial revolutions, starting from

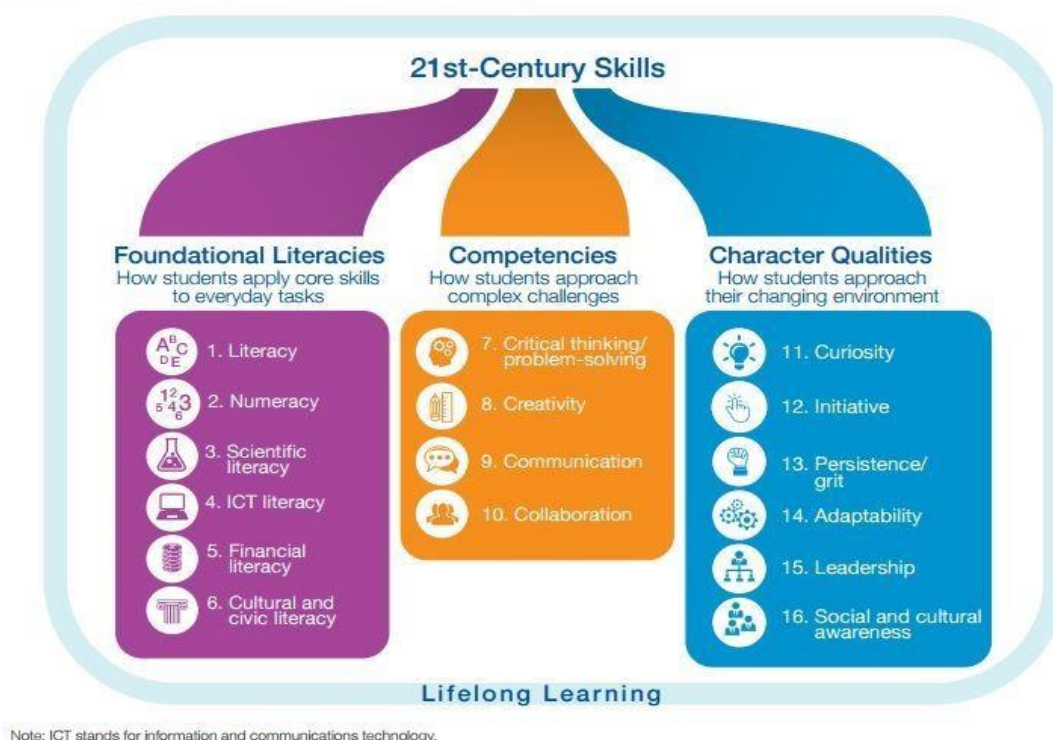
wherever the people are on this spectrum. This is where skills formation, the role of the education system and the relevance of 21st century skills come in.

What are called the 21st century skills are not necessarily all novel, nor do they mark a clean break from what were important in the 20th century or the 19th century. There are common and timeless elements of quality and relevance for learners and the whole of society in any system of education. Education systems have always struggled to achieve and maintain these essential elements, and they have not become invalid in the 21st century (Ibid.).

Figure 2.2:

21st Century Skills

Exhibit 1: Students require 16 skills for the 21st century



(Source: World Economic Forum, ““What are the 21st Century Skills Every Student Needs?” 2016.)

The World Economic Forum formulation of 21st century skills recognises the value of the foundational skills of multiple literacies, the essential tools for learning. This is the base on which the higher order skills of solving problems and thinking critically are built. Young people also have to be helped with social and emotional maturity and acquiring moral and ethical values— the qualities of character. A lifelong learning approach has to be adopted for this. As in the case of technology adoption and adaptation, skills development and education also need to consider the perennial basic and essential elements that can respond to the

diverse phases of technology, production, consumption, lifestyle and expectations in which people find themselves (Soffel, 2016). The education authorities the 'Ministry of Primary and Mass Education' and the two divisions of the Ministry of Education and the National Curriculum and Textbook Board are all engaged in a review of school curricula in the context of 21st century challenges. What is more important than formulating the curriculum is to find effective ways of implementing the curriculum. Teachers- their skills, professionalism and motivations—are the key here. So is the way students' learning is assessed which profoundly influences what happens in classrooms and what attract students' and teachers' attention. Look at the negative backwash effects of the current public examinations—too early and too frequent; many questions on what they actually assess; and the resulting distortion of the teaching-learning process in schools. A good move is to start streaming students to different tracks from 11th grade rather than 9th grade, something which is under consideration now. The aim is to build a common foundation of competencies for all, and not force young people to foreclose their life options early. Klaus Schwab (2016) had warned that we face the danger of a job market that is increasingly segregated into "low-skill/low-pay" and "high-skill/high-pay" segments, giving rise to growing social tensions. Coping with the implications of this danger for education and skill development is a continuing concern. Numerous structural and operational obstacles to necessary reforms in education and skills formation and how to deal with these have to be addressed.

2.5 ICT, change and the importance of teachers' perspectives

ICT has been integrated in education with a belief that it is a catalyst of change that can encourage knowledge transformation, critical thinking and student-centred learning (Roblyer & Doering, 2010). Accordingly, governments are adopting different policies and strategies for integrating ICT into education systems (Kozma, 2008). However, the potential of ICT in education is not yet been clearly realised (Moonen, 2008). One reason for this is that teaching professionals are often not adequately prepared for teaching with ICT (McDougall, 2008). School teachers are trained in and prepared for implementing school curricula by a cadre of professionals or teacher trainers, who themselves struggle with understanding the full potential of the technology (Swennen & Klink, 2009). It is often reported that government initiatives regarding enhancing the quality of education around the world, in both developed and developing countries, mostly focus on primary and secondary education sectors and preparing the teachers of these schools. Little focus is given to teacher education programmes, and preparing teacher educators. Consequently, this remains an

under-researched area (Koster, Brekelmans, Korthagen, & Wubbels, 2005; O'Sullivan, 2010 as cited in Chowdhury, 2012). This is also true in regard to research about integrating ICT in education. A considerable number of studies can be found that focus on school teachers' perspectives and classroom practice of using ICT in schools (Ertmer & Ottenbreit-Leftwich, 2010), but relatively few studies are found that focus on the teacher educators' perspectives of using ICT in teacher education programs (Peeraer & Petegem, 2011), particularly in the context of a developing country (Shohel & Power, 2010).

2.6 The Bangladeshi Context

Bangladesh is a developing country with a density of 1265 persons per square kilometre (Bangladesh Bureau of Statistics [BBS], 2009). The natural resources available in this country are not sufficient to provide economic emancipation to this huge population, so the Bangladeshi Government policies always emphasise the potential for transforming this large population into human resources (Hoque, 2002). Consequently, one of the major goals of the national education policy is to develop human resource through education and training for national and international markets, and, by doing so, to accelerate economic progress and to enhance the quality of life for the people of Bangladesh (Ministry of Education Bangladesh [MOEBD], 2010)). One major source of earning for Bangladesh is the remittance from Bangladeshi people working overseas (Hoque, 2002). Bangladesh sees ICT as an important potential area for earning foreign currency, and consequently established the National Information and Communication Technology Policy-2009 [NICTP-2009] as a key initiative to develop competent ICT resource persons, who will work for international ICT markets and contribute to the national economy. This policy is also reflected in the recent education policy in Bangladesh, where particular emphasis is placed on the development of ICT competency among the students (MOEBD, 2010). It is noteworthy that the existing education system in Bangladesh was introduced by the British colonisers in the early 19th century, and its aim was to produce skilled people, who could help the colonisers by assisting with clerical work (Salahuddin & Chowdhury, 2010). Consequently, the British schooling structure, including curriculum, syllabus, and textbooks, became part of the Bangladeshi education system, and to some extent there is still evidence of its influence. There has been a historic and continuing dependence on European countries to inform the curriculum and recently ICT is a new addition to this list.

It is often claimed that ICT is a western innovation, and it is being introduced into other countries by international commercial agencies, such as the World Bank (Zembylas &

Vrasidas, 2005). Similarly, in Bangladesh, ICT is being incorporated in education through support from international financial organisations, such as the Asian Development Bank (ADB) (Pouzevara & Khan, 2007) and the Department of International Development, UK (Shohel & Power, 2010). In addition, foreign consultants are being appointed to design ICT curricula and textbooks, and to train the educators, so that the educators can then train the school teachers to implement ICT in education. For example, the Ministry of Education, Bangladesh, has been implementing a project called Teaching Quality Improvement in Secondary Education Project (TQI-SEP) since 2005 with an aim to enhance teaching quality of the secondary teachers (Chowdhury, 2012). In addition to, National Academy for Computer Training and Research (NACTAR) also provided various ICT based training towards teachers of school, college, madrasah and technical and vocational educational institutions.

2.7 ICT integration in education of Bangladesh

The Government of Bangladesh (GOB) has taken an initiative of formulating their first ICT policy in 2002 but did not succeed because of inactiveness of the stakeholders. In term of present government, a revised policy has passed in 2009, where they took almost all the components from previous one and include an action plan to implement it successfully. The aim of this well-developed policy is reducing poverty and unemployment by producing an ICT knowledge-based society throughout the country. It was most important to include ICT in education to achieve the objectives of digital Bangladesh. According to the policy statement, GOB emphasized on boosting the use of ICT tools in schools, improving the quality of education through ICT, more access to education and resources, ensuring ICT tools for special needed students etc. The policy also gave importance on initiating diploma and trade courses for the teachers to build their capacity of using ICT tools in classroom practices (Wallet, 2014). Although the Government of Bangladesh is trying to integrate ICT in education almost for a decade but still the result of the integration of ICT is not that extensive like other sectors. There are both external and internal obstacles that GOB has been facing to implement ICT in classroom practice. Infrastructure, unavailability of equipment, lack of technical support, etc. are considered as external obstacles. On the other hand, internal barriers include school levels and teacher levels factors such as an organizational practice or teacher's motivation of using ICT in the classroom (Parvin, 2013). Most of the educational institutions had not managed to implement ICT in teaching-learning activities because of their lack of resources, training, and motivation. Some institutions in big cities have the

facilities in the classroom, but still, they cannot implement it successfully because of the lack of vision and planning. Therefore, government and some NGO's are trying to train the teachers and providing infrastructure facilities to achieve successful integration of ICT in all level of education as a part of government's vision of making a digital Bangladesh within 2021 (Khan et al., 2012). Educational institutions of Bangladesh mostly use their computers for storage and printing purposes. For instance, Upazilla education offices (UEO) have their chance to use computers for administrative purpose, whereas primary and secondary schools are hardly using ICT in their organizational activities. The Internet has been reaching the remote areas of the countries and mostly by the help of mobile operator companies (Rahman et al., 2012 as cited in Imon, 2017). Moreover, most of the schools of Bangladesh do not have a proper plan, support or essential training for implementing ICT in the classroom. They also don't have the vision to make school digitalized through the integration of ICT. The shortfall of a vision for the successful integration of ICT into teaching-learning process makes the situation worse (Tondeur, Van Keer, van Braak, & Valcke, 2008 as cited in Imon, 2017). Previous studies described the situation of ICT usage in different levels, but those reviews were not exclusively connected with the education policy. Most of the studies were focused on the challenges, and some mentioned the limited extent of ICT usage as well. Researcher, in this study, assume that the situation has changed over last few years because of the implementation of the master plan of ICT, which was a consequence of national education policy. Also, ICT implementation in education is an on-going process, so it can be re-examined that are there the same loopholes remaining in the application or are there some new problems emerged in this issue.

2.8 Government vision and initiatives on ICT integration

The government of any country should have to be very clear about their national ICT policy that involves all sectors including education. ICT in education is one of the sector plans of national policy, which is linked up with other sectorial programs, policies, and development. Sector Wide Approaches (SWAs) play a crucial role in integrating all sectors under a standard policy. If government faces difficulty in allocating money for large ICT investment, then PPPs (Public Private Partnerships) can be significant drivers to solve the financial problem in this sector. Private enterprise can usually move faster than governments to exploit the benefits of ICT (ADB, 2009). As part of its development aspirations, the government of Bangladesh has established Vision 2021. GOB has come up with the National ICT Policy-2009, National Education Policy-2010 and Master plan for Information and

communication technology in Education- 2013 to act as a catalyst in the country moves to become Digital Bangladesh by 2021 and thereby upgrade its position from developing to a middle-income country. In pursuit of Digital Bangladesh by 2021, it is vital that Bangladesh invests in Information Communication Technology (ICT) to improve its human capital to ensure that trained and skilled and well-educated human resources are created as human capital, which is the crucial tool to boost the country's development. Approximately 106 textbooks of primary and secondary levels are converted to e-books, an electronic version of textbooks and published by the National Curriculum and Textbook Board (NCTB). Government is also establishing digital classroom and ICT laboratories in schools. Education wing has been established under the a2i (Access to Information) project to support the digitalization of the schools and to organize more training and providing instant facilities. Beside this, private schools are also increasing their ICT facilities in the classroom and trying to ensure better teaching-learning environment. Different NGO's are also working with some private schools to enhance these services. Information and communication for Development society (ICTD) think ICT can bring a positive and sustainable development in the education sector, which can also bring the economic freedom to people (Guttermann *et al.*, 2009). Likely, to ensure education for all, improve the standard of education, get more skilled workforce, eradicate the digital discrimination GOB also has taken a master plan in 2013 on implementing ICT in education, which supports their education policy taken in 2010. According to Ministry of Education (2013, p.58), "policymakers in Bangladesh widely accept that access to Information and Communication Technology (ICT) in education can help individuals to compete in a global economy by creating a skilled workforce and facilitating social mobility." According to ICT master plan (2013), MOE destined some implementation strategies for ICT in education. There, they emphasized on collaboration between government and non-government organizations for sharing experience and resources. Moreover, in this plan they identify the need of sufficient funding, ensuring people's participation in all level, using modern and sustainable technologies, enhancing the skills, prioritize on-going implementation projects and providing safe and effective technology use. Followed by this master plan "Access to Information" (a2i, 2016) reveal that establishing full-fledged computer labs in every school was expensive, as a result, they started to equipped school with one laptop and projector as a pilot project to introduce multimedia classroom. After taking the very positive feedback, they began to establish Multimedia Classroom (MMC) at all schools of the country. At present, among 19,847 secondary schools of Bangladesh, 16,859 schools have the computer now in their schools, and 15,085 have

multimedia to use ICT in their classroom practices (BANBEIS, 2016). MMC allowed teachers to present complex ideas through audio-visual contents and students started to get a better understanding of previously completed topics (a2i, 2012). In the process of education, the human is the central element, but there is always a limit of the human part. Other interventions need to be brought out to overcome the limitations and for successful delivery and transformation of knowledge. ICT is taking this potential role of contributing to improvement in the effectiveness and efficiency of education in general (UNESCO, 2004).

2.9 ICT policies in Bangladesh

The Government of Bangladesh has given emphasis to the inclusion of ICT in the education system. For this purpose, different policies have been developed and are being implemented to integrate ICT in the education system. In the following paragraph key elements, i.e. National Information and Communication Technology Policy (NICTP)-2009, the National Education Policy (NEP)-2010, and the ICT Curriculum for secondary level of education are discussed (Chowdhury, 2012).

2.9.1 The National Information and Communication Technology Policy (NICTP)-2009

The National Information and Communication Technology Policy (NICTP)-2009 of Bangladesh considers ICT as an essential means for the country's economic and social development (Ministry of Science and Information and Communication Technology of Bangladesh [MOSICTBD], 2009). The policy defines ICT as any kind of electronic technology that supports the creating, preserving, processing, transforming and disseminating of information. This policy addresses all public sectors of Bangladesh, such as business, social-welfare, and education, and it recommends strategies for integrating ICT into each sector. In regard to the education sector, this policy aims to develop citizen's computer literacy, and to encourage research and development work on ICT. It advocates ICT subject in primary, secondary, technical and vocational education and training programs. Bangladesh's national ICT policy considers ICT as a fundamental skill of the 21st century, and suggests different strategies to develop ICT literacy for primary and secondary teachers and students. For this purpose, the policy recommends developing the ICT infrastructure in schools and teacher training institutions through the provision of computers, local area networks and Internet connections. The policy also regards ICT as an effective tool for teaching and learning activities, and mandated the preparation of multimedia-based content and materials for the teacher training programs. In order to encourage teachers and teacher educators to use ICT in classrooms, the policy advises providing them with ICT loans and

incentives, so that they can buy ICT equipment and prepare resources for multimedia based classroom environments. It also recommends peer-learning methods and action research as key strategies for preparing teachers to use ICT in classrooms. With a view to integrating ICT in education, the ICT policy suggests preparing digital learning content, such as e-books, in Bengali scripts and disseminating those in schools. The national ICT policy aims to introduce ICT-related subjects at all levels of education, and to progressively upgrade the curriculum. It also proposes to set up a central online database of digitally developed learning materials, e-books and lesson-plans, so that teachers and students can gain easy access to resources and find essential information. The policy further recommends recruiting teachers in schools, who have considerable ICT knowledge and skills. In addition, the policy advocates the preparation of appropriate learning materials to support the education of children with special needs (Chowdhury, 2012).

2.9.2 The National Education Policy (NEP)-2010

The National Education Policy-2010 also emphasizes the integration of ICT in the education system suggesting that ICT is one of the most important elements to lever the quality of education (Ministry of Education of Bangladesh [MOEBD], 2010). The first chapter of the policy (the Goals and Objectives of Education) consists of 30 general objectives of education in Bangladesh and the twenty-first objective is "to increase the use of information and communication technology as a teaching-learning tool in all levels of education" (p. 2). Accordingly, in chapter four, 'Secondary Education', the policy proposes to introduce ICT as a compulsory subject in the secondary curriculum, and recommends that the Government provide the necessary ICT infrastructure in schools. In order to prepare the teachers for teaching with and about ICT, in Chapter 24 'Teacher Training', it proposes to modernise the teacher education curriculum and syllabus with ICT knowledge and skills. Moreover, there is a separate chapter on ICT education. Chapter 12, "Information Technology Education", states that ICT education can contribute to reducing the poverty of the country by preparing the pupils with effective skills to work abroad in ICT sectors and consequently to send remittance back to Bangladesh. It states two specific objectives of ICT education: firstly, preparation of international standard ICT-experts, and secondly, the prioritisation of knowledge pertaining to not only computer science, but also a wide range of communication technologies, such as mobile and telecommunication technologies, radio, and television. In order to introduce ICT to children, the policy recommends including ICT as a teaching learning tool within primary schools, and it proposes the inclusion of 'computer

science' as a subject in the secondary curriculum for those students, who want to further their study of ICT within the science discipline (Chowdhury, 2012).

2.9.3 ICT curriculum of secondary level education of Bangladesh

Bangladesh last revisited its secondary school curriculum in 1995. Since then, major changes have taken place in technology, in the job market, and in the local and global socioeconomic conditions resulting in a gap between what students learn and the desired skills and competencies required to prepare for further education, work and life in the 21 century. Hence, the Ministry of Education adopted the National Education Policy 2010, which called for the revision of the curriculum. After 17 years, National Curriculum 2012 has begun to be implemented since 2013. In 2012, Bangladesh embarked on revising the then existing grades vi-xii curricula and implementing these in all secondary schools and madrasahs within the national education system. The goal is to equip future citizens with 21 century skills through National Curriculum 2012. (NCTB 2012, SESIP-TA2003) As mentioned in the partnership for 21 century's framework and NEP 2010, the national curriculum incorporated ICT as core subject from classes VI to XII to develop among students the information and communication literacy as basic tools in the knowledge economy and the information society of today's world.

Table 2.2

Place of ICT subject in latest curriculum of Bangladesh

Division of Subject	Classes	Subject	Exam Marks	Periods in a week	Periods in a semester	Periods in a Year
Core Subjects (all streams)	VI-VIII	Information and Communication Technology	50	2	35	70
Same	IX-X	same	same	same	32	64
Same	XI-XII	same	100	-	64 year	128 total both in 1 st and 2 nd year

Source: NCTB: National Curriculum 2012 (grades vi-viii, ix-x, xi-xii), 2012.

2.10 Teacher' experiences and understandings of ICT

2.10.1 ICT is more than a teaching-learning tool

Policy documents regarding ICT in education present ICT as an effective tool that can enhance the quality of education by supporting students to learn subject content in meaningful ways. They state that ICT can be used to present content knowledge attractively and that multimedia can motivate students to learn. There is a tendency within the documents to focus on ICT as a teaching-learning tool to enhance the quality of traditional educational approaches. The policy documents support learning about and with ICT, but they do not seem to emphasise the potential of ICT to fundamentally change the way students learn. ICT has the potential to change the way students learn and this is often described as “learning through ICT” (Cook, 2010; Finger *et al.*, 2007).

2.10.2 Teachers are key-agents to integrate ICT

The teacher's believe that teachers are critical to the process of the integration of ICT in education. Although they understand ICT is a combination of different hardware and software, they count 'humanware' (i.e. the people who operate ICT, particularly the teachers in educational settings) as key to the successful use of the hardware and software. This understanding that teachers are key players is also widely supported in the literature. For example, Ertmer & Ottenbreit-Leftwich (2010) argue that teachers are the 'key agent' of implementing ICT in educational settings, and any initiative of incorporating ICT in classrooms should first consider whether teachers understand the pivotal role they play. Teachers should believe that ICT will not replace them, and they are more important than technologies (Li, 2007). Some teachers are afraid of ICT because they think ICT may replace them and this fear often creates a feeling of disempowerment in teachers' minds (Li, 2007). Therefore, Li suggests that teachers' beliefs in their own importance concerning ICT are important for the successful implementation of ICT in educational institutions.

2.10.3 ICT is a virtual mentor to the teacher

The teacher perception of ICT as a virtual mentor, as a way of constructing and sharing knowledge, is also recognised by other researchers. Whitehouse, *et al.*, 2006; as cited in Chowdhury, 2012) reviewed some empirical studies on online teacher professional development programmes and noted that online communications among teachers were regarded as a useful strategy for their professional development. Similarly, Looi, Lim & Chen (2008) point out that computer-mediated communication (CMC) is becoming popular among teachers and educators as it supports constructing knowledge from different perspectives.

2.11 Key issues in implementing the ICT curriculum

2.11.1 The ICT curriculum is highly prescriptive

A key problem is that ICT curriculum is highly prescriptive. It defines objectives, competencies, concepts of ICT to be taught, and methods of teaching-learning in the classrooms. The teachers have limited flexibility to identify and include different ICT concepts to teach students because at the end of the year students are assessed according to the curriculum's prescribed guidelines. However, if the teachers do identify some different and useful ICT concepts, they need some freedom to include these in their teaching-learning activities. The teachers suggest designing the ICT curriculum in a way that can give them some flexibility to decide what ICT concepts to include and how they might best be taught. McDougall (2008) notes that in different countries including the USA, ICT curricula define some generic competencies and teachers decide what components to teach and how to teach them.

2.11.2 The curriculum is mostly teaching about ICT

Although one objective of the ICT curriculum is to prepare students to use ICT in teaching-learning activities, the curriculum focuses mostly on teaching them ICT skills isolated from pedagogical application. The teachers think the curriculum should give emphasis to the pedagogical use of ICT. Teaching about ICT skills isolated from pedagogy is one reason teachers and learners are less confident in using ICT in classrooms (Ertmer & Ottenbreit-Leftwich, 2010, Somekh, 2008). Therefore, the structure of the ICT curriculum itself remains a key problem for the educators as it prioritises skills over pedagogy.

2.11.3 Not all of the teachers are prepared for teaching with ICT

Another key problem is that the majority of teachers have little or no knowledge of ICT. This is a difficulty because they are expected to train school students in how to use ICT. If the teachers do not know about ICT, they are unlikely to prepare school students satisfactorily. This indicates that teachers need a sound knowledge of technology along with pedagogical understanding of content knowledge (Mishra & Koehler, 2006). Therefore, it is crucial to recognize that teaching and learning with ICT itself is a specialist learning area and teachers must be prepared well for teaching this knowledge to learners.

2.11.4 Lack of ICT resources and infrastructure

There is a lack of computers, multimedia facilities and internet connections in most educational institutions of Bangladesh. Two or more teachers share one computer in the classroom. Besides, the computers often go out of order, and the lack of a computer

maintenance budget is a reason that broken computers are not repaired. This view is supported by Ertmer & Ottenbreit-Leftwich (2010), who report that technical problems often contribute to a lack of confidence amongst teachers. Hew & Brush (2007) also demonstrated that lack of resources can be a barrier to teachers' technology use. Therefore, when building a supportive infrastructure, it is also important that schools be well equipped, not only with ICT resources, but with the pedagogical expertise to facilitate meaningful use and maintenance. Since Bangladesh neither produces ICT devices nor can afford to buy expensive equipment, it depends on international financial agencies for support in bringing ICT technologies into educational settings. However, the support from international financial agencies is imbalanced because they mostly provide money for purchasing ICT devices and rarely for developing context appropriate pedagogical uses of ICT in the grounded educational settings that exist in Bangladesh.

2.11.5 English scripts embedded in computers is a barrier

English script is embedded in computer programs is a potential barrier, because English is a foreign language in Bangladesh. Although the teachers understand English to some extent, they reported that it was often not comfortable to learn new knowledge through a foreign language. Incec (2009) found that Turkish students also had problems learning concept maps in a foreign (English) language. Similarly, it can be argued that learning ICT in English language posits a dual challenge to Bangladeshi teachers and students: firstly, learning about a new technology, and secondly, learning it in a foreign language. Therefore, the embedding of English language in computer programs can be considered a key obstacle blocking implementation of ICT education.

2.11.6 Confidence in teaching about and with ICT

Confidence is a key factor that empowers teachers. Most of the teachers have had previous experience of working with computers, and this gives them confidence. The teachers also study and practice computer technology regularly for preparing themselves to take ICT classes. Their self-study and practice increases their confidence. They also maintain communication with their professional community to discuss, share and learn ICT knowledge. Ertmer & Ottenbreit-Leftwich (2010) note that teacher's confidence in ICT is more important than their ICT knowledge and skills. Therefore, prior experience of ICT, self-study, communicating with knowledgeable peers, and students' success of using ICT are factors that need to be considered to prepare both school teachers and teacher educators for teaching about and with ICT.

Literature suggests different strategies for building confidence in using ICT. Playing with ICT (Somekh, 2008), starting with small successful experiences (Ottenbreit-Leftwich, 2007), working with knowledgeable peers (Ertmer, Ottenbreit-Leftwich & Youk, 2006), providing suitable environments and infrastructure (Ertmer *et.al*, 2010), participating in a professional learning community (Putnam & Borko, 2000) are all suggestions for developing confidence and self-efficacy in ICT.

2.11.7 Other prevalent issues of implementing ICT curriculum

The major challenges identified by Chowdhury's study (2012) in enhancing utilization of ICT education (as identified in the latest progress report on implementation of the said master plan) are:

- Inadequacy in terms of infrastructure,
- Lack of proper internet connectivity,
- Lack of access to electricity,
- Availability and maintenance of equipment,
- Need for further sensitization,
- Ensuring quality of the services delivered,
- Capacity constraints of the human resources,
- Need for improving monitoring and reporting practices,
- Insufficient funds,
- Social and cultural factors,
- Lack of knowledge and skill,
- Scarcity of time.

2.12 Suggestions to improve the ICT Subject

The curriculum experts advocate the inclusion of pedagogical knowledge of ICT in the curriculum, so that teachers and students can understand the practical applications of ICT while learning about ICT skills. It is a general belief that teacher's lack of ICT knowledge is found as a barrier for teaching, it is important to train teachers before they teach ICT. In order to increase the teachers' confidence in using ICT and to encourage them to use ICT, one recommendation is the implementation of yearly awards or incentives for those teachers, who will show examples of best practice. Some of the teacher also stressed the need to increase all students' positive attitudes towards ICT subject. Positive belief has a great impact on the Importance of ICT in education and its success in the classroom. Wozney, Venkatesh &

Abrami (2006) argue that a sound knowledge base and strong self-efficacy cannot ensure meaningful technology use. It is also important to investigate teachers and learners' attitudes towards ICT, because attitude acts as a lens, when people work with new knowledge and skills. Therefore, developing teachers and learners' positive attitudes towards ICT, developing Teacher's professional culture, including the principal's or head teacher's leadership and government-level supports, are also recognised as important. Ertmer & Ottenbreit-Leftwich (2010) note that professional culture makes an impact on the development of teachers' knowledge and beliefs, and it is important to take account of both the context in which they are prepared, and the context in which they will teach.

2.13 Previous research study in line with current study

Study of Chowdhury, (2012) aimed to explore Bangladeshi teacher educators' perspectives of ICT education as it is presented in the teacher education curriculum. This study investigates the perspectives of ten teacher educators regarding the teaching of ICT in Bangladesh. The research question that guides this study is: What are the educators' experiences and understandings of ICT within the B.Ed. teacher preparation programme in Bangladesh?

Another study conducted by Hassan (2013) describes some important aspects of curriculum and then focuses on the concern of Bangladesh government with education as well as its development and then deals with government initiatives to change the curriculum of the secondary schools of Bangladesh. Finally it explores whether the important aspects of curriculum have been given due importance here or not.

Besides, study of Imon (2017) investigated the strategy of technology- inclusion in secondary education according to new education policy of Bangladesh. It examines the extent of ICT usage in the classroom, the perceived impact of technologies in teaching and learning and the possible factors that seem to hamper enhanced ICT use in secondary education.

The other research study of Sultana & Haque (2018) focused on the ICT used by the teachers and their attitude towards using ICT in the classroom, as well as to identify the current ICT status on higher education specially a government college in Bangladesh. Their study result showed that though the education sectors of Bangladesh are suffering hundreds of problems, ICT can change the present scenario.

2.14 Training Courses of NACTAR

To conduct the academic and training programs smoothly, the academy has a training department. NACTAR offers two types of courses, which are as follows:

Table 2.3:

Training Courses offered by NACTAR

Sl. No	Title of Course	Intake numbers of Trainees per Batch	Minimum Qualification to enter into the Course	Course Fees per trainee	Remark
1.	Advanced Certificate Course on Computer Training (Six Month Course)	180	NA	-	NA
2.	11 types short course	80/60/56/40/20			
3.	Teachers Training Course (2 types)	120	NA	NA	Teachers and other criteria are selected by the Ministry of Education.
4.	In-service Training Course	20	NA	NA	Participants and other criteria are selected by the Concern Authority
5.	6 Months Computer Training Course	60	H.S.C Above	5000/-	After Training they can apply for computer demonstrator/teacher for school and college. Also they can apply for various govt./non- govt offices.

(Source: Training Calendar 2012-13 of NACTAR)

This is the end of literature review chapter. Details of research methodology will be discussed in the following chapter.

Chapter-3

Methodology

3. Introduction

Gay and Airasian (1996) illustrated that the nature of the question or problem to be investigated determines either the study is qualitative, quantitative or mixed method. If we look back the research objectives, we understand that all of the research objectives seek demands both qualitative and quantitative data to depict a holistic picture. The researchers manipulated a mixed method research approach in this study following positivist and constructivist paradigms as the research needs mixed type of data, i.e. qualitative and quantitative data to gain in-depth information from the key informants, such as- teachers, trainee teachers and head teachers in the concerned secondary schools, colleges, madrasah and technical educational institutes.

3.1 Population of the Study

Secondary (grade VI-XII) schools, colleges, Madrasahs and Technical Educational Institutes of eight (08) divisions of Bangladesh were the population of the study. ICT teachers and head teachers in these educational institutions comprised the population of the study. In addition, curriculum experts of ICT were also in the population of this study.

3.2 Research Design & Type of the research

This research is mainly descriptive and explorative in nature. Current research adopted the survey research design to accomplish the study. As the research objectives demands both types of data from the respondents using survey method. In order to fulfilling the research objectives, present research expects qualitative as well as quantitative kinds of data. Henceforth, present study explored the real scenario in a holistic manner and describes the phenomenon by adopting mixed method approach.

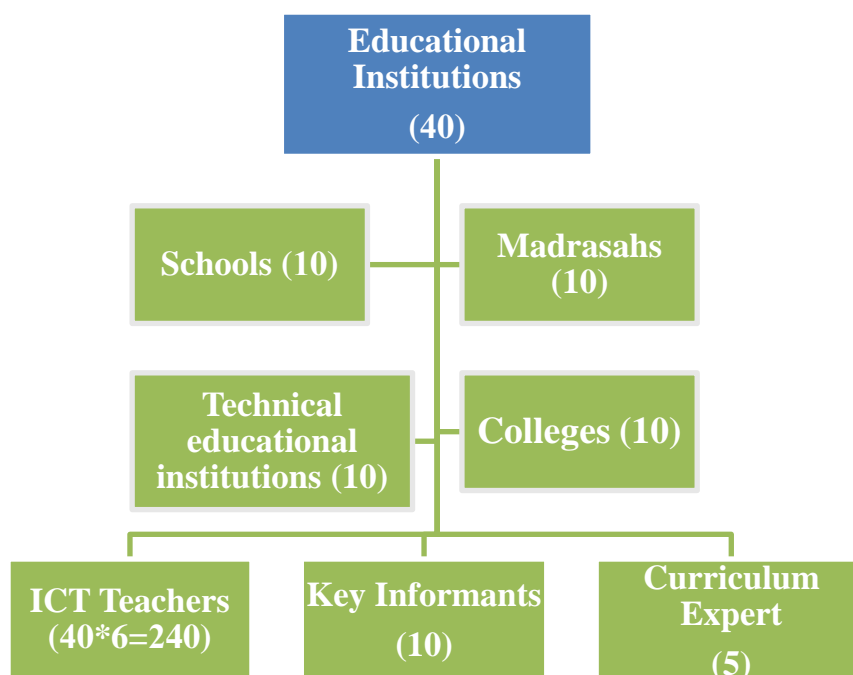
3.3 Sample and sampling technique of the study

216 ICT trainee teachers of NACTAR constituted the main sample for the current study and they were selected purposively, who were working in the secondary schools, colleges, madrasahs and technical educational institutes at the different districts of eight divisions, e.g. Dhaka, Rajshahi, Chittagong, Khulna, Sylhet, Barisal, Mymensingh and Rangpur of Bangladesh. The head teachers of the selected educational institutes were also participated in the study as key informants well. Besides, 10 curriculum experts were chosen through convenient sampling process. Area, educational institutions and personnel were selected with considering the easy access of the researchers and to complete the research perfectly and minutely in imposed date. In the sample frame there were 236 samples in total. Among them 216 ICT teachers, 10 key informants (that include head teachers, principals and

NACTAR officials) and 10 curriculum experts were in the sample frame. For the limitations of time and convenient of the researchers the sample size was confined in 236. The whole sample design is given below-

Figure 3.1:

Sample frame of the study



3.4 Data Source of the Study

Two different types of data were generated for the study that is, primary and secondary data. The respondents of the study, i.e. trainee ICT teachers, head teachers and curriculum experts were the main source of primary data. On the other hand, the researcher collected secondary data from the grade VII, IX and X curriculums prescribed by NCTB (National Curriculum Text Book) and ICT training curriculum/module of NACTAR (National Academy for Computer Training and Research).

3.5 Tools and Method of Data Collection

For this study, data triangulation tools were appeared. Triangulation is used to address the validity of the data (Barbour, 2001). Triangulation methods used multiple forms of data collection tools, such as- interview, questionnaire, observation and semi-structured interviews to address the research objectives. Utilizing multiple data collection methods lead to an

acceptance of reliability and validity, when the data from the various sources are comparable and consistent (Golafshani, 2003). In this study, following data collection tools were used.

- **Questionnaire**

Semi-structured questionnaire was constructed for the ICT teachers of the secondary schools, Madrasah and Technical Educational Institutes. Valuable information about the knowledge, actual classroom teaching situation of ICT subject and application, challenges and gaps in ICT curriculum and ICT subjects were generated to depict a holistic picture about ICT subject of grades VII, IX, X, XI and XII of secondary schools, colleges, madrasah and technical educational institutes.

- **Semi-structured Interview Schedule**

Semi-structured interview questionnaire was developed for the key informants and curriculum experts. Applicability as well as the challenges of the ICT curriculum related information were collected by interview schedules.

- **Documents analysis checklist**

Basically, a three and four points Likert-scale will be developed and applied to find out the suitability of the curriculum, contents systematically designed for the ICT subject. The checklist will also find out the reflections of the teachers opinions about the quality of the ICT subject.

3.6 Data Analysis Techniques and Presentation

Two types of analyses were manipulated in this study, i.e. quantitative approaches of analysis that was used for quantitative data and on the other hand, qualitative approach was used to analyse qualitative data, which are described as follows.

- **Quantitative Data Analysis**

The semi-structure interview schedule, semi-structure questionnaire and all the demographic information were treated as quantitative data, which was analysed using quantitative approach. In order to analyse quantitative data simple descriptive statistics, like mean, frequency tables along with percentage were found out with the help of IBM SPSS software as per research requirements. Output frequency graphs and charts were also produced through Microsoft Excel.

- **Qualitative Data Analysis**

According to Merriam (1998) and Marshall and Rossman (1999), as quoted in Creswell (2003, p. 203), “*data collection and data analysis must be a simultaneous process in qualitative research.*” During the data collection and data analysis stages, the data was organized into categories and reviewed repeatedly.

To analyse data researcher was followed the steps of organizing data, developing theme and then interpretation of data (Marshall & Rossman, 1999). The semi-structured interviews and the semi-structure questionnaires were also provided qualitative data for the study. The qualitative data was analysed thematically in this study. Thematic analysis is a categorizing strategy for qualitative data and identifies the patterns of meaning or themes in qualitative data (Clarke & Braun, 2014). Qualitative data was organized according to the emerged themes and concepts, and in some cases qualitative information was presented in narration form as well.

3.7 Ethical consideration

Ethical consideration is important for any research, which Wellington (2006, p.54, see also Jahan, 2012, p.128) has explained as:

“ My own view is that the main criterion for educational research is that it should be ethical ...[E]very researcher [should] place it foremost in the planning, conduct and presentation of his/her research. Ethical considerations override all others”.

Following the above view, any persons or organizations was not disturbed or hurt by the researchers of the study. For gathering data it will be ensured to take permission of the participants. Confidentiality of the data was also maintained properly. Moreover, participants’ had right to withdraw themselves from any time of the study.

In this chapter, research methodology is discussed. Findings of the research are discussed in the next two consecutive chapters.

Chapter-4

Findings and Interpretation of Curriculum (VI to XII) Review

4: Introduction

Data analysis is a vital part of any research study. Information was collected from different sources though the main source of information was teachers, who participated in ICT training of NACTAR. Two different types of data, i.e. quantitative and qualitative data were generated in this study from the key informants and reviewing ICT curriculum of grades VI to XII. This part of the findings presents the curriculum review of ICT subject from grade VI to grade XII including teachers' knowledge of ICT curriculum at their assigned grade/class, suitability of ICT curriculum in the classroom at grade VI-XII of the secondary level of education and gaps between curriculum and actual classroom situation of ICT subject at grade VI-XII. Findings obtained from grade wise secondary level ICT curriculum analysis are discussed in the following sections.

4.1: Analysis of the secondary level ICT curriculum

The curriculum has been analysed according to the basic components of curriculum formation. The secondary level ICT curriculum prescribed by NCTB (National Curriculum and Textbook Board) has been analysed on the basis of four basic components of curriculum. Grade wise ICT curriculums have been analysed. The themes of curriculum analysis are being selected on the basis of the basic curriculum components and the themes are:

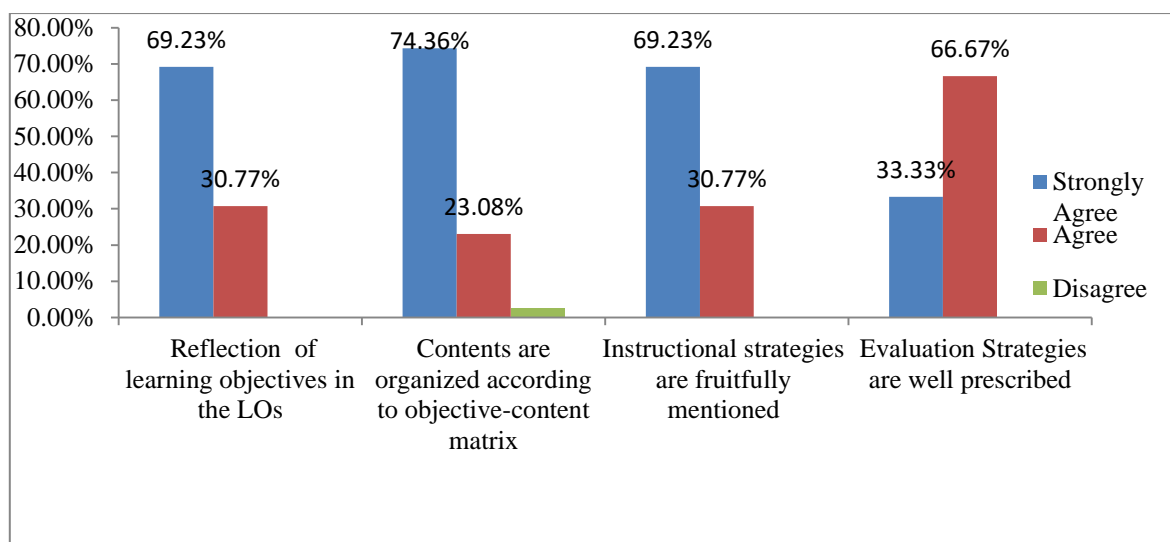
1. Reflection of the prescribed objectives in the prescribed Learning Outcomes (LOs);
2. Suitability of content selection;
3. Indication of suitable teaching-learning methods; and
4. Prescription of evaluation strategies to assess students learning.

4.1.1: Grade Six ICT curriculum analysis and findings

The curriculum of the subject ICT of grade-VI has been analysed and the findings are as the followings:

Figure 4.1:

Analysis of ICT curriculum at grade-VI



(Source of data: Information collected from curriculum experts, February 2021)

4.1.1.1: Reflection of Objectives in the Learning outcomes of ICT curriculum of Grade-VI-XII

The prescribed ICT curriculum have been analysed, where a three point Likart scale was used to analysed the document ICT curriculum developed by NCTB. The learning outcomes prescribed in the curriculum were analysed in the light of the objectives of the curriculum of ICT and it was seen whether the learning outcomes perfectly reflected the objectives. Figure 4.1 indicates that, 69.23% opinion stands for strongly agree as learning outcomes are reflected the objectives. Whereas, 30.77% opinion stands for agree as learning outcomes are reflected the objectives. No single opinion was observed as disagree in this issue. Moreover, the learning outcomes are found well organized according to the learning domains and all three learning domains are found prescribed using proper action verbs. Even, with a domain, the learning outcomes are found organized accordingly to the sequence of the sub-domains of the particular domain. The learning outcomes were marked as strongly agree, agree and disagree, on the basis of the perception of the curriculum experts point of view.

4.1.1.2: Suitability of the contents with learning outcomes in the ICT curriculum of grade-VI

Content is one of the important components of curriculum and according to objective-content matrix, contents comes after objectives. Therefore, the contents were analysed using the same three point Likart scale to get whether the contents are properly selected and organized to attain the prescribed learning outcomes. The analysis from Figure 4.1 reveals that 74.36% contents are found under strongly agree point, 23.08% contents are under agree point and 2.56% contents are found under disagree point under three point Likart scale. Only one learning outcome was found under disagree were it was not properly reflected as title of

the content. Although, the contents are found organized according to the maxims of teaching, where the psychological order of contents organization are found.

4.1.1.3: Teaching-Learning methods prescribed in the ICT curriculum of grade-VI

Classroom teaching-learning requires suitable instructional strategies which makes the classroom activities easy, interesting, flexible and encouraging to attain the expected learning outcomes. Suitable teaching-learning methods and strategies help both the teachers and the students to attain their educational objectives. Curriculum as a complete written plan of education, suitable teaching-learning strategies are expected to be prescribed in the document for the best interest of the practitioner teachers.

Therefore, Figure 4.1 shows that, methods are properly prescribed in the curriculum, and among the prescribed methods 69.23% methods are under strongly agreed point, whereas 30.77% methods are under agreed point. No methods are found unnecessary in the curriculum. Different teaching-learning methods and techniques are found mentioned in the grade-VI curriculum of ICT, such as- question-answer method, demonstration method, pair/group work, observation method, problem-solving method, learning by doing approach, discussion method, exposure trip, brainstorming, debating, etc. Along with the methods, the required materials are also mentioned in the curriculum under the column of teaching-learning activities in the curriculum. Some of the prescribed materials are the ICT textbook, chart, poster, picture, diagram, real objects, ICT gazettes, multimedia projector, internet, computer laboratory etc. Therefore, the methods and materials need to think more critically for better implementation before incorporated in the curriculum.

4.1.1.4: Prescription of the Evaluation Strategies to assess students learning of grade-VI

Evaluation is another important component of the curriculum. Evaluation techniques are important to mention in the curriculum to assess students learning as well as to evaluate and rethink the teachers about their activities for the best interest of the learners. Evaluation helps to make judgment about student's achievement from the lesson and finally the intended learning outcomes from the lesson. Therefore, the curriculum was analysed to identify the suitability of the evaluation strategies prescribed in the ICT curriculum of grade VI. Figure 4.1 shows that the evaluation strategies prescribed in the curriculum in respect to the contents are suitable to assess students learning as no single opinion was seen under disagree point of the used Likart scale. 33.33% responses indicate strongly agree point, while 66.67% of the responses support agree point. Different type of assessment strategies are being prescribed in the curriculum and performance based assessment strategies in particular. Some of the

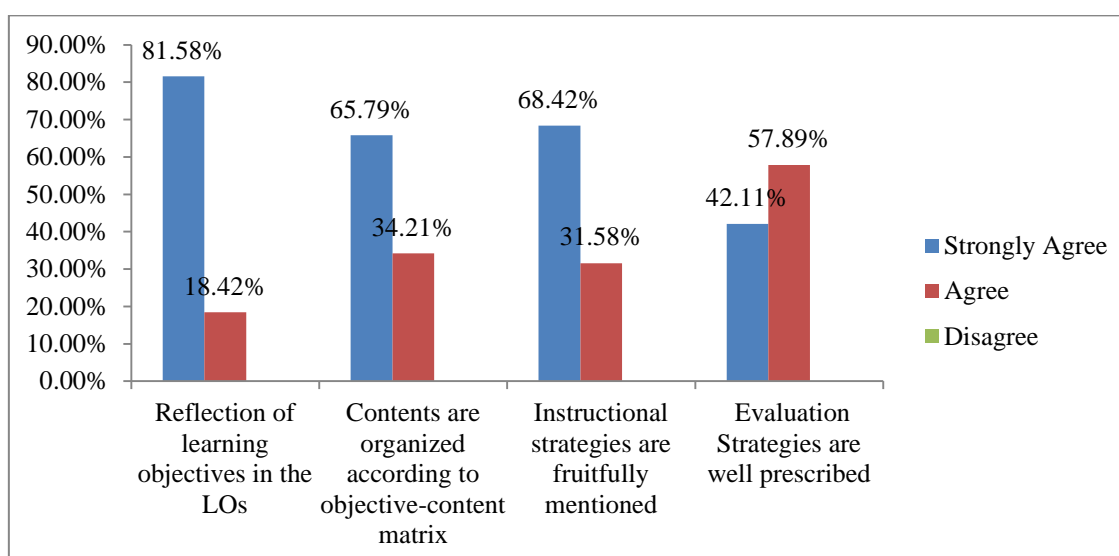
evaluation strategies are the oral test, class test, performance observation etc. ICT as a technical subject, the performance based and activity based assessment strategies prescribed in the curriculum is really very significant to enhance the skills of the learners as well as to attain the educational objectives of the subject ICT. Therefore, the evaluation strategies should be finalized in such a technique so that it all support strongly agree points in respect to assessment.

4.1.2: Grade Seven ICT curriculum analysis and findings

The curriculum of the subject ICT of grade-VII has been analysed and the findings are as the followings:

Figure 4.2:

Analysis the ICT curriculum of grade-VII



(Source of data: Information collected from curriculum experts, February 2021)

4.1.2.1: Reflection of Objectives in the Learning outcomes of ICT curriculum of Grade-VII

Figure 4.2 shows that objectives are properly reflected through the prescribed learning outcomes of the ICT curriculum of grade-VII as the figure shows that frequencies are distributed between strongly agree and agree point from the three point Likart scale. Among the frequencies, 81.58% of the responses support the strongly agree point, whereas 18.42% of the frequencies support the agree point and no responses found in disagree point. Unlike the ICT curriculum of grade-VI, here in the ICT curriculum of grade-VII, the learning outcomes are found properly organized according to the learning domains. Some learning outcomes are

related to the safe use of ICT and the security of ICT gazettes. As this issue is very significant, therefore, the integration of these items should be handled carefully.

4.1.2.2: Suitability of the contents with learning outcomes of ICT curriculum of grade-VII

Figure 4.2 shows that, like the ICT curriculum of grade-VI, the contents are prescribed here in the grade-VII curriculum of ICT are incorporated maintaining the objective-content matrix as no figure shows in the disagree points. In Figure 4.2, 65.79% responses support the strongly agree point; whereas 34.21% responses support the simple agree point. Beyond this, during curriculum development the content organization was followed by maxim of teaching. Although, the contents are properly organized according to the objective-content matrix, therefore, more concentration is expected to provide during objective wise content selection.

4.1.2.3: Teaching-Learning methods prescribed in the ICT curriculum of grade-VII

The curriculum was analysed to identify whether suitable teaching-learning strategies are incorporated in the prescribed curriculum. Figure 4.2 shows that, strategies mentioned in the curriculum are suitable for imparting quality support in classroom teaching as well as beneficial for the learners for fruitful learning as from the figure it shows that, 68.42% of the responses support the point strongly agree; whereas 31.58% responses support the point agree. The Figure 4.2 indicates that the prescribed instructional strategies are beneficial for classroom teaching-learning. During the analysis of the document it was noticed that various methods and techniques are incorporated in the curriculum mentioning the activities of the teachers and the students separately. Some of the strategies are the question-answer method, problem solving method, demonstration method, discussion method, exposure, group/individual works, brainstorming, debate etc. More activity centred methods should be incorporated in the ICT curriculum as it is a technical subject and learners are expected to develop their practical skills regarding ICT and its application.

4.1.2.4: Prescription of the Evaluation Strategies to assess students learning of grade-VII

Incorporated strategies regarding evaluation of the students' performance from the ICT curriculum of grade –VII are analysed and the findings shown in the above mentioned Figure 4.2. According to Figure 4.2, relevant evaluation techniques are prescribed in the curriculum as it indicates 42.11% opinion in response to strongly agree point, whereas 57.89% responses are found against the point agree. No response was found against the point disagree. Among the evaluation strategies some of the strategies are the oral test, class test, group test, performance test as individual test in the form of summative and formative test

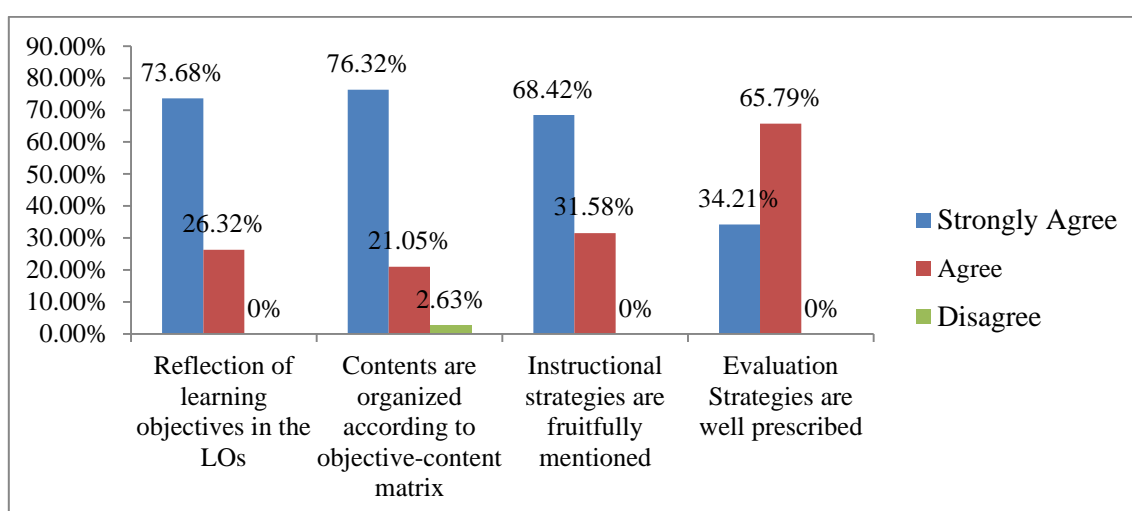
etc. Therefore, more activity based laboratory oriented activities should be incorporated in the evaluation portion.

4.1.3: Grade Eight ICT curriculum analysis and findings

The curriculum of the subject ICT of grade-VII has been analysed and the findings are as the followings:

Figure 4. 3:

Analysis the ICT curriculum of grade-VIII



(Source of data: Information collected from curriculum experts, February 2021)

4.1.3.1: Reflection of Objectives in the Learning outcomes of ICT curriculum of Grade-VIII

Figure 4.3 shows that the objectives are properly reflected in the prescribed learning outcomes of the ICT curriculum of grade-VIII. According to the figure, 73.68% responses support the point strongly agrees in response to the reflection of the objectives among the learning outcomes, whereas 26.32% responses support the point agree under the same issue. Unlike the ICT curriculum of grade VI and grade VII, the learning outcomes of grade-VIII ICT curriculum are organized maintaining the characteristics of the learning domains.

4.1.3.2: Suitability of the contents with learning outcomes of ICT curriculum of grade-VIII

Contents of the curriculum are prescribed according to the objective-content matrix. In the curriculum the objectives are being reflected in the learning outcomes and then the contents are finalized following the learning outcomes. Figure 4.3 shows that, responses found in all three points as strongly agree, agree and disagree. According to the figure, 76.32% responses support the point strongly agree, 21.05% responses support the point agree and only 2.63% responses support the point disagree. Although the responses against disagree

is very trivial, which it is certainly unexpected. To satisfy the term objective-content matrix, all the learning outcomes should be clearly reflected through the contents. Therefore, it is important to note that although very few contents seems dissimilar with the learning objectives therefore necessary instructions are found in the activities part to attain that particular objectives. Unlike the curriculum of grade-VI and VII, the contents in the grade-VIII are also organized according to the maxim of teaching.

4.1.3.3: Teaching-Learning methods prescribed in the ICT curriculum of grade-VIII

Instructional strategies as teaching-learning methods are analysed and the findings are shown in the Figure 4.3 implying that 68.42% responses are in favour of strongly agree and 31.58% responses are in favour of only agree. The responses of both strongly agree and agree means that the prescribed teaching-learning instructional strategies are properly incorporated in the curriculum, which are separately mentioned for both, i.e. teachers and students. Some methods and techniques are question-answer, demonstration, discussion, brainstorming, exposure, group work methods, debating etc. To apply the methods, necessary materials are also mentioned properly in the curriculum. The methods are suitable for imparting cognitive information as well as to develop the technical skills of the learners regarding ICT.

4.1.3.4: Prescription of the Evaluation Strategies to assess students learning of grade VIII

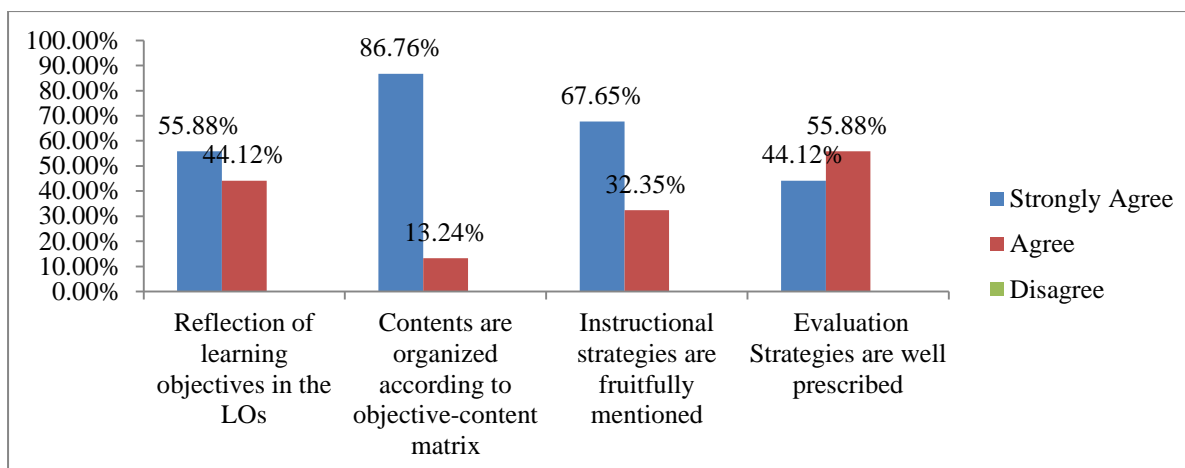
Evaluation strategies incorporated in the curriculum are analysed and the findings are shown in the Figure 4.3 indicating that all the prescribed evaluation strategies are suitable to assess students' cognitive and performance based (i.e. ICT skill) achievements. According to Figure 3, 34.21% responses are in favour of the strongly agree point; whereas 65.79% responses are in favour of the only agree point. The evaluation are incorporated both the summative and formative assessment including classroom performance of the learners. The evaluation strategies along with the instructional methods are seems very helpful to support both the teachers and the students to attain their educational objectives. No comments found in the disagree point. Therefore, for better result more activity oriented assessment methods should be incorporated in the curriculum.

4.1.4: ICT curriculum analysis and findings of Grade Nine & Ten

The curriculum of the subject ICT of grade IX-X has been analysed and the findings are as the followings:

Figure 4.4:

Analysis the ICT curriculum of grade IX-X



(Source of data: Information collected from curriculum experts, February 2021)

4.1.4.1: Reflection of Objectives in the Learning outcomes of ICT curriculum of Grade- IX-X

Figure 4.4 shows, in what extent the learning objectives of teaching ICT at grade IX-X are reflected through the prescribed learning outcomes. According to Figure 4.4, 55.88% responses are in favour of the point strongly agree, whereas 44.12% responses are in favour of the point only agree. No response was seen in regards to point disagree. The analysis reveal that, all the learning objectives of teaching ICT at grade IX-X are- (i) properly reflected within the prescribed learning outcomes of grade IX-X ICT curriculum, (ii) organized under three different learning domains (i.e. cognitive, affective and psychomotor domain) and (iii) prescribed using action verbs. The application of psychomotor domain is found good but this portion should be emphasizes more to enhance the in hands problem solving skills of the learners.

4.1.4.2: Suitability of the contents with learning outcomes of ICT curriculum of grade-IX-X

The contents are being selected according to the learning objectives and learning outcomes. Figure 4.4 shows that all the contents are precisely organized in the ICT curriculum of grade IX-X. Among the contents, 86.76% of the contents covers under the response of strongly agree, whereas 13.24% responses support the point only agrees. Most of the contents are best fit with the prescribed learning outcomes implying that the learning outcomes are easy to attain through the prescribed contents. Importantly, the contents in this grade are more order than the previous grade.

4.1.4.3: Teaching-Learning methods given in the ICT curriculum of grade IX-X

Appropriate methods are imperative for quality teaching-learning, which helps both the teachers and the learners to attain their educational objectives. Method selection depends on the nature of the contents most particularly on the learning outcomes. Necessity of suitable

methods is bound description. The standard of a quality curriculum demands for incorporation of suitable instructional strategies. Focusing on this point it is observed from Figure 4.4 shows that 44.12% responses are in favour of the point strongly agreed, whereas 55.88% responses are in favour of the point only agree. As there is no opinions in favour of disagree, therefore, findings indicate that the methods incorporated in ICT curriculum of grade IX-X are properly selected.

4.1.4.4: Prescription of the Evaluation Strategies to assess students learning of grade-IX-X

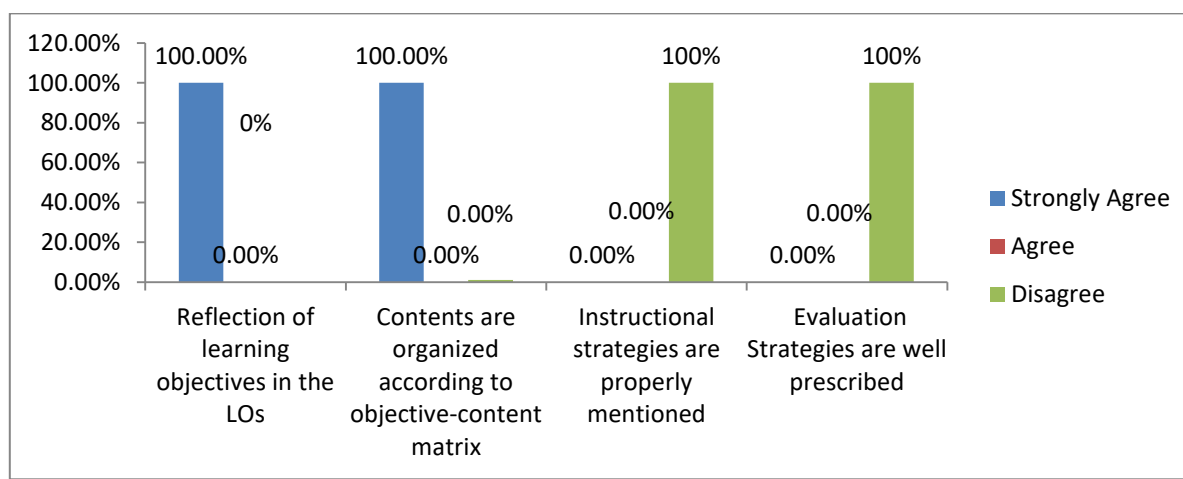
The evaluation strategy is one of the significant components of the curriculum. The suitability of the evaluation strategies of the curriculum demands for quality implementation of the curriculum. Figure 4.4 shows that, 44.11% responses are in favour of the point strongly agree, whereas 55.88% responses are in favour of the point only agree denoting that the evaluation strategies prescribed in the curriculum are properly organized.

4.1.5: ICT curriculum analysis and findings of Grade Eleven & Twelve

The curriculum of the subject ICT of grade XI-XII has been analysed and the findings are as the followings:

Figure 4.5:

Analysis the ICT curriculum of grade XI-XII



(Source of data: Information collected from curriculum experts, February 2021)

4.1.5.1: Reflection of learning objectives in the LOs of the ICT curriculum of grade XI-XII

Figure 4.5 shows that the analysis report reveals 100% of the responses in favour of the point strongly agree, whereas no response was found for the point agree or disagree

expressing that the learning objectives are properly being reflected through the learning outcomes prescribed in the ICT curriculum of grade XI & XII. In this analysis the following issues are identified:

- Every learning objectives are properly reflected through the LOs;
- In the learning outcomes proper action verbs are being used;
- The LOs aren't found organized accordingly to the learning domains properly;
- The organizations of the LOs are found accordingly to the psychological order.

4.1.5.2: Suitability of the contents with learning outcomes of ICT curriculum of grade XI-XII

Figure 4.5 shows that, the analysis report reveal 100% of the responses in favour of the point strongly agree, whereas no response was found for the point agree or disagree, which mean that the contents are precisely organized according to the learning outcomes prescribed in the ICT curriculum of grade XI & XII. This analysis comes up with the following findings:

- Contents are properly selected according to the learning objectives and outcomes.
- Contents are systematically organized according to the maxim of teaching.
- Curriculum contents are very suitable for practical application and it is developed considering that students of secondary level (VI-XII) are matured enough to adjust with the prescribed contents.
- Contents have logical significance in student's real life to be an economically productive human resource albeit socio-economical and geographical location of the students' is an issue here to make fruitful implementation of the prescribed contents.

4.1.5.3: Teaching-Learning methods prescribed in the ICT curriculum of grade XI-XII

Figure 4.5 shows that no teaching-learning methods are mentioned separately here in the ICT curriculum of grade XI-XII except the general guidelines of using different teaching methods and techniques at the introductory part of the curriculum. The result reveals that, 100% of the responses are in favour of not mentioned point. ICT curriculum from grade VI to X contains the instructional strategies separately, which is totally absent here in the ICT curriculum of grade XI-XII. This is really challenging for the teachers to choose appropriate methods for particular content during teaching in the classroom. They might have to be faced difficulties rather than flexibilities.

4.1.5.4: Prescription of the Evaluation Strategies to assess students learning of grade XI-XII

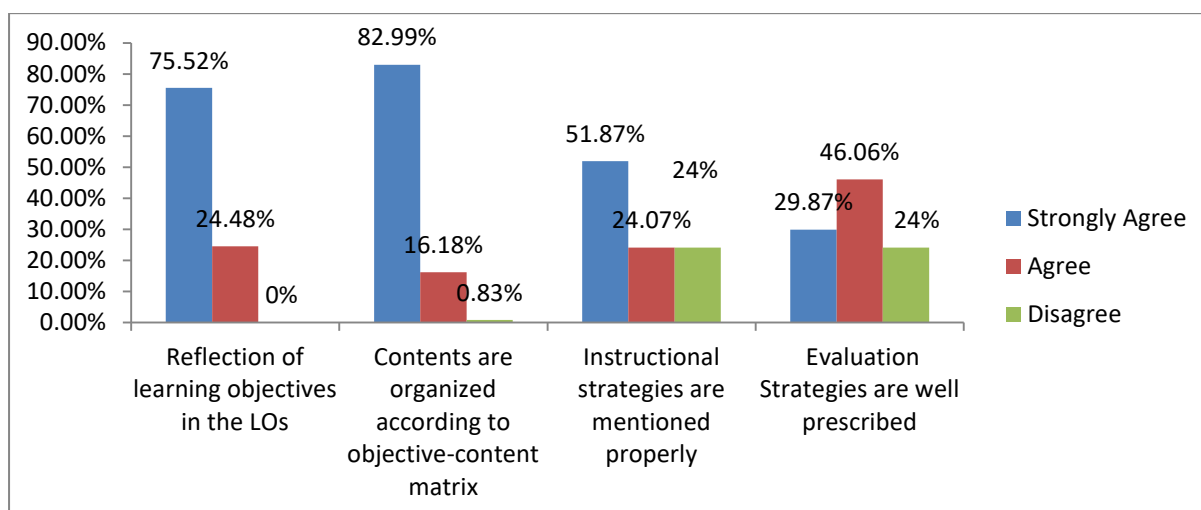
Figure 4.5 shows that, like teaching-learning method no evaluation methods are mentioned separately here in the ICT curriculum of grade XI-XII except the general guidelines of using different evaluation techniques including formative and summative evaluation at the introductory part of the curriculum. The result reveals that, 100% of the responses are in favour of not mentioned point. ICT curriculum from grade VI to X contains the suitable evaluation strategies separately, which is totally absent here in the ICT curriculum of grade XI-XII. Some learning outcomes are prescribed as practical work, which is expected to evaluate through performance assessment but no guidelines are found regarding that issues.

4.1.6: Summary of the analysis of ICT curriculum review

The overall analysis of the secondary level ICT curriculum is found as the followings:

Figure 4.6:

Analysis the secondary level ICT curriculum



(Source of data: Information collected from curriculum review, February 2021)

Figure 4.6 shows the overall analysis and findings of the secondary level ICT curriculum. All four components of the ICT curriculum are properly analysed and the findings discussed as follows.

- ☑ In the secondary level curriculum the objectives are properly reflected through the learning outcomes of the ICT curriculum as all the observed opinion are in favour of strongly agree (75.52%) and agree (24.48%) option. No single responses are found against the option disagree implying that the objectives aren't reflected properly

through the learning outcomes of the secondary level ICT curriculum. The learning outcomes are being prescribed using learning domains, where action verbs are being used. Therefore, during the development of the curriculum more attention should be given on the formation of LOs, so that the learning objectives reflected properly.

- ☒ Content should be developed following the learning outcomes (Learning outcomes are derives from the objectives). Figure 4.6 shows that, all but except a very small proportion (0.83%) of the contents are properly prescribed according to the learning outcomes. Findings shows that 82.99% responses are in favour of strongly agree, whereas 16.18% responses are for agree option. The data also reveal that the selection of the contents is mostly having strong alignment with the learning outcomes, which demands for fruitful implementation in the classroom. Beyond this, the contents organizations are also found as in psychological order. Therefore, more attention is needed to maintain strong logical alignment between the learning outcomes and the contents followed by learning objectives.
- ☒ Selection of suitable methods is significant for fruitful classroom communication and actions thereby. Figure 4.6 shows that the methods prescribed in the ICT curriculum are suitable for teaching-learning in the classroom as 51.87% responses are found in favour of strongly agree point and rest of 24.07% responses are in favour of agree point. For disagree point, the findings are 24.07%, which is due to the curriculum of grade XI-XII and where the teaching-learning methods aren't mentioned separately in the curriculum. The instructional guidelines are provided as the general guidelines of using the curriculum. It is important to note that, mentioning the instructional strategies against the LOs is significantly important for the teachers. Therefore, the prescribed methods are suitable but the name of the suitable methods needs to be mentioned separately in the curriculum within the student-teacher activities column. Although, except the ICT curriculum of grade XI-XII, in other secondary level ICT curriculum, the required materials name are properly prescribed over the curricula but should better to mention the materials separately for better implementation of the curriculum which will enhance the teaching-learning of ICT smoother.
- ☒ Evaluation is another important component of the curriculum. Evaluation strategies should be mentioned properly in the curriculum and that should be applicable to measure the performance of the learners regarding the expected learning outcomes from the contents using suitable methods. Figure-6 shows that, 29.87% responses are

in favour of strongly agree point, 46.06% responses are in favour of the agree point and rest of 24.07% responses are in favour of disagree point. The result found in the disagree point due to the ICT curriculum of grade XI-XII, which is challenging for the grade XI and XII teachers to select suitable assessment strategies in the classroom. Therefore, suggestions are made to use more concrete strategies of evaluation in the ICT curriculum at all grades of secondary level.

Analysis reveals that, except the ICT curriculum of grade XI-XII, other ICT curriculums of secondary level are properly develop maintaining the sequence as objective-content-method and evaluation. The ICT curriculum of grade XI-XII is suggested to be developed accordingly to the ICT curriculum of other grades of secondary level. In general, the organization of the methods, materials and evaluation strategies of all grades ICT curriculum should be selected and organized carefully to make the teaching-learning more effective, flexible and interesting. In the next section the findings of information generated from the key informants will be interpreted.

Chapter-5

Findings and Interpretation of data generated from Key Informants

5: Introduction

The primary data was generated from the key informants, i.e. trainee teachers, head teachers and NACTAR officials. Two different kinds of data were collected for this study, i.e. quantitative data and qualitative data. The quantitative data then coded and analysed using SPSS and MS Excel soft-wares. It is important to note that 240 trainee teachers were chosen for the sample in this study but finally, 216 trainee teachers were included in the analysis process. The researchers exclude 24 data, which were not irrelevant and respondents hardly completed one or two items of the questionnaire or did not fill out the questionnaire at all. Findings obtained from analysing quantitative data of the study are discussed in this chapter using figure, table and for qualitative data to provide very clear understanding of the findings some narrations are also presented.

5.1: Demographic information of the teacher respondents

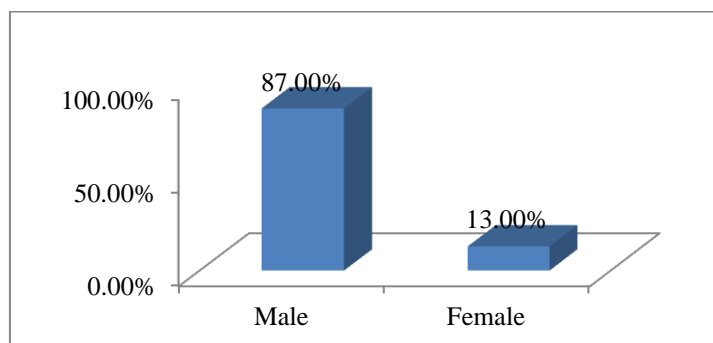
Demographic information of this study includes teachers' gender, age, job position, educational qualifications, teaching experience and schools location belong to divisions, where teachers are working, which are described in the following section.

5.1.1: Teachers' Gender

Figure 5.1.1 shows the gender of the teacher participants of the study implying that most of the participants (87%) in the sample are male teachers and on the other hand participation of female teachers (13%) are noticeably less than their counterpart male teachers. Thus, it is important to create opportunity for female teachers and motivate them to participate in such a training to boost up their teaching quality.

Figure 5.1.1:

Gender of the teacher participants



Note: Total N=216

(Source of data: Primary data collected from fieldwork, February 2021)

5.1.2 Teachers' Age

Result regarding teachers' age indicates, as shown in Table 5.1.1 that the mean age of the teachers are 36.42 years with standard deviation 6.23 and range 27. The minimum age of the teacher participants is 24 years and maximum age is 51 years.

Table 5.1.1:

Age of the teacher participants in the sample

Mean	SD	Range	Minimum	Maximum
36.42	6.23	27.00	24.00	51.00

Note: Total=216

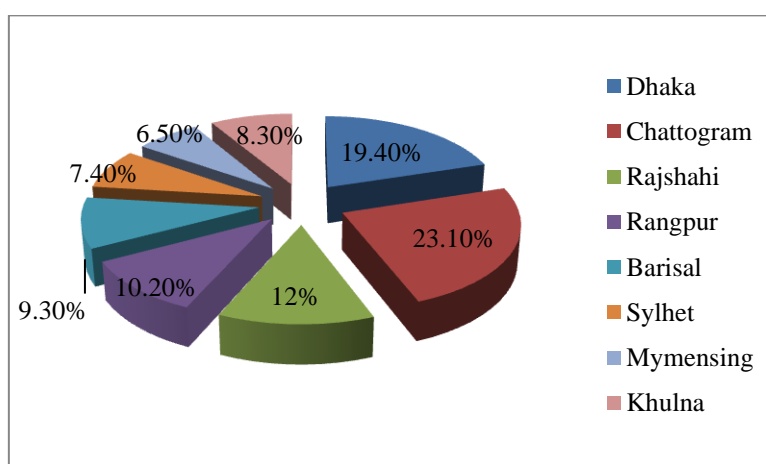
(Source of data: Primary data collected from fieldwork, February 2021)

5.1.3 Geographical representation of the teacher participants

Teachers participate in ICT training provided by NACTAR work in different educational institutes located in different divisions of Bangladesh. It is seen that many of the teachers (23.10%) in the sample are from Chattogram division and lowest numbers of teachers in the sample (6.50%) are from Mymensing division as Figure 5.1.2 indicates.

Figure 5.1.2:

Geographical representation of the teacher participants



Note: Total =216 (100%), Valid N= 208 (96.3%) and Missing= 8 (3.7%)

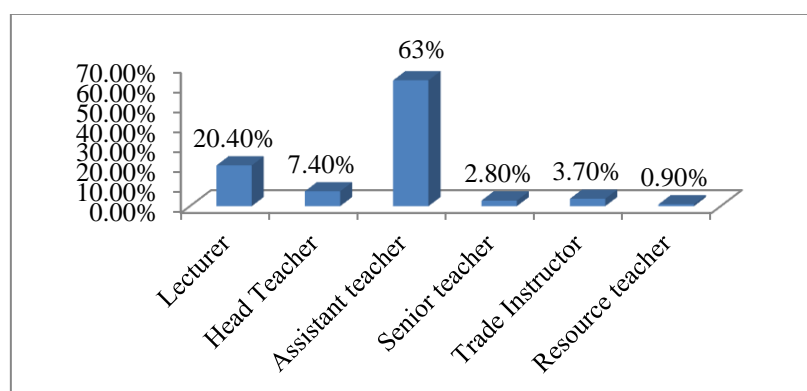
[Source of data: Primary data collected from fieldwork, February 2021]

5.1.4: Designation of the teachers

Figure 5.1.3 shows that significant number of participants (63%) in the sample is assistant teachers. It is also seen from the figure that a noticeable number of participants (20.40%) are lecturers and a few number of participants in the sample are respectively head teachers (7.40%), senior teachers (2.80%), trade instructor (3.70%) and resource teachers (0.90%).

Figure 5.1.3:

Designation of the teachers



Note: Total= 216 (100%), Valid= 212 (98.1%) and Missing cases= 4 (1.9%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.1.5: Teachers teaching experience

The mean teaching experience of teachers is 9.13 years as Table 5.1.2 indicates with SD 6.87 and range 27 years, where teachers' minimum teaching experience is 1 year and maximum is 28 years.

Table 5.1.2:

Teachers teaching experience

Mean	SD	Range	Minimum	Maximum	N (%)
9.13	6.87	27.00	1.00	28.00	101 (93.5%)

Note: Total= 216 (100%), Valid N= 202 (93.5%) and Missing cases= 14 (6.5%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.1.6 Teachers' educational qualifications

While looking at the findings presents in Table 5.1.3, it is clear that large number of teachers (75.9%) hold post-graduate level education (i.e. MA, MSc or MCom), where 18.5% teachers in the sample have completed graduation (i.e. BA, BSc or BCom degree) and negligible number of teachers (5.6%) have other type of degree, for example MSS.

Table 5.1.3:

Educational qualifications of the teachers in the sample

Response Category	N (%)
• Graduation	40 (18.5)
• Post-graduation	164 (75.9)
• Others	12 (5.6)
Total	216 (100)

[Source of data: Primary data collected from fieldwork, February 2021]

5.1.7: Teacher-Student Ratio in ICT class

Class size is a vital issue in teaching-learning process, where acceptable teacher-student ratio should be 1:30 for effective teaching. It is important to note that in education policy of Bangladesh clearly pointed that teacher-student ratio in schools should be 1:30/40. Looking at Table 5.1.4 it is clear that teacher-student ratio in the sample schools is slightly high according to policy's instruction denoting the mean ratio is 42.51 (i.e. 1:42.51) with SD 16.99 and range 67, where minimum teacher-students ratio is 1:13 and maximum ratio is 1:67.

Table 5.1.4:

Teacher-student ration in ICT class

Mean	SD	Range	Minimum	Maximum
42.51	16.99	67.00	13	67.00

Note: Total=216, Valid N= 164 (75.9%) and Missing case= 52 (24.1%)

[Source of data: Primary data collected from fieldwork, February 2021]

5.2: Institutional situation evaluation for ICT teaching according to ICT curriculum of grade VI-XII

In this section, findings are presented to demonstrate the actual ICT teaching situation of the institutions to findings out the gap of ICT facilities considering the following indicators, (i) infrastructure facility for teaching ICT subject, (ii) internet facility, type and speed (iii) teachers' knowledge of ICT curriculum and ICT training, (iv) challenges of taking ICT class in the Schools/institutes and (v) finally, the way out of challenges to improve the classroom situation for effective ICT teaching.

5.2.1: Educational Institute's infrastructure facilities for teaching ICT subject

In order to assess the institutions' actual ICT teaching situation by following curriculum of ICT subject from grade VI to XII, teachers in the sample are asked to describe their ICT arrangement in classroom situation that are imperative of effective ICT teaching. Findings derived from teachers' opinions as shown in Table 5.2.1 reveal that ICT arrangements in their institutes' actual classroom situation are not adequate as it should be albeit they have good level of electricity connection (98.1%) and multimedia/projector (77.8%) facilities. Most of the teachers in the sample claim that they do not have adequate facilities of sound system (87%), computer in the classrooms (84.3%), sound system (87%), adequate number of computer and CD-ROM (87%) in their institutes, which are prerequisite for effective ICT subject teaching according to curriculum of VI to XII grades.

Table 5.2.1:

ICT arrangement in actual classroom situation for ICT teaching

Indicators	Response		
	Yes (%)	No (%)	N (%)
1. Electricity connection	212(98.1)	4(1.9)	216 (100%)
2. Sound System	28 (13)	188 (87)	216 (100%)
3. Computer in classroom	34(15.7)	182 (84.3)	216 (100%)
4. Sound system	28 (13)	188 (87)	216 (100%)
5. Multimedia projector	168(77.8)	46(21.3)	214 (99.1%)

6. Condition of projector	148 (68.6)	64 (29.7)	212 (98.1)
7. Adequate computer and CD-ROM	28 (13)	188 (87)	216 (100%)

o

te: Total N= 216 (100%); **Missing cases:**1(.09%) for multimedia/projector, N= 107 (99.1%) and 2 (1.9%) for condition of projector, N= 106 (98.1%)

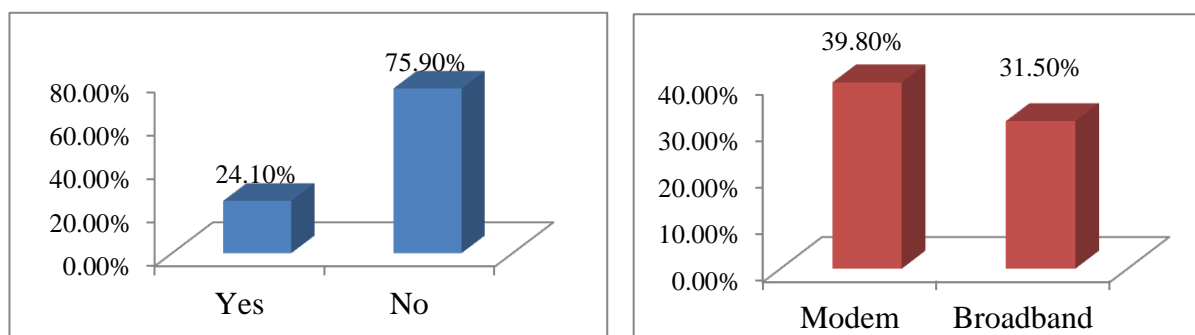
(Source of data: Primary data collected from fieldwork, February 2021)

5.2.2: Facility, type and speed of internet connection

Facility of internet connection with its type and speed is vital for ICT class. Teachers were asked to indicate the facility, type and speed of internet connection that their educational institutes possess. A significant number of teachers (75.90%) in the sample reveal that they do not have internet facility in their institutes at all. Contrary, 24.10% teachers claim that they have internet facility, where 39.80% teachers use modem and 31.50% teachers use broadband for getting access to internet.

Figure 5.2.1:

Facility and type of internet connection



Note: Total=216; **Missing cases:** 62 (28.7%) for type of internet; N=154 (71.3%)

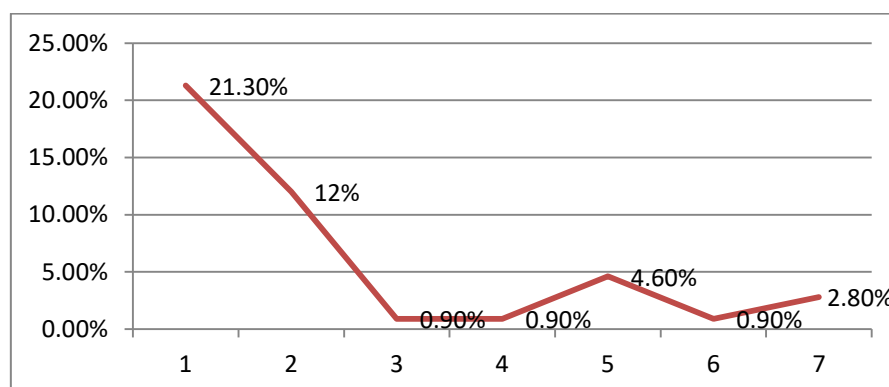
(Source of data: Primary data collected from fieldwork, February 2021)

Internet speed is another important area of ICT based class. Focusing on this point teachers were asked to state the internet speed they usually have access at their institutes. Looking at Figure 5.2.2, it is clear that 21.30% teachers in the sample get facility of internet at their institutes that have 1 mbps speed. A significant number of teachers (12%) use internet that contain 2 mbps speed. A noticeable number of teachers indicate that they have internet with 5 mbps (4.60%) and 7 mbps (2.80%) speed respectively, whilst a negligible portion of

teachers use internet at their institutes that contains speed of 4 mbps (0.9%) and 5 mbps (0.9%).

Figure 5.2.2:

Teachers' access to internet speed



Note: Total= 216 (100%); Valid N= 94 (43.5%); Missing cases: 122 (56.5%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.2.3: Information related to Computer Lab

Considering the importance of computer lab and lab assistant, teachers in the sample were asked to indicate whether they have computer lab and Lab assistant in their institutes, which are illustrated in Table 5.2.2 as follows implying that most of secondary institutes do not have computer Lab (61.1%) and Sheikh Russell Lab albeit majority of the teachers (85.2%) indicate that they have Lab assistant at their institutes for computer practical class.

Table 5.2.2:

Information related to computer Lab

Response Category	Yes (%)	No (%)	Total (%)
• Computer Lab	84(38.9)	132(61.1)	216 (100%)
• Sheikh Russell Lab	50(23.1)	166(76.9)	216 (100%)
• Lab Assistant	30(13.9)	184(85.2)	214 (99.1%)

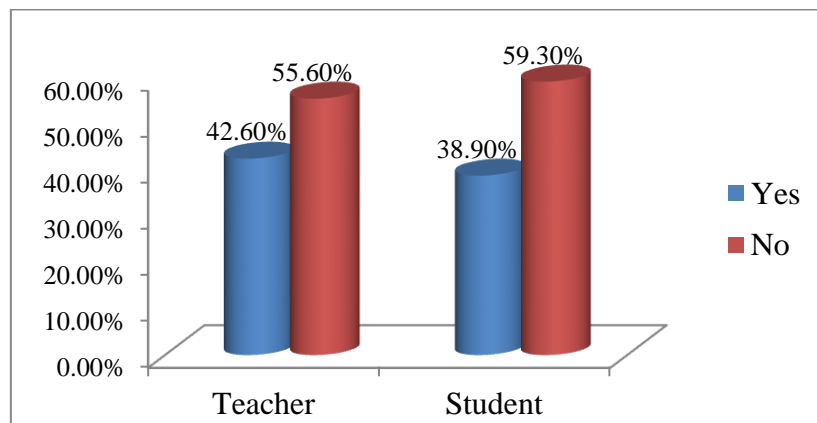
Note: Total=216; Valid N= 214 (99.1%) and Missing cases=1(.09%) for indicator Lab assistant.

[Source of data: Primary data collected from fieldwork, February 2021]

In the next phase, teachers were also asked to denote whether teachers and students of their institutes have opportunity to use institute's computer lab. Findings presented in Figure 5.2.3 imply that more than half of the teachers in the sample opine teachers (55.60%) and students (59.30%) of their institutes do not have opportunity to use institute's computer Lab. In contrast, a noticeable number of the teachers reveal their views stating that their teachers and students have access to use institute's computer Lab. Figure 5.2 also denote that teachers (42.60%) have more access to computer Lab than their students (38.90%).

Figure 5.2.3:

Use of institutes' computer Lab by teachers and students



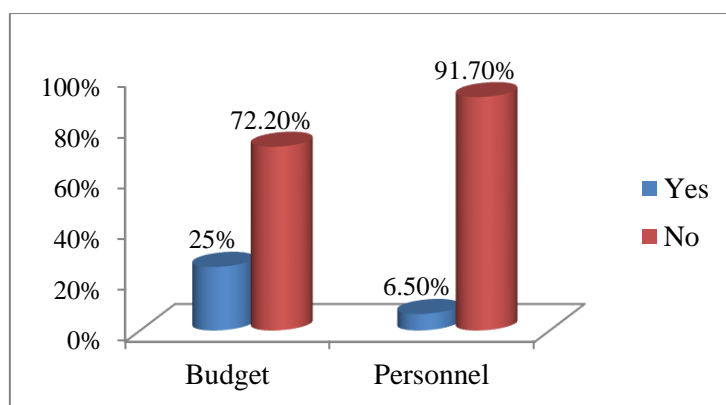
Note: Total= 216 (100%); For indicator teacher, Valid N= 212 (98.1%) & Missing cases: 4 (1.9%).
(Source of data: Primary data collected from fieldwork, February 2021)

5.2.4: Budget and personnel of educational Institutes for repairing ICT Gadgets

Findings illustrated in Figure 5.2.4 present information about budget and personnel of educational institutes for repairing ICT gadgets. Almost three quarters of the teachers (72.20%) in the sample firmly assert that they do not have enough budgets for repairing ICT gadgets and a large number of teachers (91.70%) indicate that they do not have any personnel in their institutes to repair their ICT gadgets.

Figure 5.2.4:

Educational Institutes budget and personnel for repairing ICT gadgets



Note: N= 216 (100%); **Valid N=** 210 (97.2%) & **Missing cases:** 6 (2.8%) for budget and **Valid N:** 212 (98.1%) & **Missing cases:** 4 (1.9%) for personnel
(Source of data: Primary data collected from fieldwork, February 2021)

Table 5.2.3 represents the funding source for repairing institute's ICT gadgets. A good number of the teachers (39%) indicate that institutes provide fund from their own internal income sources for repairing ICT gadgets, whilst 9.3% teachers state that sometimes they spend money from their own pocket to repair their institute's ICT gadgets and 1.9% teachers opine that institutes spend money for repairing ICT gadgets that they have derived from donor donation. Interestingly, 27.8% teachers present their view about the question ICT gadgets repair as not applicable for them.

Table 5.2.3:

Information about how to repair educational Institute's ICT gadget

Response	How to Repair
• Funding from institution's internal income	84 (39.0)
• Funding from teacher's self-income	20 (9.3)
• Not Applicable	60 (27.8)
• Donor donation	2 (.9)
Total	166 (76.9)

Note: Total=216 (100%);Valid N=166 (76.9%) &Missing cases: 50 (23.1%)

(**Source of data:** Primary data collected from fieldwork, February 2021)

5.2.5: Status of Educational Institute's Website

It is gleaned out from the findings as shown in Table 5.2.5 that half of teachers (50%) in the sample state that they have their own institute's website though nearly half of the teachers (49.1%) indicate that they do not have own website in their institutes. In addition, a significant number of the teachers (68.5%) disclose that their institutes do not update their website on regular basis.

Table 5.2.5:

Status of educational institute's own website

Response Category	Yes (%)	No (%)	Total (%)
• Institute's own website	108 (50)	106 (49.1)	214 (99.1%)
• Update Institute website	46 (21.30)	148 (68.5)	194 (89.8)

Note: Total: 216 (100%);For indicator institute's own website: Valid N: 214 (99.1%)&Missing cases: 2(.09%) and for update Institute website: Valid N: 194 (89.8%) & Missing cases:11 (10.2%);

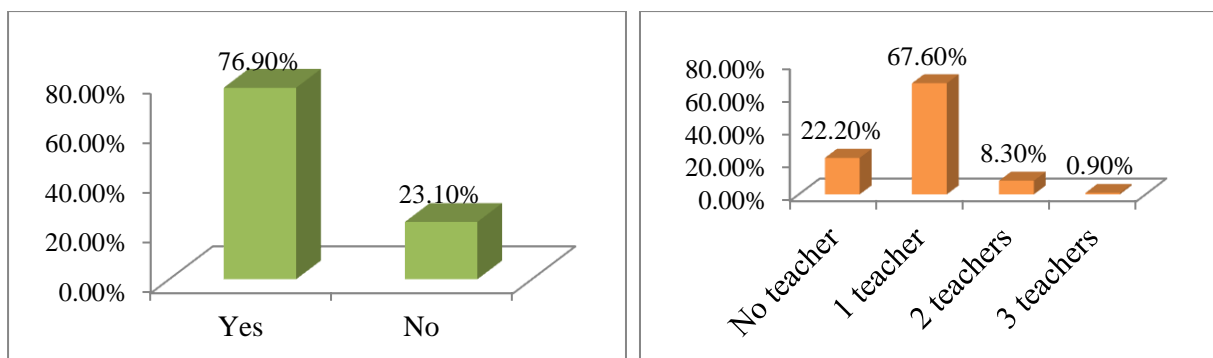
(**Source of data:** Primary data collected from fieldwork, February 2021)

5.2.6: Information related to educational institute's ICT teacher

This section portrays ICT teachers' related information that include whether institutes have ICT teachers, number and qualifications of ICT teachers in their institutes. It is steadily said from the findings as demonstrated in Figure 5.2.4 that most of the secondary educational institutions have teachers (76.90%) for teaching ICT subjects albeit 23.10% teachers in the sample state that they do not have any ICT teacher in their institutes.

Figure 5.2.4:

Information related to ICT teachers



Note: Total= 216, Valid N= 214 (99.1%) & Missing Cases: 2 (0.9%) for ICT teachers

(Source of data: Primary data collected from fieldwork, February 2021)

For variable number of ICT teachers, it is observed from the findings that most of the institutes (67.60%) have one (1) ICT teacher in their institutes. Interestingly, a good number of teachers (22.20%) in the sample indicate that they do not have any teachers at their institutes for ICT subject.

5.2.6: Qualifications of ICT teachers

It is glean out from Table 5.2.6, near about half of the teachers in the sample state that ICT teachers in their educational institutes have different types of qualifications and trainings on computer, for example, under graduate degree along with 6 months diploma in computer (19.4%), diploma in computer science (11.1%), under graduate degree (i.e. BSc) in computer science (3.7%) and graduate degree with 6 months computer training (8.3%). Only 0.9% teachers reveal that they have computer teachers with MSc in Computer Science. Noteworthy findings also observed from Table 5.2.6 as 36.9% teachers express that in their educational institutes ICT teachers have under graduate and post graduate degrees in different subject other than any degree or certificate on computer, for example, Math, Arbi, English (M.A), Science, Bengali, Agriculture and Business studies.

Table 5.2.6:

Qualifications of ICT teachers

Qualifications of computer teachers	N (%)
• Diploma in computer science	26 (11.1)
• Under graduate with 6 months ICT diploma	42 (19.4)
• Under graduate (BSc in computer science)	8 (3.7)

• Graduate with 6 months computer training	18 (8.3)
• MSc in computer science	2 (0.9)
• Under graduate and post graduate (other subjects)	82(36.9)
Total	200 (92.6)

Note: Total=216 (100%); Valid N=200 (92.6%) & Missing cases: 16 (7.4%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.2.7: Information related to teachers' training on ICT

For effective teaching training is imperative. Thus, the teachers in the sample were asked to state whether they have any training on ICT or computer and also to indicate the type of training they have received on ICT. It is observed from Table 5.2.7 that 63.9% teachers in the sample have training on ICT though 13.9% teachers in the sample still do not have any training on ICT.

Table 5.2.7:

Teachers' Training on ICT

Response Category	ICT training
• Yes (%)	138 (63.9)
• No (%)	30 (13.9)
Total (%)	168 (77.8)

Note: Total= 216 (100%); Valid N=168 (77.8%) &Missing cases: 48 (22.2%)

(Source of data: Primary data collected from fieldwork, February 2021)

Form Table 5.2.8, it is seen that teachers have received different types of trainings to increase their ICT teaching skills, for illustration, teachers received ICT training as part of their CPD (Continuous Professional Development) training (27.8%) and some have completed 6 months computer course (10.2%). Further, it is observed from the findings that some teachers in the sample participated 12 days, 15 days, 18 days and 40 days trainings on computer. Some have completed 28 days training, diploma course and other basic computer courses on computer from different organizations, like NACTAR, BRAC and UITRCE (Upazila ICT Training and Resource Centre for Education). Moreover, 1.9% teachers have digital content development training to increase their teaching quality along with ICT skills.

Table 5.2.8:*Type of ICT training teachers received from different training programmes*

Type of Training	N (%)
• CPD	60 (27.8)
• ICT Training	14 (6.5)
• BTT 12 Days	8 (3.7)
• 6 month computer course	22 (10.2)
• BTT and Basic short course	16 (7.4)
• 40 days training	2 (1.8)
• 28days basic course	8 (3.7)
• 15 days training	4 (1.9)
• NACTAR,BRAC,BANBIES	2 (.9)
• 18 days training	2 (.9)
• Digital content development	4 (1.9)
• Diploma course	2 (.9)
• <i>UITRCE</i>	4 (1.9)
Total	150 (69.4)

Note: N=216 (100%); Missing cases: 66 (30.6%)**(Source of data:** Primary data collected from fieldwork, February 2021)

5.3. Information related to Teachers' concept about ICT Curriculum and ICT Class

In this paragraph information related to teachers' concept of ICT Curriculum and ICT Class, reason for not taking ICT Class, steps institute need to be taken for ICT teaching, how

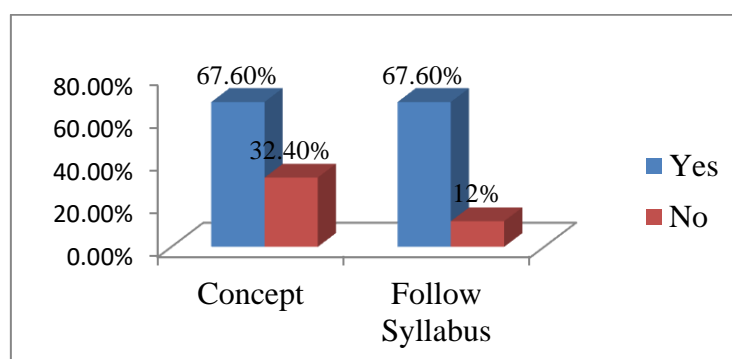
do teachers benefit from teaching ICT subject?, challenges in ICT teaching and suggestions for effective ICT subject teaching according to ICT curriculum are discussed.

5.3.1: Teachers' concept of ICT Curriculum and ICT Class at School

Figure 5.3.1 presents teachers concept of ICT curriculum (i.e. grade VII to X curriculum) and whether they follow the curriculum and syllabus, while teaching ICT in the classroom. More than half of the teachers (67.60%) strongly agree that they have good level of concept about ICT curriculum and they follow the curriculum and syllabus before teaching ICT though 32.40% teachers state that they have not clear concept of ICT curriculum and 12% express that they do not follow the ICT curriculum and syllabus. Thus, initiatives, i.e. training or day long workshop need to be taken to introduce teachers' ICT curriculum and it is important to monitor whether teachers are taking their ICT class following the curriculum and syllabus.

Figure 5.3.1:

Teachers' concept of ICT curriculum and they follow ICT curriculum and syllabus during ICT class



Note: N= 216 (100%); Valid N= 186 & Missing cases: 30 (13.9) for follow ICT curriculum/syllabus

(Source of data: Primary data collected from fieldwork, February 2021)

Teachers are asked to expose the type of ICT class usually they emphasize on, while teaching ICT. Majority of the teachers (60.2%) claims, as shown in Table 5.3.1, that they emphasize on both aspects of ICT subject, i.e. theory and practical, while teaching ICT in the classroom. In contrast, 39.8% teachers denote that they focus only on theory during ICT class. As ICT is a practical oriented subject, therefore, teachers should encourage

emphasizing on both of the classes (i.e. theory and practical) and it should be obligatory for the ICT teachers.

Table 5.3.1:

Type of ICT class that teachers teach in the classroom

Response	Type of ICT Class
Theory	86 (39.8)
Both (theory and practical)	130 (60.2)
Total	216 (100.0)

(Source of data: Primary data collected from fieldwork, February 2021)

Interesting findings are coming out after analysing data about what are the reasons for not taking ICT class in their institutes. A significant number of teachers (24.5%) sprightly express that the precise reason for not taking ICT class is lack of proper arrangement of ICT facilities that include institutes do not have ICT teacher, multimedia projector, computer and computer Lab, which are imperative for ICT class. Other reasons identified from the findings as shown from Table 5.3.2, are institutes do not have the following ICT facilities, such as- ICT teacher (9.3%), computer Lab (15.7%), multimedia or lack of electricity and internet facilities (18%).

Table 5.3.2:

Reasons for not taking ICT Class

Response category	N (%)
• No ICT Teacher	20 (9.3)
• No Computer or Lab	34 (15.7)
• No Multimedia projector	10 (4.6)
• No Electricity and internet	4 (1.8)
• No ICT facilities (i.e. no ICT teacher, computer Lab and multimedia projector)	52 (24.5)
• NA	22 (10.2)

Total	142 (65.7)
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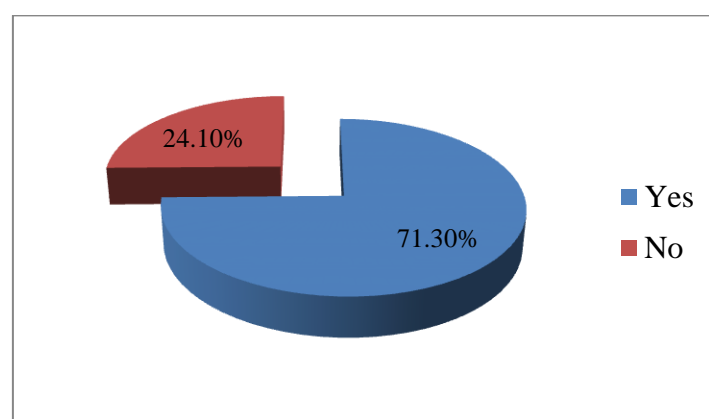
Note: Total =216 (100%); Valid N= 142 (65.7%) &Missing cases: 74 (34.3%)

(Source of data: Primary data collected from fieldwork, February 2021)

Figure 5.3.2 illustrate that almost three quarters of the teachers in the sample strongly reveal their voice that they use digital content and multimedia in classroom teaching. A noticeable percentage of teachers (24.10%) state that they do not use any digital content and multimedia for teaching. So, the teachers, who are not well trained on digital content and multimedia they should encourage to use both of the options in their teaching-learning activities and they also need to be provided training on these options if they do not have any training or they are not familiar with digital content and multimedia.

Figure 5.3.2:

Teachers teach using digital content and Multimedia



Note: Total= 216 (100%); Valid N= 206 (95.4%); Missing cases: 10 (4.6%)

(Source of data: Primary data collected from fieldwork, February 2021)

Multifaceted reasons are distinguished, while teachers are asked to describe why teachers do not use digital content and multimedia during teaching. Findings presents in Table 5.3.3 depict that a noticeable number of teachers (21.3%) believe, lack of teachers ICT knowledge and skill is the main reason for not using digital content and multimedia during teaching. Other reasons include institutes do not have computer and multimedia projector that discourage them to use digital content and multimedia. Further, lack of electricity and internet facilities are also a great hindrances for using digital content and multimedia in their classroom teaching. Thus, institutes should provide adequate arrangement computer and

projectors, so that teachers will be motivated to use digital content with the help of multimedia. In addition, educational institutes must ensure that they have the internet facility and less electricity problem.

Table 5.3.3:

Reason for not using digital content and multimedia during ICT class

Response Category	N (%)
• No computer	32 (15.8)
• No Multimedia projector	26 (12.0)
• No Electricity and internet	4 (1.8)
• Lack of skill	46 (21.3)
• No ICT facilities (i.e. no ICT Teacher and computer, internet and multimedia/projector)	28 (13)
Total	136 (63.0)

Note: Total= 216 (100%); Valid N= 136 (63%) &Missing cases: 80 (37%)

(Source of data: Primary data collected from fieldwork, February 2021)

Table 5.3.4 presents the teacher opinions about what necessary steps, they think, institute should take for effective ICT training. Findings indicate that more than half of the teachers (55.6%) believe for effective ICT teaching both of the facilities, such as trained teachers and good ICT infrastructure are imperative. Besides, 26.8% teachers think trained teacher are most important factor for effective ICT teaching and 15.7% claim that most important issue is infrastructure for ICT. Very negligible teachers (0.9%) believe other factors like, motivation, support and facilities along with trained teacher and infrastructure need to be considered for effective ICT teaching.

Table 5.3.4:*Necessary steps educational institute should take for effective ICT teaching*

Response Category	N (%)
• Trained teacher	58 (26.8)
• Infrastructure	34 (15.7)
• Both (i.e. trained teacher and infrastructure)	120 (55.6)
• Others (motivation, support and facilities)	2 (0.9)

Note: Total=

216 (100%); Valid N= 214 & Missing cases: 2 (0.9%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.3.2: How do teachers benefit from teaching ICT subject?

Teachers participated in the study provide their consensus that they are benefited in a number of ways in teaching ICT subjects following the ICT curriculum in compare to other subjects. 65.7% teachers indicate that ICT teaching create opportunity for them to practice how to operate ICT and prepare digital content using power point presentation (PPT) more efficiently. Apart from this, ICT subject teaching help them to earn new information (65.7%) frequently and easily from browsing internet, they can teach easily, conduct class within a short time and in a much planned way. Further, teachers can use slide to make their lecture more attractive (35.2%).

Table 5.3.5:*How teachers are benefited from teaching ICT subject following curriculum*

Response Category	N (%)
• Help to practice ICT efficiently and prepare digital content using power point presentation (PPT)	142 (65.7)
• Help to know new information for ICT teaching	142 (65.7)
• Teach students easily	32 (14.8)
• Conduct class within a short time	42 (19.4)
• Can take class in a much planned way	76 (35.2)
• Use slide to make lecture more attractive	76 (35.2)

Note: Total =216 (100%)

(Source of data: Primary data collected from fieldwork, February 2021)

Some teachers' voices are given below that reflect the similar findings as given in Table 5.3.5.

“Through ICT teaching according to curriculum I get frequently learn and generate new knowledge about ICT. Further, practicing ICT during my teaching helps me to prepare power point presentation (PPT) for my class lecture” (Assistant teacher).

“I can take my class in a planned way and with little time I can present more example and information. I can present my lecture using slide, while conduct in class with ICT that help students to understand their lesson quickly” (Lecturer).

5.3.3: Challenges that ICT teacher face during ICT class

Teachers are asked to indicate what kinds of challenges they usually face, while teaching ICT subject. A number of challenges identified from the findings as illustrated in Table 5.3.6 implying that chief hindrances of effective ICT teaching are lack of computer lab (31.5%), electricity problem (25.9%) mainly occur for rigorous load shading and insufficient network connection (16.6%). Other challenges include (i) teachers have limited opportunity for using multimedia (13.9%) and (ii) lack of ICT infrastructure(18.5%), teachers' ICT skill (12%), ICT related books (3.7%), content knowledge (6.5%) and monitoring (8.3%). 5.6% teachers claim that they do not have sound system that is also very important issue for ICT teaching.

Table 5.3.6:

Challenges ICT teachers face during ICT class

Challenges	N (%)
• Electricity problem	65 (25.9)
• Limited use of multimedia	30 (13.9)
• Lack of ICT infrastructure	40 (18.5)
• Lack of teachers' skill	26 (12)
• Lack of ICT related books	8 (3.7)
• Lack of computer lab	68 (31.5)
• Insufficient network connection	36 (16.6)

• Lack of content knowledge	14 (6.5)
• No sound system	12 (5.6)
• Lack of monitoring	18 (8.3)

Note: Total = 216 (100%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.3.4: Suggestions for effective ICT teaching according to curriculum of ICT subject

Teachers are also asked to describe the way out of challenges for making ICT class more attractive and effective. Findings found out from teachers voices, as shown in Table 5.3.7 depict that followings are the robust suggestions, which can play important role to improve ICT teaching in the classroom situation, for example, educational institutes authority should arrange short training or course (67.6%) on ICT, compulsory ICT training is imperative (66.7%) along with facility of computer lab (66.7%). Other factors identified from the findings include educational institutes should appoint trained ICT teacher (65.7), create opportunity of foreign training for making ICT teachers' more skilled (34.3%), provide computer facilities for all students (33.3%), get rid of electricity interruption (32.4%) and appoint computer hardware engineer, who can teach ICT subject at one hand and on the other hand can solve computer's problem promptly (8.3%).

Table 5.3.7:

Teachers' suggestions for improving effective ICT subject teaching

Response Category	N (%)
• Compulsory training	144 (66.7)
• Foreign training for achieving more skill	74 (34.3)
• Appoint trained ICT teacher	142 (65.7)
• Need computer lab	144 (66.7)
• Need computer for all students	27 (33.3)
• Remove electricity interruption	70 (32.4)
• Arrange short training or course on ICT	146 (67.6)
• Appoint computer hardware engineer	18 (8.3)

Note: Total=216 (100%)

(Source of data: Primary data collected from fieldwork, February 2021)

Voices of teachers are presented as follows that depict the similar view as demonstrated in Table 5.3.7.

“Teachers should provide ICT training mandatorily and arrange foreign training on ICT for the skilled teachers to make them more skilled” (Assistant teacher).

“Training on ICT for all ICT teachers should be mandatory and for effective ICT teaching teachers should provide free internet access at their institutes” (Lecturer).

“To establish computer lab in every institutes and appoint a hardware engineer as a ICT teacher” (Instructor).

5.4: Impact of NACTAR’s 30 days ICT training to enhance teacher ICT Skill

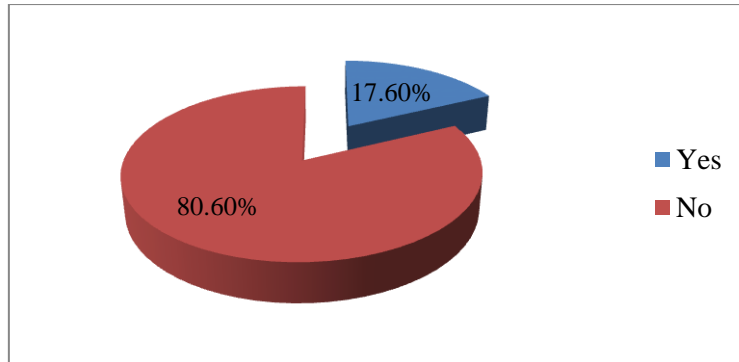
In this section, the impact of NACTAR is discussed focusing on the following areas- whether teachers have received any ICT training from NACTAR, how many teachers have received 30 days ICT training from NACTAR (previously familiar as NOTRAMS), are they interested to arrange an in-house ICT training at their institutes after the training? are their head teachers provide room for the teachers to arrange any training, who received ICT training from NACTAR? And how they are benefited from the 30 days training offered by NACTAR?

5.4.1.1 Teachers received ICT Training from NACTAR or NOTRAMS

Finding regarding ICT training that teachers received from NACTAR or NOTRAMS is shown in Figure 5.4.1. More than third quarter of the teachers (80.60%) in the sample declare that their teachers have not obtained any ICT training from NACTAR or NOTRAMS. 17.60% teachers claim that teachers of their institutes have received ICT training offered by NACTAR or NOTRAMS.

Figure 5.4.1:

Teachers received ICT Training from NACTAR or NOTRAMS



Note: Total= 216 (100%); Valid N= 212 (98.1%); Missing cases: 4 (1.9%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.4.2. Number of teachers received ICT Training from NACTAR or NOTRAMS

Further teachers are also asked to describe how many teachers of their institutes received ICT from NACTAR or NOTRAMS. Majority of the teachers state that only one (1) teacher from their institutes/schools and 13.9% claims that from their institutes no one has got any opportunity for ICT training offered by NACTAR or NOTRAMS. A few number of the teachers indicate that 2 teachers (7.4%), 3 teachers (4.6%) and 4 teachers (2.8%) of their institutes have received ICT training respectively from NACTAR or NOTRAMS and a very negligible portion of the teachers (0.9%) assert that 5 teachers and 6 teachers from their institutes respectively received ICT training offered by NACTAR or NOTRAMS.

Table 5.4.1:*Number of teachers received 30 days ICT training from NACTAR or NOTRAMS*

Number of Teacher	30 Days Training from Nectar
Null	30 (13.9)
1	138 (63.9)
2	16 (7.4)
3	10 (4.6)
4	6 (2.8)
5	2 (0.9)
6	2 (0.9)
Total	204 (94.4)

Note: Total= 216 (100%); Valid N=204 (94.4%) &Missing cases: 12 (5.6%)

(Source of data: Primary data collected from fieldwork, February 2021)

5.4.3. Teachers received ICT Training from NACTAR or NOTRAMS

Table 5.4.2 represents teachers' attitude whether they or their head teachers are willing to arrange any in-house ICT training after any teachers of the institutes receiving ICT training from NACTAR. The findings imply that almost half of the teachers (46.3%) in the sample recognize that in order to share their achieved knowledge and skill they do not arrange any ICT training in their institutes albeit 39.8% teachers agree that they hardly try to arrange any training to share their newly achieved knowledge after getting training from NACTAR. On the other hand, 58.3% teachers acquiesce that their head teachers arrange in-house training, when any teachers of their institutes received ICT training from NACTAR, so that other teachers can acquire new knowledge in regards with ICT from the teachers, who received ICT training from NACTAR.

Table 5.4.2:*Arrangement of in-house ICT training by teachers and Head teachers*

In-house training		
Response	Trained teacher *	Head teacher**
Yes (%)	86 (39.8)	126 (58.3)
No (%)	100 (46.3)	82 (38)
Total (%)	186 (86.1)	208 (96.3)

Note: Total= 216 (100%); Valid N= * 186 (86.1%) & ** 208 (96.3%) &

Missing cases: *30 (13.9), ** 8(3.7%)

(**Source of data:** Primary data collected from fieldwork, February 2021)

5.4.4: Teachers get benefit from ICT training provided by NACTAR

Findings derived from the analysis of the primary data regarding how teachers get benefit from ICT training offered by NACTAR are given in Table 5.4.3 as follows. Looking at Table 5.4.3, it is clear that majority of the teachers in the sample strongly agree that NACTAR create an opportunity for them receiving training on ICT (67.6%) that helps to increase- (i) teachers ICT knowledge (64.8%), interest toward ICT (35.2%), skill to prepare digital content for class lecture (35.2%), and finally, knowledge and skill to use multimedia (34.5%).

Table 5.4.3:*How do teachers get benefit from ICT training provided by NACTAR?*

Response Category	N (%)
• Get an opportunity for training on ICT.	146 (67.6)
• Increase teachers' ICT knowledge.	140 (64.8)
• Help to increase teachers' interest toward ICT.	76 (35.2)
• Increase teachers' skill to prepare digital content for class lecture.	76 (35.2)
• Increase teachers' knowledge and skill to use multimedia.	70 (32.4)

Note: Total=216; [**Source of data:** Primary data collected from fieldwork, February 2021]

Teachers' views about how are they benefited from the training on ICT provided by NACTAR are given below that reflect the similar findings as shown in above Table 5.4.3.

“I think, NACTAR create an opportunity for secondary teachers to get training on ICT, which certainly help to increase teachers' ICT knowledge, skill to prepare digital content and use multimedia” (Head teacher).

“I think, NACTAR is such an organization that helps teachers of secondary level to be skilled on ICT and I also think that all teachers of secondary level should take this training offered by NACTAR” (Assistant teacher 1).

“NACTAR is a training based organization that provides basic knowledge to the trainee teachers with their training and help teachers to use their acquired knowledge in their ICT teaching” (Assistant teacher 2).

“Teachers, who teach ICT, can acquire basic knowledge about ICT and after training they can implement their earned knowledge in their ICT teaching at their institutes” (Instructor).

5.4.5: Way forwards of enhancing teachers' ICT teaching quality following curriculum

Findings achieved from the teachers' voice for how to improve teachers' ICT teaching quality following ICT curriculum at grade VI-XII present in Table 5.4.4. Multifaceted areas of improvement are identified from the findings that may contribute in increasing ICT teachers' teaching quality of secondary institutes. More than half of the teachers in the sample belief that for improve ICT teachers' teaching quality institutes' authority should- (i) provide 1 year compulsory training for all ICT teachers (69.4%), (ii) appoint trained ICT teacher (64.8%) and (iii) established computer lab in the institutes and need to take proper management (64.8%) of the lab and (iv) provide adequate ICT facilities, such as- multimedia, broadband facility and free internet (64.9%). In spite of these, other measures institutes can take into account, according to teachers' views, to enhance teachers' ICT teaching skills, such as - (i) establish branch of NACTAR in every district of Bangladesh, so that educational institutes can arrange training for their ICT teacher negotiating with NACTAR (39.8%), (ii) need to increase number of ICT practical class (34.3%), (iii) appoint more (i.e. 3 or 4) ICT teachers from Computer Science background (30.6%), (iv) appoint a demonstrator in each

institute, who can help ICT teachers and sometime can take ICT class in absence of ICT teachers (30.6%) and (v) provide adequate budget for repairing ICT gadgets (34.3%).

Table 5.4.4:

Way forwards of challenges to enhance teachers' ICT teaching quality

Response Category	N (%)
• Establish NACTAR in every district of Bangladesh.	86 (39.8)
• Increase number of ICT practical class.	74 (34.3)
• Appoint trained ICT teacher.	140 (64.8)
• Established computer lab and take proper management	140 (64.8)
• Appoint more (i.e. 3 or 4) ICT teachers from Computer Science background.	66 (30.6)
• 1 year compulsory training for all ICT teachers.	150 (69.4)
• Provide adequate ICT facilities.	66 (30.6)
• Appoint a demonstrator and provide budget to repair computer	66 (30.6)
• Provide broadband facility and free internet	74 (34.3)

Note: Total=216; (**Source of data:** Primary data collected from fieldwork, February 2021)

Teachers' views regarding way forwards of enhancing teachers' ICT teaching quality following curriculum are given in narrative forms as below that are similar to the findings illustrated in above Table 5.4.4.

“Number of initiatives need to be taken to increase ICT teachers' teaching quality as I believe. Some these are-arrange proper infrastructure for ICT teaching, increase number of ICT practical class, established computer lab and provide adequate budget to repair computer” (Principal).

“In order to improve ICT teachers' teaching quality first thing we need is proper training for ICT teachers. Moreover, for quality ICT teaching school needs a well arrange infrastructure along with adequate ICT facilities that include computer lab, broadband facility, free internet and adequate budget for repairing school's computer and there is also need to proper take care for computer lab management” (Head teacher).

“I believe, the most important initiative should be established NACTAR in every district in Bangladesh, which I hope, can help to improve quality implementation of ICT subject according to curriculum reducing the existing challenges or problems” (Assistant teacher).

5.5 Findings from the Key informants interview about the ICT training provided by NACTAR

Information generated from the interviews of the key informants, i.e. head teachers, principals and NACTAR officials are analysed to find out the main themes regarding ICT training provided by NACTAR that include respondents opinion about the 30 days training, what type of skills they include in the training, what kinds of benefits teachers get from the training, what are the short coming of the training and how to resolve the challenges. Qualitative data, in fact, obtains from the interviews, which are then manually coded and analyse. The main themes are found from analysis is illustrated as follows along with respondents’ voices in narration form.

5.5.1: Respondents’ views about the 30 days ICT training provided by NACTAR

Most of the respondents participated in the in-depth interview reveal that the 30 days ICT training provided by NACTAR for the teachers of secondary level is good and effective as the training help to develop the following skills in teachers, which eventually improve their teaching quality.

- Increase teachers’ ICT skill;
- Create skilled ICT teacher to building digital Bangladesh;
- Teachers get proper and updated knowledge about ICT;
- Teachers can learn more practical sides of ICT from the training as the training manual is prepared according to the curriculum of ICT; and
- It helps to increase the creativity of the trainer.

Some of the respondents’ voices are narrated below that reflected the findings found from the interviews.

“I can strongly opine that the ICT training offered by NACTAR is a great opportunity for the teachers as it helps to create skilled ICT teacher for building digital Bangladesh” (Head teacher).

“Teachers get proper and updated knowledge about ICT from the ICT training provided by NACTAR” (Principal).

“Teachers can learn more practical sides of ICT from the training as the training manual is prepared according to the curriculum of ICT of secondary level of education” (Coordinator, NACTAR).

5.5.2: Skills developed within the teacher from the ICT training

Respondents are asked to indicate what types of skills are developed within the teacher by this training they received from NACTAR. The following skills are identified from the respondents’ opinions.

- ICT skill,
- Technological skill,
- Digital skill,
- Soft skill, and
- Multimedia skill.

Some opinions of the respondents are given as below for triangulation of the findings that echoed the similar thinking as pointed in previous part.

“I think from this training many skills are developed within my teachers, for example, IT skill, technological skill, digital skill and different soft skills” (Head teachers).

“Largely the ICT and use of multimedia skills are developed within the teachers of my college from this training, which add an extra value in their teaching-learning activities as I believe” (Principal).

5.5.3: Do teachers and students get any benefit by the 30 days ICT training?

Teacher, who participate in 30 days ICT training provided by NACTAR and their students are getting benefitted by this training in a many ways as found from the respondents’ views. The most identified benefits teachers receive from this training include the followings.

- By improving their technical knowledge.
- By enriching their ICT practical knowledge.
- By getting updated knowledge about ICT and technology.
- Students are benefitted by knowing from their trained teachers about the use of ICT.
- Teachers and students will be able to be entrepreneur by using technology.

- Student can learn lot about the theoretical and practical knowledge of ICT.

Respondents' voices are presented in narration form as below, which portrayed the similar refection.

“I believe that teachers of my schools get benefit greatly from this training, such as- they are benefited by improving their technical knowledge, ICT practical knowledge and getting updated knowledge about ICT and technology” (Head teacher 1).

“Teachers can improve their ICT related knowledge participating in this training that they can later in their teaching practice” (Head teacher 2).

5.5.4: Changes observed in the teachers' teaching skill after the training

Respondents steadily state that they have a look a good level of changes in teaching skills of their teachers, who got 30 days ICT training from NACTAR. Some of the changing skills are given as follows.

- Teach ICT class (both theory and practical) effectively than before.
- Teachers are more confident to operate IT related equipment (i.e. computer, multimedia).
- Teachers have more sound knowledge and skilled about ICT subject than ever.
- Teachers are able to make PPT (power point presentation);
- Teachers become able to prepare digital content for their lecture;
- Teachers can share their ICT knowledge arranging in-house training at their Schools/Institutes;

Views of heads and principal are cited here that express the similar outlooks.

“The teachers, who have already taken this training, are more adroit and softly handle both theoretical and practical class of ICT” (Head teacher).

“After taking this training teachers have more sound knowledge and skilled about ICT subject than ever. As I can see that teachers in my college are able to prepare power point present (PPT) and digital content for their ICT class that most of them did not know at all or they have very little knowledge about these. Besides, I sometimes give them an opportunity to arrange in-house training, so that other teachers can get knowledge on ICT from the newly trained teachers” (Principal).

5.5.5: Lacking or problems of the 30 days ICT training according to key informants' views

Though NACTAR open a space for the teachers of secondary level to get knowledge and skills on ICT from its training but there is still some short coming of this training as found from the respondents' opinions present as follows.

- Short duration of course;
- Slow speed of internet;
- Only one branch of NACTAR located in Bogura;
- Need more qualified teacher;
- Every teacher has different and individual quality to grasp the training, which is most challenging to deal with such diversified teachers; and
- Sometimes teachers do not get permission from the principal or head teachers of their schools or colleges.

Followings are the voices of the respondents, which reflect the same point of views as described earlier.

“Every teacher has different and individual quality to grasp the training, which is most challenging to deal with such diversified teachers during training session. Other problem that we can't avoid, are slow speed of internet, not possible to manage or organize cultural program and further we do not have enough TV room for our teacher trainees” (Director, NACTAR).

“NACTAR create a great opportunity for our teachers as they can update new knowledge and skills through this. There are still some lacking of the raining, such as- schedule class is very short and there is no option to select the training center as there is only one branch of NACTAR located in Bogura” (Head teachers).

“The main problem of location of the training center as the only center of NACTAR is located in Bogura. For this location some teachers, particularly female teachers are interested to join in the training though they get the permission from the college. Additionally, some teachers complain problem of mosquito as this is the residential training” (Principal).

“The teachers, who are the trainees of this training sometimes do not get permission to participate in this training program because some head

teachers or principals do not allow those teachers for taking this training”
(Coordinator, NACTAR).

5.5.6: Suggestions to uplift the quality of NACTAR’s 30 days ICT training programme

Respondents are asked to provide some suggestion to uplift the quality of NACTAR’s 30 days ICT training programme. Suggestions originated from the interviews of the respondents are given in the following section.

- Need to recruit qualified trainer.
- Increase the branches of NACTAR.
- Increase internet speed.
- Increase the duration of course.
- Increasing the number of computer lab.
- Incorporating updated course in the training manual.
- Trainee teachers ought to continue their practice at their institutes and should apply the achieved knowledge of the training in classroom teaching practice.
- Need to develop infrastructural facilities more fully.
- To up the facilities of hostel for the trainees and to increase budget etc.

Respondents’ opinions are narrated below and similar points are echoed as shown in the above points.

“For effective training we should increase the number of computer lab and incorporate updated course in our training manual, so that trainee teachers can get update knowledge about the improvement of ICT and do not face any problem for computer lab shortage. Moreover, the trainees ought to continue their practice at their institutes and should apply the achieved knowledge of the training in classroom teaching practice” (NACTAR Director).

“As far as I think, for fruitful training NACTAR authority should recruit more qualified trainer for the teacher trainee and the internet system with its speed should be upgraded” (Head teacher 1).

“In order to improve the quality of NACTAR training, the authority should increase the duration of course and appoint qualified trainer for the training” (Head teacher 2).

“For the further development of this training program, NACTAR authority should take proper steps to develop infrastructural facilities and increase budget. For trainee teachers, my one and only suggestion and request to the newly trained teachers are that they should apply their new knowledge in their real life” (Coordinator, NACTAR).

It summary, it can be said some robust findings are achieved from this study that might have implications in formation of ICT curriculum and taking any training program for increasing ICT teachers’ knowledge and skills at secondary level education. In the next chapter, discussion of the findings along with policy implications and limitations of the study are discussed.

Chapter-6

Discussion

6: Introduction

This study has taken an attempt to assess the 30 days ICT training provided by NACTAR according to curriculum at secondary level (VI-XII) of education in Bangladesh. In order to address the research objectives, information was generated from different perspectives that include (i) review of ICT curriculum of grade VI-XII, (ii) principals, head teachers, teachers, curriculum experts and NACTAR officials training coordinators opinions about ICT teaching to get a clear scenario about the ICT teaching practice and teachers' ICT knowledge, iii) scenario of educational institutions for teaching ICT, and (iv) gaps among ICT curriculum from grade VI to XII, teaching practice and ICT training manual of NACTAR respectively. Salient findings acquired from the analysis of the data of this study are described in the following section.

6.1: Findings related to teachers' demographic information

✚ Female teachers' participation in ICT training offered by NACTAR is noticeably less than their counterpart male teachers, which is line with the findings of other researchers that reported a significant difference between male and female use of technology in general and computer in particular (Martina, Meelissen, &Drent, 2008; Ozer, Ugurlu, & Beycioglu, 2011; Bakr, 2011). In support this findings, interpretation can be that the female teachers outnumber men in primary education sector in Bangladesh (BANBEIS, 2013; cited in Mim, 2020), the scenario is different for secondary education, where female participation in teaching profession is not as much of primary education and this may be the one reason of less participation of female teachers in the ICT training program. Another point can be female teachers are more anxious than their counterpart male teachers towards hardware (Hong and Koh, 2002). Moreover, female teachers probably do not get selection from the authority to participate in ICT training for as being female teachers, and female teachers most of the time do not show their interested to attain in any training, which is far away from their home.

✚ The age of the teachers participated in the study are between 24 to 51 years (mean age 36.42 years) and most of them are assistant teachers having post-graduate level education (i.e. MA, MSc or MCom) and experienced teachers (mean teaching experience of teachers is 9.13 years). It would not irrelevant to think that these group of teachers are more energetic and enthusiastic, who are engaging to build our students for 21st century's job market. Thus, opportunity of ICT training for them

should frequently arrange to boost up their teaching quality, so that they can then use ICT efficiently and effectively in their teaching-learning.

- ✚ Teachers participated in the study worked in different educational institutes, which are located in different divisions of Bangladesh. Inequality is found in teachers' participation in ICT training as large number of the teachers (23.10%) is from Chattogram division, whereas only a few teachers in the sample (6.50%) are from Mymensing division. Thus, it is suggested that equal opportunity need to be created for all teachers of all divisions in Bangladesh.
- ✚ Class size is a vital issue in teaching-learning process, where acceptable teacher-student ratio should be 1:30 for effective teaching. Findings stated that teacher-student ratio in the sample schools was slightly high than the policy recommended ratio denoting the mean ratio was 1:42.51, which is certainly an impediment for effective teaching.

6.2: Findings related to the Evaluation of Institutional ICT teaching situation according to ICT curriculum of grade VI-XII

For effective ICT teaching good level of ICT facility is mandatory. Findings regarding actual classroom teaching situation, some range of progress are identified in the ICT use in classroom settings nevertheless there are still noticeable gaps are found in classroom situation as described in the following section.

- ✚ Findings indicate that though institutes have good level of electricity connection and multimedia projector facilities but the ICT arrangement are still far lag behind as most of the teachers in the sample claim that there are not adequate facilities of sound system, sound system (i.e. microphone), adequate number of computer and CD-ROM in their educational institutes, which are prerequisite for effective teaching of ICT subject according to curriculum of VI to XII grades.
- ✚ For effective ICT teaching, facility of internet connection with its type and speed is important. It is observed that most of the educational institutes do not have internet facility though near about one quarter of the teachers claim that they have internet facility in their schools, which they usually use either by modem or broadband. For internet speed, most of the cases teachers get internet access at their educational institutes with 1 mbps speed. In some educational institutes have internet facility with speed of more than one mbps.

- ✚ While ICT is authorized as compulsory subject in the curriculum of secondary level of education, computer labs remain relevant in educational institutes for effective ICT teaching. Further, it creates an innovative learning environment at school, so that, institutes can prepare their students according to the need of rapid changing world of 21st century. Considering the importance of computer lab and lab assistant, it is gleaned out from the findings that most of secondary educational institutes do not have computer Lab and Sheikh Russell Lab albeit majority of the teachers in the sample indicate that they have Lab assistant at their school for computer practical class. Findings of this study also reveal that teachers and students do not get opportunity to use educational institute's computer lab. In some cases, teachers dominate more access to computer lab than their students. Further, most of the educational institutes do not have enough budgets for computer repairing and they do not have any personnel in their school to repair their computer as well.
- ✚ Information regarding funding source for repairing ICT gadgets portrayed that institutes generally provide fund from their own internal income source to repair ICT gadgets, ironically in some cases, teachers spend money from their own pocket to repair their schools computer and related instruments. Some educational institutes have opportunities to spend money from donor donation.
- ✚ Many educational institutes have their own school website as found from the opinions of half of the teachers in the sample and nearly half of the teachers indicate that they do not have own school websites in their institutes. In addition, a significant number of the teachers disclose that their institutes do not update their website on regular basis.
- ✚ Findings state that most of the educational institutions have at least one ICT teachers albeit there is still need of ICT teacher in some educational institutes as there is no computer teacher in their institutes.
- ✚ It is a general believe that teachers who teach ICT they should have a degree on computer. It is clear from the findings that ICT teachers have some sorts of qualifications and trainings on computer along with their academic first degree but a very negligible number of teachers have under graduate degree (i.e. BSc) in computer science. Noteworthy, it is also observed from the findings that teachers teach ICT subject in some educational institutes have under graduate and post graduate degrees in different subject other than any degree or certificate on computer.

- ✚ For effective teaching training is imperative. Findings reveal that more than half of the teachers in the sample have training on ICT and they have received different types of trainings to increase their ICT teaching skills, for illustration teachers received ICT training as part of their CPD (Continuous Professional Development) training, some have earned 6 months computer course, some teachers in the sample participated 12 days, 15 days, 18 days and 40 days training on computer and some teachers have received 28 days course, diploma course and other basic computer courses on computer and digital content development training to increase their teaching along with ICT skills. There are some in the institutes, who have not get any training on ICT

To the sum up, though the government of Bangladesh is working hard to achieve the vision of 2021 and has taken a number of initiatives, for example, a2i project and CPD program for making teachers technologically efficient and skilled but the education institutes at secondary level are still far behind to achieve this goal due to lack of infrastructure and facilities as found it clear from the above discussion. Thus, the authority should take required steps for increasing quality ICT teaching and environment reducing the identified gaps.

6.3 Findings of teachers' concept about ICT, ICT curriculum and ICT class

Findings, as explained below, are also recognized some challenges for the indicator teachers' concept about ICT, ICT curriculum and ICT class and some suggestions derived from the teachers' opinions that must take into consideration at government level and institutes level for creating effective ICT teaching environment.

- ✚ More than half of the teachers in the sample have good level of concept about ICT curriculum and they follow the curriculum and syllabus, while teaching ICT and at the same time, findings also indicate that, many teachers have not clear concept of ICT curriculum yet and some of the teachers do not follow the ICT curriculum and syllabus during teaching ICT. In ICT teaching, more emphasize should be given on both aspects of ICT, i.e. theory and practical as a small portion of the teachers focus only on theory ignoring the practical class.
- ✚ Interesting findings are coming out about for not taking ICT class in their institutes. The precise reason for not taking ICT class is lack of proper arrange of ICT facilities that include educational institutes do not have ICT teacher, computer Lab and multimedia projector in their school at all, which are imperative for ICT class. Apart

from this, lack of electricity and internet facilities also are a big hindrance for ICT teaching in some institutes.

- ✚ From the last decades Government of Bangladesh (GoB) has paid more attention to produce more efficient and skill secondary school teachers providing ICT based training. For example, GoB, in collaboration with the TQI-SEP and Access to Information Project (a2i), has inaugurated training on develop digital content as part of CPD (Continuous Professional Development) to escalation teachers ICT knowledge and skills. It is ascertained from the findings that almost three quarters of the teachers in the sample strongly raise their voices that they use digital content and multimedia in classroom teaching implying a significant improvement of teachers' teaching skill. Contrary, there are many teachers in the educational institutes, do not use any digital content and multimedia during classroom teaching. Multifaceted reasons are distinguished about for not using digital content and multimedia during teaching that include lack of teachers ICT knowledge and skill, institutes do not have computer and multimedia projector that discourage teachers to use digital content and multimedia, and lack of electricity continuous supply and internet facilities are certainly the main hindrance for effective use of digital content and multimedia in their classroom teaching. It is furthermore seen from teachers' views that trained teachers and good ICT infrastructure are imperative for effective ICT teaching. Apart from this, teachers' motivation, institutes support and facilities need to be considered along with trained teacher and infrastructure for effective ICT teaching.
- ✚ Findings of the study depicted that teachers are benefited in a number of ways in teaching ICT subjects following their curriculum, for illustration, ICT teaching create opportunity for them to practice how to operate ICT and prepare digital content using power point presentation (PPT) more efficiently and teachers can prepare slide to make their lecture more attractive. The ICT training also help teachers to attain new information for teaching ICT, teach their subject easily, and conduct class within a short time and in a much planned way.
- ✚ A number challenges identified from this study regarding ICT teaching that include lack of computer lab, electricity problem that mainly occurs for rigorous load shading, insufficient network connection, teachers have limited opportunity for using multimedia and institutes do not have sound system, which are very crucial issues for

quality ICT teaching. Other challenges include lack of ICT infrastructure, teachers' ICT skill and content.

✚ A number of suggestions are illustrated from teachers' voices regarding point how to resolve the challenges for making ICT class more attractive and effective. Some of these are- compulsory ICT training or some sort of short training or course on ICT that institutes should arrange for their ICT teachers, need to provide computer lab facility for practical class, appoint trained ICT teacher, create opportunity of foreign training for making ICT teachers' more skilled, provide computer facilities for all students and remove electricity interruption. Further, institutes should think to appoint computer hardware engineer, who can teach ICT subject at one hand and on the other hand can solve computer's problem promptly.

✚ For enhancing teachers' ICT teaching quality as found from teachers' voices, following measures need to be taken into account, i.e. provide 1 year compulsory training for all ICT teachers, appoint trained ICT teacher and established computer lab in the institutes and need to take proper management of the lab providing adequate ICT facilities, for example, multimedia, facility of broadband and free internet. Besides, teachers believe that initiative need to be taken for establishing NACTAR in every districts of Bangladesh, so that institutes can arrange training for their ICT teacher negotiating with NACTAR, need to increase number of ICT practical class, appoint more ICT teachers from Computer Science background, provide adequate budget for repairing computer and appoint a demonstrator, who can help ICT teachers and sometime can take ICT class in absence of ICT teachers and finally.

6.4: Impact of NACTAR's 30 days ICT training to enhance teacher ICT Skill

Following findings, as described as follows, are derived from the study for the role of NACTAR identifying some vigorous areas that are very vital for increasing ICT teachers teaching skill and quality.

✚ National Academy for Computer Training and Research (NACTAR) is a training and research institute that has been providing practical and pragmatic training on ICT for making teachers' more skilled and efficient. It is clear from the findings that though at least only one (1) teachers from some educational institutes received ICT training from NACTAR or previous NOTRAMS but more than third quarter of the teachers in the sample declare that teachers of their institutes have not get any ICT training yet.

- ✚ In order to share attained knowledge and skill on ICT, teachers who received training from NACTAR or NOTRAMS, do not arrange any ICT training at their educational institutes though some teachers hardly try to arrange training to share their newly achieved knowledge with other teachers of their educational institutes. On the other hand, head teachers sometimes take initiatives for in-house training allowing newly trained teachers to share their knowledge and skill with other teachers of educational institutes.
- ✚ How teachers get benefit from ICT training offered by NACTAR? Firstly, it can be said that NACTAR creates an opportunity of intensive ICT training for the teachers, which certainly helps to increase teachers' proper and update ICT knowledge, interest toward ICT, skill to prepare digital content for class lecture, also enhance teachers' knowledge and skill to use multimedia. Additionally, teachers can learn more practical sides of ICT from the training as the training manual is prepared according to the ICT curriculum of grade VI-XII and NACTAR's initiative is remarkable as it is working hard to create skilled ICT teacher to building digital Bangladesh.

In a nut shell, it can be said that NACTAR is playing a great role to produce quality ICT teachers for secondary level of education offering demanding training on ICT. Respondents of the study (i.e. teachers, head teachers, principals and NACTAR official) strongly opined that the ICT training provided by NACTAR is really opened a room for them to acquire new knowledge and skill on ICT, which make them more confident and efficient to take their theory and practical class handling ICT related equipment. It is, therefore, the policy makers need to take into consideration the achieved findings for the betterment of the ICT teachers to improve their teaching quality. Further, authorities of the institutes should arrange in-house training that certainly allows their teachers to share their new knowledge and skill of ICT with their colleagues, so that other teachers also can earn knowledge and skill.

6.5: Findings derived from Curriculum Review

Followings are the salient findings originated from the review of ICT curriculum of grade VI to XII, which can identify some gaps of curriculum, which can be considered as valuable recommendations for improving the ICT curriculum of all grades.

- ☑ After reviewing the prescribed ICT curriculum from grade VI to Grade XII, it is seen that the learning outcomes in the curriculum is perfectly reflected the objectives at different grades (i.e. VI-XII) of secondary level education. Moreover, the learning

outcomes are found well organized according to the learning domains and all three learning domains, (i.e. cognitive, affective and psychomotor domain) are found prescribed using suitable action verbs. Even, within a particular learning domain, the learning outcomes are found organized accordingly to the sequence of the sub-domains of that domain. Further, some learning outcomes in the curriculum of each grade (VI-XII) are related to the safe use of ICT and the security of ICT gazettes. Therefore, the integration of these items should be handled carefully as the issues are very significant.

- ☑ Content is one of the important components of curriculum. Findings reveal that most of the contents in the curriculum are properly selected and organized to attain the prescribed learning outcomes according to ICT curriculum and also organized according to the maxims of teaching. To satisfy the term objective-content matrix, all the learning outcomes should be clearly reflected through the contents. In grade XI-XII curriculum the application of psychomotor domain is found good but this portion should be emphasized more to enhance the practical skills of the learners. The contents in this grade are higher order than the previous grade. Limitation is found only in the grade VI ICT curriculum, where only 01 (one) LO was found which was not reflected properly according to title of the content. One thing is important to point out that, although very few contents seem dissimilar (i.e. in grade VI and VII) with the learning objectives but necessary instructions are found in the activities part to attain those particular objectives. Therefore, more attention is needed to maintain strong logical alignment between the learning outcomes and the contents followed by learning objectives.
- ☑ Classroom teaching-learning requires suitable instructional strategies, which makes the classroom activities easy, interesting, flexible and encouraging to attain the expected learning outcomes. It was noticed from the curriculum review that, various methods and techniques for example, question-answer method, demonstration method, pair/group work, observation method, problem-solving method, learning by doing approach, discussion method, exposure trip, brainstorming, debating, etc., and the required materials, such as- ICT textbook, chart, poster, picture, diagram, real objects, ICT gazettes, multimedia projector, internet, computer laboratory etc. are prescribed in curriculum from VI to X grades mentioning the activities separately for the teachers and the students, which is totally absent in the ICT curriculum of grade

XI-XII. This is really challenging for the teachers to choose appropriate methods during teaching in the classroom. They might have to be faced difficulties rather than flexibilities. The activities for both, i.e. the teachers and the students are mentioned separately in the curriculum but more activity centred methods should be incorporated in the ICT curriculum of grade VI to grade XII. The curriculum experts should keep in mind that ICT is more practical oriented subject and thus, they need to emphasize more on students' practical skills and its application, while developing ICT curriculum. Further, the teaching materials also need to think more critically for effective implementation before incorporated in the curriculum matching with teaching methods.

☑ Evaluation is another important component of the curriculum that helps to assess student's achievement and intended learning outcomes from the lesson. In respect to the contents, it is seen from the curriculum review that the evaluation strategies prescribed in the curriculum at all levels are suitable to assess students learning. In addition, ICT as a technical subject, the performance based and activity based assessment strategies prescribed in the curriculum is really very significant to enhance the skills of the learners as well as to attain the educational objectives of ICT subject. Interestingly, ICT curriculum from grade VI to X contains the suitable evaluation strategies separately, which is can't be found in the ICT curriculum of grade XI-XII. For grade XI-XII only the general guidelines for different evaluation techniques including formative and summative evaluation at the introductory part of the curriculum were prescribe in the ICT curriculum. So, it can be opined that more activity based activities should be incorporated in the evaluation portion of ICT curriculum at all grades of secondary level.

☑ In the ICT curriculum, some learning outcomes are prescribed as practical work, which is expected to evaluate through performance assessment but, no specific guidelines are found regarding that evaluation strategies.

Summing up the discussion of curriculum review, it can be pronounced that the ICT curriculum should be properly develop maintaining the sequence as objective-content-method and evaluation of grade XI-XII, like other ICT curriculums of secondary level. In general, the organization of teaching methods, materials and evaluation strategies should be selected and

organized carefully in the ICT curriculum of all grades to make the teaching-learning more effective, flexible and interesting.

6.6 Policy implications of the research

The findings of the study have articulated some guidelines for policy implications, which are narrated as follows.

6.6.1: Policy implications for teaching ICT subject and Curriculum

- ✚ As it is a general believe that female teachers are more anxious of using hardware than male, so female teachers' should encourage to participate in ICT training offered by NACTAR or other organizations in different times for making them more knowledgeable and skilled. Schools/institute authority can arrange ICT training for their female teacher in their premises as well.
- ✚ The authorities of educational institutes should keep in mind that ICT subject is more practical oriented subject, so teacher-student ratio should be maintained strictly particularly for ICT class keeping its size in maximum 1: 40 ratio.
- ✚ Educational institutes should appointed more trained teachers for ICT teaching and a good level of ICT infrastructure at educational institutes should be maintained for effective ICT teaching providing adequate facilities of sound system, sound system, computer and CD-ROM, broadband and free internet connection with sufficient speed, computer lab for practical class, lab assistant, multimedia projector, adequate supply of electricity and internet facilities along with skilled ICT teachers. In addition, educational institutes need to develop their own website and it should be update on regular basis.
- ✚ Authority of educational institutes should have enough budgets and personnel for repairing computer, so that teachers can avoid spending money from their own pocket. Moreover, teachers and students access to use computer lab must be ensured.
- ✚ It is important to take proper steps and monitor whether all secondary educational institutes have ICT teachers for teaching ICT subject. Adequate number of ICT teachers need to be appointed in urgent basis in the educational institutes, where there is no ICT teacher at all. Attention also need to be paid on teachers qualifications as in many educational institutes teachers do not have any degree or certificate on computer and even any training on ICT.

- ✚ Training on ICT is imperative for increasing teachers ICT skill and clear concept about ICT curriculum. Thus, different types of in-service trainings educational institutes can arrange, so that teachers can acquire knowledge and skill about develop digital content and use multimedia etc. in classroom teaching.
- ✚ Teachers should emphasize on both of the aspects of ICT subject, i.e. theory and practical during teaching and it is mandatory to monitor teachers' ICT class on regular basis whether they are teaching ICT subject following the curriculum and syllabus.

6.6.2: Policy implications for ICT curriculum of grades VI-XII

- ➡ More attention should be given on the formation of LOs (learning outcomes) during the curriculum development, so that the learning objectives will be reflected properly and also more attention is needed to maintain strong logical alignment between the learning outcomes and the contents followed by learning objectives of subject ICT.
- ➡ The materials suitable for quality facilitation and learning of ICT should be mentioned clearly in the curriculum of all grades to attain the prescribed Los hence the learning objectives of subject ICT, as well as to enhance students learning.
- ➡ More concrete strategies of evaluation need to be precisely incorporated in the ICT curriculum at all grades of secondary level.

6.7 Limitations of the study

Though this research was carefully designed and meticulously carried out, there are several factors that could have interfered in the study outcomes and the quality of the study.

The considered limitations are briefly discussed below:

- **Representativeness:** The representativeness of the participants was the first limitation. Only 250 respondents were involved in this study. It does not give the complete picture of Bangladesh.
- **Coverage:** It is not possible to interpret the findings in light of gender, age, or experience as these variables were clearly not set as selection criteria.
- **Time:** The major limitation of this study is the limited time for conducting this study. A long time research could give us a more effective and viable picture.
- **Level:** Another limitation of the study was that this study was conducted only for the grade VI-XII. Further research would be needed to address other grades and other level of education.

- **COVID-19:**The pandemic situation due to COVID-19 was a barrier for collecting data, face to face interaction and what not. Its hampered the spirit of research as well as the mentality of the researcher.
- **Diversity:** Lastly, the diversity of educational institutions was not fully represented in this study. The study mainly focused on mainstream educational institutions of secondary level of education.

This chapter present the discussion of the findings derived from the study. In the next chapter conclusion of the study is presented.

Chapter Seven

Conclusion

The main focus of this study was to evaluate trainees' educational institute who received 30 days ICT training from NACTAR following the implementation of ICT Subject as per the prescribed curriculum in secondary schools, colleges, madrasah and technical educational institutes of Bangladesh. Mixed research method was adopted in this study to generate two different kinds of data, i.e. quantitative and qualitative data. Information was collected from the teachers, who constituted the main sample of this study. Information also was generated from the experts, principals, head teachers and NACTAR's officials. Apart from this, information was gathered from the analysis of ICT curriculum of grade VI-XII along with the opinions of curriculum experts and ICT training manual of NACTAR to get a clear picture of the ICT teaching practice and teachers' ICT knowledge, to find out the gaps of ICT curriculum at grades VI to XII and teachers' teaching practice. Some notable findings are achieved from the study, which might have policy implications.

Findings of this study clearly identified the need of female teachers' more participation in ICT training to achieve ICT knowledge and skill. Moreover, equal opportunity of training must be offered for all divisions' ICT teachers i.e. head teachers, lecturers, assistant teachers, senior teachers, trade instructor and resource teachers, who are working in the educational institutes of different divisions in Bangladesh, as it is found from the findings that most of the teachers were from Chattogram and Dhaka divisions. To resolve this issue, NACTAR can initiate an attempt that, with the help of the legitimate authority they may formally inform the institution's head to send their non-trained ICT teachers to send NACTAR to receive training for their skills development of teaching ICT. In this issue, the term equity should be applicable to make a balance considering the training capacity of NACTAR. ICT class, in fact, is particularly interrupted due to lack of ICT infrastructure as evidently found from the findings of the study. In many educational institutes teachers can't take ICT class at all or not on regular basis and multifaceted reasons are identified from the findings of the study for not conducting ICT class, for example, many teachers in many secondary institutes are not well familiar and train up with ICT, lack of teachers ICT knowledge and skill, inadequate ICT infrastructure, i.e. institutes do not have computer and multimedia projector, lack of electricity and internet facilities. All of the options mentioned here are obligatory for ICT teaching. Focusing on this drawback, some vital measures need to be taken for regular and effective ICT teaching, for illustration, maintain right teacher-student ratio for ICT class, sound ICT infrastructure, such as-sufficient electricity supply, multimedia-projector, sound system, adequate number of computer for the students, CD-

ROM, computer lab, lab assistant and free broadband internet connection with sufficient speed. All secondary educational institutes should have their own websites, so that teachers and students can get any information easily from their website. For effective ICT teaching only infrastructure is not sufficient, the educational institutes authority must ensure that they have trained teachers from computer science background and computer lab demonstrator for teaching ICT at grades VI to XII students and they also have sufficient budget and personnel for repairing computer, which are fundamental need for teaching ICT.

It is important to keep in mind that training is imperative for making teachers' more effective. Given importance on ICT based secondary teachers' training, government of Bangladesh has taken an initiative for training on develop digital content as part of teachers' Continuous Professional Development in collaboration with the TQI-SEP and Access to Information Project (a2i). Teacher believe that this type of training is beneficial for them, since they can know how to teach ICT in the classroom following the curriculum, operate ICT related equipment, i.e. computer, multimedia, projector etc. and prepare digital content using power point presentation (PPT) more efficiently. It is important to note that many teachers in the sample suggested establish NACTAR in every district of all divisions in Bangladesh, so that institutes can arrange training for their ICT teacher negotiating with NACTAR.

From the findings of curriculum review, it can be suggested that more attention is needed to maintain strong logical alignment between the learning outcomes and the contents followed by learning objectives of subject ICT. As ICT is more practical oriented, therefore, it is crucial to emphasize more on students' practical skills and its application. Further, the teaching materials also need to think more critically for effective implementation before incorporating in the curriculum matching with teaching methods. Interestingly, ICT curriculum from grade VI to X contains the suitable teaching and evaluation strategies separately, which haven't found in ICT curriculum of grades XI-XII albeit there were some general guidelines for different evaluation techniques. More activity based laboratory oriented activities should be incorporated in the evaluation portion of ICT curriculum at all grades. Thus, it is suggested from the curriculum review that the educationalist, curriculum experts, ICT expert and policy makers should take into account these issues, while developing ICT curriculum of secondary level of education.

It is expected that the findings of this research can figure out some new ideas and direction for the people of different training organizations (i.e. NACTAR,) and programmes (a2i), educational researcher, educationalist, curriculum experts, ICT experts and policy makers, who are involve in ICT related research, programs and curriculum development at secondary education. Finally, further research on ICT curriculum development and implementation, teachers' knowledge, skill and teaching practice is suggested that can explore more in-depth information about fruitful implementation of ICT curriculum.

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Appendices-I

গবেষণা তথ্য সংগ্রহের উপকরণ-০১

শিক্ষকদের জন্য আধা-কাঠামোবদ্ধ প্রশ্নোত্তরিকা

নামঃ জেডারঃ বয়সঃ বিভাগঃ

পদবিঃ শিক্ষা প্রতিষ্ঠানের নামঃ

ই-মেইলঃ মোটোফোন নম্বরঃ

অভিজ্ঞতাঃ সর্বোচ্চ শিক্ষাগত যোগ্যতাঃ

সম্মানিত উত্তরদাতা,

নিচের প্রশ্নগুলো মনযোগ সহকারে পড়ুন এবং আপনার মূল্যবান মতামত প্রদান করুন-

আপনার শিক্ষা প্রতিষ্ঠানের ভৌত অবকাঠামোগত সুযোগ-সুবিধাঃ

ক্রমিক নং	বিবৃতি	মতামত		মন্তব্য/সংখ্যা
		১। হ্যাঁ	২। না	
১	বিদ্যুত সংযোগ			
২	শ্রেনিকক্ষে সাউন্ড সিস্টেম			
৩	শ্রেনিকক্ষে কম্পিউটার/ ল্যাপটপ			
৪	আপনার প্রতিষ্ঠানের নিজস্ব ওয়েবসাইট			
৫	শিক্ষক-শিক্ষার্থীর অনুপাত			

৬	শ্রেণিকক্ষে মাইক্রোফোন এবং সাউন্ড সিস্টেম			
৭	প্রজেক্টর/মাল্টি-মিডিয়া প্রজেক্টর			
৮	কম্পিউটার এবং সিডি রম এর পর্যাণ্ডতা			
৯	কম্পিউটার ল্যাব			
১০	শেখ রাসেল ডিজিটাল ল্যাব			
১১	ল্যাব সহকারী/ডেমোনেস্ট্রেটর			
১২	ল্যাবে ইন্টারনেট সংযোগ			

- ১। যদি ইন্টারনেট সংযোগ থাকে, তাহলে কোন ব্যান্ডের? (টিকচিহ্ন দিন) মডেম বেসড/ব্রড ব্যান্ড
- ২। ইন্টারনেট স্পীড কত? (দয়া করে লিখুন)
- ৩। কম্পিউটার ল্যাব ব্যবহার হয় কি? (টিকচিহ্ন দিন) হ্যাঁ/না
- ৪। কম্পিউটার ল্যাব ছাত্র-ছাত্রী ব্যবহার করতে পারে কি? (টিকচিহ্ন দিন) হ্যাঁ/না
- ৫। মাল্টিমিডিয়া প্রজেক্টরটি (যদি থাকে) সচল আছে কি? (টিকচিহ্ন দিন) হ্যাঁ/না
- ৬। কম্পিউটার ল্যাবে আইসিটি বিষয়ক তত্ত্বীয়/ব্যবহারিক ক্লাস হয় কি? (টিকচিহ্ন দিন) হ্যাঁ/না
- ৭। কম্পিউটার যন্ত্রাংশ নষ্ট হলে ক্রয়/মেরামতের জন্য বাজেট বরাদ্দ আছে কি? (টিকচিহ্ন দিন) হ্যাঁ/না
- ৮। যদি না থাকে তাহলে কম্পিউটার যন্ত্রাংশ ক্রয়/মেরামত কিভাবে করেন? লিখুন-

.....

- ৯। কম্পিউটার মেরামত করার জন্য আপনার প্রতিষ্ঠানের জনবল আছে কি? (টিকচিহ্ন দিন) হ্যাঁ/না
- ১০। আপনার প্রতিষ্ঠানের নিজস্ব ওয়েবসাইট (যদি থাকে) প্রতিনিয়ত হালনাগাদ করা হয় কি? (টিকচিহ্ন দিন) হ্যাঁ/না
- ১১। আপনার প্রতিষ্ঠানে আইসিটি বিষয়ের শিক্ষক আছে কি? (টিকচিহ্ন দিন) হ্যাঁ/না.....

১২। আইসিটি বিষয়ের শিক্ষক কতজন আছে? (উল্লেখ করুন).....

১৩। যদি থাকে তাঁর/তাদের শিক্ষাগত যোগ্যতা কি? লিখুন-

১৪। যদি না থাকে, তাহলে আইসিটি বিষয়ের ক্লাস কোন বিষয়ের শিক্ষক পড়ান? যোগ্যতাসহ লিখুন-

১৫। আইসিটি বিষয়ের ক্লাস যে বিষয়ের শিক্ষক পড়ান, তারা/তাদের আইসিটি বিষয়ের উপর কোন আনুষ্ঠানিক প্রশিক্ষণ রয়েছে কি? (টিকচিহ্ন দিন) হ্যাঁ/না

১৬। কি ধরনের প্রশিক্ষণ রয়েছে? দয়া করে উল্লেখ করুন-

১৭। আপনার প্রতিষ্ঠানে নট্রামস/নেকটার থেকে ০৬ মাস মেয়াদি প্রশিক্ষণপ্রাপ্ত শিক্ষক আছে কি? (টিকচিহ্ন দিন) হ্যাঁ/না

১৮। নেকটার থেকে ৩০ দিন মেয়াদি তথ্য ও যোগাযোগ প্রযুক্তি বিষয়ক প্রশিক্ষণপ্রাপ্ত কয়জন শিক্ষক আপনার প্রতিষ্ঠানে আছে? লিখুন-

১৯। নেকটারে প্রশিক্ষণপ্রাপ্ত শিক্ষক ইন-হাউস ট্রেনিং-এর ব্যবস্থা করেন কি? (টিকচিহ্ন দিন) হ্যাঁ/না

২০। আপনার প্রতিষ্ঠানের প্রধান ইন-হাউস ট্রেনিং-এর ব্যবস্থা করেন কি? (টিকচিহ্ন দিন) হ্যাঁ/না

২১। যদি করে থাকে, তাহলে কিভাবে? দয়া করে ব্যাখ্যা করুন-

২২। আপনার কি আইসিটি বিষয়ের শিক্ষাক্রম/পাঠ্যক্রম সম্পর্কে সুস্পষ্ট ধারণা আছে? (টিকচিহ্ন দিন) হ্যাঁ/না

২৩। যদি হ্যাঁ হয়, তবে আপনি কি শ্রেণীকক্ষে আইসিটি বিষয়ের পাঠদানের ক্ষেত্রে আইসিটি বিষয়ের শিক্ষাক্রম/পাঠ্যক্রম অনুসরণ করেন? (টিকচিহ্ন দিন) হ্যাঁ/না

২৪। যদি হ্যাঁ হয়, তবে আপনি কিভাবে এবং কেন শ্রেণীকক্ষে আইসিটি বিষয়ের শিক্ষাক্রম/পাঠ্যক্রম অনুসরণ করেন? দয়া করে উল্লেখ করুন-

২৫। পাঠ্যক্রম অনুসারে আইসিটি বিষয়ে নিচের কোন ক্লাসটি করানো হয়? (টিকচিহ্ন দিন)

১। তত্ত্বীয়

২। ব্যবহারিক

৩। উভয়ই

২৬। শিক্ষাক্রম/পাঠ্যক্রম অনুসরণপূর্বক আইসিটি বিষয়ের পাঠদানের ক্ষেত্রে আপনি কীভাবে উপকৃত হচ্ছেন? দয়া করে উল্লেখ করুন-

২৭। পাঠ্যক্রম অনুসারে আইসিটির কোন ক্লাস না হলে কেন হয় না? (টিকচিহ্ন দিন) (একাধিক টিক চিহ্নও প্রযোজ্য)

১। আইসিটি শিক্ষক নেই

২। কম্পিউটার/ল্যাব নেই

৩। মাল্টিমিডিয়া প্রজেক্টর নেই

৪। বৈদ্যুতিক সংযোগ নেই

৫। অন্যান্য (উল্লেখ করুন)

২৮। ডিজিটাল কন্টেন্ট তৈরি করে মাল্টিমিডিয়া প্রজেক্টরের মাধ্যমে ক্লাস গ্রহণ করা হচ্ছে কি? (টিকচিহ্ন দিন) হ্যাঁ/না

২৯। কন্টেন্ট তৈরি করে ক্লাস না নেয়া হলে, কি কারণে নেয়া হয় না? (টিকচিহ্ন দিন)

১। কম্পিউটার নেই;

২। মাল্টিমিডিয়া প্রজেক্টর নেই;

৩। বৈদ্যুতিক সংযোগ নেই

৪। দক্ষতার অভাব

৫। অন্যান্য (উল্লেখ করুন)

৩০। আপনার মতে, পাঠ্যক্রম অনুযায়ী শিক্ষা পাঠ্যক্রম পরিচালনার জন্য কোনটি বেশী প্রয়োজন? (টিকচিহ্ন দিন)

৩।

অন্যান্য

(উল্লেখ

করুন)

৩১। আইসিটি পাঠ্যক্রম অনুযায়ী শিক্ষা কার্যক্রম পরিচালনার জন্য আপনার কোন পরামর্শ থাকলে লিখুন-

৩২। শ্রেণীকক্ষে যথাযথভাবে আইসিটি বিষয়ের ক্লাস নেয়ার ক্ষেত্রে আপনি কী ধরনের সমস্যা/বাধার (অভ্যন্তরীণ/বাহ্যিক) সম্মুখীন হন? দয়া করে উল্লেখ করুন-

অভ্যন্তরীণ বাঁধা/সমস্যা	বাহ্যিক বাঁধা/সমস্যা	অন্যান্য বাঁধা/সমস্যা

৩৩। আপনার মতে, আইসিটি শিখন-শিক্ষণের ক্ষেত্রে শিক্ষার্থীরা কী ধরনের বাঁধা/সমস্যার সম্মুখীন হচ্ছে? দয়া করে উল্লেখ করুন-

৩৪। আপনার মতে, নেকটার কতক প্রদানকৃত আইসিটি প্রশিক্ষণের মাধ্যমে শিক্ষকরা কীভাবে উপকৃত হচ্ছে? দয়া করে উল্লেখ করুন-

৩৫। মাধ্যমিক পর্যায়ের শিক্ষাপ্রতিষ্ঠানে আইসিটি শিক্ষাক্রম অনুযায়ী আইসিটি বিষয়ের গুণগত বাস্তবায়নের ক্ষেত্রে বিদ্যমান বাঁধা/সমস্যাসমূহ দূরীকরণে কী ধরনের পদক্ষেপ নেয়া যেতে পারে বলে আপনি মনে করেন। দয়া করে উল্লেখ করুন-

(আপনার মূল্যবান মতামত এবং সময়ের জন্য অনেক ধন্যবাদ)

Appendices-II

Interview Questionnaire for the Key Informants

1. Which part of the training do you emphasize more? Why?
2. Which training manual do you use for the teachers is best suitable? How?
3. What types of problem do you face for this training?
4. How can you evaluate that teachers are benefitted by this training?
5. What is your suggestion for the further development of such training program by the NACTAR?
6. What is your suggestion for the newly trained teacher?
7. How can students' benefitted by this training?
8. As per your opinion, are educational institutions having the applicability to adopt such training?

Appendices-III

Official Research Work Order from NACTAR

জাতীয় কম্পিউটার প্রশিক্ষণ ও গবেষণা একাডেমী (নেকটার), বগুড়া
কারিগরি ও মাদ্রাসা শিক্ষা বিভাগ
শিক্ষা মন্ত্রণালয়
বগুড়া, বাংলাদেশ।

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Web: www.nactar.gov.bd

স্মারক নং ৫৭.২১.০০০০.০০৮.৩৮.০০০১.১৮-৮৬

তারিখঃ ১৪/০১/২০২১ খ্রি.

বিষয়ঃ ২০২০-২১ অর্থ বছরে রাজস্ব খাতের আওতায় নেকটার কর্তৃক “৩০ দিন মেয়াদি শিক্ষক প্রশিক্ষণ কোর্সে অংশগ্রহণকারী প্রশিক্ষণার্থীদের প্রতিষ্ঠান মূল্যায়ন” সংক্রান্ত গবেষণা কার্যাদি পরিচালনার কার্যাদেশ।

জনাব,

স্মারক নং- ৫৭.২১.০০০০.০০৮.৩৮.০০০১.১৮-১৫৫৫ তারিখ ১৯/১২/২০২০ খ্রিঃ নেকটার-এর নোটিস বোর্ড এবং www.nactar.gov.bd এর মাধ্যমে “৩০ দিন মেয়াদি শিক্ষক প্রশিক্ষণ কোর্সে অংশগ্রহণকারী প্রশিক্ষণার্থীদের প্রতিষ্ঠান মূল্যায়ন” সংক্রান্ত গবেষণা প্রস্তাব আহবান করা হয়েছিল। জবাবে আপনার দাখিলকৃত গবেষণা প্রস্তাবটি মূল্যায়ন কমিটির নিকট গ্রহণযোগ্য হওয়ায় মূল্যায়ন কমিটির সুপারিশ মোতাবেক নিম্নবর্ণিত শর্তসাপেক্ষে আপনাকে “৩০ দিন মেয়াদি শিক্ষক প্রশিক্ষণ কোর্সে অংশগ্রহণকারী প্রশিক্ষণার্থীদের প্রতিষ্ঠান মূল্যায়ন” সংক্রান্ত গবেষণা কার্যাদি সম্পাদনের জন্য কার্যাদেশ প্রদান করা হলঃ

- ১। ০৮ বিভাগের শিক্ষা প্রতিষ্ঠানের প্রশিক্ষণার্থীদের নিকট থেকে সংগ্রহকৃত তথ্যের উপর গবেষণা পরিচালনা করতে হবে। (সংগ্রহকৃত তথ্য নেকটার কর্তৃক সরবরাহ করা হবে)
- ২। কার্যাদেশ প্রাপ্তির দিন থেকে ৬০ দিনের মধ্যে গবেষণা কাজ সম্পন্ন করতে হবে।
- ৩। গবেষণা চলাকালীন সময়ে নেকটার কর্তৃপক্ষকে প্রতি সপ্তাহে গবেষণা কার্যক্রমের অগ্রগতি সম্পর্কে অবহিত করতে হবে।
- ৪। গবেষণাকালে নেকটারে চলমান শিক্ষক প্রশিক্ষণ কোর্সের যে কোন একটি ব্যাচের প্রশিক্ষণার্থীদের Interview গ্রহণ করতে হবে।

৪। গবেষণাকালে নেকটারে চলমান শিক্ষক প্রশিক্ষণ কোর্সের যে কোন একটি ব্যাচের প্রশিক্ষণার্থীদের Interview গ্রহণ করতে হবে।

৫। গবেষণাকালে Research ethics মেনে চলতে হবে।

৬। গবেষণা কাজের শেষে আন্তর্জাতিক মানের জার্নালে প্রকাশের উপযোগী গবেষণাপত্র তৈরি করে বাংলায় (৪ কপি) এবং ইংরেজিতে (৪ কপি) নেকটার কর্তৃপক্ষের নিকট জমা দিতে হবে।

৭। সকল গবেষণা কাজের হার্ড কপি ও সফট কপি নেকটার কর্তৃপক্ষের নিকট জমা দিতে হবে।

৮। গবেষণা চলাকালীন সময়ে নেকটার কর্তৃপক্ষের পরামর্শ ও নির্দেশনা অনুসরণ করতে হবে।

৯। গবেষণার ফলাফল নেকটার কর্তৃপক্ষ ছাড়া অন্য কোথাও সরবরাহ, হস্তান্তর বা প্রকাশ করা যাবে না, করলে বাংলাদেশের প্রচলিত আইনুযায়ী ব্যবস্থা নেয়া হবে।

১০। Sample Size ২০০-এর উপরে হতে হবে।

১১। গবেষণার জন্য Quantitative and Qualitative Sample/Data সংগ্রহ করতে হবে এবং Quantitative and Qualitative Research methodology ব্যবহার করতে হবে।

হবে এবং Quantitative and Qualitative Research methodology ব্যবহার করতে হবে।


১২। ডাটা সংগ্রাহকালে ধর্মীয়, রাজনৈতিক ও সরকার বিরোধী কোন ধরনের উস্কানীমূলক প্রশ্ন/উত্তর সংগ্রহ করা যাবে না।

১৩। উল্লেখ্য যে, দরপত্রে উল্লেখিত ২,০০০০০/- (দুই লক্ষ) টাকা ০২ (দুই) কিস্তিতে পরিশোধ করা হবে।

১৪। Inception Report জমা দেয়ার পর মোট টাকার ৫০%, এবং Final Report জমা দেয়ার পর ৫০% পরিশোধ করা হবে।

১৫। উপরে উল্লেখিত শর্তাবলী আংশিক বা সম্পূর্ণ পরিবর্তন, বাতিল করার ক্ষমতা কর্তৃপক্ষ সংরক্ষণ করেন।

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