QUALITY EDUCATION IN BANGLADESH: LEADERSHIP ROLES OF SCHOOL HEADS AND TEACHERS TO INTEGRATE TECHNOLOGY IN SECONDARY SCHOOL CLASSROOMS

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A Thesis

Submitted to the Graduate College of Bowling Green State University in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

August 2016

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ABSTRACT

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This study investigated the quality education components of the technology integrated classrooms in Bangladeshi secondary education, and secondly, the roles played by the school leaders to integrate technology which might support those quality components. Sixteen school leaders were interviewed to determine the quality components and leaders’ roles. Only teachers and head teachers were considered as school leaders for this study. One-on-one in-depth interviews made up the major primary data collection. These interviews were taken to address research questions regarding the quality education components Multimedia Classrooms (MMCs) have in secondary education of Bangladesh, the leadership roles played by head teachers in integrating technology in secondary education MMCs that might support quality education, and the leadership roles played by the non-head teachers in integrating technology in secondary education MMCs. Although qualitative methodology is employed, a mix of qualitative (maximum variation) and quantitative (snowball) sampling is used to select these sixteen participants or cases. This is a case study guided by the instructional leadership model of Weber (Hoy & Miskel, 2004).

The findings have two parts. The first part identified some quality education components of MMCs in secondary education. These components help students’ learn easily and enhance teachers’ teaching ability by utilizing educational technology in the MMC. Major national policies and some international declarations and conventions like the national Information Communication Technology (ICT) policy (2009), the National Education Policy (2010), EFA
(Education for All), and MDG (Millennium Development Goal) influence these quality components. The second part of the findings addressed school leaders’ roles in integrating technology which might promote desired quality components. Thirty-one subthemes of leadership roles were categorized in five broad areas: defining institutional visions, managing curriculum and instruction, teaching and learning, assessment, and attitudes toward technological integration. These roles followed the jobs or responsibilities of Weber’s model. For example, school leaders develop a common vision collaboratively, supervise and monitor classroom practices, provide support for the enhancement of the teaching-learning process and professional development, and possess positive attitudes to promote a positive learning climate for the technological integration. School leaders play their roles in collaboration with other government and non-government actors, where some limitations regarding the infrastructure and resources turned out to be barriers to their leadership roles.
Dedicated to all my friends, family members, and teachers who have supported me in doing this thesis.
ACKNOWLEDGEMENTS

I sincerely thank my advisor, Dr. Bruce Collet, for being receptive and supportive during my two-year master’s study in the area of cross-cultural and international education. All the fundamental ideas, concepts, and theories inside and outside of the area of comparative education I have internalized via his class, which created a strong platform to start and continue doing this thesis. He was also very patient in understanding my point of view, different cultural expectations and limitations while I was working on this thesis.

Also, I am grateful to my thesis committee members, Dr. Hyeyoung Bang and Dr. Bonnie L. Mitchell, for their sensible and meaningful suggestions on every section of this thesis. They have always been ready to spend significant amounts of time to help me out and discuss my progress. I managed to complete this thesis with their great support.

I have found all my faculty members of MACIE very helpful. Their consistent encouragement always inspired me whenever I was struggling or getting frustrated. I always feel lucky to be a part of such a wonderful environment and the family of MACIE.

Finally, I express my gratitude to my family members and friends in Bangladesh and in the USA for their unfailing inspiration and support. Many of them gave efforts to help me in different parts of this study. Special thanks to some officials from Access to Information (A2I) program in Bangladesh, the interviewer and those sixteen respected participants who helped me to accomplish this task.
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CHAPTER I. INTRODUCTION

Chapter Overview

In this chapter, I give an introductory and background idea on the subject of educational technology in Bangladeshi secondary education. To provide the background idea, I discuss the historical background of Bangladesh education and contemporary educational projects that integrate technology in Bangladeshi secondary education. After this, I provide the rationale of the study, study purpose and research questions, and the statement of the problem. I conclude the chapter by summarizing each of the chapters from the entire thesis. I briefly present the literature review, methodology, theoretical background, findings and discussions, and conclusion at the end.

The present government has ruled Bangladesh for two terms in a row. “Digital Bangladesh” or “Vision 2021” was a major political manifesto of this party, which became a national agenda later on. “Digital Bangladesh” means using technology to ensure transparency and efficiency in every level of society (Rairagi, Rajon, & Roy, 2011). As a consequence, Information Communication Technology or ICT is taken as a thrust sector for national development as well as education improvement (Buiyan, 2011). Government bodies and non-government organizations (NGOs) are operating ICT projects concurrently in primary and secondary schools. These projects and programs are financed by the government as well as national and international donors. But the output of ICT in Bangladeshi schools is different. The success rate in Bangladesh is far below the expected level. A lot of backlash is directed against ICT integration to promote quality education in schools. Lack of administrative leadership quality is one of the major reasons behind the technological stagnation in the Bangladeshi education system (Parvin, 2013). That is why this study examines school leaders’ roles in
integrating technology to discover how they are integrating it, what roles they are unable to play due to barriers or limitations, and what suggestions they might have for a better technological integration.

**Background of the Study**

Bangladesh became independent in 1971. At the beginning it focused more on access and facilities in education. As a consequence, primary education was declared free and compulsory in 1974 (Government of the People’s Republic of Bangladesh, 1974). After that, the enrollment and completion rate kept increasing. The primary enrollment rate was almost one-hundred percent and the primary completion rate was eighty percent until 2013 (“Bangladesh MDGs Progress Report,” n.d.). These statistics imply that Bangladesh made remarkable progress in educational access. Then Bangladesh shifted its attention from quantitative achievement to qualitative achievement. In the 1990s, Bangladesh endorsed the Convention on the Elimination of all Forms of Discrimination against Women (CEDAW), the UN convention on child rights, the Education for All (EFA), the Dakar declaration, the Millennium Development Goal (MDG), and the Child Rights Declaration (Rabbi, 2007). As a result, international agencies and conventions have influenced the structure of quality components of Bangladesh education. At the same time, its post-colonial, Islamic, third-world society has added different dimensions to the definition of quality education. Therefore, this study examined how the structure of the quality education is shaped, and to what extent the quality components are influenced, by the national and international agencies. To locate the components specified in the area of educational technology, this study tends to identify the quality components of technology aided secondary classrooms of Bangladesh.
It is widely acknowledged that technology can enhance students learning in various ways (Goodyear & Retalis, 2010). Bangladesh is trying to keep up with the recent innovations and patterns of global education system. That is why it is not only incorporating technology in education but also looking to expand it across the country. Considering the influence of technology on the growth and development of the young and adults, Bangladesh is encouraging ICT initiatives in elementary, secondary and tertiary levels of education (Rairagi et al., 2011). All the technology related projects and programs in the sector of education in Bangladesh can be subsumed into two broad categories: governmental initiatives and NGO initiatives. In the last decade, the government has played a leading role by initiating lots of ICT based programs and projects in Bangladesh. This is one of the driving forces behind expanding the educational technology so fast. These projects develop interactive e-contents for primary and secondary students, train teachers to produce e-contents based on the national curriculum, and use those e-contents in classrooms, establish multimedia classrooms with computers, Internet and projectors in every school, develop web portals to share e-contents, use the e-Student Performance Management System, and develop technology supportive infrastructure and policy (Save the Children, 2014).

These are some of the major areas where ICT projects work. Government and NGOs perform very similar activities. They are working both collaboratively and separately. The Ministry of Primary and Mass Education (MoPME), Ministry of Education (MoE), Directorate of Primary Education (DPE), Directorate of Secondary and Higher Education (DSHE), National Academy of Primary Education (NAPE), National Academy for Educational Management (NAEM), Prime Minister’s Office, Education Board and University Grand Commission (UGC) are government agencies that are actively participating in the ICT integration of education. The
Primary Education Development Program (PEDP), Teaching Quality Improvement in Secondary Education Project (TQI-SEP), English In Action (EIA), and Access to Information (A2I) are some ICT based education projects launched and operated by the government. In addition to these, they have regular technology related activity training on teachers from each stage of education. UNDP, USAID, and World Bank are largely financing these projects. The British Council, Save the Children, BRAC, D-net, JAGAO Foundation are some international and national NGOs working in the sector of ICT in education.

A2I is one of the most popular technology related programs in the area of Bangladesh primary and secondary education. Bangladesh’s government is operating this program in collaboration with UNDP (United Nations Development Program) and USAID (Save the Children, 2014). The government started in 2007 with an objective to “…improve quality, widen access, and decentralize delivery of public services to ensure responsiveness and transparency” (Introduction to a2i | Access to Information (a2i) Programme, n.d.). This study has collected the major primary data through interviews of sixteen head teachers and teacher who have the experience of taking MMCs. The MMC is widely established through this A2I program. MoE, MoPME, DSHE, and DPE work collaboratively to run this project. Under this program, MMCs have computers, projectors, Internet modems, screen, and speakers for the teachers and students. Different government and non-government agencies and actors are providing training to the teachers and head teachers to develop digital content or e-contents (electronic contents) and use them with the help of MMC materials. They can add text, images, animations, videos, and audios in the e-contents to explain difficult concepts of the textbook.

Due to lack of teaching skills, training, infrastructural support, technical support and materials, the educational technology faces a lot of challenges in the schools of developing
countries (Mndzebele, 2013). They cannot successfully create an effective learning environment among the teacher and students. In spite of these ongoing teacher trainings, teachers still fail to implement training and technology in classrooms. Bangladesh is also having similar problems. Its socio-economic condition is different from that of developed countries. Decision making failure, and mismanagement are some of the major problems behind the ineffective technology integration in Bangladeshi classrooms. In and out-side of class, leadership can be a big factor here in relation to a successful ICT implementation. That is why this study examined teachers’ and principals’ leadership qualities in effectively implementing technology in the classroom learning.

**Rationale of the Study**

Although in the last few years, ICT has enhanced the teaching-learning processes in many places, Bangladesh could not meet those benefits of technology in classrooms (Khan, Hasan, & Clement, 2012). Like other developing countries, Bangladesh is going through a lot of challenges in integrating classroom technology. It has inadequate infrastructural capacity, power supply, technical support, digital materials, efficient trainers, and unmotivated teachers and students. Anwaruddin (2015) argued that in spite of the increasing technology use in classrooms, this ICT integration is still not promoting students’ learning in classrooms to ensure quality education. That means maybe the teachers are not able to enhance the teaching-learning process by using technology. Educational technology projects are launched for the sake of students learning, but inefficient leadership and management capacity has turned out to be one very common barrier to ICT implementation according to recent research across developing countries (Gichoya, 2005; Khan et al., 2012; & Mingaine, 2013). One of the major recommendations came from recent research that due to inefficient leadership quality in campus, schools are failing to
coordinate, cooperate, manage, and supervise among teachers, administrators, NGOs, private stakeholders or government in Bangladesh (Parvin, 2013). As a result, quality is compromised in the school. That is why this study will examine school leaders’ roles in integrating technology in classrooms which might support quality education. The head teacher is considered the main leader in the school. Roles played by the teachers are also leadership roles. In the five dimensions of Weber’s model, he included some leadership responsibilities: creating an effective learning environment in the classroom, ensuring the best instructional practice, the use of resources in the classroom, setting classroom expectations, and incentives to promote a positive environment, and evaluating curriculum implementation (Hoy & Miskel, 2004). These are very regular duties for a teacher in the classroom, so (non-head) teachers can also be counted as major school leaders. That is why teachers’ leadership roles, particularly in a Bangladeshi context, are included in the study, not just head teachers.

Research Questions

The purpose of this study is to examine head teachers’ and teachers’ leadership roles to integrate technology in secondary education classrooms which might support quality education in Bangladesh by the following questions.

A. What are the quality education components Multimedia Classrooms (MMCs) have in secondary education of Bangladesh?

B. What leadership roles do head teachers play in integrating technology in secondary education MMCs that might support quality education in Bangladesh?

C. What leadership roles do teachers play in integrating technology in secondary education MMCs that might support quality education in Bangladesh?
Statement of the Problem

This study has selected a number of cases and applied a case study approach to examine them in order to gain an in-depth understanding on this area. A2I is one of the biggest government ICT programs in Bangladesh. This study interviewed teachers and head teachers of secondary schools under the surveillance of A2I. So, the teacher and the head teacher will be considered as school leaders for this study. As they are teaching classes in MMCs, they are likely to be able to provide valid data on their roles to integrate technology in classrooms. The scope of this study is thusly limited within the teaching learning activities of school leaders regarding MMCs, but this study does not have anything to do with the program and it is not evaluating the program.

Literature Review

The second chapter of this thesis, literature review, is an attempt to create a platform which is going to assist the readers to understand the ground of the research questions. A detailed discussion of some of the contemporary educational technology related projects and programs provides a clear understanding of who the major government and non-government actors are working in the policy and field level. The actors are key to analyze school leaders’ roles. To define the quality education components of the MMC, I have provided a comprehensive discussion on who the actors are influencing Bangladeshi quality components and how they are doing this. This is a logical background of finding out quality education components of the MMC. I have discussed it from two perspectives. I have tried to examine the quality components from the point of major national policies and international declarations and conventions. At the end of this chapter, I have explained some background of Weber’s model, the theoretical framework.
Methodology

In the third chapter, I have discussed my methodology. This is a qualitative case study. I have studied the cases of sixteen teachers and head teachers. They used technology in their classes. Based on the literature review and the analytical framework, a data collection tool is designed. This includes demographic questions, survey questions and semi-structured questions to examine quality components and school leaders’ roles that might support those components. My case is the role of school leaders in integrating technology which might support quality education. To explain this case, I have studied sixteen cases of sixteen school leaders within this case. This is why it is a “within case” exploration (Baxter & Jack, 2008). These sixteen cases are selected to understand one specific case. This is also why it is an instrumental case examination (Srake, 1995). Four pilot interviews were taken using the initial questionnaire. Based on the responses of piloting, I have done the necessary modifications and finalized the questionnaire. The Human Subject Research Board (HSRB) was satisfied by the level of confidentiality assured by this study. They gave the approval in January 2016. This study has followed the methodological framework of Yen to analyze the data (Yen, 1989). According to this framework, I have written individual case reports first. In the latter section, I have done a cross-case theme analysis. Based on that analysis, I have written the final discussion which is a cross-case report. The policy implications I have found out, I put them in the conclusion chapter under the summaries of the findings. The memoing, coding, and formation of themes are very crucial for the data analysis.

Theoretical Background

The term educational leadership or school leadership emerged in the late 20th century (Hallinger, 2003). It refers to organizational management and improvement toward any specific
goal. Achievement driven schools started to focus on the accountability of administration and management. Kenneth, Day, Sammons, Harris, and Hopkins (2006) viewed the leadership as a growth industry. They classified different types of leadership like instructional, distributed, transformational, servant or constructivist leadership. Instructional leadership is one of the predominant theories in the area of education management. This is also known as “learning centered leadership” in England.

According to one prominent scholar, Philip Hallinger (2003), the instructional leadership theory emerged and developed in early 1980s in the USA. He defined it as “strong, directive leadership focused on curriculum and instruction from the principal” (Hallinger, 2003, p. 329). Although the head teacher has been considered the main leader in the school, now all other formal leaders like teachers, administrative officers, and staff are also counted as school leaders. The model developed by Hallinger and Murphy in 1985 was one of the influential models at the early stage of the development of instructional leadership (Hoy & Miskel, 2004). It is formed by examining the head teacher’s instructional leadership behavior. Afterwards, Murphy in 1990 and Weber in 1996 came up with two other models. Weber’s model seems more clearly redefined and reorganized than previous models. His dimensions are 1) defining mission, 2) managing curriculum and instructional, 3) promoting a positive learning climate 4) observing and improving instruction 5) assessing the instructional program (Hoy & Miskel, 2004). These five domains include and cover all the aspects of previous models. Thus, Weber’s model fits very well to explain and elaborate upon school leaders’ roles. So, this model is going to be the theoretical background of instructional leadership for this study.
Findings and Discussion

In the fourth chapter I have combined all the findings and discussions. Based on the interview responses, I have used the theoretical framework (Weber’s model) and the literature review to discuss and analyze the findings. The first part of this chapter discusses the quality education components of the MMC in Bangladeshi secondary schools. The second part discusses school teachers’ and head teachers’ roles to integrate technology which might promote those quality components. I have analyzed the quality education components in the first part mainly in the light of some major national policies and some international declarations and conventions. For example, National ICT policy 2009, national education policy 2010, EFA, and MDG are some of the national and international policies analyzed. I have identified that the quality components that the MMC is programmed to bring are influenced by these policies and declarations. I have categorized the quality components in eight themes like the quality components of the MMC, students’ performance enhancement and teaching ability enhancement. In the second part, I have emphasized five domains of Weber’s instructional technology model to discuss the school leaders’ roles to integrate technology. There are total thirty-one subthemes. I have identified their roles in defining and achieving schools’ vision, teaching and learning, and managing the curriculum and instruction. In most of the cases their roles followed the Weber’s model.

Conclusion

I have summarized all the discussions and findings in the conclusion chapter. Along with this summary, I have provided some opinions and recommendations from the point of view of the principal researcher. These recommendations are for the enhancement of the school leaders’ roles in integrating technology in the education. These are some changes recommended to be
made in the policy and practice level. In my reflections, as a principal researcher I have found a strong influence of capitalism in the integration of technology. For example, I have considered removing the gender imparity and poverty and developing skilled man power for a competitive labor market as influences of capitalism. I have also identified that the policy maker of the secondary education system mostly preferred hard policy instruments to soft policy instruments. Hard policy instruments are more assessment based than monitoring or supervision, centralized than localized, and dependent on policy rather than context. In my implications for future research, I suggested for research to contextualize the technology from the Bangladeshi perspective to incorporate them in secondary education. Moreover, research can be done to examine to what extent the principles of multimedia, contiguity, modality, redundancy, coherence, and personalization are maintained in the e-materials.
CHAPTER II. LITERATURE REVIEW

Chapter Overview

This chapter provides a description of the existing situation in Bangladesh in the area of educational technology. At the beginning, I briefly discuss the importance of educational technology in Bangladeshi education. After that, I elaborate the nature, scope, and capacity of some representative technologies and ICT (Information Communication Technology) related education projects. Then, I analyze the quality education of Bangladesh targeted by the contemporary educational project reports, government and non-government policies in Bangladesh. Next, I discuss another important part of this chapter; national and international policies and declarations for Bangladesh from the perspective of educational technology. After that, I review some common types of leadership roles exhibited by secondary school leaders. At the end, this chapter gives some background discussion on the theoretical and analytical framework for this study.

Importance of Educational Technology in Bangladeshi Education

UNESCO (2014) stated in the global monitoring report that the integration of educational technology enhances the teaching-learning environment in classrooms. It helps mobilize and produce effective learning materials to reduce learning difficulties; “Innovation in the use of technology can help improve learning by enriching teachers’ curriculum delivery and encouraging flexibility in pupil learning” (UNESCO, 2014, p. 35). Goodyear and Retalis (2010) have also acknowledged various ways in which technology can enhance students’ learning. Recent generations and following generations are going to spend their lives in a technology rich environment. So, Bangladesh has not only incorporated technology in the education but also paid close attention to expand it across the country in order to keep up with the present education
system of the world. Moreover, technology can play a significant role to manage the education system and knowledge. Bangladesh is also encouraging ICT initiatives in every elementary, secondary and tertiary level of education (Rairagi, Rajon, & Roy, 2011). ICT is considered as a global infrastructure for producing, sharing and innovating knowledge (Save the Children, 2014).

According to Januszewski and Molenda (2013), educational technology is a way of “…facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources.” Save the Children (2014) has identified some benefits of technology or ICT in the education of Bangladesh. With the help of technology, education can happen anywhere, anytime. Technology in the classrooms of Bangladesh increases the engagement, improves relevance of content, enriches teacher’s delivery, encourages flexibility for students in classroom learning, tailors locally relevant teaching materials to meet individual learning needs, facilitates team work, creates learner-centric teaching, promotes lifelong learning, and maintains networks with other teachers and students. Moreover, technological provisions are documented to increase access, enhance quality and improve system management in education. Adequate technology based training and teaching materials for teachers promotes quality education. In line with the ‘Vision 2021’ framework of the current Government of Bangladesh (GoB), ICT is emerged as an integrated part of major national development plans and policies. Therefore, the National ICT Policy 2009 committed to develop curriculum, pedagogy and teacher’s capacity align with the technology in their vision of producing 21st century manpower (Ministry of Science and Information & Communication Technology [MSICT], 2009). Though teachers in Bangladeshi schools have a great interest in learning how to use technology in education, in practice, their technological use in education is limited only in the use of Microsoft Office. Multimedia, email, video, conferencing, and
networking are not popularly used (Save the Children, 2014). The effectiveness of technology in learning enhancement depends on the knowledge and expertise of the teachers as they are the facilitators of the learning environment in the classroom. Teacher training is supposed to be the core for the successful implementation of any educational technology project. Expectedly, the government has initiated ICT infused programs for the improvement of the primary, secondary and higher education systems. Non-government organizations (NGOs) also played supplementary roles by introducing innovative learning projects and opportunities.

**Educational Technology**

Information Technology (IT) refers to all the aspects of information processing. It mainly comprises tools, equipment, methods, and programs to analyze, store, control, or convert data to form information (Knezek & Christensen, 2002). Two basic areas of IT are the software and hardware. All necessary equipment of personal computers are the hardware and the programs used to operate all the applications are software (UNESCO, 2003, as cited in Save the Children, 2014). Computers, computer accessories, projectors, scanners and digital cameras are some commonly used hardware. Database storage programs and multimedia programs fit into the software category. The word ‘Communication’ is added to Information Technology to form Information Communication Technology (ICT). ICT refers to IT usage in order to communicate and transmit information. It includes the aspects and forms of technology which transfer, share and process the project information, and produce information by electronic means (UNESCO, 2007, as cited in Save the Children, 2014). For example, radio, television, mobile, multimedia projectors, computer, Internet, software and hardware, social media, email, and video conferences are some forms of ICT.
By nature, ICT is a part of technology. So, educational technology also covers ICT in education. Whether referred to as ICT or technology, this study is concerned mainly about the computer or technology as a teaching-learning tool not as a subject. Broadly, technology or ICT in education means the usage of technology to enhance the teaching-learning environment.

Niederhauser and Stoddart (2001) has differentiated two roles of educational technology usage in education: ‘skill based transmission use’ and ‘open-ended constructivist use’. The first one is helping teachers and students to achieve their daily basic learning competencies, and the second one is using technology as a tool like games or simulations so that students can construct their own learning or knowledge.

**Educational Technology Projects in Bangladesh**

Save the Children (2014) has recently published a mapping report which gives a holistic idea of all the ongoing initiatives that use ICT in schools. If we subsume them, then there will be two broad categories: governmental initiatives and NGO initiatives. Educational technology has been expanded so fast because the government has taken the leading role by initiating lots of ICT based programs and projects in Bangladesh. These educational technology projects have integrated strategies mainly to establish an interrelation among technological provisions in policies, teacher education and training, the teaching-learning environment, non-formal education, monitoring and measuring changes, and research and knowledge sharing in Bangladeshi education system (Save the Children, 2014). These projects develop interactive e-contents, especially for primary and secondary students. They train teachers to produce e-contents based on the national curriculum and use those e-contents in classrooms. They establish the Multimedia Classroom (MMC) in every school with computers, the Internet and projectors. They develop web portals to share e-contents, use an e-Student Performance Management...
System, and develop technology supportive infrastructure and policy (Save the Children, 2014). These are some of the major areas where ICT projects work.

**Government Initiatives**

Government and NGO activities are very similar in nature and objectives. They are working both collaboratively and separately. The Ministry of Primary and Mass Education (MoPME) and the Ministry of Education (MoE), the two major authorities of GoB, are managing the integration of educational technology in primary and secondary education (Save the Children, 2014). Directorate of Primary Education (DPE) and National Academy for Primary Education (NAPE) are working in the area of policy making, ICT training, MMC, teacher’s professional development, and preparing classroom materials under the supervision of MoPME. MoE is guiding a higher number of agencies. It regulates and coordinates the activities of the Directorate of Secondary and Higher Education (DSHE), the National Academy for Educational Management (NAEM), educational projects by the Prime Minister’s Office, the National Curriculum and Textbook Board (NCTB), the Bangladesh Bureau of Educational Information and Statistics (BANBEIS), the Education Board and University Grand Commission (UGC). All these agencies are actively contributing in making and implementing policies and ICT master plans, organizing ICT training programs, providing necessary materials for MMCs, producing and circulating e-books, and maintaining and updating the Educational Management Information System (EMIS). Some of the government initiatives in integrating educational technology are described below.

MoE is the apex institution to make policies, laws, rules and regulations for the management and administration of post primary education including: secondary schools, madrasahs, technical and vocational institutions. It has formulated the National Education Policy
in 2010 and emphasized the integration of ICT in education. In recent years, it has made ICT a compulsory subject in secondary education and established computer labs in a few secondary schools, government Teacher Training Colleges (TTC), and Higher Secondary Teacher Training Institutes (HSTTI). Several agencies are working to integrate technology under the supervision of MoE. DSHE administers and manages the initiatives to make technological facilities available for teachers and students. Some of DSHE’s activities include: developing 20,500 MMCs, supplying laptops, Internet modems and projectors, organizing training under Teaching Quality Improvement in Secondary Education Project (TQI-SEP) and Access to Information (A2I) programs, and developing blogs and sites for sharing digital materials produced. DSHE is supervising a project named TQI-SEP, which is funded by Asian Development Bank (ADB) and Canadian International and Development Agency (CIDA). The TQI project is aimed to contribute quality education by developing professional competencies through the regular, initial and in-service teacher training of secondary school teachers (“Government of the People’s Republic of Bangladesh - Ministry of Education - Home,” n.d.). Its main area of improvement is the management standard and networking of teacher training. Besides these initiatives, DSHE has established some computer laboratories and mobile computer laboratories with Internet connections and other necessary accessories in several secondary schools and madrasahs in districts and Upazilla (sub-districts) level all over Bangladesh (Save the Children, 2014). NAEM is another leading institute under the MoE that covers multiple areas of responsibilities. It is responsible for an efficient and effective management and administration of secondary education. Moreover, it offers training for secondary school head teachers and teachers on the area of ICT literacy, management, planning, and related educational research and policy (“National Academy for Educational Management [NAEM],” n.d.). Teachers usually participate
in three-week long basic courses on computer and EMIS, and head-teachers of government schools participate in four-month long foundation training courses. BANBEIS is another institute which organizes refresher training for secondary school teachers on basic computer skills and multimedia productions. It is working to set up 116 Upazilla ICT Training and Resource Centers for Education (UITRCE) in 128 Upazilla (sub-districts). It is also well-known for collecting, organizing, updating and disseminating all the information and statistics of secondary education. BANBEIS has established the first e-library and e-book centers in Bangladesh. The Bangladesh Computer Council (BCC) is responsible for organizing training programs for teachers and government officials, providing support for ICT related activities and contributing in the technology related policy formulation.

A2I is a UNDP and USAID supported program. It was launched by the GoB in 2007 as an e-governance umbrella initiative. Its objective was described in Chapter I and emphasized transparency, accessibility, and quality (Introduction to a2i | Access to Information (a2i) Programme,” n.d.). The MMC is one of its initiatives that has a major contribution in integrating technology in the education sector. A2I is operated by a collaboration of MoE, MoPME, DSHE, and DPE with a vision of making technology aided education available throughout the country (Save the Children, 2014). In doing so, its major activity is providing training to the teachers and instructors to prepare teacher-led digital contents and use those digital contents in classrooms. It widely circulates e-textbooks. It has developed a Content Portal named “Shikkhok Batayon (Teacher’s Window)” to upload countrywide prepared e-materials and has already trained nearly 70,000 teachers in using MMCs (Minges, Raihan, & Raina, 2011). Now teachers can use digital contents which contain texts, images, animations, videos, and audios to explain difficult concepts in the textbook. The MMC is helping teachers and students to broaden their cognitive abilities,
conduct lessons in a more interactive manner, and increase participations by integrating technology with the traditional teaching-learning approach (United Nations Development Programme [UNDP], 2012). Under the guidance of A2I, “Shikkhok Batayon” is developing and sharing digital contents for the newly trained teachers. It also declares the best three teachers every week by pedagogy rating of their uploaded e-contents. It rewards teachers annually with laptops and certificates. A2I has also acted as the primary formulator of the Master Plan for ICT in Education (2012-2021).

The MMC, an objective in the master Plan for ICT (2012-2021), is a very popular innovation in recent years in Bangladesh. A MMC comprises a laptop with Internet connection and a projector for classroom presentation (Minges et al., 2011). This proved to be economically cheaper and a more feasible approach than a computer lab within the school. Bangladesh has a central education system, and it has around 18,500 secondary schools and secondary schooling in about 6,685 Dakhil madrasahs or Islamic Schools (MoE, 2016). According to Save the Children (2014), MoE and MoPME have already established MMCs in 20,500 secondary schools and madrasahs. Government actors and NGO actors are working in a parallel manner to provide standard training to effectively run these MMCs. The GoB has prepared four hundred master trainers to teach how to develop and present e-contents for MMCs in primary and secondary schools. These four hundred people are from fourteen Government TTCs, five HSTTIs, Bangladesh Madrasah Teachers Training Institute (BMTTI) and National Academy for Computer Training and Research (NACTAR). At the same time, providing school teachers with relevant MMC training is a part of the regular functions of educational projects in NGOs. The MMC is administered by a collaboration of district education offices, ministries, directorates and schools (Minges et al., 2011). An online monitoring system, “Dashboard,” has been developed
by A2I for the monitoring and management of MMC activities all over the country. Moreover, the digital content portal, “Shikkhok Batayon,” has been created by “British Council” in order to share e-contents. These digital contents are produced and shared by the teachers from all over the country to use in MMCs.

**Non-government Initiatives**

NGOs are playing substantial supporting roles to the government initiatives in Bangladesh. ARBAN, BNNRC, BRAC, British Council, Dhaka Ahsania Mission, Dnet, JAAGO Foundation, Light of Hope, and Save the Children are some of the NGOs have very effective technology based projects and programs in the field of education (Save the Children, 2014). Some of their technology related educational activities are briefly described here. In recent years, Bangladesh initiated the community radio for educational purposes. Bangladesh NGOs Network for Radio and Communication (BNNRC) has fourteen community radio stations broadcasting information and educational activities. They have pioneered teaching English through community radio in certain places of five districts through the “Basic English Language for Outreach Radio Audience” project. People can listen to them in regular or mobile radios. BRAC is one of the oldest NGOs working in Bangladesh’s education sector. BRAC has a “Computer Aided Learning” (CAL) project, which assists teachers to develop interactive educational contents based on the national curriculum and local context (Sharmin & Roy, 2011). BRAC provides technical supports and materials like projectors, computers, and monitors for the capacity building of teachers. This project enhances classroom engagement by facilitating group work, peer work, and chain drills along with the use of e-contents. “Gonokendro” is another ICT based education project of BRAC, which provides computers, printers, projectors, CDs with e-learning packages, and Internet modems in the Union (smaller unit than Upazilla) library.
(Ahmad & Ferdousei, 2013). Usually, these libraries are situated in secondary schools, and the
students of the schools are the members of these libraries. It contributes to the areas of ICT
literacy, social awareness, and health or sanitation of students and non-student members to
ensure access to information and empowerment. Already BRAC has established 2,545
“Gonokendros” all over the country. The librarian is trained for eleven days on basic Microsoft
Office applications, hardware and ICT knowledge before the equipment is given in the library.
Adolescent Development Program (ADP) is another project of BRAC, which teaches ICT skills
and basic English competencies to adolescents (especially girls) (Save the Children, 2014). It is a
unique project because, unlike the traditional classroom teaching, it helps the adolescents to
empower and socialize with each other by engaging in peer group activities by using laptops,
radios, CDs, etc. British Council is also partnered with the BRAC in this project.

Dhaka Ahsania Mission has the “Community Resource Center” project in the union level
of the country to teach basic skills on Microsoft Office to the underprivileged students (Save the
Children, 2014). This project is equipped with TVs, computers, modems, scanners, and printers.
Dnet has five technology based education projects (“Dnet,” n.d.). “ICT based Education
Initiatives for Empowering the Under-privileged youth in Bangladesh (ICLC)” is a recognizable
project that works to facilitate technology based education and develop the computer based skills
of the underprivileged students in rural areas. It has two innovations: Smart Class Room (SCR)
and Computer Literacy Center (CLS). With the help of an LCD monitor, laptop, solar power
system, interactive multimedia CDs, modem, and printers, SCR created an enjoyable learning
environment and increased participation among the underprivileged students. Teachers take the
help of those CDs to prepare students in English, Geometry, Geography, and Science before they
conduct the class. Computer Literacy Center (CLS) teaches these students basic skills like
writing, calculating, painting, and Internet browsing on the computer. “English and ICT in After-School Clubs project” is another project of Dnet, in collaboration with the British Council, which integrated technology in learning English (“Dnet,” n.d.). The use of laptops and English learning CDs during after-school clubs improves the learning environments in secondary schools or international NGOs, which has projects and programs multiple areas like children, women, food and health, disaster and emergency, and human rights. Dnet has been working to promote the quality of education through the proactive use of technology in primary and secondary education from the last decade. In collaboration with the MoE and MoPME, Save the Children is running a project named “Infusion of ICT in Primary Education, Sponsorship Program” in almost one hundred forty primary schools in Meherpur and Gazipur districts (Save the Children, 2014). This project develops interactive audio visual learning materials for MMCs. Save the Children conducts the “Teacher Led Content Development” training in collaboration with the DPE and A2I (“ICT for Learning | Bangladesh | Save the Children,” n.d.). Moreover, it has developed a data management system named “Students’ Performance Management System (SPMS)”. Teachers can follow-up the gradual progress and development of every student with SPMS throughout students’ entire school cycles.

A corporate group like Rahimafrooz Group has some initiatives for e-learning development of secondary education. For example, “DigiClass” is one which has Interactive Whiteboards and a Teaching Management System (TMS) (Save the Children, 2014). With the help of “DigiClass” and TMS, teachers can prepare interactive presentations for classrooms and collect or upload plenty of digital teaching material in an organized manner. They have introduced ‘Core School’, which is a students’ information preservation system in the cloud. ‘SmartBoards’, known as Interactive Whiteboard, is another initiative by Rahimafrooz. This
electronic whiteboard provides teachers with more options including photos, illustrations, maps, graphs, games, and video in the lesson to enrich the classroom experience.

The GoB has not only introduced some ICT related policies in last fifteen years but also emphasized the technological integration in several other major national policies, which is a radical shift toward a technology friendly education system. Some of these major policies are the National ICT Policy in 2002, updated National ICT Policy in 2009, National Education Policy in 2010, and ICT Master Plan in 2015. Besides that, the GoB itself has played the leading and active role in blending formal and non-formal approaches by launching and promoting technological initiatives. In collaboration with NGOs, the GoB has initiated to expand the opportunities of ICT literacy and availabilities of all types of e-books and e-contents in secondary schools all over the country. Establishing MMCs and computer labs and providing the laptop, projector, Internet, hardware and software supports are the government’s infrastructural innovations. Ensuring initial and in-service teacher training and making web portals to organize e-materials and administer educational technology are some of the areas where the GoB has contributed their legal and administrative supports. In parallel with the GoB initiatives, NGOs have played significant supporting roles in creating technological provisions in the education sector. They have not only introduced Smart Class Room, SmartBoard, DigiClass, computer literacy centers, and community radios but also trained teachers and trainers regularly to utilize the technology effectively in the classroom. Some of the leading NGOs also played substantial roles in educational technology related national and international policy formulation.

**Quality Education in Bangladesh**

Several important events took place in the 1990s, after Bangladesh’s post-independence education reforms. A free market economy has been adopted and the democratic government
came into power after almost sixteen years in Bangladesh. The government put more attention in building relationships with international communities. It has endorsed CEDAW, the UN Convention on Child Rights, Education for All (EFA), Dakar declaration, Millennium Development Goal (MDG), and Child Rights Declaration by 1990s (Rabbi, 2007). These declarations have played an important role in defining the structure or components of education by setting up some milestones for the education sector of Bangladesh. As a result, quality components of Bangladesh education have been influenced by the global pattern of quality in education. According to the Bank (1995), quality components are considered as priorities and strategies to be determined in the policy to create better learning opportunities and outcomes. Coombs (1985) has tried to define quality in the educational curriculum in terms of student learning achievement. To define quality, Morgatroyd and Morgan (1994) indicated an evaluation or assessment method to examine if the educational practice meets desired expectations.

The elimination of any kind of gender imparity and poverty and the reduction of the illiteracy rate and dropout rate are very fundamental quality components mentioned in the education policy (Ministry of Education [MoE], 2010). Although Bangladesh is now focusing more on qualitative aspects, such quantitative measures like the literacy rate are still considered as the standards of quality. Bangladesh is receiving loans and grants in the name of such lofty pretexts as ‘poverty reduction’ from the World Bank (WB), International Monetary Fund (IMF), Asian Development Bank (ADB) and other donor agencies (“China and International Financial Institutions | Focus on the Global South,” n.d.). By assisting in building the economic structure and financing educational projects and setting up international trade rules, IMF, World Bank and other international agencies have established Bangladesh as part of a capitalist education system. Globally, there is a flow of many contemporary ideas of typical capitalist education systems.
regarding the educational administration, assessment or curriculum. These ideas get negotiated, twisted or moderated when they are adopted within a specific context (Carney, 2008). In line with that, student-teacher ratio, accountability, teacher and student evolution based students’ test scores, decentralizations, active School Management Committee (SMC), teacher training, technology and ICT incorporation, child-centered learning, co-curricular activities, and completion rate are established as quality elements (Yoshifumi Tokushige, n.d.).

To comply with such a capitalist nature, policies are proposing mostly “hard policy” instruments. These involve providing teaching materials, libraries, laboratories, rooms, toilets and other infrastructural supports, applying grading systems and creative question papers for students’ assessment in every levels, emphasizing on summative assessment, and extending primary education from grade five to grade eight (Kalene et al., 2005). This policy has guidelines to appoint native teachers for the tribal people and print books in their own languages for the purpose of providing equal educational opportunities (MoE, 2010).

Austin et al. (2008) has identified some infrastructural aspects of quality components of education in Bangladesh. They have mentioned that there are inadequate resources, insufficient and unqualified teachers, and lack of stakeholder involvement. This resource indicates the funding, textbooks, infrastructure, and learning materials. For the sake of an effective stakeholder involvement, a good collaboration among ministries like MoE and MoPME, district and Upazilla level education offices, teachers, parents and local community is required. Ahmed and Williams (2008) located some more features of quality in Bangladesh’s education system from the perspective of equity in education. An effective information management system to supervise and monitor the educational activities based on organized data, meaningful decentralization in terms of resource mobilization and autonomy, adequate supervisory and
instructional support, and elimination of fees and other direct costs are some quality elements that they found in the educational administration. Materials, pedagogy, quality textbooks, guides, supplementary materials for teachers, supporting ICT resources, assessment of the efficiency of the materials, students’ achievement, adequate contact hours, teachers’ and educators’ salary scales (as well as their career opportunity), and the standard of teacher training for the professional development are some curriculum related components to maintain the quality. They also have identified multiple purposes of assessment. That covers the assessment of students’ inside and outside the classroom performance, sources of learning problems, teachers’ and other stakeholders’ accountability, and credentials. Bank (2004) has also identified similar quality factors regarding the Bangladeshi education system. An efficient management and accountability system to coordinate school, district and ministry level operations, adequate teacher qualification and training, standard curriculum and textbook, infrastructural support adequacy for both inside and outside of the classroom, and improved access are considered basic quality components for Bangladesh. Regarding the managerial quality, Bank (2007) has considered the governance and transparency in teacher recruitment, teachers’ attendance, teaching certification exams, girls’ stipends disbursement, and the circulation of free textbooks in a timely manner as significant elements for quality improvement. Therefore, it can be imagined that all the technology aided educational projects and programs are also designed to support such quality components in education.

**Educational Technology Related Policies in Bangladesh**

Creating a digital Bangladesh by 2021 is one of the major announcements in the election manifesto of the present government of Bangladesh. ICT integration in education is getting a higher priority in Bangladesh due to the technological emphases in the political, national and
educational visions of Bangladesh. ICT is given a considerable importance from the Prime Minister’s office in recent years and also declared as a ‘thrust sector’ for national development. Most of the policies have considered it one of the major subcomponents of education. The GoB successfully has placed educational technology in major national policies (Save the Children, 2014). ICT in education is a comparatively new idea in Bangladesh. These policies have been working as catalysts and motivations to guide and assist the government, international and private agencies and NGOs to reorganize the landscape of educational system by incorporating educational technology. Besides national policies, technological integration in education has been substantially influenced by the international declarations, treaties and conventions.

**Bangladesh National Policies**

**National ICT Policy 2009.**

The MSICT (2009) has formulated the National ICT Policy 2009. In its ‘Education and Research’ section, it has outlined a number of guidelines to emphasize the technology and ICT literacy in education (MSICT, 2009). Regarding the technological integration in education, it puts special focuses on mathematics, science and English. It intends to provide legal and logical supports in the administration and policy level and to expand the quality by using technology at all levels of education throughout the country. It is directive to accelerate any type of necessary infrastructural development in the primary, secondary, and tertiary level for an effective technological integration. With a view to building up capacity of the school leaders, teachers, and trainers at a large scale, it advised school leaders to provide updated technology based training in both public and private education sectors. It prepared its action plans of creating closer collaboration between academia and industry, establishing ICT center for excellence to conduct research, and expanding ICT literacy by introducing ICT as a course in secondary
education. It also has clear instructions to value training diplomas or credentials of the personnel while recruiting. Moreover, it has promoted educational technology as essential means for distance learning, mass literacy, and lifelong learning.

**National Education Policy 2010.**

In line with the national developmental demand, the National Education Policy 2010 clearly prioritizes the technological integration in the policy. First, it emphasized IT as a subject in education (MoE, 2010). A large portion of Bangladeshi skilled manpower is working abroad, which is gradually increasing every year. To maintain a consistent foreign currency earning, the improvement of technological skills among students and potential foreign workers is mentioned as an objective of education in the policy. Irrespective of potential foreign or local workers, it is essential to develop technological knowledge at different areas and levels of education to enable people to meet global and local job market requirements successfully. Moreover, this policy gave importance to ICT, along with mathematics, science and English, with an objective of building up a digital Bangladesh. Computer and ICT are included as compulsory courses in the curriculum of every stream of education like vocational, technical, or madrasah education. This policy also guided to place technology substantially within the curriculum as a tool of education to assist and achieve optimum level of competencies.

The twelfth chapter of the policy, “Information Technology Education”, describes more on how initiatives are going to be taken to institutionalize the technological provision all over the country.

Proper use of information technology can lead to the achievement of expected skills. Technology can play a vital role in the eradication of corruption by bringing in transparency in the state machinery. More attention will be given to prospective areas of
export such as software, data processing or call center services industry including supply of skilled manpower in information technology. (MoE, 2010, p. 40)

Computers are instructed to be used for teaching in schools right from the primary level. The scope of learning graphic designing, multimedia, or animation has to be in vocational and technical education. This policy is committed to arrange and coordinate training for the technological skill development of government and non-government officials at district and Upazilla levels. It also has suggested organizing IT Olympiad at national and international levels to raise interests for IT among all.

**Master Plan for ICT in Education (2012-2021).**

The Master Plan for ICT in Education (2012-2021) gives a holistic idea on how the GoB formulates policy to ensure quality in education through the use of technology (MoE, 2013). It is prepared by the MoE, but the MoE and MoPME are both responsible for its implementation. A2I officials also have a strong participation in forming this policy. Its seven objectives are simply aimed at assuring quality of education by ensuring one-hundred percent enrollment rate, effective use of ICT, reduction of the dropout rate, and the development of teaching-learning materials and professional skills. The first, second, third and fifth objectives are designed to develop the teaching-learning environment, develop the professional and ICT skills of teachers, improve the standard of teaching-learning materials, and ensure the transparency, accountability and efficiency in educational administration (MoE, 2013). It is very clear that the implementation strategies to assure educational standard is planned to promote quality components in schools. It has very specific action plans such as transforming all classrooms to MMCs, developing and updating books and curriculum in every three years, including basic ICT elements like computer and multimedia in the training curriculum, developing and distributing
learning materials and videos, and establishing ICT labs in each institutions and training institutions to improve the quality of education. This is a master plan which has instructions to coordinate government and non-government activities, share experiences and resources, allocate adequate funds in the national budget, use updated, safe, effective, sustainable and economic technologies, and prioritize the undertaking of educational programs and their implementation (Save the Children, 2014).

**International Policies**

The influence of international declarations in defining quality components of educational technology is strong. Among all, I have decided to examine the influence of MDG, EFA, CEDAW and UNESCO for this study. UNESCO (2009) believes that “ICT can play an important role in reshaping education to respond to contemporary information society needs (p. 11).” Moreover, it considers ICT as a necessary element to meet targets of international conventions like MDG or EFA. To promote ICT in education, it (2009) has mentioned, “With the challenges faced by the international community in meeting the MDG and the EFA targets, it seems unrealistic to assume that conventional delivery mechanisms will ensure quality and equal educational opportunities for all in affordable and sustainable ways by 2015 (p. 11).”

**Education for All (EFA) and Millennium Development Goals (MDG).**

EFA was declared in 1990 to ensure educational needs for all children, youth and adults by 2015 (UNESCO, 2009). Educational technology is perceived to be important for reaching EFA goals. EFA has six goals and it is led by UNESCO. Its last four goals aimed to increase the literacy and life skills for adults, eliminate gender disparity and improve quality education by ensuring excellence in literacy, numeracy and essential life skills. Eight international development goals were set up in 2000 by United Nations (UN) to be achieved by 2015 which is
called MDG (UNESCO, 2009). Among them, the second goal aims to achieve universal primary education and the eight goal aims to develop a global partnership to use ICT for development. These two goals require the presence of ICT in education. “It is expected that ICT will contribute significantly to addressing international poverty alleviation goals by harnessing the potentials of technologies to improve the quality of educational outcomes; transcending the usual barriers to the empowerment of poor people through social networking and greater accessibility to information; and increasing the productivity of marginalized groups and their inclusion into the labor market (UNESCO, 2009, p. 13).”

**UNESCO Principles.**

UNESCO has defined a core set of *ICT in education* indicators. According to the UNESCO (2009), ICT is for expanding teaching-learning opportunities as well as reforming and improving curriculum for quality achievements. UNESCO measures the availability of hardware and software in schools, technical and pedagogical support in schools, national ICT related policies and frameworks, availability of electricity, government and non-government financial resource allotment, ICT based teacher training and trained teachers, enrollment rate and completion rate, student-computer ratio, level of access to the computer, Internet and computer laboratory among the learners, presence of computers, overall availability of Internet connected computers, ICT assisted exercise in curriculum, teachers’ work load and teacher-student ration as *ICT in education* indicators. Moreover, it also measures to what extent ICT is integrated as a teaching tool in the curriculum, and teachers use ICT to teach in the classroom.

**CEDAW.**

The Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW), is an international declaration to protect women rights and has been initially ratified
by 189 countries (Government of the People’s Republic of Bangladesh, 2015). The tenth article of CEDAW is a guideline that necessitates equal opportunity for girls in education and advocates for a reduction of female students' dropout rate. ICT has been recognized as crucial for the achievement of women empowerment at the fourth World Conference on Women in Beijing in 1995.

**Human Capital Development in Technological Leadership**

National policies have given significant attention to manpower development and poverty reduction. From that perspective, human capital development theory seems a potential approach to use to explain leadership roles in Bangladeshi schools. Usually, the development of the people of a nation is considered one of the primary requirements for national development. When the population is developed, then they turn to human capital (Fägerlind & Saha, 1989). This is the main idea of human capital theory. Human capital theory grabbed attention as a significant theory in 1960s, after Theodore Schultz made his presidential address on the theme “Investment in Human Capital” in the American Economic Association. He projected education not as a form of consumption, rather as a productive investment. Recent studies are trying on to borrow the term ‘Human Capital’ from economics and utilize it to reform the school leadership for a better teaching-learning environment. Some of them have proposed such pedagogical reform which is different from current instructional practices (Ball & Cohen, 1999; Fuhrman, 2001; Spillance & Thompson, 1997, as cited in Hoy & Miskel, 2004). They have said that it requires deeper subject knowledge and skills to blend it with pedagogy in order to tackle unpredictable and changing classroom learning environments.

Qualitative research has been done employing human capital development theory to uncover an approach which can support teacher learning (Hoy & Miskel, 2004). The literature on
school restructuring shows that a little attention is always given for the pedagogical improvement in classrooms. Instructional reform is determined as the focus of interest while enhancing the students’ learning. Principal leadership is considered a core element for human capital development in the way of a teacher’s professional development or teacher learning. Hoy and Miskel (2004) have described such a qualitative study on twenty-five high school principals. Principals were interviewed about their roles in human capital development in schools. Findings are of four broad areas. It suggested some instructional reform strategies for the teacher development, expanded conceptualization of teacher development, introduction of secondary setting for teacher learning, and reorganization of materials and social resources to support teacher development.

**Leadership Roles in Bangladeshi Secondary Schools**

Bush and Jackson (2002) documented that the excellent leadership in schools is an influencing factor for educational outcomes and school effectiveness. The principal or head teacher, assistant principal or assistant head teacher, teachers, and clerks are some leadership positions in Bangladeshi secondary schools. Among them, the head teacher is the main leader who controls and organizes the activities of other stakeholders. A large portion of head teachers of secondary schools in Bangladesh mostly execute a positional leadership style, which is also known as heroic leadership style to the western world (Salahuddin, 2012). This style means that head teachers are not interested in utilizing the potentialities, talents and expertizes of all other individuals within school boundaries. S/he makes decisions by the authority or power given by the position. There is less opportunity for the teachers or any other stakeholders to take part in head teacher’s decision. Secondary school head teachers also show another form of leadership in terms of the power distribution. It is called the distributed leadership (Elmore, 2000). This
leadership notion distributes the central leadership authority among teachers and other stakeholders in order to make them participate in the development of teaching-learning activities. Nowadays, the teaching-learning process in secondary schools relies on both head teachers and teachers. Secondary education is now in a transitional period of changing its leadership style from a dictatorial positional leadership to distributed leadership. Taking into account the leadership roles of both the principal and teacher ensures higher accountability and promotes better quality in education (Ferrandino, 2001). Thus, teachers’ roles also carry significance along with the head teachers’ roles to create an effective learning environment in secondary schools. Government and non-government agencies provide professional development trainings to enhance teachers’ leadership quality and pedagogical skills in Bangladesh (Salahuddin, 2012). But teachers have less involvement in making the strategic development plan for schools.

According to the BANBEIS (2010), the role of a head teacher is to lead the institute whereas an assistant head teacher helps him/her to execute rules and regulations. Head teachers play their leadership roles mostly in managerial and administrative sectors. SMC is a major managerial body within the school territory through which the school takes major leadership decisions and blends the leadership roles of both the head teachers and teachers (Rahman et al., 2010). One of the indicators to evaluate leadership efficiency is the students’ results in national public exams (Salahuddin, 2011). One study by Salahuddin (2012) on the principals of four secondary schools has revealed some common leadership roles and responsibilities of principals. Principals motivate, inspire and lead teachers and students toward the goals of the institution according to the rules. Rewarding and punishing is also part of their responsibilities. For Bangladesh, handling the political pressures is another sophisticated area that the principals have to deal with. S/he has to stick with the institutional rules and ethics when there is any influence
from outside to compromise the quality of education. Some of the principals also consider senior teachers’ voices in making decisions to make the school successful. They actually consider school leadership as not only the principal’s responsibility but also a combined effort of teachers, students, parents and community members, which is a distributive manner of leadership (Harris, 2003). But, Salahuddin (2011) has identified a different reality in most of the secondary schools that the teachers’ and students’ opinions are devalued and excluded during the decision making. So, considering teachers and other relevant stakeholders in the decision making process is one of the principal’s major roles. Creating enough space and opportunity for interaction, networking and cooperation among the principal, teachers, students, and parents are one strong side of the principal’s leadership. Creating such an interaction among all the stakeholders is an execution of the distributed leadership (Spillane 2006). Thus, interactive relationship inside the school results in the progress. Salahuddin (2011) has viewed the school leadership as a team leadership between teachers and principals. A principal, as a visionary leader, will not only manage the training opportunity for the professional development of the teachers but also engage them in various activities and responsibilities to be future leaders.

**Instructional Leadership and Technology in Schools**

The term educational leadership, or school leadership, emerged in the late twentieth century (Hallinger, 2003). It refers to the organizational management and improvement toward any specific goal. Achievement driven schools started to focus on the accountability of administration and management. Organizational change in the policy and process is another dimension of educational leadership. By labeling leadership as a growth industry, Kenneth, Day, Sammons, Harris, and Hopkins (2006) have mentioned different types of leadership like instructional, distributed, transformational, servant or constructivist leadership. Among these,
“instructional leadership” has a wider coverage in education. Interestingly, this term is known differently in other countries. For example, it is known as “learning centered leadership” in England.

Philip Hallinger is one of the major scholars and contributors in the field of educational leadership. He is also a proponent of one of the popular initial models of instructional leadership. He has stated (2003) that instructional leadership theory emerged and developed in early 1980 in the USA. He defined it as “strong, directive leadership focused on curriculum and instruction from the principal” (Hallinger, 2003, p. 329). Although the principal has been considered the main leader in the school, but all other formal leaders like teachers, administrative officers and staffs are also counted as school leaders. To define the principal’s instructional leadership behavior, Murphy and Hallinger has developed a model in 1985 (Hoy & Miskel, 2004). Three dimensions and eleven jobs are framed in that model. Defining the mission, managing instructional program, and promoting school climate are the three dimensions. They developed it by reviewing school leadership behaviors and literature. The mission is defined in terms of goals. Instruction is elaborated in terms of teaching-learning supervision, monitoring, evaluation, and coordination. The principal should create a positive school climate by promoting teachers’ professional development, providing incentives, and maintaining academic standards. Afterwards, Murphy elaborated the model with some systematic reviews of research in 1990. It consists of four dimensions and sixteen responsibilities.

In 1996, Weber came up with his (Weber’s) Model, which is basically consistent with previous models of instructional leadership. He as identified some interesting sides of instructional leadership. For example, he has found that a leaderless-team approach has a powerful appeal in school instruction, but a single principal authority is still necessary for a large
team regardless of the hierarchical nature of the organization. His emphasis on site based management and shared leadership is also notable. Weber’s model has redefined dimensions of the previous models into five essential domains. Those are 1) defining missions, 2) managing curriculum and instructional, 3) promoting a positive learning climate, 4) observing and improving instruction, and 5) assessing the instructional program (Hoy & Miskel, 2004). These five domains include and cover all the aspects of previous models. Thus, Weber’s model fits very well to explain and elaborate school leaders’ roles. That is why I have chosen this model as the theoretical background of instructional leadership for this study.

**Conceptual Framework**

Some already existing surveys along with the theoretical framework have helped to define the analytical framework. The Principals Technology Leadership Assessment (PTLA) is such a survey produced by the International Society for Technology in Education (ISTE) to measure principals’ leadership competencies (Anderson & Dexter, 2005). This survey has followed a model: the National Educational Technology Standards for Administrators (NETS-A). It has six standards: 1) Leadership and vision, 2) Learning and teaching, 3) Productivity and professional practice, 4) Support, management and operations, 5) Assessment and evaluation, 6) Social, legal and ethical issues. The Teacher Technology Integration Survey (TTIS) is another popular survey that measures teachers’ technology integration in six areas like: 1) risk taking, 2) perception of benefit, 3) belief and behavior, 4) administrative and instructional use, 5) students’ use, and 6) access and support (Vannatta & Banister, 2009). These two surveys have similarities with Weber’s model, the theoretical framework of this study. Dimensions of Weber’s model of instructional leadership are defining missions, managing curriculum and instructions, promoting a positive learning climate, observing and improving instruction and assessing and evaluating the
instructional program (Hoy & Miskel, 2004). Therefore, based on the frameworks of PTLA and TTIS, I have formed a five standard analytical framework in the light of Weber’s model to use as the analytical framework for this study. These five standards are a) vision and plan b) learning teaching and professional development c) management and operations d) assessment and evaluation e) attitude and comfort with technology.
CHAPTER III. METHOD

Chapter Overview

This is qualitative research which employs a case study method. I compare and contrast emergent categories and themes from the cases to describe the in-field situation in Bangladesh in terms of technology integration in secondary classrooms. This chapter gives an idea about how the data collection and data analyses progressed. In doing so, this chapter has a) research objective and research questions, b) analytical framework, c) justification of case study, d) research design and methodology: case study, e) sampling and participants, f) ethical clearance, g) data collection, h) increasing rigor in accuracy and reducing researcher bias, k) data analysis, and l) participants’ demographics.

Research Objective and Research Questions

The purpose of this study is to examine head teachers’ and teachers’ leadership roles to integrate technology in secondary education classrooms that might support quality education in Bangladesh. The research questions are:

A. What are the quality education components Multimedia Classrooms (MMCs) have in secondary education of Bangladesh?

B. What leadership roles do head teachers play in integrating technology in secondary education MMCs that might support quality education in Bangladesh?

C. What leadership roles do teachers play in integrating technology in secondary education MMCs that might support quality education in Bangladesh?

This study has selected a number of cases and has applied a case study approach to examine those cases to gain an in-depth understanding on this area. I have chosen teachers and head teachers for the data collection in this study since they have experiences of taking classes in
MMCs using technological support. Their experience has enabled them to provide valid data on their roles to integrate technology in classrooms. So, the scope of this study is limited within the teaching learning activities regarding the MMC.

**Analytical Framework**

I have considered the conceptual framework of this study as the analytical framework for the data analyses. This framework is influenced by some popular theories of instructional leadership in education and well established existing surveys on educational leadership. The International Society for Technology in Education (ISTE) created a Principals Technology Leadership Assessment (PTLA) survey to measure principals’ leadership competencies (Anderson & Dexter, 2005). ISTE has formed this survey based on the concept of a six standard model, which is called the National Educational Technology Standards for Administrators (NETS-A). The Teacher Technology Integration Survey (TTIS) is another significant survey used in several studies, which measures teachers’ technology integration in six areas. These two surveys are compatible with most of the core areas of Weber’s model, which is one of the influential frameworks in the field of educational leadership. Weber’s model has categorized school leaders’ instructional roles in five basic dimensions (Hoy & Miskel, 2004). I have used a five standard framework, which is based on the frameworks of PTLA, TTIS, and the five dimensions of Weber’s model, as the conceptual framework as well as the data analytical framework for this study. These five standards are: a) vision and plan; b) learning, teaching and professional development; c) management and operations; d) assessment and evaluation; and e) attitude and comfort with technology.
Justification of Case Study

The topic of this research is the roles of school leaders in integrating technology that might support quality education. This study explores the extent to which these leadership roles are played in secondary classrooms to integrate technology successfully.

Case study research is a qualitative approach in which the investigator explores a real-life contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case description and case themes (Creswell, 2013, p. 97).

The researcher has to decide the boundaries of the cases by defining the time, events, and process. The topic or issue of this study is bounded by the certain context of Bangladeshi secondary schools and a two-month long period of data collection. A2I is one of the biggest projects in Bangladesh which is implementing MMCs at a large scale in the country. I have interviewed sixteen teachers and head teachers from eight secondary schools. These sixteen individual stories are considered individual cases for this study. So, it has a specific and clearly defined scope. Cases are identified, which is an important characteristic of a case study (Creswell, 2013). Creswell (2013) has further explained that an intrinsic case study analyzes multiple cases within a single case.

I have chosen a qualitative approach to answer the research questions. In order to find out the present status of secondary school leaders in the field level, I have tried to explore the real scenario of technological integration in classrooms. A2I program ensures technological arrangements in secondary classrooms. So, studying teachers’ and head teachers’ cases from these schools as specific and concrete cases is reasonable to represent the real scenario. A2I is
widespread all over the country and it seems to be ‘…promising and useful’ to be selected as the site for this case study (Creswell, 2013, p. 100).

Case study is a qualitative research method which presents a step-by-step approach and rich illustrations of the case or cases (Stake, 2006). Usually, it studies a current case or cases within certain parameters like any country or time (Creswell, 2013). Thus, the findings become the most recent and accurate. Sixteen school leaders were interviewed from different school settings to ensure the inclusion of different and various perspectives in the findings. This study has also utilized multiple sources for a saturated, complex, and detailed understanding of these issues (Creswell, 2013). Thus, this inquiry is suitable to follow a qualitative research method.

Most of the educational technology related contemporary research in Bangladesh examines different issues or barriers regarding the incorporation and implementation of new technologies in the classroom from a holistic point of view (Ali, 2003; Khan et al., 2012). Ivy (2013) has recently conducted a research on the same sites of the A2I program to analyze the use of multimedia in secondary school classrooms. Although her study was on the same area of educational technology integration in Bangladesh, its purpose is still limited in the pedagogical aspects of technological integration. Leadership roles of school stakeholders specifically in the areas of technological integration and significance of those roles in promoting quality education are widely missing in current studies. So, adopting a case study approach through interviewing a number of school teachers and head teachers as real-life cases seems logical to explore the roles of school leaders in integrating technology.

**Research Design and Methodology: Case Study**

A case study approach has been followed to answer the research questions. By nature, this is an instrumental case study. Stake (1995) has mentioned “… the intent of the case study
may be to understand a specific issue, problem, or concern and a case or cases selected to best understand the problems” to define the instrumental case (p. 98). This research is exploring the roles of school leaders in integrating technology that might promote quality education as a single bounded case from Bangladesh. To examine this case, multiple cases have been studied. From that point, it is also an intrinsic case study analyzing multiple cases within a single case (Creswell, 2013).

An instrumental case first focuses on a problem and then selects a case or cases, which are suitable to answer or illustrate the problem. In terms of bounded case size, the unit of analyses can vary. The unit of analysis can be either multiple cases or a single case (Creswell, 2013). Sixteen interviews of the teachers and head teachers from six secondary schools are individual units of this study. An intrinsic case study offers the option to analyze multiple units within the case as well as analyze the entire case (Creswell, 2013). A researcher can choose any approach based on the nature of the study, or “cases within the case”. My case is the role of school leaders in integrating technology which might support quality education. To explain this case, these sixteen cases are within this case. Therefore, this study is a “within case” exploration (Baxter & Jack, 2008). When the number of cases increases, the depth of the study decreases (Creswell, 2013). That is why the data collection was limited within these sixteen cases.

Multiple sources of information is one of the strengths of the case study (Creswell, 2013). Utilizing multiple sources of data is useful for an in-depth understanding. Typically, a case study collects data from extensive sources like interviews, documents, archives, observations, audio-visual materials, and physical observations (Yin, 2009; Creswell, 2013). Collecting data from multiple sources in order to conclude into themes from multiple cases is one of the strong sides of the case study. Interview is the major data collection tool for finding in-depth primary data. I
have developed the data collection tool for this research, an interview questionnaire, based on the ideas found from the literature review, nature of the research questions and theoretical framework. Moreover, I have collected data from several primary and secondary sources like technology and non-technology related reports, books, peer-reviewed journals, handbooks, manuals, relevant national policies, international declarations, and the national constitution to make our findings rigorous.

I have analyzed findings from sixteen cases to conclude themes. These themes are discussed in the light of the literature review and theoretical framework. But, to what extent the themes are generalized, that depends on the difference among the cases. I have done cross-case theme analysis before the discussion of the findings (Creswell, 2013). Cross-case analysis is not to generalize the findings but to understand the complexity of the case. Regarding the data analysis, it is called a holistic analysis when case study analyzes the entire case, not just a single aspect of it. Particular aspects are analyzed in the embedded analysis.

**Sampling and Participants**

In nature, the sampling of this study is basically a mix of qualitative and quantitative sampling. Maximum variation (qualitative) sampling and snowball (quantitative) sampling are combined to identify suitable participants for this study (Creswell, 2011). My case is the role of school leaders in integrating technology that might support quality education. The characteristics of qualitative inquiry is not to generalize to the population, but rather to develop an in-depth inquiry to best understand the central phenomenon, which is school leaders’ roles in integrating technology to promote quality education for this study (Creswell, 2011). So, my intent has been always to conduct a certain number of interviews to get an in-depth exploration of the issue from individuals who are information rich and to select them from schools under the sites of A2I.
program. This program is working to integrate technology at a large scale in Bangladeshi education system and it ensures technological arrangements like MMCs, projectors, laptops, Internet modems, and speakers about what interviews were conducted. Bangladesh has seven divisions and this project is running in all of them.

For the first part of sampling, I adopted a purposive sampling (Creswell, 2013). To bring multiple perspectives of the school leaders to present the complexity of leadership roles, I have done maximum variation sampling to sample eight head teachers from eight secondary schools of four different divisions. Dhaka, Chittagong, Sylhet and Rangpur are four divisions. I have selected two head teachers from two schools per division. In collaboration with A2I authority, I have prepared a list of schools whose teachers and head teachers meet the minimum required characteristics to be the participants for this study. To ensure a legitimate, sensible and valid conclusion on head teachers’ and teachers’ leadership roles in integrating technology, I have planned to find participants that are appropriate, important and suitable to answer the questions. So, I have tried to make sure that each of the teachers and head teachers has some government or non-government training on how to use the technology, computer or multimedia in classrooms and has technological arrangements in their classrooms to apply that training. My participants were supposed to be trained about how to make digital contents based on the national curriculum and how to use them effectively in classrooms. These are the minimum required characteristics of the participants for this study. They were also provided with laptops, projectors, modems, manuals, booklets, and digital or e-learning materials. These are common elements and equipment for MMCs in Bangladesh. Based on that list, I have contacted head teachers and confirmed them when they agreed for the interviews.
Then, each of the head teachers has chosen one of his/her teachers who had relevant training. As the head teacher has chosen the teacher for the interview, it is a snowball sampling (Creswell, 2011). I have interviewed eight head teachers and eight teachers from eight schools of four divisions. Each of our participants is one single case within the instrumental case. Selecting such multiple participants was not to generalize the findings but to “…employ maximum variation as a sampling strategy to represent diverse cases to fully describe multiple perspectives about the cases (Creswell, 2013, p. 147).”

**Ethical Clearance**

**HSRB Approval**

The time frame for this research was from October 2015 to April 2016. After submitting documents for the Human Subject Research Board’s (HSRB) approval in October 2015, the approval was granted on the 8th of January 2016. It approved the data collection tool, consent form, follow-up consent form, and recruitment letter. (IRBNet ID 825570).

**Confidentiality**

All the procedures used to protect the confidentiality of participants are based on protecting their safety, dignity, and privacy. All confidential procedures were spelled out during the consent process and in the consent form. To secure the confidence of participants, an interview number, as opposed to the participant’s name, was recorded at the beginning of the interview. Further, all other information from the interview was collected and preserved under codes. If participants had ceased the interview due to feelings provoked by the questions, information about where they could get support or services was readily available. All data were stored electronically and only the principal researcher and the advisor of the research committee had access to the data obtained. Electronic files will be destroyed four years after the completion
of this study. These facts were made known to study participants before the interview process begins.

**Informed Consent**

Participants were provided with an agreement of informed consent prior to the interview. The age limit of the head teachers or teachers were eighteen to sixty-five. When participants expressed interest to participate then they were introduced to the study and provided with an appropriate consent form. The consent form was to be signed by the head teacher or teacher before the interview starts. All consent agreements were carefully worded to ensure the understanding of participants. With regard to informed consent’s procedures, the interviewer carefully walked participants through the agreement, giving them ample time for review, and any questions they might have regarding the nature of the study or their participation in it. Furthermore, the consent agreements provided a description of the study, including its purposes, confidentiality, voluntary participation, risk or discomforts, benefits of participation and information about where questions may be addressed after the interview. Participants were informed that their agreement to participate was absolutely voluntary, that they may decline to answer specific questions, and that they may withdraw from the study at any time without any obligations. No monetary compensation was involved with the participation in the study. Deciding to participate or not did not have any impact on the participants’ relationship with the school, A2I, researcher or Bowling Green State University. Participants needed to provide name and signature at the end of consent form to testify their voluntary participations. In this case, data is not anonymous, but the participants’ names are mentioned or associated with their responses in the thesis. Their information is presented in relating to their pseudonyms and demographic information, and their identities are kept highly confidential.
Data Collection

For an extensive data collection, this study has covered a wide range of sources of information like interview, field notes, reports and documents. Yen (2009, as cited in Creswell, 2013, p. 100) has mentioned documents including varieties of reports and policies, archival records, interviews, observations, and physical artifacts as sources of extensive information collection. Table 1 provides data sources for the information. In-depth one-on-one interview is the major source of primary data because that has provided field level experiences on the leadership role to integrate technology in classrooms. Field notes taken during the interviews have helped to identify key words from the perspectives of participants’ attitudes and sentiments. These notes have eased the emergence of themes and organization of codes later in data analysis. Although observation is a major component of my theoretical background, I have not collected observational data. I had to complete the entire process of data collection and data processing within a limited time period. Moreover, as I did not have any financial support, it was difficult for the interviewer to stay longer at the sites and gain access in every setting by developing rapport with individuals to collect observational data. It also requires having careful attention and good listening skills for collecting observational data. Depending on an interviewer, who is not the principal researcher, the observational data did not seem compelling for me to assure appropriate data for this research. That is why I decided not to collect observational data.

Table 1 – Data Sources

<table>
<thead>
<tr>
<th>Interview Transcripts</th>
<th>Newspaper Articles</th>
<th>Government Reports</th>
</tr>
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<tbody>
<tr>
<td>Field Notes</td>
<td>Published Thesis/ Dissertation</td>
<td>Peer Reviewed Articles</td>
</tr>
<tr>
<td>Manuals</td>
<td>NGO Reports</td>
<td>Government Policies</td>
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</table>
Data Collection Tool: Interview Questionnaire

I recruited an interviewer who has conducted interviews in several studies previously since I was in the USA when the interviews took place in Bangladeshi secondary schools. Although he has interviewing experience, I trained him thoroughly in six to seven sessions and also communicated regularly before and after each interview. He conducted four pilot interviews using the initial questionnaire. Based on the responses of piloting, I completed the necessary modifications and finalized the questionnaire. The data collection tool comprises three parts: demographic questions, survey questions and semi-structured questions. This questionnaire aims to examine school leaders’ roles in integrating technology which might support quality components in schools. This data collection tool is developed based on the literature review, nature of the research questions and theoretical framework. In the semi-structured questions, I followed two inner philosophies to form the items. Firstly, the questions were asked to know what the school leaders are doing, what they cannot do, and what their suggestions are in regards to the integration of technology. Secondly, items were formed with an intension of cross checking between the information of the head teachers and the teachers.

Interview Protocol

A one-on-one in-depth interview was based off an eight-page questionnaire. I translated the questionnaire from English to the participants’ native language Bangla. Demographic and survey items consist of multiple choice options as well as open spaces for responses. Survey items acted as icebreaker also to slowly introduce the interviewee to the quality components in secondary education, which is one of the basic aspects of this study. Semi-structured questions basically explore the roles played by the school leaders which might support those components in classrooms. Although the probe questions in the semi-structured section guided both the
participant and the interviewer toward the purpose of the study, the interviewer had enough flexibility and freedom to switch to different parts and questions of the questionnaire to maintain a continuity of flow of the respondent’s speech on any specific area. The interviewer’s previous interview taking experiences on diversified fields and the training sessions on this current study helped him to deliver the interview items in his own words, not just reading aloud before the interviewee. Every interview took about thirty minutes, while the interviewer had also taken related field-notes. With the permission of the participants, these interviews were audio taped and then transcribed. Data were recorded with a digital recorder during the semi-structured questionnaire. Recorded data were transcribed verbatim onto a Word document afterwords. The recorder was visible at all time during the interview, and the participants may have elected to stop the audio recording and/or stop the interview at any time during the process.

After the interview, that was the end of their involvement, unless they were willing to be contacted for a follow-up interview with the researcher. When they agreed to be contacted for a follow-up, which was completely optional, they needed to provide their contact information at the end of the consent form. The follow-up interviews were for further clarifications or elaborations if any of the responses seemed incomplete to the researcher. Upon their agreement to be followed up, follow-up interviews would have taken place in-person and necessary correspondences would be done mainly through mobile because people in Bangladesh mostly rely on mobile rather than email.

The content assistant (Education), e-learning specialist and monitoring assistant are three people from the A2I program who introduced the researcher with the head teachers and assisted to communicate and schedule interviews with teachers and head teachers. Thus, it became very easy to build trust and rapport with the participants. Steps were taken to ensure that the
recruitment was completely voluntary that it adheres to the standards of confidentiality and consent addressed and that it does not adversely affect the recruiter in any way. Once participants were done with the signature in the consent form, and there were no further questions prior to the interview, a safe, publicly accessible and suitable place was located for the interview. In all the cases, school teachers and head teachers were interviewed somewhere inside their school campus according to their wish. No personal information was accessed or collected without their knowledge and consent.

**Increasing Rigor in Accuracy and Reducing Researchers Bias**

I have adopted data triangulation in this study to implement a rich and robust investigation for understanding (Creswell, 2013). Besides the comparison of interview responses, data are also utilized from other sources like reports, articles, books and policies for the comparison. Statements from different people, are compared and contrasted in the cross-case analysis and generalization sections. The purpose of this triangulation is to verify the consistency of findings in different primary and secondary sources. To explain the benefits of triangulation, Creswell (2011) has stated, “This (triangulation) ensures that the study will be accurate because the information draws on multiple sources of information, individuals, or processes. In this way, it encourages the researcher to develop a report that is both accurate and credible (p. 259).” To make sure that interviewees were not deceptive and did not provide information that they think the researcher wants to hear, the interviewer clearly informed that the purpose of this research is the fulfilment of a master program, and this study is not done by any authority like A2I. Participants were assured that these interviews had nothing to do with their jobs or schools. Furthermore, they were told that the truth would be so crucial for the improvement of the education system of Bangladesh, and they were the most suitable and authentic target group to
answer those questions. In those questions, interviewees were asked about their regular activities, opinions and attitudes toward the integration of technology inside the classroom a regular and stable setting, so none of the content of the interview, physical setting, or environment were likely to produce any tension or anxiety for them as long as they agreed to the informed consent. Moreover, I conducted member checking to make sure the findings have authentic perceptions of the respondents and confirmed the member checking with the participants before the coding and the formation of the themes start to make sure that the findings are accurate. I also checked the authenticity with them in terms of complete description, accuracy of translation and representative and fair interpretation (Creswell, 2011).

**Data Analysis**

As an instrumental case, this study has focused on the issue and then illustrated the issue by exploring sixteen interviews. The roles of school leaders in integrating technology to promote quality education is the case and the interviewed teachers and head teachers of eight schools are considered cases within the case. This study has done a holistic analysis of the entire case, not any specific part or aspect of it. Stake (1995, as cited in Creswell, 2013, p. 199) suggested four types of data analysis in case study research. Among them, the categorical aggregation is chosen in order to analyze the data received from the school leaders’ interviews.

In categorical aggregation, the researcher seeks a collection of instances from the data, hoping that issue-relevant meanings will emerge (Stake, 1995, as cited in Creswell, 2013, p. 199).
Figure 1 – A visualization of the data analysis: Case study method of Yin (Yin, 2009, p. 49).
For the data analysis, it followed the case study method of Yin (Yin, 2009, p. 49). Figure 1 provides a visual of the cast study method as used by Yin. This method has three stages. After making data collection tools in the first stage, I completed the interviews which is the first part of the second stage. In the last part of the second stage, I translated the responses and wrote the individual case reports. For the third stage, I first completed the memoing, and coding. Based on those codes, the themes formed. The section of drawing cross-case conclusions is the starting of the third stage. This section comprises two types of analysis: within case theme analysis and cross-case theme analysis. Themes emerged from every cases have been cross-case analyzed. Cross-case analysis portrayed some similarities and differences among the cases. These similarities and differences are written through assertions and generalizations. At this point, existing literature and the theory were compared and contrasted with the themes for the triangulation and discussion.

**Memoing**

After making a verbatim translation, I read each interview transcript entirely several times to get a sense of the interview as a whole (Creswell, 2013). Based on that sense, I wrote memos on the margin of the transcripts, which has helped in later data analysis. These memos are like short phrases or ideas. Initial categories are formed from these ideas. Looking over these memos is very significant because that created a chance to see what the interviewees have said disregarding the predetermined questions. It helped to draw attention to ideas if there are newly found any.

**Coding**

In the light of the interviewees’ perspectives and the literature, forming codes or categories has been the heart of the data analysis process. Coding is started in the third stage of
this multiple case study and continued during the cross-case analysis (Creswell, 2013). In the participants’ demographics, it describes detailed and various aspects of the setting such as sites, cases, areas of expertise, and actors. Cross-case analysis compares and analyzes the themes across the cases. I used color coding. These codes have eventually led to detailed descriptions, themes or dimensions and interpretations. These details are described from the perspectives of interviewee’s designation, responsibility, school condition, and experience. Collected data is concluded to the final assertions and generalizations through a process of condensing the codes. The themes or key focuses are not for generalizations, but for understanding the complexity or variation within the cases. Interpretation, which is abstracting out from the codes and themes of the larger context and research literature, is made based on the evidences, insights, and intuitions.

**Themes**

Reducing the large dataset from sixteen interviews to a small and manageable set of themes to conclude the findings is one of the difficult parts of the data analysis section. Table 2 provides a list of the themes of quality education components and Table 3 provides a list of the themes of school leaders’ roles to integrate technology that might support quality education. Forming themes occurred in the within-case and cross-case theme analysis sections. Deconstructive stance, proposed by Czarniawska (2004, as cited in Creswell, 2013, p. 186), is used to look into the information with a view to creating themes. According to this stance, dismantling the nature of the contexts or events, examining silenced groups of people, attending the contradictions in sense making, focusing on peculiar elements that limit conceivability of ideas, interpreting metaphors as a rich source of multiple meaning, and separating group-specific or general biases are some basis of forming the themes. Finally, I aggregated data into eight themes for the quality education components and five themes for school leaders’ roles in
integrating technology. These broader themes are mainly the five dimensions found in the analytical framework and they include some broader traits of leadership role in promoting quality in the classroom. Five themes of school leaders’ roles in integrating technology have thirty-one subthemes. Generalizations made in the final section are based on these themes and how they were compared and contrasted. The discussion part of this thesis compiles evidences from the existing literature and theories in support of the assertions and generalizations.

Table 2 – Cross-Case Theme Analysis: Quality Education Components

<table>
<thead>
<tr>
<th>Themes</th>
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<tbody>
<tr>
<td>1</td>
<td>Quality components of the MMC</td>
</tr>
<tr>
<td>2</td>
<td>Students’ performance enhancement</td>
</tr>
<tr>
<td>3</td>
<td>Teaching ability enhancement</td>
</tr>
<tr>
<td>4</td>
<td>Barriers to the technology related quality components</td>
</tr>
<tr>
<td>5</td>
<td>The MMC related teachers training</td>
</tr>
<tr>
<td>6</td>
<td>Suitable subjects for the MMC according to students</td>
</tr>
<tr>
<td>7</td>
<td>Rate of multimedia use in the classroom</td>
</tr>
<tr>
<td>8</td>
<td>Attitude towards using technology in the classroom</td>
</tr>
</tbody>
</table>
Table 3 – Cross-case Theme Analysis: School Leaders’ Roles to Integrate Technology that Might Support Quality Education

<table>
<thead>
<tr>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Vision and plan</td>
</tr>
<tr>
<td>2 Learning, teaching and professional development</td>
</tr>
<tr>
<td>3 Managing curriculum and instruction</td>
</tr>
<tr>
<td>4 Assessment evaluation</td>
</tr>
<tr>
<td>5 Attitude towards technology and comfort with technology</td>
</tr>
</tbody>
</table>

**Frequency Distribution**

The frequency distribution was table based upon the frequency of how many times each of the themes or subthemes, described in the findings and discussion section, are mentioned by the respondents. Table 4 gives information about the frequency of responses and percentage of frequencies. Based on that frequency, I have identified some bigger or major subthemes to generate a qualitative effect size of those subthemes. Regarding the themes of the first part of the findings and discussion chapter, quality education components of the MMC, each of the participants responded to each of those themes. As a result, each of the themes has the same frequency. So, I have not developed any frequency table to identify any bigger themes from the first part. This table is for the second part, roles of school teachers and head teachers to integrate technology. Some of the thirty-one subthemes such as head teachers’ supporting roles or teachers’ management roles are more prevalent than others. I have identified the six biggest subthemes. I have considered the subthemes with percentage of the frequency larger than four percent (4 %) the major or bigger subthemes. Compared with other subthemes, the bigger
subthemes imply that school leaders are likely to play most of their roles in those areas or they emphasized those areas the most to be improved for a better technological integration. Policy implications and practices in relation to those bigger subthemes can be prioritized. However, I have considered that each of the subthemes are equally significant for my findings and discussion irrespective of the frequency rate because qualitative research aims to know detailed and complex understanding of the phenomenon.
Table 4 – Frequency Distribution Table

<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes</th>
<th>Frequency of Responses</th>
<th>Percentage of the Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision and plan</td>
<td>1. Schools’ visions of technological integration in classrooms</td>
<td>19</td>
<td>3.3 %</td>
</tr>
<tr>
<td></td>
<td>2. Achieved vision</td>
<td>19</td>
<td>3.3 %</td>
</tr>
<tr>
<td></td>
<td>3. How schools’ visions of technological integration might support quality education</td>
<td>11</td>
<td>1.9 %</td>
</tr>
<tr>
<td></td>
<td>4. Teachers’ roles to implement the vision of technological implementations</td>
<td>17</td>
<td>2.9 %</td>
</tr>
<tr>
<td></td>
<td>5. Role to communicate, cooperate, interact to achieve visions</td>
<td>18</td>
<td>3.1 %</td>
</tr>
<tr>
<td></td>
<td>6. Barriers to achieve visions</td>
<td>33</td>
<td>5.7 %</td>
</tr>
<tr>
<td></td>
<td>7. Confident school leaders</td>
<td>12</td>
<td>2 %</td>
</tr>
<tr>
<td>Learning, teaching and professional development</td>
<td>8. Teachers’ roles to create an effective teaching-learning environment</td>
<td>16</td>
<td>2.8 %</td>
</tr>
<tr>
<td></td>
<td>9. Teachers’ supporting roles to enhance the teaching-learning</td>
<td>13</td>
<td>2.3 %</td>
</tr>
<tr>
<td></td>
<td>10. Head Teachers’ roles to create an effective teaching-learning environment</td>
<td>23</td>
<td>4 %</td>
</tr>
<tr>
<td></td>
<td>11. Head Teachers’ supporting roles to enhance teaching-learning</td>
<td>26</td>
<td>4.5 %</td>
</tr>
<tr>
<td></td>
<td>12. Barriers to teaching, learning and professional development</td>
<td>44</td>
<td>7.7 %</td>
</tr>
<tr>
<td></td>
<td>13. School leaders’ dreams, wishes, and future plans</td>
<td>10</td>
<td>1.7 %</td>
</tr>
<tr>
<td></td>
<td>14. Schools’ reputation</td>
<td>4</td>
<td>0.7 %</td>
</tr>
<tr>
<td>Managing</td>
<td>15. Supervision and monitoring</td>
<td>16</td>
<td>2.8</td>
</tr>
<tr>
<td>Curriculum and Instruction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>16</td>
<td>Head teachers’ management roles to incorporate technology</td>
<td>23</td>
<td>4 %</td>
</tr>
<tr>
<td>17</td>
<td>Teachers’ management roles to incorporate technology</td>
<td>29</td>
<td>5 %</td>
</tr>
<tr>
<td>18</td>
<td>Multimedia Class is in school routine</td>
<td>5</td>
<td>0.8 %</td>
</tr>
<tr>
<td>19</td>
<td>Fund management: Collection and allocation</td>
<td>16</td>
<td>2.8 %</td>
</tr>
<tr>
<td>20</td>
<td>Update software and hardware</td>
<td>16</td>
<td>2.8 %</td>
</tr>
<tr>
<td>21</td>
<td>A specialized dynamics at the Government schools</td>
<td>8</td>
<td>1.4 %</td>
</tr>
</tbody>
</table>

| Assessment Evaluation | | | | |
|---|---|---|---|
| 22 | Roles to promote technology-based assessment | 20 | 3.5 % |
| 23 | Technology-based assessment’s impact on quality education | 17 | 2.9 % |
| 24 | Technology-based or hands-on: Suitable assessment system | 20 | 3.5 % |

| Attitude Towards Technology and Comfort with Technology | | | | |
|---|---|---|---|
| 25 | Effectiveness of technology for quality education | 26 | 4.5 % |
| 26 | Effectiveness of technology from particular school perspective | 27 | 4.7 % |
| 27 | Rewarding for technology related best practices | 16 | 2.8 % |
| 28 | Teachers’ and students’ satisfaction | 26 | 4.5 % |
| 29 | Suitable subjects to use technology in | 15 | 2.6 % |
| 30 | Subjects not suitable to use technology in | 15 | 2.6 % |
| 31 | Roles to make teachers and students interested | 13 | 2.3 % |

Total | 573 | 100 %
Participants’ Demographic

Table 5 provides participants’ demographics information. I have selected eight schools from four divisions of Bangladesh; two schools from each of the division. Sylhet, Gazipur, Chittagong, and Lalmonirhat are the names of the districts where these schools are situated. Gazipur and Lalmonirhat fall under the Dhaka and Rangpur divisions respectively. Eight teachers and eight head teachers were interviewed from eight different schools. Five of the teachers and five of the head teachers are male. Three of the teachers and three of the head teachers are female. Two-thirds of the head teachers are aged between fifty to sixty years. The remaining head teachers are 41 and 43 years old. Five of the teachers are between forty to fifty years and three are between thirty and forty years. All the participants reported to be from a city except only one teacher. Six participants have a bachelor’s degrees and the other ten have master’s degrees. These degrees also include B.Ed and M.Ed degree. Teachers have fifteen to twenty-two years of teaching experience where head teachers usually have more experience. Three-fourths of the head teachers have more than thirty years of teaching experience. Most of them teach from grade six to ten, which is called secondary education in Bangladesh. They have varieties in their teaching specialties.
<table>
<thead>
<tr>
<th>Teacher/Head Teacher</th>
<th>Pseudonym</th>
<th>District of School</th>
<th>Gender</th>
<th>Age</th>
<th>School Environment</th>
<th>Level of Education</th>
<th>Teaching Experience (years)</th>
<th>Teaching Age Group (Grade / Class)</th>
<th>Teaching Specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jahid</td>
<td>Sylhet</td>
<td>Male</td>
<td>51</td>
<td>City</td>
<td>Bachelor</td>
<td></td>
<td>30</td>
<td>8, 9, 10</td>
<td>Math, Science, Physical Education and Health</td>
</tr>
<tr>
<td>Zannat</td>
<td>Sylhet</td>
<td>Female</td>
<td>53</td>
<td>City</td>
<td>Bachelor (B. Ed)</td>
<td></td>
<td>30</td>
<td>6, 7, 9</td>
<td>Religion and Moral Education, Bangla, Home Science</td>
</tr>
<tr>
<td>Dina</td>
<td>Gazipur</td>
<td>Female</td>
<td>57</td>
<td>City</td>
<td>Bachelor</td>
<td></td>
<td>33</td>
<td>8, 9, 10</td>
<td>Science Math</td>
</tr>
<tr>
<td>Faria</td>
<td>Gazipur</td>
<td>Female</td>
<td>41</td>
<td>City</td>
<td>Masters</td>
<td></td>
<td>20</td>
<td>8, 10</td>
<td>English</td>
</tr>
<tr>
<td>Arif</td>
<td>Chittagong</td>
<td>Male</td>
<td>58</td>
<td>City</td>
<td>Masters</td>
<td></td>
<td>36</td>
<td>9, 10</td>
<td>Business Studies</td>
</tr>
<tr>
<td>Saiful</td>
<td>Chittagong</td>
<td>Male</td>
<td>43</td>
<td>City</td>
<td>Masters</td>
<td></td>
<td>20</td>
<td>6, 7, 8, 9, 10</td>
<td>Bangla, Bangladesh and Global Studies</td>
</tr>
<tr>
<td>Azim</td>
<td>Lalmonirhat</td>
<td>Male</td>
<td>40</td>
<td>City</td>
<td>Masters</td>
<td></td>
<td>15</td>
<td>8, 9, 10</td>
<td>English</td>
</tr>
<tr>
<td>Babor</td>
<td>Lalmonirhat</td>
<td>Male</td>
<td>50</td>
<td>Suburb</td>
<td>Masters</td>
<td></td>
<td>22</td>
<td>9, 10</td>
<td>Bangla, Bangladesh and Global Studies</td>
</tr>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mijan</td>
<td>Sylhet</td>
<td>Male</td>
<td>40</td>
<td>City</td>
<td>Bachelor</td>
<td></td>
<td>17</td>
<td>8, 9, 10</td>
<td>Math, Science, ICT, Career Education</td>
</tr>
<tr>
<td>Nadia</td>
<td>Sylhet</td>
<td>Female</td>
<td>37</td>
<td>City</td>
<td>Masters</td>
<td></td>
<td>15</td>
<td>8, 10</td>
<td>English</td>
</tr>
<tr>
<td>Tithi</td>
<td>Gazipur</td>
<td>Female</td>
<td>43</td>
<td>City</td>
<td>Masters</td>
<td></td>
<td>18</td>
<td>6, 7, 8, 9, 10</td>
<td>English, ICT</td>
</tr>
<tr>
<td>Sumi</td>
<td>Gazipur</td>
<td>Female</td>
<td>50</td>
<td>Suburb</td>
<td>Masters</td>
<td></td>
<td>20</td>
<td>8, 9, 10</td>
<td>Science, Art and Crafts</td>
</tr>
<tr>
<td>Atiq</td>
<td>Chittagong</td>
<td>Male</td>
<td>42</td>
<td>City</td>
<td>Masters (M. Ed)</td>
<td></td>
<td>15</td>
<td>6, 7, 8, 9, 10</td>
<td>English, Bangladesh and Global Studies, ICT</td>
</tr>
<tr>
<td>Kamal</td>
<td>Chittagong</td>
<td>Male</td>
<td>44</td>
<td>City</td>
<td>Bachelor</td>
<td></td>
<td>22</td>
<td>6, 7, 8, 9, 10</td>
<td>Mathematics, ICT, Agriculture Studies</td>
</tr>
<tr>
<td>Rabbi</td>
<td>Lalmonirhat</td>
<td>Male</td>
<td>33</td>
<td>City</td>
<td>Bachelor</td>
<td></td>
<td>09</td>
<td>6, 7, 8, 9, 10</td>
<td>Science, Agriculture Studies</td>
</tr>
<tr>
<td>Tareq</td>
<td>Lalmonirhat</td>
<td>Male</td>
<td>36</td>
<td>Village</td>
<td>Kamil (equivalent to Maters)</td>
<td></td>
<td>14</td>
<td>6, 7, 8, 9, 10</td>
<td>Religion and Moral Education, Art and Crafts</td>
</tr>
</tbody>
</table>

Table 5 –Participants’ Demographics
CHAPTER IV. FINDINGS AND DISCUSSION

Chapter Overview

I combine all the findings and discussions in this chapter. The entire chapter has mainly two parts. The first part addresses the quality education components of the Multimedia Classroom (MMC) in Bangladeshi secondary schools. The second part discusses school teachers’ and head teachers’ roles to integrate technology which might promote those quality components. I refer all the findings and discussions to the pseudonyms and demographic characteristics of the respondents. In doing so, I place the discussions after the findings of every theme or subtheme. In the first part, I discussed every theme. In the second part, I discussed every subtheme.

I have analyzed, discussed, and evaluated the findings in the light of the theoretical framework and related literature review in this chapter. To explore the quality education components of the MMC in the first part, I have relied mostly on the existing literature. I have compared and contrasted the contemporary and relevant Bangladeshi national policies as well as international conventions and declarations with the interviewed data. I have examined the data through the lens of policies and conventions because my plan is to check to what extent quality components reflect these policies. I have not used the theoretical framework in exploring quality components in Bangladesh context because I have considered the five dimensions of the Weber’s instructional leadership model only to assess the instructional roles of the school leaders found in the interview data. I have categorized these components in eight themes. The second part discusses school leaders’ roles in integrating technology. I have analyzed the entire part based on the ideas that emerged from the literature review and the theoretical framework, Weber’s model of instructional leadership.
Quality Education Components

This section answers the first research question. I designed the survey questions to identify what quality components Bangladeshi secondary schools have in their MMCs. The interviewer asked all the head teachers and teachers exactly the same eleven questions on the area of quality education components. I have organized my quality components findings in eight themes.

Theme 1: Quality Components of the MMC

Subtheme 1: MMC Materials.

All sixteen participants acknowledged that they had at least a modem, computer, multimedia projector, screen, speaker or sound box in the MMC of their schools. These were common elements to form a MMC. Computers included laptop and desktop computers.

Subtheme 2: Number of (Functioning) Computers.

According to the teachers and head teachers, two schools from Sylhet had twenty-three and fourteen functioning computers respectively. These are the highest and third highest number of computers respectively. One school from Lalmonirhat also had fourteen computers. A school from Chittagong reported to have twenty computers which is the second highest of this survey. In teachers’ and head teachers’ opinion, the rest of the schools did not have more than five functioning computers. One school from Gazipur had two, the other from Gazipur had three, and one from Lalmonirhat had four, and one from Chittagong had five computers.

Subtheme 3: Students’ Computer Usage.

Arif from Chittagong reported that 95% of their students were allowed to use their computers, which is the highest portion of students in this survey. Azim and Rabbi from Lalmonirhat and Zannat and Nadia from Syhet, who were the head teachers and the teachers
from the same school, mentioned that 50%-60% of their students can use school computers. Faria and Sumi from Gazipur, Mijan and Zahid from Sylhet, and Saiful and Kamal from Chittagong, who were the head teachers and the teachers from the same school, noted that 10%-20% of their students were able to use computers in schools. Besides that, Atiq found 50%, Ratan found 40%, and Babor found 20% of their students were able to use computers inside the school. Only one school from Gazipur could not provide the opportunity to their students to use computers.

**Subtheme 4: The MMC contributes to quality education.**

In the opinion of all the sixteen participants, the MMC contributed to higher quality education for students. Only Atiq from Chittagong added that MMCs also grew leadership quality and increases skills.

**Discussion**

The National Education Policy 2010 has been prepared in tune with this (17th) article of the (national) Constitution and various national and international Conventions. Further, the Master Plan for Information and Communication Technology (ICT) in Education has been developed to help achieve various aims and objectives of the education policy (MoE, 2013, p. 1).

This statement implies that the shape of the quality of education in the secondary education of Bangladesh is supposed to be determined by the characteristics of relevant national policies and international declarations. I have taken the national ICT policy 2009, national education policy 2010, and master plan for ICT in education (2012-2021) into account as national policies to be examined and compared with the interview data for this study. At the same time, I have considered EFA, MDG, CEWAD, and UNESCO’s principles and indicators
on ICT in education as international declarations to analyze the primary data. Interviewees’ responses show that the quality components in Bangladeshi secondary education, which are promoted by the educational technology in MMCs according to the respondents, are vastly influenced by these national and international policies.

MoE (2013) has made the mandatory elements of the MMC clear in the master plan for ICT: “Establishment of a multi-media classroom (MMC) with one laptop, one multi-media projector/LCD screen, Internet connection at each educational institution…” (p.7). Save the Children (2014) has also listed the same basic technological elements for the MMC, established by A2I program. Participants’ responses confirmed the presence of these elements in secondary schools and listed the Internet modem, computer, multimedia projector, screen, and speaker or sound box as common elements of a regular MMC. They also believed that the MMC promoted quality education. UNESCO (2009) has measured the availability of hardware and software in schools, the presence of computers, student computer ratio, and the level of students’ access to the computer, Internet and computer laboratory as its indicators of ICT in education. According to the participants, the number of computers, including the laptop and desktop, varied from three to twenty-three in the schools for this study. That means schools’ capacity and resource varied from school to school in terms of technology arrangements. Regarding the level of students’ access to the computer, school leaders identified two bigger categories of percentages of the students, who were able to use those computers. In schools, mostly 10%-20% or 50%-60% students were allowed to use the school computers. So, the extent to which these technological facilities were available to the teachers and students is a quality component for Bangladeshi secondary education.
Theme 2: Students’ Performance Enhancement

Almost all the participants identified several ways to explain how the MMC enhanced students’ performances. They found that the MMC raised classroom interaction, increased active participation, enhanced students test scores on exams, reduced learning difficulties, and made an effective and enjoyable learning environment. The MMC also increased students’ attentions in the study, achieved higher learning competencies, decreased students’ dropout rate, increased students’ enrollment rate, uplifted attendance rate, and created real-life learning.

Discussion

Goodyear and Retalis (2010) acknowledged various ways in which technology can enhance students’ learning. Therefore, the master plan for ICT has objectives to create a learner-centric teaching and ICT-enabled teaching-learning environment (Save the Children, 2014; MoE, 2013). To do that, teachers used audio-visual elements to develop e-contents by which they were broadening both teachers’ and students’ cognitive abilities, conducting lessons in a more interactive manner and increasing participations by integrating technology with the traditional teaching-learning approach (UNDP, 2012). Responses from the school leaders of this study are also consistent with this literature. Participants said that the MMC intended to create an environment which was very supportive for students in so many ways to enhance their performance. For example, they said that it enhanced participations and interactions in the class. The literature shows that although Bangladesh is now focusing more on qualitative aspects, some quantitative measures are still considered as the standards of quality (“China and International Financial Institutions | Focus on the Global South,” n.d.; MoE, 2010). Participants believed that the MMC contributed to decreased dropouts, increased enrollments, and raised attendances.
Theme 3: Teaching Ability Enhancement

Subtheme 1: The MMC Assists Teachers.

All the participants identified some common characteristics of multimedia about how it assisted teachers to accelerate their teaching abilities. In their opinion, the MMC enhanced teaching capacity, reduced teacher’s workload, created easy to learn materials for students, helped to organize lessons, reduced costs in the classroom, shortened the amount of time the teacher spends on preparation, increased student’s level of understanding, allowed to use technology-based assessment for the students, and reduced teaching problems.


Participants mentioned thirteen ways about how computers supported regular teaching-learning practices in schools. They said that they used computers to develop e-contents, present them in classrooms, collect information through the Internet to use in classrooms, keep attendance in spreadsheets, maintain student grades in spreadsheets, make Power Point presentations for classrooms, organize information, create instructional handouts, create or use graphs and charts, use Microsoft Word for doing assignments, collect audio, video and animation, collect or use images and maps, and prepare students' results.

Discussion.

In the policy and practice, technological integration in education is targeted to enhance the teaching capacity and assist teaching-learning process. UNESCO (2014) reported that the integration of educational technology enhances the teaching-learning environment by mobilizing and producing effective learning materials to reduce learning difficulties. Save the Children (2014) reported that the technology in classrooms of Bangladesh improves the relevance of content, enriches teachers’ delivery, and tailors locally relevant teaching materials to meet
individual learning needs. MoE (2013) described that the first, second, third and fifth objectives of master plan for ICT in education are designed to develop the teaching-learning environment, develop the professional and ICT skills of teachers, and improve the standards of teaching-learning materials. MSICT (2009) directions to provide updated technology based training to build up capacity of the school teachers and head teachers. Participants of this research also revealed similar quality aspects of technology. They said that the multimedia enhanced teachers’ teaching ability and capacity by reducing teacher’s workload, creating easy to learn materials for students, reduces teaching problems and helps to organize lessons.

Ahmed and Williams (2008) noted some more quality features for secondary education such as reducing fees and other direct costs, making supportive ICT resources available, and ensuring adequate contact hours. UNESCO (2009) emphasized on teachers’ workload and ICT assisted exercises as its *ICT in education* indicators. Besides, MDG and the master plan for ICT in education have suggested the effective use of ICT to help students achieve higher educational outcomes (MoE, 2013; UNESCO, 2009). These benefits of technology are clearly reflected in the participants’ opinions. They found that the educational technology supported teachers by reducing costs in the classroom, shortening the preparation periods, and increasing student’s level of understanding.

Participants provided further details on how computer based technology eased the teaching-learning process for teachers, which is also consistent with the literature. The objectives of the national ICT policy 2009 and education policy 2010 are aimed to establish the use of ICT as a teaching-learning tool (MSICT, 2009; MoE, 2010). UNESCO (2009) has also measured to what extent ICT is integrated as a teaching tool in the curriculum as one of its *ICT in education* indicators. The master plan for ICT in education has action plans to improve the standard of
teaching-learning and audio-visual materials and distribute those materials (MoE, 2013).

Interviewees of this research also demonstrated the usages of ICT as a teaching tool. They collected and used information, audio, video, animations, images, graphs and charts and maps to develop and present e-contents with the help of technology. But, one thing was missing among all the responses. One of the responsibilities of A2I is to widely circulate e-textbooks, and none of the interviewees mentioned if they use e-textbooks or not (Save the Children, 2014).

**Theme 4: Barriers to the Technology Related Quality Components**

Participants discussed problems or barriers that school leaders faced in their way of using technology effectively to create a better effective environment. These barriers were insufficient infrastructural support and funding, lack of appropriate training for teachers, instructional materials, and expert teachers. They also noted some teachers who felt more comfortable with hands-on teaching rather than using technology.

**Discussion.**

Providing adequate teacher training and teaching materials is a major focus in the initiatives taken by the government agencies like NAPE, MoPME, MoE, and DSHE as well as NGOs to integrate technology (Save the Children, 2014). In addition to the initiatives of these authorities, NCTB and BANBEIS also play roles to provide appropriate training and teaching materials. National and international policies and declarations have clear instructions to meet the shortage of skilled teachers in schools by providing professional training (MSICT, 2009; MoE, 2013; UNESCO, 2009). These policies have also advised to allocate adequate funds in the national budget for technological integration. A gap showed up between the policy and the practice when respondents identified limitations in schools which hindered the effective use of technology in the class. They thought that if there was a lack of appropriate training, essential
instructional materials and expert teachers, then that would be a gap between the policy and practice. For instance, they recognized the insufficient infrastructural support and funding, which is categorized as infrastructural quality components by Austin et al. (2008), as a major hindrance to technological integration in their schools.

**Theme 5: The MMC Related Teachers Training**

Teachers’ level of specialized training in technology is an indicator of teachers’ teaching expertise. Five head teachers and one teacher in this survey did not have any training. Moreover, the trained stakeholders reported to receive their training under governmental institutes, authorities, and projects. Those were TTC (Teachers Training College), BCC (Bangladesh Computer Council), TQI-SEP (Teaching Quality Improvement in Secondary Education Project), NAEM (National Academy for Educational Management), CPD (Continuous Professional Development), and Polytechnic Institutes. They named their trainings: CPD (Phase 2) TOT (English), office automation course, Pil Program, HRDT (Human Resource Development and Training), ICT for Digital content development, ICT for Digital content development- Follow up, Computer Council Training, ICT Training, MMC development, Digital Content, and Basic Course Certificate Course. I have categorized their training durations largely in two types. One type was five to six-day long. Another one was two to four-week long. Only one teacher reported to attend a ninety day long basic course.

**Discussion**

Among government institutions, NAPE, MoPME, MoE, NCTB, TTC, BANBEIS, and BCC are some of the apex teacher training providers (Save the Children, 2014). BRAC, Dnet, and Save the Children are some training providing NGOs. A2I and TQI-SEP are two government programs whose training programs are administered by DSHE. The participation of all these
agencies in providing training implies that a higher portion of trained school head teachers and teachers are likely to promote quality in the secondary education. Slightly more than one third of the participants did not have any MMC or technology related training. So, responses represent that almost one third of the school leaders of this sample were supposed to lack of efficiencies and instructions in using technology in the classroom. Trained participants reported to receive their all training from government agencies like TTC, BCC, TQI, and NAEM. It indicates that all the training initiatives by functioning NGOs could not make any contribution in the field level, particularly in case of this sample. These trainings like CPD TOT, ICT for Digital content development, and ICT Training were largely for developing school leaders’ skills and efficiencies in preparing and using digital contents in the class. The lengths of their trainings are consistent the literature. Teachers usually participate in three weeklong basic courses on computer, and head teachers participate in four-month long foundation training courses (NAEM, n.d.).

**Theme 6: Suitable Subjects for the MMC According to Students**

Participants identified some subjects as suitable to use technology. They are science, English, Bangladesh and global studies, religion and moral education, physical education and health, agriculture studies, mathematics, Bengali, business studies, information communication technology, home science, art and crafts. Home science discusses about some household management like personal security, primary knowledge about common diseases, and nutrition. Bengali is the native language of Bangladesh. Bangladesh and global studies discusses history, culture, economics, sociology and foreign affairs of Bangladesh.
Discussion

Subjects mentioned by the participants like Bangla, English, and Mathematics were almost all the subjects of secondary school. It means that they found all the subjects suitable to use technology in the class. However, this finding contradicts with the findings from the semi-structured interview where participants prioritized ICT, English, mathematics and science as the most suitable subjects for the multimedia use. These four subjects were also given priority over other subjects regarding the implementation of technology by national and international policies and conventions (MSICT, 2009; MoE, 2010; UNESCO, 2009; Dnet, n.d.).

Theme 7: Rate of Multimedia Use in the Classroom

Almost half of the participants said that they use the MMC in twenty-five percent (one out of four classes) of their classes. Four participants used it in fifty percent of their classes and five other participants did it in seventy-five percent of their classes.

Discussion

UNESCO (2009) had measured to what extent ICT is integrated as a teaching tool in the curriculum and to what extent teachers use ICT to teach in the classroom as the core sets of ICT in education indicators. In line with that, multimedia class taking frequency or rate can be a component which is supposed to promote quality in the classroom. Responses show that almost half of the participants took one MMC in their every four classes at best. So, findings infer that the school leaders were far away from the target or vision of taking all the classes in MMCs. Among all eight schools, data from three schools show that the teacher and the head teacher from the same school gave the same multimedia class taking frequency. In case of the rest of the respondents, although the frequencies were not the same, they were close to each other.
Theme 8: Attitude towards Using Technology in the Classroom

Participants expressed a positive attitude regarding the technological integration. They said that they were interested in promoting the use of technology in the classroom, excited to learn how to use new technology for the classroom, and confident with my ability to troubleshoot when problems arise while using technology. They also believed that teachers were comfortable in using technology and students learnt easily when technology is used to deliver lessons or content.

Discussion

The literature review has implied that the government and non-government actors not only have formulated ICT related policies in last fifteen years but also have initiated varieties of projects and programs for the technological integration in secondary education (MSICT, 2009; MoE, 2013; Save the Children, 2014). Such an active participation implies that the stakeholders of all levels are supposed to possess a positive attitude towards a technology friendly education system. This positivity is also reflected in the attitude of the participants. Their confidence, comfort, and excitement towards the implementation and integration of technology in classrooms exhibited a positive attitude.

School Leaders’ Roles to Integrate Technology that might Support Quality Education

I have addressed the second and third research questions in this part. The questions’ intent is to identify school leaders’ roles in supporting quality education by implementing educational technology in classrooms. Although all the interview questions asked to the head teachers and teachers were on the same area of their role implementation, those were slightly different. For teachers, questions were asked on their pedagogic roles to implement and incorporate the technology in classrooms. On the other hand, head teachers were mostly talking
about how they were coordinating and managing all the supports to make an effective integration of technology in classrooms. I have subsumed the responses from the eight head teachers and eight teachers of eight schools in five themes and thirty-one subthemes.

Theme 1: Vision and Plan

Subtheme 1: Schools’ visions of technological integration in classrooms.

All the head teachers and teachers constructed a vision for their schools in order to make an effective implementation of educational technology. Almost all the sixteen participants expressed their vision to make MMCs available for every class and every student. This means either transforming every classroom to a MMC or making technological equipment available enough to enable teachers to take classes of every subject using the multimedia. School leaders were trying to get it done as soon as possible. Zannat, a head teacher from a school of Sylhet, aimed to do it within four years: “My target is to set multimedia in all my classrooms within next four years.” Three of the respondents wanted to make sure that they can take all the classes in MMC. Atiq, a teacher from a school of Chittagong, mentioned, “Our vision is to bring all the classes and subjects under the surveillance of the MMC. We want every student to learn using multimedia.” Jahid, a head teacher from a school of Sylhet, described how he was progressing toward his goal: “My target is to take all the classes of all the subjects using ICT. Having that intension, I already transformed two of the classrooms into Smart Classrooms. Although it is not one-hundred percent teachers, most of our teachers are adept in using computer and ICT.”

Five head teachers and teachers were working to set up more MMCs. Kamal, a teacher from a school of Chittagong, said, “A MMC is already functioning. We are starting two more MMC next month so that we can ensure that most of the classes take place in the MMC.” He also brought his school’s reputation as one driving force behind such vision: “As my school is a
leading school in Bangladesh, we have our plan to transfer one-hundred percent of classes into MMC though we could not make it yet.” Nadia, a teacher from a school of Shylhet, had a goal to achieve this by next four years. She said, “…we could not set up MMC in one-hundred percent of our classes yet. Within the next four years, we will add three more MMCs and we will try to take all the classes by using multimedia.” Dina and Tithi, the head teacher and the teacher from the same school of Gazipur respectively, shared the same vision. Their vision was very specific: “We have a single goal- increasing the MMC as well as the training for the teachers accordingly.” Tithi elaborated those goals and said, “First, as I have received trainings, there was a pressure on us by the government to conduct an in-house training after coming back from the training. So we have decided our targets to provide in-house training for teachers so that they become capable of preparing and using e-contents in classrooms. The second target was to turn half of our classrooms to MMCs and rest of the classes by the next year.” In-house training is training which is organized and led by expert teachers, who have received government or non-government training, to train the rest of the other teachers within the school.

For some schools, the MMC takes place in their computer labs. Therefore, Zannat had a vision to expand her lab numbers. She said, “I have twenty-seven thousand students here for which three computer labs are not adequate. If I want to make three more labs, then I will also need more materials. So, my vision is to increase the number of computer labs.” Azim, a head teacher from a school of Lalmonirhat, expressed similar targets and expected multimedia for each of his classrooms from the government. Therefore, Mijan, a teacher from a school of Sylhet, put forward a strategy to achieve their vision. He said, “Our target for all of our teachers is to take at least one class in the MMC each day. According to that plan, we scheduled and distributed MMCs for all the teachers in our school routine. To do that, all our teachers, who can
be even less efficient in using MMCs, are learning from the expert teachers through the internal cluster system.” Three participants possessed a bit different vision here which was more ideological, holistic and close to a predominant national agenda- Vision 2021. Among them, Faria, a head teacher from a school of Gazipur, said, “Mainly, our visions are to make our students know the information elaborately which is given briefly in the book, collect information by searching online, and dependent on the information to be skilled in ICT.” Arif, a head teacher from a school of Chittagong, stated, “Our vision is to prepare our students as competent people in this age of digital technology to successfully implement the Vision 2021 of Bangladesh government.” Rabbi, a teacher from a school of Lalmonirhat, envisioned using multimedia for an attitudinal change and mental development of his students. Ratan, a teacher from a school of Lalmonirhat, said, “Multimedia will promote learning by doing in the class.”

Discussion.

According to Weber (1996), visions are the glue for institutions that binds the instructional system. Head teachers and teachers should articulate and remind those goals as well as help and motivate people to apply these to interpret their work. He has mentioned that the visions, determined by head teachers or teachers, are influenced by schools’ missions, course objectives, and national curriculum and policies. The teachers and head teachers of this study mainly expressed one mission. They wanted to make the MMC available for every student. So, they had a common and shared vision, which is one of the core characteristics of Weber’s model, Murphy and Hallinger’s model, and Murphy’s model of instructional leadership (Hoy & Miskel, 2004; Weber, 1996). These are the models of instructional leadership which are founded in ‘80s and ‘90s. Although every one of these authors has expressed this vision differently, these models are consistent with one another from the aspect of core characteristics. Weber (1996) said that
institution’s goals are kind of synthesis of community’s long-term, realistic, and attainable day-to-day objectives in the classroom. To provide the MMC facilities to every student, school leaders of this study were trying to set up multimedia in every classrooms or for every subjects as soon as possible. So, they were increasing the number of MMCs and amount of technological materials like computers and projectors. Some school leaders were also trying to increase the number of computer labs as their MMCs were used to take place in the lab. Such an approach of facilitating the access is also consistent with the objective of A2I, “…improve quality, widen access…” (Introduction to a2i | Access to Information (a2i) Programme,” n.d.).

Moreover, leaders had particular strategies to reach their goals. Some of them were trying to make technological facilities available within one, two or four years. Distributing MMCs in the regular routine and making teachers take at least one MMC each day were some of their strategies. National education policy 2010 has reported that an increasing number of Bangladeshi manpower is working abroad which is a vital source of consistent foreign currency for the country (MoE, 2010). The objectives of education in this policy directed priorities to develop technological skills among students and potential foreign workers. Teachers and head teachers also had targets of developing students’ ICT skills to collect, know and depend on the information. Such a vision is also consistent with the national education policy. “Vision 2021”, which was one of the major announcements in the election manifesto of the present government of Bangladesh, is also reflected in the determined visions of the school leaders (MoE, 2010).

Subtheme 2: Achieved vision.

All the teachers and head teachers mentioned different achievement levels of their planned visions. Nadia and Arif mentioned that they achieved 75%-80% of their goals. To articulate their achievements, Arif said, “We have computer labs and MMC and we are taking
classes with e-contents. We also have very high quality science lab. I think 80% is achieved and rest of the 20% will be achieved within the next one or two years.” However, Nadia highlighted their training status as their achievements. She said, “Our school has two shifts-morning and day. More than 50% of teachers have already received training and more teachers are going to take training…. If we could ensure laptops for all the teachers, then we could achieve the goals very soon. Overall, I would say 75% is achieved.” Seven head teachers and teachers reported their achievement to be 40%-60%. Faria, a head teacher from Gazipur, said, “Although we never succeed one-hundred percent anywhere, our targets are achieved 60%.” Azim’s perception was different. He said that the governmental vision was achieved completely, but the vision at the school level was not achieved due to school’s limitations like lack of multimedia. Rabbi expressed that if he could ensure technological training for more three to four teachers then they could use multimedia for all his students.

Dina, Saiful, and Babor, head teachers from Gazipur, Chittagong and Lalmonirhat respectively, were satisfied about their progress. Saiful, a head teacher from a school of Chittagong, said, “We are at its initial stage. We have not succeeded one-hundred percent yet but we are satisfied with our progress. We have plans to expand it further.” Dina was satisfied because they utilized their resources very well and got an award: “Our achievement is not bad at all. We have got a national award on the MMC last year. There are many schools that have received training and materials from the government, but those were not utilized properly. We have utilized what we have found.” Babor, a head teacher from a school of Lalmonirhat, stated that they managed to buy fourteen laptops by teachers’ own money for their school and prepared one MMC.
Three of the participants stated that their visions were not fulfilled. Sumi, a head teacher from a school of Gazipur, thought that they could not achieve all of their goals because they just introduced technology two years ago. Nadia pointed out some excuses for which they could not achieve them. She said, “We do not have laptops for all teachers. We could not transform all the classes into MMCs. I bring my students from their classrooms to MMCs.”

Discussion.

According to the participants, achievement levels of schools’ technological vision mostly varied from 40% to 75% in terms of expanding MMCs and computer labs and taking classes using multimedia. Although the bigger portion of school leaders could not say that they were fully satisfied, they were still moving toward their targets. So, they had hopes and plans and, they were working on it. Lack of resources like ICT materials and teacher training came in their ways of achieving goals. However, one third of them expressed their dissatisfactions with a comparatively lower achievement level. In sum, all of them were aware of schools’ vision of technological integration. That supports Weber’s (1996) assertion that it is very important for the school stakeholders to reach a consensus on instructional vision.

Subtheme 3: How schools’ visions of technological integration might support quality education.

In their practice of using technology in daily classes, updated training and digital contents were the core elements of the MMC which might supported quality education in classrooms. Four of the participants explained how the suitable and sensible e-contents of the teachers were promoting quality in the classroom. For example, Tithi said that the e-content was designed to achieve specific learning outcomes and objectives: “Teachers prepare the e-content based on which learning output is supposed to be in the class on that specific day or class for the students.
The e-content ensures that students have achieved certain learning objectives on that class within a specific class duration on a specific area of content.” Jahid, a head teacher from a school of Sylhet, said that the teachers were able to collect realistic examples or elements from the Internet. Thus students learnt the main point of the lesson very easily. Babor said that the use of technology allowed students to learn practically. Rabbi believed that the technology enhanced attention among students and increased willingness to come to the school. He also noticed that since the technology was new to the students, it would create an eagerness among them to learn by using new things. Ratan identified that the multimedia allowed them to find out different types of subject based teaching materials by searching online. Atiq and Dina identified the significance of multimedia training to enhance the quality of the teaching-learning process. Dina said, “If every teacher takes the training then their experiences will be increased, their ability of using multimedia will be improved… In the future, I want to train all my teachers. They will be experienced and our quality of education will increase then”.

Ratan talked about the government web portal “Shikkhok Batayon” and said that his teachers needed more training to be able to make e-contents like those found in the “Shikkhok Batayon”. However, Babor pointed out that his teachers had training and e-contents, but they were not able to bring the benefits because they were suffering from lack of technological materials. With a view of describing how the technology facilitates students’ learning in MMCs, Nadia said:

If I share my first experience of taking MMC, that was on the topic of tense. An English lesson is comparatively a bit difficult for us to make students understand. When I took MMC and used e-content with pictures then the tense became very easy for the kids. Technology is very effective because we can present a lot of things in a very short period.
Discussion.

With the help of ICT related training and available materials, school leaders able to
develop sensible e-contents which assisted students to achieve higher learning outcomes in the
class. According to the participants, the MMC enabled teachers to provide realistic examples and
students to learn practically. Besides that, updated teacher training improved their teaching
capacity and enabled them to present lot of information in a short class period. Such benefits of
MMCs are consistent with the literature. UNDP (2012) has reported that the objectives of
establishing MMCs are to help teachers and students to broaden their cognitive abilities, conduct
lessons in a more interactive manner, and increase participations by integrating technology with
the traditional teaching-learning approach. However, the MMC can still fail to meet the benefits
due to lack of training and ICT materials.

Subtheme 4: Teachers’ roles to implement the vision of technological implementations.

The teacher is one of the vital actors in implementing institutional visions. They actively
use the technology in classrooms as well as they receive necessary assistance from others for a
meaningful implementation of classroom technology.

Teacher’s role to integrate technology.

Organizing and facilitating in-house training within the school, conducting MMCs,
developing e-contents and providing necessary assistance to other stakeholders like head
teachers and students to promote technological integration are the basic roles played by the
teachers in order to implement determined visions. Nadia said, “I try to teach all my classes
using e-content. Although I have not succeeded, eighty percent of my classes are technology
based.” Facilitating in-house training is one of the vital roles of teachers. Kamal described the
purpose of that training and said, “I have arranged an in-house training with all our teachers. Its purpose was to make them aware of technology and familiar with the ICT base materials, and make them able to copy in flash drives and use e-contents in MMCs very easily. I was successful in providing them these basic ideas.” Tithi mentioned some other benefits of in-house training for teachers. She said, “… I have facilitated the in-house training and still I am continuing it. Besides that, I show the teachers how they can connect the projector and make Power Point presentations on a laptop.” Ratan mentioned that preparing e-contents, downloading and uploading e-contents from the “Shikkok Batayan”, and editing and distributing those e-contents among the all teachers and students were some of his roles. Babor emphasized the significance of the “Shikkhok Batayon”. In his opinion, this was a contributory initiative by the government where it had plenty of ready-made e-contents on different subjects. Teachers needed to just download and use. Sumi stated how her e-content development has positive impacts on her students’ learning. She said, “As a teacher, I try to prepare the e-content based on how much I know about the technology. I try to use different types of pictures and questions in the MMC. When my students see pictures in multimedia then it instantly makes them happy and interested to learn.”

**Teachers receive supports from the head teacher, teachers, students and guardians while implementing the vision.**

Five of the teachers stated that they received adequate and necessary supports from all the stakeholders like the head teachers, other teachers, students and guardians for a better implementation of their technological plans. Nadia said, “My head teacher provides me the maximum support. I am using technology a lot because of the inspirations from my students. I share my e-contents with my colleagues. Students remain waiting eagerly for the MMC.
Guardians also inspire students a lot.” Mijan found that the guardian support varies from person to person: “There are some guardians who do not have good technological understanding and cannot support us well. But the guardians who are more knowledgeable about the technology, they support us very well. Actually we are always motivated because of the excitement and interests of the students.” Kamal and Rabbi pointed out students’ support especially in their Math and Science classes. Kamal said, “They (students) help a lot and involve themselves in the discussion especially when they see science and math related video clips.” In the opinions of rest of the teachers, head teachers are very active and supportive to teachers. Mijan said, “My head teacher is very serious about it. We, including our head teacher, are trying to digitalize our school.” Tithi said, “My head teacher has been very helpful whenever and whatever the help I am asking for.” Sumi said, “Our head teacher has been very helpful and active in this issue. She has received government training. She makes us submit four e-contents every week.”

**Discussion.**

Teachers played their roles by facilitating in-house training, conducting MMC, developing and presenting e-contents, assisting their colleagues to learn using technology, and familiarizing them with the MMC instruments. In doing so, they also utilized the technological, legal, financial, infrastructural supports as well as the training supports that they received from head teachers, students, guardians, school authority and government to enhance the teaching-learning environment in class. So, the teachers and head teacher were working together to implement the vision of technological implementation. Weber (1996) portrayed the character of the successful school leader as who do not stop by envisioning their goals. School leaders of this study also actively worked with each other and involved other staff to communicate and revise the visions.
Subtheme 5: Role to communicate, cooperate, and interact to achieve vision.

Role to communicate the vision.

For a proper implementation of the determined vision, head teachers and teachers communicate and share visions among the stakeholders. That communication guides the future cooperation and interaction. According to Faria, in-house training was something to depend on first and foremost to share the basic plans and instructions among all the teachers. Four of the head teachers and teachers mentioned that they communicated their vision through the meeting. Arif said that they figured out solutions through the meeting: “Whenever we face some difficulty then we call meetings and try to find out some solutions through discussions with the parents, students and teachers.” Dina also has similar opinion. She said, “…a resolution is made based on everyone’s opinion because it (technological integration) will not be possible by a single person.” In-house training and meeting are the two basic ways to communicate the visions. Faria said, “We arrange meeting and in-house training to let our teachers know our plan. We are trying to develop the multimedia contents by ourselves.” Saiful mentioned some other ways on how they communicate visions with the students and guardians: “We share with our students during the class. We have parents meeting on specific days where we share our visions with the guardians.” Ratan shared his experience that they had to show parents how the multimedia worked in the classroom. Before, parents were skeptical about the necessity of technology in addition to the textbook in the class. Similarly, he also had to convince his untrained colleagues about the effectiveness of the MMC. Azim expressed his dissatisfaction that they could not start technology based communications yet, but he had already talked to a company about how they could establish a technology based communication though which students could check their result cards at home.
Problems while communicating the vision.

Five of the participants claimed that they faced no problems while arranging meetings and communicating those visions among all the stakeholders. Arif said, “We do not face that much of a problem. Everybody supports us. Everyone agrees to keep supporting in the future too.” Atiq said, “I hardly face any problem. When I face such problems, I try to explain to them the benefits of using technology in the classroom.” Babor said that after communicating with the stakeholders they were not just waiting for their supports. They kept searching for supports from other sources. When head teachers and teachers act to communicate and implement these visions, various kinds of limitations like infrastructural or financial limitations come in their way of achieving these visions. Jahid said, “Most of the students of these areas are from poor families. They cannot buy computers. We cannot even let every student use a separate computer when they go to the lab.” Babor said that parents were not solvent in general. As a result, they could not provide computers to their kids. Therefore, the school communicated with the district administration and managed some financial support from there. They set up CCTV (Closed-Circuit Television) and speakers in every classroom. Dina also expressed a similar opinion and said, “The main problem is the money. Otherwise, all our teachers possess positive attitudes to work for it. But we have one other limitation; that is the infrastructure of the school. We have fewer classrooms. That actually creates more trouble. All the teachers agree that we do not have enough classrooms. It is not possible by me to build classrooms.” Azim identified that all of his students were not capable of using computers. He said, “Until my students get dependent on the technology, communicating through the technology will remain as a barrier.”
Discussion.

According to Hoy and Miskel (2004), Weber’s model has advocated that school’s mission is formed collaboratively: “Instructional leader collaboratively develop a common vision of goal for the school with stakeholders (p. 33).” Teachers and head teachers of this study also developed such a vision collaboratively. Weber has underscored the communication for the school leaders in his model and says, “The instructional leader promotes a positive learning climate by communicating goals… (Hoy & Miskel, 1996, p. 33).” He (1996) further says, “The process of staff involvement means communicating goals- perhaps being willing to revise unrealistic goals… (pp. 199-200).” Participants of this research not only developed their visions collaboratively but also communicated those visions by cooperating and interacting with each other. Organizing in-house training and calling for meetings were two common ways of sharing the vision for them. They did not face that much of a problem while sharing the vision except some limitations like the infrastructural limitation and resources. All the teachers and head teachers were very supportive. Such attitude and spirit of school leaders goes with the policy expectations. The master plan for ICT in education has instructions to coordinate and share experiences and resources among the school leaders and stakeholders (MoE, 2013). Thus the national policy is reflected in school policy as well as in the roles of the school leaders for technological implementation.

Weber (1996) says that school’s broader vision or objective is formed based on the community expectations. For the Bangladeshi perspective, the community includes teachers, head teachers, students, parents, government and non-government agencies. Head teachers also took the opinion of the teachers in making the resolutions because they believed that technological integration would not be possible by a single person. But to what extent they
considered teachers’ opinion that was not very clear. Weber (1996) says that school leaders are supposed to have meetings with parents in order to come across and incorporate community’s needs in the institute’s vision. Leaders reported that they had regular meetings with the guardians and the guardians are not well off to provide all the facilities that students needed. Such collaborative attitudes among school leaders supports literature findings that the leadership style is turning from a dictatorial or positional leadership to distributed leadership in Bangladesh in case of technological integration (Elmore, 2000; Ferrandino, 2001).

**Subtheme 6: Barriers to achieve visions.**

*Shortage of MMC equipment.*

This is the second biggest subtheme of this study. Head teachers and teachers had some constant demands from the school authorities, government and the stakeholders for a successful accomplishment of the technology related visions. When there is a gap between the supply and the demand, then it creates barriers to achieve the vision. School leaders brought attentions to some common issues or limitations repeatedly. The shortage of laptops or computers, accessories, multimedia projectors, MMC equipment, modems, and screens was a barrier to achieve the vision. Seven head teachers and teachers articulated such demands to continue technological integration. Sumi said, “We need to enlarge our classrooms and make multimedia, screens, and laptops available in the classroom. We also need laptops for each of the teachers.” Kamal also felt a similar necessity of projectors and computers: “Students and guardians both bring the issue of inadequate technological equipment. If we can manage to get adequate computers and projectors, then these goals are achievable.” The number of projectors and MMCs were minimal which was inadequate to fulfil the demand of the school with a large number of students. Sumi, “Eight classes run at a time in our school where we have only one projector. If
we had a projector for each class, we would not have wasted any time there. Everything would be ready there to start teaching.” Rabbi also supported him and said that they could not use the projector in other classes when they were used to use it in one classroom. Nadia and Rabbi agreed that they needed to get the projector for every class and arrange or decorate the class to make it suitable for the multimedia use. Rabbi said, “As we have only one projector, we have to run it all the time. So, it is likely to be damaged very frequently. We have to keep it turned off for a while after taking one class with it.” Zannat said, “We have a large number of students…” Therefore, multiple teachers cannot conduct classes at the same time. Every teacher could effectively take MMC every day if I had more MMC materials or instruments.” Faria added some other demands: “We have to use one single modem all day long. We do not even have smartphones for all of us to use when it’s needed.”

**Teacher shortage and inadequate training.**

Teacher shortage and the lack of their preparation time for the MMC is another crucial barrier to achieve the vision especially in schools with a large number of students. Nadia described the condition of her school:

We also have teacher shortage. My school has class three to class twelve here. But we have the same number of teacher structure existing in other government schools which have class six to ten or three to ten. We are overloaded. If we could increase the number of teachers, then teachers could have enough time to develop e-contents for their classes… In the context of my school, I have to take twenty-four classes per week. If this class number would have dropped to ten or twelve, then I could have put more time. Shortage of trained teachers and inadequate teacher training were some other realities that school leaders faced. Due to the lack of updated training, teachers did not know how to use
information and computers very well. Jahid said, “…if we could receive more training or more expert teachers in ICT then we could bring more effectiveness.” Saiful said that they could not ensure abroad training or Dhaka or Chittagong based training for all of their teachers.

*Lack of MMCs and infrastructural support.*

Inadequate numbers of MMCs and poor infrastructural support were some realities in the way of implementing technological visions identified by the respondents. Five teachers and head teachers stated that they could not achieve their visions due to the barriers of classroom shortage. Shortage of MMCs was really problematic for them. For example, Tithi said, “…we could not transform all of our classrooms into MMCs. Still, we have to move the instruments like projectors from classroom to classroom to provide the multimedia facilities. But we have the electricity connection available.” Saiful said that they wanted to increase MMC: “We could not transform all the classes to MMC yet. We have only one MMC. We hope this year we will succeed to set up some new MMCs.” He said that they already informed the government about their necessity to increase the classrooms and equipment. Similarly, old classrooms in the school were also identified as not suitable for MMC. Zannat said, “Our classrooms are so old that causes some problems for teachers to take MMCs.” Four participants stated that they needed infrastructural changes and enough multimedia facilities like sufficient projectors, better Internet connection, and screens to overcome the limitations. Ratan mentioned that the interrupted power (electricity) supply was one problem when they were used to take MMC in their school.

**Discussion.**

Teachers and head teachers were asking the school authority, head teachers, and the government to support them with more computers, projectors, modems, screens, classrooms, and teacher training. They wanted to get laptops for each of the teachers to prepare and present e-
According to the Save the Children (2014), DSHE (Directorate of Secondary and Higher Education) is supposed to provide these MMC instruments and necessary training for the teachers under the umbrella of A2I or TQI-SEP programs. But Bangladesh, as a developing country, always has infrastructural limitations and resource limitations. A2I program, under the guidance of MoE, MoPME, DSHE, and DPE, has already trained nearly 70,000 teachers to use the MMC (Minges, Raihan, & Raina, 2011). These 70,000 teachers are from primary (elementary) and secondary schools. But there are 344,789 primary teachers and 232,929 secondary teachers in Bangladesh right now (“Government of the People’s Republic of Bangladesh - Ministry of Education - Home,” n.d.). So, the biggest portion of the teachers have yet to receive training. One of the biggest reasons of this training gap is the resource limitation.

All the schools did not have qualified or competent teachers, enough or suitable classrooms, adequate teaching materials, enough teachers, and financial solvency. They could not overcome every challenge immediately when they were introduced with something like technological integration in schools. This caused a gap between the supply and the demand which was considered to be the biggest barrier by the respondents to achieve the vision. Austin et al. (2008) also has located the inadequate financial and physical resources, insufficient and unqualified teachers, and lack of stakeholder involvement as very significant hindrances to the quality education. Participants expressed that they needed to enlarge classrooms and get new classrooms. Number of materials, classrooms, and trained teachers were lower compared to the number of students and their requirements. Moving the MMC instruments from class to class also decreased schooling hours. These factors were considered as impediments in the way of ensuring quality education by the school leaders.
Subtheme 7: Confident school leaders.

Leading schools.

Something was found notable that being a leading school nationally or locally had a positive influence on the roles of teachers and head teachers. They tried to act according to the expectations from them. To indicate that her school is a leading school in the district, Nadia said, “In the Sylhet district, the most number of MMCs happens in our school.” Such confidence drove the school stakeholders to be technologically skilled. Zannat was satisfied with the skill level of her students and teachers: “I have skilled and trained teachers on MMCs. Moreover, as it is the generation of Information Technology, most of the students of my school are interested and adept in the use of technology. That is why I believe that I will be able to ensure quality.” Similar satisfaction on the competency of his teachers was reported by Saiful. He said, “Almost 90% of teachers are competent to ensure quality education. Our teachers are very aware to maintain the quality of education. They have pre-knowledge about the content before they go to the class. They also go to the class with lesson plans and specific teaching material.” Interestingly, Arif was the only person in this study who said that they were financially very solvent and they had a very strong infrastructure. Such strong conditions had positive impacts on school leaders’ performances and roles.

Attitude towards technological implementation in the classroom.

Such a strong support from the school gave birth to a positive attitude among the teachers to develop their skills. Kamal said, “Support is limited but I managed to utilize it the most because of my interest.” Zannat discussed about some of her motivated teachers, “I have three English (grammar) teachers who do not have any training. You will be surprised to see that there is nothing that they cannot do. They are self-educated and very skilled. When they take MMCs
for English then my girls feel very comfortable.” Jahid and Faria felt that teachers were needed to change themselves to be compatible with the modern generation. Jahid said, “I tell them that this is the age of digital technology and they need to change a little bit too. Some of the teachers have computers in their houses where their kids know better use of computers but they do not know.”

Discussion.

Locally and nationally leading schools had high expectations from their school leaders. Those expectations grew a positive attitude among the leaders and drove the leaders to be skilled and prepared for the classes. These expectations worked as a constant motivation and encouragement for them. As a result, they showed some excellence in the use of technology in classrooms. For instance, they were very confident with their well-trained teachers who were self-educated and very skilled. Being the teachers and head teachers of leading schools, they were enthusiastic to execute their skills to enhance the learning environment. Motivating and encouraging the staff to work toward a common goal is a major task of school leaders stated by Weber (1996). Further, he has mentioned that academic expectations and norms depend on the given school setting. According to that, leading schools of this study were supposed to have a better infrastructure and solvency compared to other schools.

Theme 2: Learning, Teaching and Professional Development

Subtheme 8: Teachers’ roles to create an effective teaching-learning environment.

The MMC allowed teachers to use technology to create an effective teaching-learning environment. Almost all the teachers said that e-content was the first and foremost, which made the difference. They created interest among students by using e-contents. Mijan said, “When we bring technological materials in the class then students eagerly accept it and enjoy it. They keep
waiting to see which subject or topic the teacher is going to introduce with the technology.”

Kamal said, “The MMC itself creates a learner friendly environment. Besides that, when the presentation includes words, pictures and letters then it creates a very joyful learning environment and students welcome the lesson. Therefore, they (students) interact among themselves and with the teacher as well. In that case, students become very active and the teacher plays the role of a facilitator.” However, e-contents were also supportive materials for some teachers. Nadia said, “Actually the e-content is my supporting material and I myself the teacher is the main factor in class.” They clarified how e-contents helped to enhance the teaching-learning environment in every class lecture. Nadia mentioned, “Earlier, teachers were used to writing on the black board. Now we use slides. I am showing already prepared slides and simultaneously walking in the midst of students. I go among the students to help them to complete the tasks.” Sumi mentioned what difference the multimedia made: “We used to verbally introduce something to gradually enter the topic. Say, when I want to teach about the animals and plants then I ask students what they have seen while walking down the street. They reply trees or humans. But, the advantage of the multimedia is that when I show them a picture then they can understand what I am going to teach.” Rabbi also used different pictures to let his students guess the topic of the lecture. Tithi found multimedia very good to warm up the class: “After the setup, first I show them a video or a picture. Thus, it becomes easy for me to warm them up, which was not possible for me without the technology.” Four of the respondents found no problem to manage the technology to create an effective teaching-learning environment in class. Sumi said, “When we see multimedia is not available in every classes then we use the multimedia in turn, not in every classes.” Ratan said that since they had around one-hundred students in each class, which was not easy to fit in a MMC, they split the class in two sections.
Discussion.

The findings show that teachers incorporated words, pictures, map, and video to prepare e-contents and used it to create an effective teaching-learning environment in MMCs. Some of them used pictures or videos to warm up the class or introduce the lesson in the class more interestingly. They transformed their traditional classes to the Power Point slide based classes. Thus they brought qualitative changes to their teaching-learning practices by integrating technology. To make an effective coordination of all these materials with the teaching methods, Weber (1996) has pointed out that the teacher needs to know general principles of effective teaching and basic principles of learning, instructional methods, cross-disciplinary knowledge, and schools’ instructional goals. Teachers of this study already made an effective demonstration of technology enhanced student engagement. For such reasons, their students also eagerly waited for the MMC and enjoy it.

Subtheme 9: Teachers’ supporting roles to enhance the teaching-learning.

Four participants mentioned that the teachers helped each other’s work while acting like a team. Faria said, “Actually, I seek opinion from all about how we can do it and decide based on every one’s opinion. Try to solve the problems.” To enhance other teachers’ teaching capabilities, Tithi said, “I would suggest watching at least one technology aided class. Then s/he can say how much easier it will be for him/her. If one watches it, then s/he will be motivated… I think if one stays as an observer in my MMC then s/he will do well. S/he will think that it will be easier for him/her because by creating the content once one can reuse it for several years.” According to Zannat, most of the teachers prepared e-contents by their own. Some of her teachers are members of web-based resource “Shikhok Batayon”. They collected e-contents from it.
In different parts of the interview, head teachers mentioned that the teacher had been supportive in the process of technological integration. Eight participants mentioned that teachers, with the help of all the government supports, contributed significantly to make the teaching learning process effective. According to Jahid, “Without the help of teachers we could not have done these. The government has given us a computer lab. I have fourteen to fifteen computers. We did not buy any of them and I received them all from different governmental authorities … My teachers are also cordially trying to help students and me as much as they can.” Arif expressed that the governmental budget they received for the ICT purpose, they were able to afford their school’s demands with that. Saiful also had some more expectations from the government: “School authority has expanded the access to the laptops for the teachers at school offices. Hopefully this will be expanded more.” He said further, “Yes, in terms of teachers’ help, I get help from teachers who are in charge and experienced.”

**Discussion.**

Participants said that the teachers were very supportive and helpful to each other, and they acted like a team. Even head teachers became part of the team and sought opinion from them to make decisions. Thus, they were following an instructional leadership and making the teaching-learning process effective. In order to encourage collaborative planning, Weber (1996) has suggested teachers to have a team approach for determining curriculum or learning goals. He has also given importance to organizing teaching teams for their instructional improvements.
Subtheme 10: Head teachers’ roles to create an effective teaching-learning environment.

Sending teachers for training.

This is one of the sixth biggest subthemes of this research. A major responsibility that the head teachers needed to fulfill was ensuring and creating enough training opportunities for the teachers. All eight head teachers described their activities, which indicated that they had been active and positive in making the teachers participate in the training programs. Jahid was very proactive in sending his teachers to training: “… I am sending teachers to different trainings. If teachers have any problem with participating in training, then I am removing those problems to make sure that they receive the training. I am growing interests of using ICT while teaching in the class among teachers through different seminars. … I try to send the teachers to ICT or computer trainings always.” Removing problems meant removing the pressure of a lot of classes and exam papers. Faria also showed such positive attitude toward teachers training: “I am positive about their training. For the professional development of my teachers, I always try to make them participate in the available training irrespective of government or non-government training.” Besides ensuring government training, Babor was used to contact BRAC, an NGO, and try to send his teachers there. Arif sent his new teachers to the TTC colleges for long-term training. Saiful also went further to create training opportunities for the professional development of the teachers and said: “I personally contact the training institutes and programs to invite our teachers for those specific trainings and to increase the number of my teachers in training participations. I contact them through the mail or over the phone… We are trying to increase our teachers’ participations in such kind of national or international training… I have plans to expand more scopes of training.” Six of the participants directly acknowledged that the
teachers were very interested for their professional development in the technological expertise. Arif said, “As education cannot progress without the technology, teachers are very interested to participate in training and know about new technologies.”

**Organizing in-house training.**

Almost all the eight head teachers revealed that they organized in-house training by the expert teachers for the professional development of the teachers. Jahid described his role in organizing in-house training and said, “I create opportunity so that the teachers can spread their experiences among other teachers after receiving the training… When anyone from our school goes to training including me, then we arrange a seminar inside the school after his/her returning. We teach our teachers what we have learnt there. Teachers inform the students later on. To do that, we arrange seminars in the computer lab and share their training experience with others.” In addition to that, Azim was used to bring experts from the outside to teach teachers how to prepare e-contents. Besides providing training, he was used to encourage them for using technology. Faria was used to find some free time to train her teachers: “We spend time to train our teachers who are interested to learn during the free time between classes, tiffin period, and before or after class time… I also tell teachers that if they find free time then they can work in the school.” Dina also expressed her dissatisfaction because she was too busy and did not manage to organize more than one in-house training session. Besides organizing the in-house training, Babor ensured that his school paid the Internet bill of the teachers.

**Discussion.**

According to the participants, ensuring teacher training for their professional development was the one of the most significant jobs done by the head teachers. They collaborated with government and non-government training agencies and tried to make sure that
their teachers did not miss any training. They identified training as a mandatory need for the teachers. Weber (1996) also has described similar characteristic for leaders. He believes that it is not important for school leaders to be everywhere, every time, but he has to understand the right needs of his teachers on the right time. He further said, “The focus in an instructional leader’s observation practices, then, must be on the problems and needs of the teachers (p. 211).” To meet such needs, head teachers of this study personally contacted training authorities to create more training opportunities and get their teachers invited. At the same time, they organized in-house training too. Expert and trained teachers, train other teachers to spread their learning experiences in the in-house training. These activities also coincide with Weber’s opinion. He thinks that school leaders need to know and communicate some instructional goals, methods, and teaching practice with others to create an effective teaching-learning environment (1996). In-house training allowed them to help each other and enhance their teaching-learning practices. Apart from the in-house training, some of the head teachers trained others during the free time between the classes, tiffin period, and before or after class time.

**Subtheme 11: Head teachers’ supporting roles to enhance teaching-learning.**

This is one of the fifth biggest subthemes in this thesis. All the teachers expressed that their head teachers helped them a lot. They said that they received true support from the head teachers for their teaching-learning and professional development. Mijan said that he received consistent encouragement and assistance from his head teacher: “Actually he is more interested than what we need.” Rabbi said that his head teacher was very supportive in every case and he received a laptop, a projector, and training from the government which was enough for only one MMC. Tithi and Nadia said that their head teachers allowed them to use MMC whenever they asked. They got assistance from head teachers whenever they complained about the broken
projector. Babor always encouraged his teachers. Kamal said that his head teacher established an ICT lab although they had a lot of infrastructural problems. His head teacher even assured them that there would be two more ICT labs very soon. Sumi mentioned that her head teacher always got some extra time for teachers: “She even told us that if we can come to school before class starts or stay after class ends then she can teach us how to use multimedia. She permitted the teachers, who do not have their personal computers, that they can even take the laptop in turn to their home.” Rabbi also shared similar experience and said that although his head teacher allowed him the laptop always, head teachers from some other schools kept the laptop locked at his/her office. He believed that preparing slides for the multimedia use required time and effort, which was not possible without constant access to the laptop. However, Sumi and Tithi identified that head teachers’ support was limited in some cases. Head teachers could not help in the issue of projector and computer shortages. They supported to present e-contents in classrooms, but they did not support the teachers in preparing e-contents. Teachers had to prepare on their own. Sometimes head teachers did not offer support, and the teachers had to bear some personal expenses. Tithi further mentioned, “What I am doing now is that I have bought a personal laptop. Secondly, I am paying for my Internet by myself.”

As the head teacher was an administrative leader in school, s/he was considered a vital part of the school authority. Five of the participants said that they always got the support from the school authority and the head teacher for the teaching-learning purpose. Head teachers supported them to ensure enough training and encouragement. Nadia explained how she got enough support from the school authority: “… most of the time I can bring my students here in MMCs. Authority never said anything; they always supported me.” Babor strongly believed that the government did a lot by providing the training and putting a lot of e-contents in the
“Shikkhok Batayon” website. Then, it was all about the teachers to utilize those. But due to the limitations that the schools have, head teachers could not always make everything available. Dina said, “When my teachers ask for anything, I try according to the capacity of my school, to provide them what is required to get the job done.” Four of the respondents claimed that they did not receive enough support from the school authority, head teacher or government. Sumi said, “I did not get that much help from the government except receiving one laptop.” Tithi said, “They actually do not help to prepare e-contents. In fact, the government has only provided me a training. But I have to bear the expenditure of Internet and personal laptop at my home. Because, developing e-contents requires enough free time, which is not manageable in the short period of school time. These are my personal expenditures.” Ratan mentioned that the government provided them only the training and one Doel (a brand provided by the government) laptop, which was broken within six months. After that their head teacher took an initiative to buy laptops in installment. Each of the teachers started to deposit two thousand taka (Bangladeshi currency) every month. With that money they were buying two laptops every month. So, he said that the support they got from the government and the head teacher that was not adequate to implement the MMC.

Rabbi found the utilization of multimedia largely depended on the Internet. However, he was suffering from inadequate Internet facilities in his school. Nadia also demanded to increase the number of projectors to the school authority and government because “… sometimes four of our teachers want to take MMCs but we cannot afford four projectors. Then two of us agree to use it on the next day. Thus we solve it mutually.”
Discussion.

There were basically two groups. One thought that the head teacher supported them very well, and another thought that s/he did not. However, one thing was clear that head teachers were always willing to support for all the teachers for example by ensuring trainings, providing and repairing ICT materials, and making MMC available for them. The government also had a positive attitude to increase MMC facilities. Since the government, school authority and the head teacher had limitations in their capacities and resources, they could not make available them. Therefore, head teachers demonstrated an attempt to make a best use of limited facilities and resources. For example, they were finding free time to train teachers, coordinating MMCs to equally distribute MMs among the teachers, buying laptops in installments, and evenly allowing teachers to use laptops and MMCs. Weber (1996) has suggested head teachers to be supportive and claimed, “… it is not so important for principals to be everywhere or know everything, but to be in the right place at the right time (p. 201).” But still, head teachers or the school authority could not bear some personal costs of teachers like the cost for the laptop and Internet bills. This was not unexpected as the supportiveness and management skills varied from person to person for the head teachers. Overall, the head teacher was a source of constant encouragement. Weber (1996) has mentioned that the general goal of the instructional leader is to encourage if s/he wants to improve condition. Students’ achievements also go higher when teachers’ expectations are high. General encouragement from the head teachers was an attempt to hold the expectations higher from the students.

Subtheme 12: Barriers to teaching, learning and professional development.

This is the biggest subtheme identified from the responses of the interviews. Participants highlighted these barriers by mentioning most number of times at a large volume. All the
participants articulated and highlighted these barriers to their professional development and suggested the government, head teachers and teachers to take initiatives to overcome these lacking. These are similar to the barriers of the vision implementation.

**Shortage of multimedia instruments, projectors, computers, MMCs.**

Almost all the teachers and head teachers mentioned several times that they had shortage of multimedia instruments, projectors, computers, modems, flash drives, and MMCs in their schools, which was constantly interrupting their teaching-learning practices. They felt the necessity of laptops and other instruments for each of the teachers. Kamal said, “Each teacher does not have their laptop or tab yet. Teachers should have laptops or tabs while they are coming to the school. To support, one should have flash drive and modem with him/her.” Jahid mentioned, “Most of them (teachers) cannot buy computers.” Nadia expected a laptop from the government and school authority: “I suggest the government or the institutional head allot a laptop for each teacher, increase the amount of projectors and transform every classroom to a MMC. Teachers should be given more technological support like laptops, modems etc.” School leaders demanded to set up more MMCs. To increase MMCs in schools, Saiful planned to use their internal fund. He said, “We can increase the number of MMCs and ICT labs by using our internal fund. We have already taken these initiatives. We will create a few more MMCs within this year.” To do that, Arif wished they had a better fund, “We are trying to increase the number of MMCs gradually. If our fund increases, then we will increase the MMC.” Zannat, Faria and Saiful, head teachers from three government schools, expressed that being government institutions they could neither collect money from students for instruments nor get more instruments than the allotted from the government. Faria described some problems of instrument lacking: “So, now our teachers have to move all the instruments from class to class every time
which is time consuming. Moreover, setting up the MMC arrangements is also time consuming.”

Ratan pointed out some attitudinal problems which emerged from the lack of instruments. According to his observation, some school leaders considered some practices problematic and complex: browsing the Internet for information, spending money for maintaining a laptop and modem, and putting efforts for developing their technological skills.

**Lack of training and training related barriers.**

In the opinion of all the participants, insufficient training created barriers in teachers’ way of professional development in the area of teaching-learning. Faria said, “I have already said that we do not get adequate training. Two of us have received government training and I heard that only two more will receive that training. I do not think that will be enough for a school.” Azim emphasized to increase more training sessions for his teachers. Because, he said that one of his teachers was having refresher or follow up trainings, but other teachers were not invited to participate in new training sessions. Saiful expressed his plan and willingness to increase in-house training sessions and strengthen the monitoring system. Problems related to the training even had different dimensions. Faria faced problems to send her teachers to a venue of the training, which was very far from the school. They had to stay away from their family to go there. Head teachers also had to deal with different types of critical situations when the training was used to take place during the regular schooling time. Tithi mentioned, “First, the school cannot send teachers to participate in training sometimes as the classes are going on in full swing, although the teachers are interested about the training. Second, some teachers think that they have already passed most of their job life, and it will not be that much help for them. They do not feel interested.” Mijan observed, “It is true that all of us do not have enough training. But, most of the time teachers cannot apply their training experiences due to schools’ limitations.”
Azim also supported this statement and said that his teachers could not practice it due to the lack of laptops and projectors when they returned from the training.

According to the participants, this lack of training led to some other complexities. Jahid said that some of his elder or senior teachers had fear or discomfort about the computer use. Saiful also mentioned similar experiences. He said, “…the teachers have a fear or anxiety of operating the ICT related instruments, which has been the biggest barrier behind the effective use of MMCs. It is happening due to the lack of adequate teacher training.” Regarding such teachers, he further said:

… there are some elder teachers who feel uncomfortable and anxiety to use these technologies. They are interested to accept the new technology but they cannot apply it due to the lack of training. Thus it becomes a pressure for them. We have only two or three trained teachers out of fifty-two teachers. The largest part of the teachers are still out of the training.

Saiful found that the use of technology was limited to a couple of persons in the school. He said, “What we are doing is a personal approach. The ICT lab is running based on only two to three trained teachers who are very interested. We could not make the implementation of MMCs effectively in line with the expectations that we fixed in the in-house ICT training.” To emphasize the significance of the training, he said, “One should have necessary knowledge and training on technology … Otherwise, it will not be possible to distribute the ICT aided classes for every subject and it will be limited only in a few subjects. The largest part of the teachers will lag behind in the use of technology.”
**High student-teacher ratio.**

A limited number of teachers and a larger number of students created a critical situation in schools. Teachers had to take many class periods, which allowed less preparation time for them. According to Faria:

I would say we have less teachers compared to the number of students. At present, we have so many subjects in every class (grade)... Every single teacher has to teach varieties of subjects. Say, each of the teachers has to take classes in eight to ten subjects. In that case, they cannot provide time to prepare e-contents. Teachers would have felt more comfortable in preparing e-contents if they could take less classes in any specific subject.

Saiful also had similar thoughts. He said, “Professional development needs them to spend enough time in technology, but they can hardly manage time for it due to their other responsibilities... After fulfilling the academic and administrative responsibilities, teachers do not have adequate time remaining to spend for the MMC purpose. If there would be less administrative responsibilities, then they could take MMCs more efficiently and comfortably.”

**Infrastructural limitation, classroom shortage, and small classroom.**

Faria informed their accommodation problem in the interview: “I have almost one-hundred students in one class. We cannot accommodate them in the room where we set up the MMC.” She further said, “We do not have larger classrooms, or we do not have the same numbers of students in all the classes. We do not even have any well decorated room for the MMC.” Three participants considered the infrastructural limitation a significant barrier to their technological integration in teaching-learning. Zannat’s teachers looked for infrastructural assistance from her because the infrastructural condition was affecting their Internet facilities. Kamal stated, “Actually we have infrastructural shortcomings. Our campus does not have a Wi-
Fi facility and we do not get good Internet speed.” He also provided some extensions to his infrastructural limitation. He shared one of his personal experiences:

After a heavy shower of rain during the rainy season, the school ground goes under water. That interrupts regular teaching-learning activities in MMCs. Due to infrastructural shortcomings, interruption in electricity supply is also very frequent in my school… We have informed the government about the water problem and we hope that the government will take initiatives to remove these problems very soon.

Discussion.

It is interesting that the barriers to professional development, but not any leadership role, have become the biggest subtheme of this study. Murphy’s model of instructional leadership has suggested that the school leaders should play their roles to coordinate the curriculum, secure resources in support of school goals and maintain high visibility (Koy & Miskel, 2004). While performing such responsibilities, school leaders identified some barriers in their ways of integrating technology. Findings shows that all the school leaders were suffering from the lack of MMCs, necessary technological materials for MMCs, classrooms, suitable and larger classrooms, teachers, teacher training, financial support, and infrastructural support. These barriers mostly emerged due to the lack of resources. These were their basic demands either from the school or the government for an effective integration of the technology. Save the Children (2014) has documented that providing training and MMC material support is one of the core objectives of every government and non-government education programs and projects. In spite of such an approach at the policy level, the findings exhibit a gap between the policy and the practice. Although the government and non-government agencies were working to ensure
necessary facilities in every sectors like materials, training, and infrastructure, they could not fulfill the demands yet.

Bangladesh has a large number of students in the secondary education. So, when findings show that schools cannot provide adequate technological facilities, that does not seem impossible. Government allotment of digital materials for MMCs in every school is fixed. Some schools were trying to expand it by their own fund when the government allotment was not sufficient. Some government schools were in a dilemma as they were not allowed to impose extra fees on the students. Teachers could not figure out times to attend training courses and they could not spend time to prepare e-contents due to the huge academic pressure. Weber (1996) has mentioned that principals need to know “… the specific needs and interests of their school’s instructional staffs (p. 201).” So, school leaders were playing their roles to overcome these limitations with their limited resources in their daily practices. These barriers should be taken into account by all the responsible agencies while reforming and reconstructing the policies and the training programs.

Subtheme 13: School leaders’ dreams, wishes, and future plans.

In their daily practice of incorporating technology in class, teachers and head teachers possessed some dreams, plans or wishes to enhance their teaching-learning process. These wishes or dreams were so positive and encouraging. Mijan said that they were on the second year of their five-year-long technology related plan. Through this plan, he wanted to bring his students closer to technology: “If we can bring all the students very close to the computer then we will be successful.” He also wished to organize few training sessions regularly in school. He said, “I wish if I could arrange two or one hour sessions where I could help my teachers or they could learn from other teachers. I wish if I could create that environment and have enough
technological material support”. He also had another dream: “I do not know if it is possible. I wish we could transfer every classroom to a computer lab to use multimedia rather than going to the lab for the MMC. This way students would be able to use the technology directly in the classroom which I have seen abroad.” Zannat had a plan to set up a new lab. Kamal expressed her willingness to arrange seminars and training sessions with the help of the district administration and the head teacher to raise ICT awareness. He stated, “A cluster has been developed very hastily. But, no initiatives have been visible to organize training based on those clusters by the district administration. Five schools are in a cluster. If we could arrange at least two to three cluster trainings every year among these schools in turn and share the e-contents among ourselves then that would be helpful for the students.” He also suggested a monthly, half-yearly or yearly plan to bring all the teachers under the scope of the MMC. Tithi wished to have a cheaper Internet facility. Sumi eagerly wanted to continue the MMC and said, “If we can manage to continue using the MMC for at least one year and if the syllabus does not get changed on the following years, then it will save a lot of our time, we will have fun in teaching.”

**Discussion.**

Some of the school leaders had some wishes or plans to create a friendly environment in schools to promote technological integration and bring students closer to the technology. Organizing cluster training, providing cheaper Internet facilities, and turning the classroom to computers lab are some of their wishes which are remarks of their positive attitude and professional commitment. Through these wishes, school leaders exhibited high devotion and expectations to their responsibilities, which is classified as an attempt of ‘positive learning climate’ by Weber (1996). In a similar pattern, they were always trying to promote a positive climate while they playing their regular leadership roles.
Subtheme 14: Schools’ reputation.

Some of the schools had a certain reputation and their teachers and head teachers tried to make a best practice of technology to maintain that reputation. Zannat stated, “My school is the best school in the Sylhet division… I always send my teachers to attend training whenever there is an opportunity of training.” With such a positive attitude, she encouraged her teachers and said, “When I monitor those classes then I tell my teachers that we are the best institute of Sylhet and we will be able to get that award every year if we perform better.” One teacher answered how school’s reputation influenced teachers’ performance. Mijan said, “School authority always provides us all types of supports. They always want to increase the school’s reputation through technological integration or whatever it is.” Teachers also held such spirit. Arif said, “This school is one of the well-reputed schools in Bangladesh and all the teachers of this institute cordially work to maintain that reputation.”

Discussion.

The reputation of certain schools worked as a driving force for the school authorities to provide support as much as they can to the school leaders. To maintain the reputation, they were constantly encouraging the leaders and sending them to attend training. Thus, they were trying to enhance their teaching capacity and ensure more technological integration. According to the Weber’s (1996) viewpoint, such “… norms, expectations” is going to positively influence students’ learning output.

Theme 3: Managing Curriculum and Instruction

Subtheme 15: Supervision and monitoring.

For the improvement of the teaching-learning process, almost all the teachers and head teachers were used to conduct supervision and monitoring in classrooms. While they were
supervising and monitoring the classrooms, all the eight head teachers mentioned that they sat with the audience in the class, observed teacher’s teaching and check if they needed any feedback or suggestions. Zannat said, “I monitor how the students are participating and how the students are processing what is taught by the teacher in the MMC.” Faria also had a look on the e-content after it was developed by the teacher, and she also gave feedback on it. Regarding the monitoring, she said, “We do not have CCTV here and we do not assess using technology. But sometimes we make video of MMC to see later how they are taking the class.” Kamal and Mijan said that they only supervised or monitored their own classes, not others’ classes. But they would not mind helping others. Mijan said, “If I am free and any of my colleagues needs any help about their class then I help them. I inform them if they have is any places to improve.” During the supervision, four of the teachers were used to assign pair works and group works to observe if students were working or not according to their instructions. Among them, Ratan and Sumi were used to walk around the students and monitor their work. Atiq just made sure that the class followed the e-content. Rabbi was used to make his students answer some questions from the content during the lecture. Thus his students gained the ability to write something on the topic immediately.

**Discussion.**

Weber (1996) has put the direct observation of teaching high in the list of effective instructional leadership methods. Findings show that most of the head teachers and teachers paid attention to supervise and monitor their and others’ technological implementation in the class. Most of them tried to do it by being present in the class and evaluate whether the pedagogic practice of the teachers helped to meet the learning outcomes or not. They were used to come up with feedback on teachers’ teaching process or learning materials. However, any specific
process, format or schedule of monitoring and supervision was not clarified in their discussions. So, how effectively or seriously supervisions were done that was not very clear. Weber has been very skeptical about leaders’ supervision practice. He said, “… that meaningful teacher observation is more praised than practiced (1996, p. 208)” So, there is chance that supervision or monitoring might be very infrequent in reality in schools.

**Subtheme 16: Head teachers’ management roles to incorporate technology.**

*Management Committee.*

This one of the sixth biggest subthemes. According to Kamal, the MMC was founded by A2I program and guided by a monitoring cell formed by the district education office and district administrative office. Two of the head teachers, Jahid and Arif said that they had a management committee to organize the technological provisions in their classrooms. Jahid said, “With the help of our management committee, I try to keep all the materials functioning. I also try to see how I can increase these necessary materials.” Arif was guided by his committee: “I have an ICT committee of three teachers who are working with efficiency. I try to serve according to the demand of this committee.” An organizing meeting was another way to implement technology in pedagogy effectively. Saiful said, “Right after my joining I had a meeting with all the teachers, and I encouraged them to use the multimedia in class. I have seen its reflections that everyone became interested in developing e-contents and they also personally collected laptops.” Azim took an initiative during the last examination at his school. Teachers, who were not busy as invigilators, learnt collaboratively in the school from each other.

Almost all the head teachers answered that they did not use technology to monitor teachers’ and students’ performance. Zannat said, “No, I do not use technology but I monitor in person.” Dina indicated her lack of training for not doing that: “No, I do not evaluate the
teachers’ performance by using technology because I do not have the training.” Jahid was able to “… prepare e-content and use Internet” only.

*Problems related to the technology management.*

Three head teachers identified problems related to their technology management. One of them, Zannat thought that if she could have a better financial support then the MMC would have been better at her school. Classroom and projector shortage was the main managerial problem for Jahid: “Regarding the managerial problem, as I said earlier, we have classroom shortage and we wish if we could have more projectors to set them up in more classes.” Babor drew attention to how all his teachers bought fourteen laptops in installments. Although they had only one MMC, they did not have to wait for that MMC as they could prepare their e-contents with the help of those laptops. For teachers’ professional development, Ratan expected his head teacher to organize some seminars within the school to train how to conduct the MMC. Azim believed that if they had to successfully implement government’s target, each of the students should have laptops. Rabbi identified that the only MMC he had that was not capable of accommodating his students. Slower Internet also turned out to be a management problem for one school. Dina said, “A management related problem that we face is the network problem of Internet. We do not have the back-up support for electricity in the classroom.” She wished for a generator to have a back-up support but lacks the funding. One school managed to set up IPS (Instant Power Supply). Kamal said, “I thank my school that they have set up an IPS in the ICT lab. Now we can even continue teaching-learning if the power supply is interrupted.” Jahid considered the socio-economic condition of the country as the reason for such problems. He said, “… but I solve the minor problems consulting my teachers or the management committee. The socioeconomic
condition of our country is the reason of these problems. I am trying to increase the number of the projectors.”

**Discussion.**

Participants reported that the MMC was guided by a monitoring cell which is formed by the district education office and district administrative office under the program of A2I. A2I is operated by a collaboration of MoE, MoPME, DSHE, and DPE (Save the Children, 2014; Minges et al., 2011). The district education office, who works under the administrative control of the DSHE, guides the MMC activities in schools. So, MMC activities are under the administration of government bodies. Head teachers basically played the role of coordinating among all the MMC functions. In doing so, they had management committees in charge of the operations of the MMC like keeping all the materials functioning and making necessary materials available. Meeting with the teachers was another major way of managing the MMC for head teachers. So, regular meetings and coordination were head teachers’ basic managerial roles. But, head teachers were not used to evaluate or monitor teachers’ or students’ performance using the technology; they rather did it in person. Weber (1996) has also expressed the necessity of management committee and regular meeting to improve the instructions among school leaders. He (1996) has said that the school leaders can learn instructional goals by “… encouraging teachers to plan collectively for instructional improvement and then sitting in on their planning sessions (p. 203).” They executed some examples of collective plans. For example, teachers also took initiatives to buy laptops in installments in the school.
Subtheme 17: Teachers’ management roles to incorporate technology.

Set up multimedia and technological instruments in class.

This is the third biggest subtheme. Teachers used to manage necessary technological instruments to use multimedia in the class properly. Tithi said, “First, we do not have fixed classrooms (MMCs). As it is given in their routine, students know which class is in which day. It takes around five minutes to set up the multimedia.” Two of the teachers said that they had to bring their personal laptops and modems. Among them, Tithi said, “To manage, I bring my own laptop. Because, other people are using the school’s laptop and that laptop may not be updated. For example, I am going to show students how to send emails in the class of ‘Information Technology’. Then I need instant Internet connectivity. In that case I bring my own (Internet modem) connectivity. I do not depend on others because that may not be available that time.”

Classroom walls were used as the multimedia screens in some cases. Ratan did not find it problematic to manage the MMC because they already had a fixed MMC where they could go and start the class with the e-content. Mijan said, “We have an advantage that all the walls are white in our schools. Every teacher has personal laptops with them in class. When we project everything on the wall then they become excited to see that real scenario.” Thus, it became easier for them set up everything. Sumi said, “Now we carry the multimedia from that room to different classrooms and use the white board as the screen. We do not need any other experts to set up; we can set up easily.”

Preparing e-content.

According to Tithi, teachers collected information from the book and the Internet on a certain topic. Then they put all these together to form an e-content and to minimize gaps in learning. Nadia mentioned that she shared her e-contents and collected from others. Mijan said
that they even discussed with the experts while preparing e-contents: “We identify some areas or contents from every chapters. Then sit together with the experts and discuss to figure out what slides or materials we can include here.”

**Manage technology with curriculum and instruction.**

Kamal developed his course plan along with chapter-based e-contents. He said, “I have designed a total course plan by developing chapter based e-contents. Whenever I get a chance, I present those e-contents in line with my pre-planned course plan.” Ratan used to play videos when students were losing interest in the class. Sumi mentioned the name of a web-based government portal “Shikkhok Diary” (Teacher’s Diary) for MMC management: “We have a government web portal “Shikkhok Diary”. What I am going to teach from the curriculum in the current week that will be written in it. Based on those pre-defined chapters we prepare our e-contents.” Kamal noted that they maintained an e-management system for MMC, “We have already included the ICT aided classes in the e-management system of our school. This software has been regularly updated by the Prime Minister’s office.” Nadia said that the present curriculum was technology friendly. She said, “Topics or contents of the curriculum is designed in a way so that we can prepare e-content based on these.” However, Tithi found a conflict between the textbook and assessment system regarding the technology integration. She shared her classroom experience:

Most of the problems we face are in our textbooks and assessment system… So what I do now, say, I taught a passage on the ‘Citizenship’ given in the book or I have created a e-content on the ‘Neighboring Country’. But it does not have any impact on their assessment because they will not get any question related to this topic. Thus it becomes a
bit difficult for us to adjust with the curriculum… We can manage some of them with the curriculum like choose the best answer, question-answer etc.

Ratan also identified some other difficulties to integrate technology with the current syllabus. He said that the syllabus was vast and all the chapters had had a lot of lessons. Preparing e-contents for those chapters turned out to be a hard job for teachers. So, they had to manage extra time at their home or school. Besides that, teachers also made sure that the ICT lab had a clean and tidy environment to make the best use of the limited resources. Mijan also helped the authority with his suggestions: “They get suggestions from me but the financial affairs are taken care by the office.” Sumi stated that the registrations and results in their school were prepared by the computer. Tithi expressed her opinion on the necessity of head teacher’s training for a better MMC management: “If the headmasters go through a system of training to have a better understanding then it becomes easier for us. Now, we have to make them understand first and then they work. It is kind of a reverse situation.”

*Management barriers to the MMC.*

Lack of MMCs and teacher training was identified as one management barrier by Atiq: “To make sure that each student in Bangladesh reaches the facilities of MMC, MMC should be set up in every classroom and every teacher should be trained to conduct MMC.” Sumi and Babor identified the lack of necessary materials in MMCs as a barrier. Sumi said, “… But we cannot continue the MMC in that room due to lack of benches. We have around seventy-five students per section. Students have to stay standing in the class… If we could have one laptop and one projector in every class, then we would not need to carry these things every time from one class to another class. We also want to have a screen there rather than having the whiteboard.” Regarding the screen, Babor expressed a different opinion. He said that it did not
need always a projector and a screen. They could work with an LED (light emitting diod) screen or digital board where they could use e-contents with the help of a flash drive only. He said, “A projector costs fifty to sixty thousand taka and a screen costs around ten thousand taka. With this money we can buy LED screens and set up in three to four classrooms.” Kamal addressed that they had a certain syllabus given by the head teacher which was designed according to the national curriculum and the annual plan of the school. They planned to complete the syllabus in a pre-defined time frame by developing chapter based digital contents. But all the teachers did not follow this.

**Discussion.**

Preparing and using e-contents for the class is a major focus of the A2I program (Save the children, 2014). Due to resource limitations, school leaders had to develop skills to well manage and set up those limited MMC instruments. In order to develop comprehensive e-contents for students, they even used to consult with the expert teachers. Findings demonstrate that the school leaders did a good job in managing the technology with the curriculum and the teaching-learning process. For example, they developed national curriculum and course plan based e-contents to complete the course work in a pre-defined time frame. There were so many classes and subjects and they used to be very busy. They also had to figure some time out of their busy schedule to develop e-contents. ‘Coordinating Curriculum’ is considered an inevitable dimension in both the models of instructional leadership by Murphy and Hallinger (Hoy & Miskel, 2004). To coordinate and managing with the curriculum, they also maintained some government web portals like “Shikkhok Diary” and e-management system which is operated by the prime minister’s office. “Shikkhok Diary (Teacher’s Diary)” is something new found in the findings. The literature has discussed about “Shikkhok Batayon (Teacher’s Window)” where
teachers can upload, download and share e-contents (Save the Children, 2014). Some of the school leaders found the current curriculum technology-friendly, while others found the assessment system in the curriculum conflicting to the technological integration. That means national ICT policy 2009 has not succeeded yet to fulfill its commitment of developing technology friendly curriculum (MSICT, 2009).

**Subtheme 18: Multimedia class is in school routine.**

Six of the respondents mentioned that MMCs was distributed among the teachers through the regular school routine. Arif said, “The MMC is distributed in the routine to all my teachers so that they take the MMC regularly.” Faria was to schedule MMC in the routine till then. The distribution of MMCs in routine really helped teachers to well organize and prepare themselves for MMC: “I already have distributed the MMC in our class routine. So, teachers know where and when they have the MMC. They can take preparation for the MMC beforehand. To maintain it, we have a register book where teachers have to sign every time they take the MMC.”

**Discussion.**

Putting MMCs in the regular school routine indicates to an attempt of distributing the technological provisions among all the school stakeholders. Such kind of managerial decisions helped the teachers to take their preparation beforehand for MMCs and work with full potentiality.

**Subtheme 19: Fund management- Collection and allocation**

Most of the head teachers of these schools said that they collected fees from the students and received some fund from the government for the ICT purpose. They used it in maintaining ICT materials. Arif stated, “… we collect a fixed fee from our students annually. Besides that, we receive some government fund too. We use this money for the maintenance of the computer,
projector, and modem.” Faria gave an idea of that fee: “From 2016, we are charging annually twenty-five taka per student for the use of technology.” Zannat clarified some expenses: “… for the maintenance of the computer lab and for the repair of any broken projector, computer or screen.” Dina said that they also used it for, “… recharging the Internet modem, buying accessories etc.” Some other expenditure is like, “We have to buy CDs and, multi plugs.” Rabbi considered the money for the Internet as the only financial support from the school which was always available for him. Teachers of government schools maintained an ICT fund and had a committee to take care of this fund according to the government instructions. But in the opinion of Sumi, a conflict to adjust between the personal effort and the financial support from both the school and government was revealed. She said, “Regarding the financial support, we get only a (Internet) modem from the school. But one modem is not enough for fourteen to fifteen teachers. Actually we have to manage laptops and Internet by our own.” Five other participants also opined in support of her. Azim and Babor said that since they were in private schools, they had to run everything by their own fund. Mijan said, “Until now we did not get any financial support. BCC (Bangladesh Computer Council) has given a computer lab with eleven computers. We are purchasing the Internet modem by ourselves. We do not have good internet speed as we do not have broadband connection.” Although his head teacher, Jahid, had a contradictory opinion: “The government has given us a computer lab. I have fourteen to fifteen computers. We did not buy any of them and I received them all from different governmental authorities”.

Discussion.

To bear the expense for the maintenance of the MMC materials like fixing the broken computers or projectors and paying Internet bill, school leaders maintained an annual fund or budget, which was basically funded by the government and the students. To what extent the fund
was adequate for the school, that varied from school to school. But, school leaders were facing difficulties to continue MMCs with such financial support. Findings infer that they were expecting a certain and regular financial allotment because teachers’ personal costs like personal laptop or Internet became a burden to them ensure technological implementation. Although Save the Children (2014) has claimed that DSHE is providing with necessary fund and MMC materials, that fund and materials were not adequate for schools and school leaders.

**Subtheme 20: Update software and hardware.**

Except for one head teacher, all the teachers and head teachers said that they updated and upgraded all the MMC related materials and instruments regularly. Tithi said, “We do not face any problems in upgrading the software or hardware. Whenever we inform the head teacher then she takes initiatives to update them.” Three of the participants acknowledged that they appointed an ICT teacher who was actually responsible for updating and upgrading everything. Among them, Jahid said, “Now we have an appointed computer teacher. He has received training from inside and outside the country. He is very skilled and in charge of the computer lab. He is responsible for the maintenance of the lab and I never hesitate to provide him with financial support.” Mijan supported that statement: “Most of the time I try to update and solve the problems by myself. If I cannot fix the hardware, then I take help from external engineers.” In the case of one school, they depended mainly on their librarian who was trained. Faria said, “Our librarian has knowledge about the computer hardware. In some cases, he fixes it. Sometimes BRAC helps to solve some computer related problems. In the rest of the cases, we take help from the service centers.”
Discussion.

According to the Murphy’s model, instructional leaders have to create an orderly learning environment and secure resources in order to promote a positive learning climate (Hoy & Miskel, 2004). To create a positive learning climate, head teachers and head teachers made sure that all types of necessary software and hardware for MMCs were updated regularly. They ascribed this responsibility largely on the appointed ICT teacher, librarian or the teacher who was in charge of the computer lab. They were usually trained to do that. If they could not manage, they took help of external engineer or service center sometimes.

**Subtheme 21: A specialized dynamics at the government schools.**

*Extra roles, responsibilities and limitations.*

Government schools had to serve some extra purposes sometimes. So, the head teachers of these schools also had to perform some extra roles and responsibilities and had some limitations. Zannat addressed his situation: “Administrative trainings also take place in my school. Almost every month we have such administrative trainings. So, we have to repair the computers immediately after they are broken.” She informed some of her limitations and said, “As it is a government school, we do not have school a management committee (SMC). So, there are fewer possibilities to share (experiences) with anyone… Like the non-government school, we cannot even take any kinds of technological material related help from the parents.” Saiful, head teacher of a government school, also supported her and said, “As we are a government school, we need to get these from the government. We specially need more laptops and projectors according to the number of classrooms but we could not manage it yet.” He also indicated another specific downside of government schools. He said, “One vital problem is that although private schools recruit specialized teachers for ICT, government schools do not have any. If the
government creates a position for specialized teachers in ICT in the government schools that will be helpful for government schools.” He also mentioned that they did not have executive power to recruit any ICT specialized teachers. He tried to draw the attention of the government: “We have informed the ministry that we need to recruit specialized teachers for ICT and they have assured us that they will try to create two specialized teacher posts for ICT.”

**Funding management.**

In terms of fund management, head teachers of government schools had limitations in collecting money from their students. They mainly had to maintain everything depending on what they got from the government. Zannat, said, “As it is a government school, it is not possible to get financial support from anyone except the government. We are maintaining it with the help of whatever we get from the government.” She explained the complex situation further, “… as most of the students are poor in my school, we cannot charge so much money at a time according to the government instruction; we charge as much as they can afford.” For that reason, she could not start imposing money on her students before 2015: “If we were used to doing that before 2015, we would have a better fund for computers.” To manage everything, she had to make an annual budget based on how much her fixed fund was going to afford.

**Discussion.**

Findings revealed different administrative perspectives of the roles of school leaders. Head teachers of government schools had some extra roles, responsibilities and limitations which turned out to be barriers for them to integrate technology in schools. For instance, arranging administrative trainings in school was one of their extra responsibilities. This is why Weber (1996) has said that leaders’ roles are defined by the social setting of the school. Different nature of the administrative process of government schools also limited the integration of technology to
a certain extent. For example, they were not allowed to ascribe extra fees on students or recruit specialized teacher for ICT.

**Theme 4: Assessment and Evaluation**

**Subtheme 22: Roles to promote technology-based assessment.**

Almost all the head teachers said that they did not start using technology-based assessment. Arif said, “We have not started doing technology-based assessment yet. We do our assessment manually.” Jahid also did a similar thing, “I just stay in the class and try to see or evaluate how much they learn.” Kamal claimed that their use of technology was limited only in class presentation, not in assessment. Saiful stated, “We have the system of technology-based assessment for the students, but the system is not well developed yet for the teachers.” Zannat had a plan to start technology-based assessment: “No, it is not started yet. But we have a plan to switch to technology-based assessment.” Although they did not use technology-based assessment, Saiful said that students’ grades were maintained and organized by the computer: “We prepare students’ results through the computer and preserve it online. In the online version, there is no chances to get manipulated by anyone. Thus, the management system of students’ results or performance is transparent.”

On the other hand, most of the teachers reported to use the technology-based assessment to evaluate their students’ performance sometimes. Sumi described how she fit technology-based assessment in her lesson plan. She said,

… five minutes for introducing the topic, twenty minutes for lecturing or fifty minutes for making my students work or participate to apply their knowledge. For the assessment purpose, I set up some questions in the multimedia and ask them for the answers. When I listen to their answers then they become very happy. Sometimes I show them a picture
without a label on it and tell them to name it. When I show the label right after their answers then that gives them pleasure.

Rabbi pointed out that he used to ask questions to students based on the multimedia based presentation. Atiq said that he used group works, pair works, and individual works as techniques among the students based on the presented e-content. Other teachers came up with different types of technology-based assessment techniques. Mijan said, “Sometimes I use software named ‘Multi Mouse’ for classroom evaluation. This way fourteen mouse can be used at a time in a single computer. To make my students use the technology in real time, I use it during the quiz.” He also pointed that its effectiveness depends on the efficiency of using it. Ratan said, “Besides using technology-based short questions and MCQs (Multiple Choice Questions), we also prepare the result sheet after the summative assessment by using the computer.” Tithi said, “If I prepare a Power Point presentation, then I use trigger animation to assess whether they have a clear identification or not. To assess their understanding level, sometimes I prepare handouts or flashcards and instruct them to write what they have understood … It is helpful for listening and speaking. Regarding the listening, if they are given the questionnaire at the beginning, then they can listen and work on it later.” Nadia said, “My students can develop e-contents. When I told them to develop an e-content in forty-five minutes after teaching tense, then they managed to develop very beautiful presentations.”

Discussion.

Weber (1996) has underscored the importance of assessment and has mentioned, “Another task of instructional leaders is to assess and revise the instructional program (p. 211).” He has viewed the assessment as a way to measure if the instructional objectives were reached or not. This subtheme is different. It was not to assess the effectiveness of the technology in
learning rather to assess to what extent the assessment process was technology-based. The head teachers were not used to use technology to evaluate teachers’ or students’ performance, but the use of technology-based assessment was existed in teachers’ practices. This infers that the teachers were depending more on the technology than the head teachers when it comes to the assessment. Although teachers did not evaluate with the technology every day, they tried to apply different types of technology-based techniques on students occasionally like labeling, quiz, trigger animation, flashcards, and handouts.

**Subtheme 23: Technology-based assessment’s impact on quality education.**

Eleven of the participants strongly agreed that technology based assessment had positive impacts on quality education. Zannat said, “Yes, of course. The technology based assessment system is more suitable than the hands-on.” Babor expressed that they should depend on the technology because they were able to accomplish a lot tasks within a short period of time using the technology. Four participants reminded their limitations in different ways. Jahid said, “… it is needed but we do not have that much capability.” Faria blamed her lack of skills: “Actually we are not skilled in using the technology based assessment system.” Sumi was sure that if students could prepare assignments using technology then that would let the student perform better, learn better and do better in the exam. She said, “… we do not have that opportunity. Our students do not have laptops or desktops at home.” Arif expressed a similar attitude: “Actually technology has an impact everywhere. I think it will play a significant role in evaluation and it will ensure accurate assessment. But we have not started doing technology-based assessment yet.”

Tithi had a slightly different opinion. She said, “It has (impact) but at a certain stage. It is not like it does not have any impact or it is one-hundred percent effective. I would say it is 50-50. Technology is supporting fifty percent; at the same time, they have to study the book also. I
cannot present everything from the book through technology. So they have to stick to the book also.” Sometimes interview questions on technology-based assessment were hard for the participants to understand. Some of them were not sure what the terms actually mean. Being less sure, two of them answered that they use technology occasionally.

Discussion.

When the technology-based assessment related questions were asked then some of the respondents were hesitant and unclear about the term and some others were not sure what should be their responses regarding this term. That means the practice of technology-based assessment was not widespread or very regular among stakeholders in schools. Some of them were not familiar with this term and practice. Such findings are not unexpected since any initiatives to train technology-based assessment process is not also available in the literature. The literature does not even provide any description of structure or process to evaluate the effectiveness of the technology in MMCs (Save the Children, 2014). Moreover, ICT in education is a comparatively new idea in Bangladesh. This might be another reason that technology-based assessment is not widely practiced yet. Although most of the participants acknowledged that the technology based assessment might have influences in promoting quality education, they were skeptical about doing it because of the limitations of their technological skills and materials. They were positive because they thought that this was likely to bring more accuracy in the assessment.

Subtheme 24: Technology-based or hands-on: Suitable assessment system.

Thirteen of the interviewees agreed that the technology-based assessment was more suitable than the hands-on assessment. Nadia said, “Based on the present situation, the technology-based assessment is more suitable.” Dina said, “The technology-based assessment system is more effective to ensure quality education.” Tithi and Saiful supported the presence of
technology along with the hands-on system in the assessment process. Tithi said, “It will not be effective without the technology actually.” Saiful considered it a demand of the modern age: “In this modern time, our daily life is also incomplete without the technology. There is no option to exclude technology. That is why we have to ensure quality of education with the help of the technology.”

Six of the head teachers agreed that they considered the use of technology-based assessment as criteria for teacher evaluation. Arif said, “Yes, of course. We take into account teacher’s teaching practice in terms of whether they are attentive and cordial in developing and using e-content for MMC.” Babor explained why he considered it criteria to evaluate teacher. He said, “Teachers are teaching students of this present generation who are comparative faster than the teachers. They are born and raised in the middle of technology and they love the technology. But, teachers have met the technology at their middle age. By the meantime the teachers are deciding to learn the technology, their students are already skilled in it. So, to cope up with such new generations, I am trying to make sure that they are adept in the technology.” Azim said that his teachers had to have technology based information and skills.

**Discussion.**

All the ministries, directorates, and NGOs are working collaboratively to develop technology-based and pedagogic skills, knowledge, and attitude among the school leaders (Save the Children, 2014). The national education policy 2010 also guided to place technology substantially within the curriculum and teaching-learning process as a tool of education to achieve optimum level of competencies (MoE, 2010). Responses of the school leaders also reflected school leaders’ positive attitude toward technological integration in the classroom. They believed that the technology-based assessment system was more effective and suitable for
their school to support quality education. They wanted to utilize technology, as a demand of the modern age, along with the hands-on system in the assessment process. In order to measure the use of technology as a tool in the teaching-learning process, some head teachers considered the use of technology-based assessment as criteria for teacher evaluation. However, they did not provide any format or explanation on how they do it.

**Theme 5: Attitude towards technology and comfort with technology**

**Subtheme 25: Effectiveness of technology for quality education.**

This is one of the fifth largest subthemes. All the sixteen participants acknowledged that they strongly believed that the MMC is necessary for the quality education in the classroom. Dina stated, “Yes, it is necessary. Actually students become interested more when they can see something in their eyes. They can even remember them longer. What they cannot learn by reading books that they can learn by watching.” Three of the participants explained how effectively multimedia brought quality components in the education. Faria said, “There are so many things written in the books that students cannot physically see; they cannot see the picture or how they work. For example, students can achieve a permanent learning by seeing a picture or video on a science lesson. Thus, the quality education is happened by ensuring realistic learning.” Sumi thought, “… watching, learning, listening, and speaking can happen together here (MMC).” She identified some more good sides of technology: “When I take the MMC according to my routine then we have a very good student attendance in the class. Students keep quiet in the class. You will be surprised to see how such a large class is quietly sitting for the MMC. Sometimes it makes me happy when my students suggest me something for better learning because they know technology better than me. Thus, it creates sharing opportunity between teacher and student.” Saiful shared his personal experience:
Actually, the MMC has advanced the teaching-learning system far beyond our traditional teaching… For example, it does not matter how many times I teach verbally the Water Cycle, it remains always very difficult to understand for the students. But when I show a video that the water is evaporated from the sea to be condensed into clouds and the water vapor again comes down as the rain then they can get it within a minute. That is why technology is very important for an effective teaching-learning environment.

Six of the interviewees answered that the technology assisted students to learn easily and effectively. Tithi expressed her satisfaction, “It makes learning much easier. As students follow the instructions, see in front of their eyes and work with their hands, they learn by doing. So, I think it (technology) is working well.”

**Discussion.**

The overall attitude of the participants was very positive toward the technological integration in education. Participants found the MMC very effective in promoting the quality education in the classroom. The learning opportunity of students by watching, listening, speaking and doing things made the learning realistic. Thus, it generated excitement and interest among students. As a result, students had a higher attendance in class and they kept quiet during the class. Such positive effects on students’ learning reflected the expectations of Weber’s model. He (1996) has said, “… the norms, beliefs, and attitudes reflected in institutional patterns and behavior practices that enhance or impede student learning (p. 204).”

**Subtheme 26: Effectiveness of technology from particular school perspective.**

This is the fourth largest subtheme. Eight of the participants strongly believed that the MMC was effective from the perspective of their schools’ resources and condition. Tithi said, “Yes, it is compatible to my school.” Although Babor found it effective at his school, he always
had a better expectation. Four other participants were fairly or considerably positive about the
effectiveness of the technology. They had similar types of evaluations: “Effective, but not
adequate yet”, “Not one-hundred percent, but pretty much” and “I think it is considerably
suitable now.” Mijan said, “I will say that it is not completely effective. As I said earlier, we
managed to achieve everything twenty-five percent.” Azim possessed different opinion and he
thought that it was not effective in his school because had lacking in everything like materials,
trainings, and funding.

Fourteen interviewees had defined the technology-based teaching-learning system as
more suitable than the hands-on system. Nadia said, “For my students, technology-based is
effective.” Sumi gave the importance on the existence of both types: “We have to do both:
technology-based and hands-on teaching. But the technology-based one seems more effective.”
Tithi explained the difference they made in the classroom: “… because we have a lot of students.
We do not have microphones to talk in our larger classrooms. So, the use of technology makes
students more active because they learn by watching.”

Discussion.

Most of the participants were considerably positive about the effectiveness of technology
from the perspectives of their schools’ resources and conditions. The rest of the people believed
that they could not use it effectively due to their limitations in resources. It simply represented
the condition of the ‘vicious cycle’ mentioned by Weber (1996). He (1996) has mentioned that
schools with lower resources have lower expectations from the students and students also
perform less. Lack of MMC materials and resources impaired school leaders’ beliefs and
attitudes. Such mindset is likely to affect their technological integration, leadership roles and
students’ learning. Because, Weber (1996) has experienced that, “Of all the important factors
that appear to affect students’ learning perhaps having greatest influence is the set of beliefs, values, and attitudes teachers and students hold about leaning (p. 204).” Largely, they thought that the technology-based teaching-learning system was more suitable than the hands-on system. But they did not want to depend only on technology; hands-on teaching was also a priority for them.

**Subtheme 27: Rewarding for technology related best practices.**

Seven head teachers and two teachers mentioned that they tried to reward their students with awards and encouragements for the technology related best practices inside or outside of school. Babor said, “Who are not using technology, we motivate them to use. Besides that, we reward them who are using it.” Arif said, “We try to do it once a year. We send our students to technology related competitions and they often win prizes there. We encourage them.” Tithi mentioned about a national level success, “In district level, there is a system of rewarding annually. There is also another one at the national level, which we already have received. The school does not have any material rewards, but it gives verbal encouragements.” Saiful appreciated the guardians also: “Recently some of them (students) were rewarded in a programming competition. We also called their guardians and appreciated them.” Jahid stated his success: “A few days ago, a competition took place on developing teaching materials in Shahjalal University of Science and Technology. Our school became one of the top ten schools in Sylhet division.” He was the only respondent who talked about the awards received by his teachers: “One of our teachers has received ICT training from Singapore. Another teacher received a laptop as one of the winners of the best ten teachers. I have more five to seven teachers who have received digital content related training.” Zannat highly appreciated her students practice in a class party: “In their class party they have prepared content like a movie
where they have included the activities of all the teachers, students, and staff. It looked very
amazing to me that my girls have made such a beautiful content. Then I awarded my girls
because of their talents in this content making.” Six of the participants mentioned that there are
no practices or options of rewards or awards for the technology related best practices in their
schools. Mijan said, “We already have suggested to use the e-contents as quiz competition in the
annual sports. But it is not implemented yet.” Rabbi also expected such rewarding initiatives
from the school authority.

Discussion.

It is likely to have a rewarding system for the technology related best practices in a few
the schools, but almost half of the responded found no such practices existing in their schools.
But the leaders used to encourage for any kinds of best practices inside or outside the school.
Except winning rewards at some local and national level competitions, there were not much
material rewards for any kinds of technology related best practices. This also mirrored the
findings from the literature. ‘Shikkok Batayon’ is one of the very few initiatives to reward
teachers’ best practices (Save the Children, 2014). Besides developing and sharing digital
contents for the newly trained teachers, it also rewards the best three teachers every week with
laptops and certificates based on the pedagogy rating of their uploaded e-contents. So, rewarding
initiatives are very limited in the field of educational technology. Taking more rewarding and
encouraging initiatives may urge the stakeholders to apply the technology effectively. Weber
(1996) has also believed that rewards not only add motivations but also enhanced “… the sense
of common effort that lightens the work of learning and teaching (p. 207).”
Subtheme 28: Teachers’ and students’ satisfaction and interest.

This is another one of the fifth largest subthemes. Eleven participants said that the teachers and students were very satisfied with the integration of technology in classrooms. However, they expected that if they could minimize their limitations regarding technological integration. Nadia said, “Mostly they are satisfied but their satisfaction will increase if they are provided with more technological support.” Ratan mentioned, “…but sometimes the projector stops working.” Azim explained why teachers were not fully satisfied. He said, “There are some ready-made e-contents available in the “Shikkhok Batayon”. If teachers cannot make by their own, they can use those e-contents. Since they do not have laptops, they cannot even take help from those now.” Babor said that his teachers were scared and disinterested about using technology a few years ago. But now teachers managed laptops for almost each of them and he made all the teachers take classes with e-contents. Thus they became interested in integrating technology. Zannat mentioned that most of the teachers were very satisfied. Tithi and Zannat said that students were very happy with it. Zannat said, “Students become very satisfied if we use such technologies in class.” Rabbi found one-hundred percent of the teachers and students were satisfied.

Students were showing their excitement and eagerness for technology in so many ways while teachers were incorporating technology in education. Three of the participants mentioned some of their experiences. Sumi said that the students requested them to take all the classes using technology. She added, “Sometimes students are even ready to attend class standing if we do not have enough benches for the in MMCs. Students do not make a noise when we show a picture.” Saiful said, “They keep eagerly waiting for the moment we are going to take them from the regular classroom to the MMC. They remain very cheerful and enjoy the MMC a lot.” He said
further, “At present, our students are pushing our teachers to take MMCs. As a result, some of the teachers are taking MMCs due to the students’ demand.” Sumi noticed students to have a better technological knowledge and help their teachers in the class. Four head teachers said that one-hundred percent of their teachers and students were interested to achieve the MMC vision.

**Discussion.**

School leaders revealed that the teachers and students welcomed the technological integration very well in the teaching-learning process. However, the unavailability of ICT materials was affecting their satisfaction level. A successful integration of technology requires a gradual process of development. To enhance the motivation and satisfaction level of the teachers and students, ensuring enough technological materials is necessary. Moreover, students were so excited about the MMC that they requested teachers to take the MMC and they were even ready to attend class standing if there were no more benches in the room. Because, students liked how digital elements like texts, images, or videos in MMC explained the difficult concepts of the textbook easily (UNDP, 2012). Providing training and necessary MMC material support is one of the core objectives of all the technology related educational projects (Save the Children, 2014). Students’ cheerfulness, interest, and excitement was a positive for the technological integration, but if these projects or programs fail to ensure the materials and support, then they might not any longer welcoming to the technological integration.

**Subtheme 29: Suitable subjects to use technology in.**

Five of the participants thought that the teachers and students were interested and happy when technology was used in any of the subjects. Babor said that computer was something that could be use in every subject. His students were willing to accept it but it was on the teachers that how much they could use the technology. Having said that, one teacher gave some
preference to English, science, and ICT. For Sumi, it was difficult to categorize: “Actually it will not be possible for me to identify subjects alone. Teachers teach different subjects. I teach science and I feel very happy to use multimedia. I can collect whatever I need using the technology… Now all the subjects can use technology.”

Ratan believed that students would love every subject if the e-content was interesting. However, Ratan and Azim identified a tendency ofpreferring technology for science among the students and teachers. Azim said, “They think that ICT means only science, mathematics and Bangladesh and global studies. They think ICT is good to use in these subjects. Bengali or religion are not good subjects to use technology in.” According to the opinions of Atiq, Mijan and Kamal, mathematics, science and English were the subjects where teachers and students were more interested and comfortable to use technology. One of these three teachers also added the subject ICT with it. Saiful, Rabbi and Dina said that science and mathematics related subjects were suitable for MMCs. Saiful tried to explain a reason behind it: “The MMC brings some benefits for the subjects of science and mathematics. Science lessons are comparatively difficult to understand for them. But the equipment of science is found online very easily. When e-contents are enriched with the materials from the Internet and presented in the MMC then students feel very comfortable learning through the audio-visual medium.” Rabbi considered science a subject requiring real life learning experiences which could be presented through the MMC. Zannat found English and Arif found science related subjects very suitable to use technology in the class. Jahid found science and geography as students’ favorite subjects for MMCs. Rabbi found his students interested when he showed maps of different countries digitally in his Bangladesh and global studies class. Tithi said, “Science subjects come first. Sometimes we use it (technology) for literature also. Say, we are teaching Bangla but the book does not have
the photo of Madhusudan Dutt. We can even show his photo of different ages with the projector. They can remember it by watching.”

Discussion.

School leaders thought that the multimedia was suitable to be effectively used in any of the subjects. However, the observation says that participants had a tendency of believing that ICT, English, mathematics and science related subjects were the suitable subjects for students where they felt comfortable and interested to use technology. The ground behind such preference was clearly visible in the policy level. National ICT policy 2009 and national education policy 2010 have clearly given priority to use ICT as a tool in the subjects of ICT, mathematics, English and science (MSICT, 2009; MoE, 2010). MoE (2010) declared its strategy: “Enhance the quality and reach of education at all levels with a special focus on Mathematics, Science and English (p. 6).” Non-government policy also possesses a similar sentiment. For example, Dnet has provided interactive multimedia CDs for teachers to prepare e-contents in English, Geometry, Geography, and Science before they conduct the class (“Dnet,” n.d.). International agencies like UNESCO (2009) also has measured the extent to which ICT is used to teach the curriculum of mathematics, science, language, and ICT as an ICT in education indicator. Interviewees thought that these subjects were comparatively difficult to understand for students and the multimedia made these complex lessons easier for them by incorporating audio-visual elements in the e-content. Geography and literature also got some preference from the school leaders regarding technological integration.

Subtheme 30: Subjects not suitable to use technology in.

Four participants said that there were no subjects where students were not interested to use technology. Tithi said, “Actually it will not be possible to say in which subjects they are not
comfortable with technology. Because, we could not take all the classes using technology till now. If we could take all the classes with technology, then we could say which subjects are not supported well with technology. Students like the classes that we have taken so far.” Dina, Ratan, and Jahid said that their interest depended on how well the e-content was developed. Jahid said, “If good e-contents are prepared then students will get interest in any subject. It depends on that e-content.” Zannat, Nadia, and kamal mentioned the names of Bangladesh and global studies, physical education and career education as less interesting subjects for them. Regarding the Bangladesh and global science, Zannat said, “They (students) do not feel comfortable because most of the themes are mainly historical in this subject.” Rabbi and Azim thought they were less interested to use ICT in religion, arts and crafts, and physical education. Rabbi said, “… physical education needs to do practical in the field.” Babor answered it differently and said that they were not interested when teachers took hands-on lectures.

**Discussion.**

In most cases, respondents did not find any subjects where students were not interested to use technology. If e-contents were designed very well, that was supposed to create interests among students irrespective of subjects. Nonetheless, some school leaders found Bangladesh and global science, physical education, religion and career education as less interesting subjects for them. Somehow, these subjects were considered different from ICT, mathematics, English and science, which are given significance in the national ICT policy 2009 and national education policy 2010, in nature (MSICT, 2009; MoE, 2010).

**Subtheme 31: Roles to make teachers and students interested.**

Eight participants said that they tried to make the students and teachers interested in the use of technology. Arif encouraged teachers by promising rewards. Saiful encourages: “Since my
joining in this school, I have been encouraging them to see outside of the textbooks and to learn from the vast learning environment of the Internet. Now 60%-70% of our students use Internet”. Azim encouraged his teachers by instructing them to get some idea from the e-contents of “Shikkhok Batayon”. Ratan said that they organized seminars in the school to raise students’ interests and enhance teachers’ skills of developing rich e-contents.

Babor gave some examples of how he encouraged his students to use the technology. Once he initiated a photo competition. He told them to take photos with the mobile and upload them in the Facebook with captions. By doing this, his students learnt how to be online. Moreover, they needed to do brainstorming while writing the caption to express what the picture said or meant. He also instructed them to send applications through e-mails if students had any like application for tuition remission or leave of absence. Atiq, Mijan and Jahid said that teachers make students interested in class by making a best use of technology. Mijan said, “The technology I bring to the class that makes them interested. Then they start to think that today they are going to learn something very attractive.” Jahid said, “If they can make the e-content more interesting than the students will be more interested.” However, Kamal said, “No, I just concentrate on my own field, not on others’ subjects.”

Discussion.

Weber (1996) has shared his experience that teachers’ encouragements and motivations are linked to students’ achievements in two ways. It affects the amount of time they devote to instructions and the quality of their teaching-learning practice. He has provided some examples of how teachers’ high expectations are executed in the teaching-learning process. They praise more for the correct answers, make more eye contacts and more general encouragements, and provide more feedback and constructive criticism. Participants of this study said that they
promised rewards and gave encouragements which is needed be enhanced for a better technological integration. They also made the e-content interesting to increase engagement among them.
CHAPTER V. CONCLUSION

Chapter Overview

This conclusion chapter wraps up all the findings, and comments and opinions on school leaders’ technological integration roles. In the summary of the findings section at the beginning, I not only summarize the findings but also provide my personal opinions and recommendations. I have these recommendations to ‘Develop Policy Implications’, which is one of the basic parts from the third stage of Yin’s data analysis method for case study. These suggestions recommend some changes in the policy and practice level based on the analysis of these findings. This summary has two parts: the quality components of the MMC, and the school leaders’ roles to integrate technology to support quality education. Afterwards, I describe the researcher’s reflections, implications for future research, and limitations of this study. In doing so, I compare and contrast the primary data, literature, and theory.

Summary of the Findings

The interviewees are from eight schools of four different divisions of Bangladesh. Basically, there are two major areas of findings from them. In the first part, this study found some quality components of the educational technology of secondary education. These components do not have to be limited necessarily in the stage of secondary education. Rather they can be applicable in the other stages too like primary or tertiary. The second part addressed the roles of the school leaders which might support those quality components in the classroom of secondary education.

Quality Components of the MMC

School leaders’ responses exhibited a clear influence of the national policies and international declarations on the components of the quality education in Bangladesh. This study
has examined the national ICT policy 2009, national education policy 2010, master plan for ICT in Education (2012-2021), EFA, MDG, UNESCO, and CEWAD as major policies, and it found significant connections between these policies and the formation of quality components of secondary education. I think a similar trend is likely to be found in other levels of education, like primary and tertiary education irrespective of technological integration. These levels of education are also supposed to have similar influences of these policies and conventions. The MMC was chosen as one sample to represent the educational technology in Bangladesh. The MMC, a technological setup for the classroom with computers, projectors, screens, and a sound system, represents an initiative for the integration of educational technology in line with the national and international policy requirements. Although the MMC was an attempt to implement the policies, the amount of technological materials and students’ access to those facilities varied a lot among the institutions. That means the agencies were not able to provide an even technological provision to the students. I think the government and NGOs should pay more attention to the technologically-lacking schools and schools with large numbers of students.

This setup enabled the school leaders to broaden students’ cognitive abilities and increase students’ classroom engagement by incorporating audio-visual elements like images, maps, graphs, slides, and videos in the lessons. These are the quality aspects, supported by the MMC, aimed to establish a student-centered and interactive teaching-learning environment in schools. These targets represent some common recommendations of the major national education policies and international conventions that Bangladesh follows. To support quality components in education, the MMC enhanced the teaching-learning process by developing the standard of teaching materials and teachers’ teaching capacities. The MMC brought some qualitative changes and advancements to secondary education, by which it utilized the instructional hours
more effectively and increased students’ level of understanding. These changes reflect influences of some of the ICT in education indicators of UNESCO (UNESCO, 2009). Essentially, it created more opportunities and means in the classroom where student interaction and student involvement were likely to happen from many different aspects.

Interviewees figured out some lacking or limitations in the practice of educational technology, which turn out to be barriers to integrate technology in secondary education. Lack of appropriate training and essential instructional materials, insufficient infrastructural support and funding, and huge pedagogical and administrative pressure of teachers were major barriers. These barriers give birth to other dimensions of impediments like classroom shortage or computer shortage. So, there were gaps between the expectations and the practices. Responses show that the responsible government agencies such as the NAPE, MoPME, MoE, NCTB, TTC, BANBEIS, and BCC were successful in providing teacher training at a certain extent. Non-government organizations’ impact was not as visible in the area of teacher training in field level, which is surprising because the literature review evinced a significant amount of NGO initiatives in the area of education technology. A2I and TQI-SEP are two predominant programs in Bangladeshi secondary education which are working to gradually incorporate the technology in the pedagogy. With such a vision, school leaders were performing their jobs mostly based on one to four week long trainings. Unfortunately, almost one-third of the leaders did not have any technology related training, which was one of the major reasons behind the technological stagnation in Bangladeshi education. The result of the lack of teacher training was reflected in the practice; most of the teachers reported to use technology in only twenty-five percent of their classes. However, it is a matter of hope that all these government and non-government initiatives
in the last decade have succeeded in growing a very positive attitude toward the technological integration in education among the school stakeholders.

Farquharson (2005) has identified that the quality components of education change rapidly over time. Moreover, the concept of quality of education for any group of people is defined according to their national goals, cultural characteristics, historical background, and national and international educational actors and players like student, teachers, and policymakers. Therefore, we will find a vast range of quality components of Bangladeshi education system if we look at it from different aspects. Different frameworks or lenses will generate different sets of quality components. Morgatroyd and Morgan (1994) have stated that the quality education is actually shaped by some determined standards, requirements and methods by the responsible bodies. These standards can vary based upon the difference among the frameworks or lenses using which quality components are examined. The quality components identified and discussed in this study, like how MMCs enhance the teaching-learning environment, are specified for the area of educational technology in secondary education, and I have examined them through a framework of certain national and international agencies and their policies. Nonetheless, these components can also be applicable to a certain extent to other areas like hands-on teaching or primary education.

**School Leaders’ Roles to Integrate Technology**

School leaders collaboratively formulated plans for a better implementation of a technological vision in their schools. Their roles largely reflected the core targets of the national and international policies. They wanted to prepare technology and information dependent students and skilled manpower to reach the Vision 2021 of the Bangladesh government. To do that, their objectives were to make MMCs or technology available to every student. They were
trying to increase the number of MMCs and other MMC materials to meet their goals as soon as they can. They organized in-house trainings and meetings to share the vision, experience, opinion and resource. This is how school leaders represented a distributed leadership in schools. I adopted a team approach when they were helping each other to develop and share e-contents, conduct MMCs and make collaborative decisions. But, to which extent the opinion of all the stakeholders were taken into account in the decision making that was not clarified.

School leaders identified some barriers like a lack of teacher training and the shortage of MMC materials, teachers, and infrastructural facilities in their ways of integrating technology. Identifying such limitations infers that school leaders were working to incorporate technology in the school level and they needed some primary supports. Bangladesh has recently introduced the educational technology and it has almost 68,19,748 students in secondary education, so it is not unexpected if they faced shortages of some primary supports in different sectors (“Secondary Education ( Page 1 ),” n.d.). Although several ministries, boards, academies, and directorates were constantly working to provide these supports, that could not fulfill their need. The expectation of the demands also varied from school to schools. Training and ICT materials were not adequate for some school leaders while some other leaders managed to utilize the limited resources and effectively ran MMCs. I would consider it a disorderly state in the beginning of the technological integration in Bangladesh. I believe such gaps between the supply and demand will be removed gradually if they can maintain a technology promoting environment. One head teacher suggested the LED screen or digital board as a less expensive setup than the projector and screen. So, if the LED screen is likely to be more durable, cost effective and suitable to meet the learning needs, then the policy makers can replace the projector by the LED screen.
“Shikkhok Batayon” is a good source of ready-made e-contents. It has e-contents on many subjects. Anyone can download and use it. If one wants s/he can also edit these e-contents before using according to one’s plan. Due to resource limitations, it will not be possible to train up all the school leaders overnight. So, such resource should be enriched in future and school leaders should know more about it.

Head teachers played a significant role to send teachers to participate in training programs and organize in-house training within the schools. Some of them proved devotions in playing this role and proactively corresponded with the training agencies to ensure adequate training for teachers. Regarding teacher training, I think the policy makers should consider some field level problems while reforming the policies. Sending teachers to the training was difficult when the school had classes in full swing. Besides that, they should also consider that teachers had a lot of subjects and classes to teach. They had huge syllabi and high teacher-student ratio. Due to such academic pressure, it was also difficult for school leaders to manage time to develop e-contents. So, if such workloads are not removed, then the objectives of the technological integration will be at risk. Diluting their academic pressure is necessary to make sure that they attend the training programs. Some school leaders said that the assessment system in the current curriculum was not compatible with the formative assessment techniques of the e-content sometimes. To avoid such conflict between the technology and curriculum, the government needs to pay more attention in forming a technology friendly curriculum.

Interestingly, school leaders from locally and nationally leading schools showed a tendency of being confident, enthusiastic, well-trained, and self-educated to execute the technological skills. Similarly, leaders from reputed institutions also had a tendency to excel in every possible sector like: adequate teacher training, regular MMCs, or sensible e-contents to
maintain their reputation by providing support. These were some positive signals for the technological integration. It was inspiring and encouraging when some of the active leaders revealed their dreams and future plans to expand labs and training sessions and restart a cluster based approach for training. So, if the government or the school authority can gradually develop the efficiency and resource level among all the school leaders, then the interests and the positivity are likely to go up. Interview responses identified one special dimension for the school leaders from the government schools that they had to work through some limitations. For example, they were not allowed to ascribe extra fees to the students and recruit specialized teachers for ICT. In that case, the government can pay more attention to their needs for a proper technological integration. I also suggest for a regular allotment from the government and NGOs for the maintenance of MMCs.

Findings demonstrate that school leaders appreciated MMCs because MMs allow for realistic and practical learning by watching, listening, speaking and doing. So, I think the curriculum and policy should be developed to promote practical learning in the class, just not to present Power Point slides. E-contents should contain enough elements to ensure realistic learning. Although teachers and students were satisfied with the use of technology, they expected enough materials for the MMCs. To keep up the satisfaction and motivation level among the stakeholders, ensuring technological materials are necessary. Teachers were more likely to be familiar with the technology-based assessment than the head teachers. Using technology-based assessment is a positive sign for the technological integration. However, the technology-based assessment was not widely used. I believe that student assessment does not have to be necessarily technology-based. However, the school leaders believed that the technology-based assessment had positive impacts on quality education. In that case, I think teacher trainers should
provide enough technology-based assessment techniques and strategies to the school leaders for the classroom uses. The literature and the responses of the school leaders show that there were no clear guides or instructions to assess the efficiency of the technological integration in the classroom. I have not found any step, format, or structure to assess the technological implementation. School leaders were not also used to supervise and monitor the pedagogical applications of technology regularly. But, assessing the instructional program is one of the five basic domains of Weber’s model (Weber, 1996). I believe that the government and NGOs should concentrate now to establish a structure or practice for the assessment of the technological integration.

Leaders regularly updated software and hardware. The distribution of MMCs in the regular class routine was one of the major managerial steps taken by them. Distributing MMCs in the routine does not make sure that teachers will be able to take preparations beforehand unless their work load is lessened. If teachers have to take a lot of classes every day, then they will not have any time to prepare themselves for the MMCs. Moreover, I think school leaders should be careful that the functions of MMCs should not be limited in only routine work. It should be monitored regularly. Weber (1996) has discussed a few types of evaluations: individual course or whole program monitoring and summative or formative monitoring. According to his theory, I think a regular monitoring practice of the technological integration needed to be established.

Minimal attention was paid to reward the teachers and students for the technology related best practices. As Weber (1996) and school leaders considered incentives, rewards, encouragements to be positive and contributory to students’ learning, policy makers should give importance to establish a rewarding process for the teachers and students. I have not found any
empirical evidence which supports that education technology is more suitable for ICT, English, mathematics or science related subjects. School leaders also thought that the use of technology in every subject should be encouraged. So, I suggest some changes in national and international policies to remove the preference for science and mathematics from the mindset of the teachers and students. Besides implementing technology in the pedagogy, I also suggest Internet based regular communication among the teachers and students through e-mails and social media.

**Researcher’s Reflections**

After analyzing all the primary and secondary data, I think the integration of educational technology in Bangladesh is a part of the influence of capitalization in education. When the democratic government came into power in Bangladesh after almost sixteen years in the 90s, then Bangladesh adopted a free market economy. The GoB started receiving loans and grants in the name of ‘poverty reduction’ from the WB, IMF, ADB and other donor agencies who are known as serving the capitalism (“China and International Financial Institutions | Focus on the Global South,” n.d.). Bangladesh also had to endorse more international conventions and agendas like CEDAW, EFA, Dakar declaration, and MDG (Rabbi, 2007). As a result of the influences of these agendas, gender imparity, and poverty reduction, the illiteracy rate and dropout rate became very fundamental quality components in Bangladeshi education (MoE, 2010). Major national education policies have clearly mentioned that the intention of technological integration is to prepare skilled man power for a competitive labor market and develop their working capacity, as well as to reform the quality of education (MoE, 2010; MSICT, 2009). Moreover, inculcating more quantitative components like the poverty rate, illiteracy rate, dropout rate, and standardized assessment in the policy and curriculum in place of qualitative components is also a capitalist characteristic of education.
The analysis showed another interesting observation. Regarding policy formation, the capitalist education system mostly prefers hard policy instruments to soft policy instruments. “Hard policy is explicitly embedded in legislation, institutional objectives and commitments, and budgetary allocations. Soft policy denotes forms of codes, guidelines, and conventions which, though not binding in nature, exercise authority through persuasion, benchmarking, and the setting of best practices rather than the law (Cini, 2001, as cited in Fok, Kennedy, & Chan, 2010, p. 2).” Cini provided some examples of hard policy instruments to explain. He said that they are more assessment based than monitoring or supervision, centralized than localized, and dependent on policy rather than context. These go very well with all the recent technological initiatives in Bangladesh. Findings have shown that leaders have less of a tendency of supervising the quality components, the policy makes the training a legislative requirement for the teachers, and technological instruments like Internet and projectors are made mandatory for teaching-learning.

Educational technology is likely to support quality education. That neither means that one-hundred percent classes have to be taken by using technology nor do all the subjects have to be taken by using technology. However, there should be enough facilities and arrangements available to teachers’ hand so that they can use it whenever they feel the necessity. Every teacher should have some minimum and basic skills to use technology in classrooms.

Although a lot of government and non-government agencies are working to provide every type of support, it is hard to fulfill demand due to the shortage of resources. I think besides all the centrally controlled training programs, there can be an approach to develop a root level network among the schools, NGOs, government education officials, and teachers. They can conduct training among themselves in a cluster approach and share teaching materials. Moreover, if it can be possible to maintain such connectivity among schools and other
institutions for three to four years, then a lot of e-contents will be saved and make e-contents available for every subject.

The broader area of educational technology in Bangladesh is a clear attempt to interrelate the education policy, teaching-learning practice, and research, but the research sector seems to be less highlighted or completely ignored. So, more attention toward research is necessary for a better technological integration. In the interview, nobody said that they download e-contents or e-textbooks, but the literature review says that there are some sources for e-materials. It implies that school leaders are not still connected with the resources through the Internet.

**Implications for Future Research**

Now school leaders are accepting all types of available technologies and materials to use in the classroom. Although these audio-visual materials are highly interactive, they are not going to help if they are not contextualized from the Bangladeshi perspective, so further studies can be done to research how to contextualize technologies for Bangladeshi education.

As Bangladesh is progressing in using educational technology, research should take it to the advanced level. These research questions could ask how e-contents should be developed based on the national curriculum as well as aims and objectives of national education. How should e-contents be designed based on learning principles? From the psychological perspectives, students’ cultural and intellectual backgrounds can be highly considered to prepare digital materials. Preparing e-materials requires the examination of some principles of learning very deliberately. Principles of multimedia, contiguity, modality, redundancy, coherence, and personalization are some inevitable standards that are followed regularly to develop e-materials (Clark & Mayer, 2011).
As it is already mentioned that the technological provision is a part of capitalization, it is very important for Bangladesh to examine the effectiveness of e-materials before allowing them for classroom use. The master plan for ICT has suggested safe, effective, and sustainable technology (Save the Children, 2014). The safe and effective technology of one country cannot be the same as the safe and effective technology for Bangladesh, but the capitalist agencies will just push every country to allow every technology. Future research can protect the country from such consequences.

As the technology has been introduced recently in education, Bangladesh has not had enough chances to evaluate the output yet. All the stakeholders are working to integrate technologies in line with national plans and policies. Next, there can be some action research to evaluate both the practice and policy. Involving some teachers to do such action research will be a sensible approach. According to the findings, modifications can be done later. In general, people have feelings that technology is good, but to what extent technology should be adopted or how to balance technology with hands-on instructions can be studied next.

Weber’s model of instructional leadership has some jobs or responsibilities under five domains. Although they are related to a specified area, I think further research can be done to include the thirty-one subthemes from Chapter IV as the responsibilities of Weber’s model. Moreover, this study is done on secondary education. Further study can be conducted on primary or higher education. It can also be done on any specific subject like science, mathematics, literature or history. It can also be on any particular aspects of technology like technology-based assessment. Next, it can be on administrative leadership, government leadership or policy leadership, not just teachers and head-teachers.
Limitations of this Study

As the principal researcher, I was not present in Bangladesh to interview and collect primary data. Had I been there, I could have been asking more relevant probe questions than the interviewer. My objective was to see the technological leadership of school leaders. In order to make the data sensible, I conducted interviews in those schools where there is an educational technology related project running on, but my goal was not to judge that project at all. My interviewer also explained the expectations clearly to the interviewees before starting interviews, but still some of them might think that this research is by A2I. Then they might try to say only good things, not the real scenario. As I was not in Bangladesh, I did not get easy access to lot of books in Bangladesh. If I could read hard copies of more books on the Bangladeshi education system, then I could enhance the quality of my literature review and discussion.

To make the data sensible, I tried to interview the school leaders who have received technology related training, but being trained, teachers and head teachers are already motivated and supposed to express positive attitudes. Sometimes participants did not understand that the answers are needed to be more relevant. They were bringing so many other topics in their responses. This is also a limitation, but, at the same time, that also has an advantage. I received a variety of responses. The interviews were during school hours and they were very busy. The interviewees might not listen to every question of the interview carefully and provide mostly the similar types of answers. Moreover, generalization is not an objective in a case study. This study interviewed sixteen people of six schools from three divisions, but Bangladesh has seven divisions. Although generalization is not an objective, there is less of a chance to generalize these data.
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APPENDIX A. ACRONYMS

A2I - Access to Information
ADB – Asian Development Bank
BANBEIS - Bangladesh Bureau of Educational Information and Statistics
BCC - Bangladesh Computer Council
CEDAW - Convention on the Elimination of all Forms of Discrimination against Women
DPE - Directorate of Primary Education
DSHE - Directorate of Secondary and Higher Education
EFA - Education for All
EMIS - Educational Management Information System
GoB - Government of Bangladesh
HSTTI - Higher Secondary Teacher Training Institutes
ICT - Information Communication Technology
IMF - International Monetary Fund
MDG - Millennium Development Goal
MoE - Ministry of Education
MMC - Multimedia Classroom
MoPME - Ministry of Primary and Mass Education
MSICT - Ministry of Science and Information & Communication Technology
NAEM - National Academy for Educational Management
NAPE - National Academy for Primary Education
NCTB - National Curriculum and Textbook Board
NGO - Non-government organization
SMC - School Management Committee

TTC - Teacher Training Colleges

TQI-SEP - Teaching Quality Improvement in Secondary Education Project

UNESCO - United Nations Educational, Scientific and Cultural Organization

UNDP - United Nations Development Programme.

WB - World Bank
APPENDIX B. HSRB APPROVAL

DATE: January 8, 2016

TO: Md. Niaz Morshed, Masters

FROM: Bowling Green State University Human Subjects Review Board

PROJECT TITLE: [825570-5] Principals’ and teachers’ leadership role to integrate technology in secondary education classroom to ensure quality education in Bangladesh.

SUBMISSION TYPE: Revision

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: January 8, 2016

REVIEW CATEGORY: Exemption category # 2

Thank you for your submission of Revision materials for this project. The Bowling Green State University Human Subjects Review Board has determined this project is exempt from IRB review according to federal regulations AND that the proposed research has met the principles outlined in the Belmont Report. You may now begin the research activities.

Note that an amendment may not be made to exempt research because of the possibility that proposed changes may change the research in such a way that it is no longer meets the criteria for exemption. A new application must be submitted and reviewed prior to modifying the research activity, unless the researcher believes that the change must be made to prevent harm to participants. In these cases, the Office of Research Compliance must be notified as soon as practicable.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact Kristin Hagemyer at 419-372-7716 or khagemy@bgsu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Bowling Green State University Human Subjects Review Board’s records.
Appendix C. Consent Letter

BGSU
Bowling Green State University
School of Educational Foundations, Leadership & Policy

Letter of Informed Consent: Participants (Principals and Teachers)

Title of the Thesis: Principals’ and teachers’ leadership role to integrate technology in secondary education classroom to ensure quality education in Bangladesh.

Introduction:
My name is Md. Niaz Morshed and I am a Master of Arts student in the Cross-Cultural and International Education program as well as a Graduate Research Assistant in Bowling Green State University at Ohio in the USA. With the help of my advisor Dr. Bruce Collet, I am now doing my thesis. My research topic surrounds principals’ and teachers’ roles and daily activities regarding the technology integration in Bangladeshi secondary school classroom and how technology is contributing to quality education. You are being requested to take part in this study because you are a teacher or principal in a secondary school where you are using multimedia classrooms. However, you must be at least 18 years of age in order to participate in this study.

Purpose:
Purpose of this study is to examine how secondary school principals and teachers are performing their leadership role to integrate technology in classroom. It aimed more to relate how these are ensuring quality education in Bangladesh. The benefit to education system is that it will help us better understand the current stances of our schools leaders about the technology integration in classroom and how policy makers can better respond if any modifications are needed there. It is supposed to identify some areas where our school leaders are lacking skill, knowledge or capacity. It may help related stakeholders to prioritize different aspects of ICT projects which require more attention in Bangladesh. Moreover, though data collection process does not involve any monetary compensation, as a direct benefit to a participant of this study a nice writing pen will be given as a compensation or gift. This gift will be given for participation, not for the completion of the participation. So, participants can withdraw from the survey at any time and still receive their full compensation.

Procedure:
This one-to-one interview will take approximately 35-40 minutes to complete. This consent form is for the entire interview which includes three parts: demographics survey, survey, and semi-structured questionnaire. Most of the primary data will come directly from this interview. With the permission of the participant, interview will be audio taped against participant’s code, not his/her name. Data will be recorded with a digital recorder and the recorder and microphone will be visible at all times during the interview, and you may elect to stop the audio recording or stop the interview at any time during the process. To secure the confidentiality, an interview code as opposed to the participant’s name will be recorded at the beginning of the interview. All data will be stored electronically and no one other than the research team will have any access to the data obtained. Additionally, no names or individual subject identifiers will be associated with the data in the report. When you agree with this consent agreement then the agreement will be applicable for all three parts of this interview. Please sign two copies of the consent forms and keep one of them for yourself. After the interview, this will be the end of your involvement, unless you are willing to be contacted for a follow-up interview with the researcher. In the follow-up interview the interviewer may need some clarifications or further elaborations if any of the responses are incomplete. Some of the answers might interest the researcher to dig more to get more saturated, significant and meaningful data. Researcher might need to sit again with the participant to get rid of ambiguity in some data. If you agree to be contacted for a follow-up, which is completely optional, please provide your contact information at the end of this consent form. The principal researcher (Md. Niaz Morshed) may contact you later if he needs further clarifications.

550 Education
Bowling Green, OH 43403-0250
Phone: 419-372-7377
Fax: 419-372-8448
BGSU HSRB - APPROVED FOR USE
IRBNet ID # 325970
EFFECTIVE 01/08/2016
Voluntary Nature:

Your participation in this study is completely optional. You are free to leave the study at any time. You may decide to skip questions, avoid discussion certain topics, or participate at any time without penalty, and at any point during the interview. Deciding to participate or not will not affect your enrollment or your relationship with your school, ‘A2i (Access to Information)’ program or Bowling Green State University.

Confidentiality/Anonymity Protection:

The research data collected during this project will be safely stored in a locked container in a secure location, and when compiled electronically, the data will be protected on password-protected computer. The principal research and his faculty advisor (Bruce A. Collet, PhD) will be the only two individuals who will have access to the data, which will be kept until the completion of the study and destroyed four years after the completion of the study.

Your responses may be quoted directly in research report, but they will be associated with your demographics rather than your identity. There will be a code on the top-right corner of the interview and the consent form. There will be the same code in both places for each particular participant. Thus the data will be organized under codes, not participant’s name. You need to provide name and signature at the end of this form to testify your voluntary participation. In that case your data will not be anonymous. But your name will never be mentioned or associated with your responses in any publication or report and your identity will be kept highly confidential.

Risks:
The risk of participation is no greater than that experience in daily life. However if you feel uncomfortable, you may decide to skip questions, quit at any time or choose not to complete the interview. You can throw away the survey or question paper if you decide not to participate - it does not need to be returned to the researchers.

Contact Information:

If you have question any question about the research or your participation in the research, please contact Md. Niaz Morshed at +1-419-377-9141 or mdniazm@bgwu.edu or the faculty advisor of this project, Bruce A. Collet, PhD., at +1-419-372-7354 or colleba@bgwu.edu. You may also contact the Chair, Human Subject Review Board, at +1-419-372-777 or hsrb@bgwu.edu, if you have any question about your rights as a participant in this research. Thank you for your time.

Consent to Participate:

I have been informed of the purpose, procedures, risks and benefits of this study. I have had the opportunity to have all my questions answered and I have been informed that my participation is completely voluntary. I agree to participate in this research and I allow to tape record my interview.

Full Name: ___________________________ Signature and Date: ___________________________

Optional:

If you would also be willing to potentially be contacted for a follow-up interview with the principal researcher, Md. Niaz Morshed, please provide your contact information as follows:

Phone Number: ___________________________

Email address: ___________________________
APPENDIX D. DATA COLLECTION TOOL FOR HEAD TEACHERS

Thesis Title

Quality education in Bangladesh: Leadership roles of school heads and teachers to integrate technology in secondary school classrooms

Demographic Survey

1. Gender: a) Female   b) Male  c) Others
2. Age: __________ years old
3. Position: a) Teacher  b) Principal / Head Teacher
4. School environment where you teach: a) Urban  b) Suburban  c) Rural  d) Other
5. Level of Education: a) HSC  b) Bachelor  c) Masters  d) Others
6. Teaching Experience: ________________ years

7. Teaching Age Group: (Check all that apply)

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8. Teaching specialty: (Check all that apply)

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<td>Agriculture Studies</td>
<td>Art and Crafts</td>
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<td>None</td>
<td>Others ________________</td>
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Survey

1. What are the functioning technical materials that your Multimedia Classrooms (MMC) have? (Check all that apply)
   - Modem
   - Computer
   - Projector
   - Screen
   - Speaker/ Sound box
   - Others
2. How many functioning computers does your school have?
   Answer:

3. What percentage of your students can use the computers?
   Answer:

4. Do you think that MMC contributes to higher quality education for students?
   Yes
   No
   Others ___________________________________________

5. MMC contributes to the student’s education in the following ways: (Check all that apply)
   • Raises classroom interaction
   • Increases active participation
   • Enhance students test scores on exams
   • Reduces learning difficulty
   • Makes an effective and enjoyable learning environment
   • Achieves higher learning competencies
   • Decreases students’ dropout rate
   • Increases students’ enrollment rate
   • Uplifts attendance rate
   • None of the above
   • Others __________________

6. Computer technology in our school is used to: (Check all that apply)
   • Develop e-content
   • Present e-content in class
   • Collect information through the internet to use in the classroom
   • Keep attendance in spreadsheet
   • Maintain student grades in spreadsheet
   • Make Power Point presentations in the classroom
   • Organize information
   • Create instructional handouts
   • Create or use graphs and charts
   • Use Microsoft Word for doing assignments
   • Collect audio, video, and animation
   • Collect or use images and maps
   • None of the above
   • Others __________________

7. Please identify the problems related to the use of computer technology in your school:
   (Check all that apply)
• Insufficient infrastructural support
• Not enough appropriate training for teachers
• Lack of instructional materials
• Not enough expert teachers
• Insufficient funding
• Non-tech or hands-on learning is more engaging than the technology-based learning in the classroom
• Technology does not enable learning as well as non-tech or hands-on teaching
• Teachers feel more comfortable with hands-on teaching rather than using technology
• Using technology in the classroom is a distraction for students
• None of the above
• Others ________________________

8. How does MMC assist teachers in the classroom? (Check all that apply)

• Enhances teaching capacity
• Reduces teacher’s workload
• Creates easy to learn materials for students
• Helps to organize lessons
• Reduces costs in the classroom
• Shortens the amount of time the teacher spends on preparation
• Increases student’s level of understanding
• Using technology-based assessment for the students
• Reduces teaching problems
• None of the above
• Others ________________________

9. What training have you received on classroom technology integration?

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<th>Name of Training</th>
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10. What are the subjects that students prefer to learn by using technology? (Check all that apply)
Check | Mathematics
---|---
Science | Bangla
English | Business Studies
Bangladesh and Global Studies | Information Communication Technology
Religion and Moral Education | Home Science
Physical Education and Health | Art and Crafts
Agriculture Studies | Others ______________
None | Others ______________

11. How frequently do teachers use technology in the class?
   - 100% of their classes (every class)
   - 75% of their classes (3 out of 4 classes)
   - 50% of their classes
   - 25% of their classes
   - Others ________________
   - Never

12. What is your attitude towards using technology for classroom teaching? (Check all that apply)
   - I am interested in promoting the use of technology in the classroom
   - I am not interested in promoting the use of technology in the classroom
   - I believe that teachers are comfortable using technology
   - I believe that teachers are not comfortable using technology
   - I am excited to learn how to use new technology for the classroom
   - Learning new technology is confusing to me
   - I am confident with my ability to troubleshoot when problems arise while using technology
   - I am anxious when using new technologies because I do not know what to do if something goes wrong
   - Students learn easily when technology is used to deliver lessons or content
   - Students learn better when technology is not used in lessons or content
   - Others ________________

Semi-Structured Interview

Vision and Plan
1. What visions or plans are your school implementing to ensure quality education through Multimedia Classroom (MMC)?
A. How do these goals ensure quality education in classroom?
B. To what extent have these goals been achieved?
C. In what areas have these goals not been achieved?

2. What do you do to communicate your school’s classroom technology goals or plans to your school’s stakeholders (teachers, students, staffs etc)?
   A. What are the problems that you see when you communicate these visions?
   B. To what extent are your teachers and students interested in achieving these goals?
   C. What changes to these goals will better ensure quality education in the classroom?

Learning, Teaching and Professional Development

3. What are the roles that you play in making assistance available to teachers to develop and present e-content in their Multimedia Classrooms (MMC)?
   A. Do you receive enough support from the government and teachers to make assistance available to all?
   B. What types of problems do you face to while provide the assistance?
   C. How do you overcome these problems?

4. What role do you play to promote teachers’ professional development in using Multimedia Classroom (MMC)?
   A. What are the roles that you play to ensure that your teachers have proper or adequate training to make effective use of technology in the classroom?
   B. Are the teachers interested in their professional development for the use of technology in the classroom?
   C. What are the barriers that inhibit teachers’ professional development in the use of classroom technology?

Managing Curriculum and Instruction

5. What are the management roles that you play to ensure quality education through Multimedia Classroom (MMC)?
   A. Do you supervise and monitor Multimedia Classroom (MMC)? How?
   B. Do you oversee students’ and teachers’ performance record using technology? How?
   C. How do you prioritize the allocations of funds?
   D. How frequently do you upgrade, repair or replace your computer hardware and software?

6. What types of problems or challenges do you face regarding the management of Multimedia Classroom (MMC)?
   A. How do you solve these problems?
   B. What are the causes of the problems?
   C. What else could be done for the development of the management of MMC?
Assessment and Evaluation
7. What role do you play in promoting technology-based assessment system to evaluate teachers’ and students’ performance?
   A. Does the technology-based assessment have any impact in ensuring quality of education?
   B. What type of assessment is more suitable to ensure quality education: technology-based or hands-on?
   C. To what extent did you include the effective use of technology as a criterion for assessing the performance of teachers?

Attitude and Comfort with Technology
8. Do you feel that the Multimedia Classroom (MMC) are necessary or effective to ensure quality education?
   A. Are Multimedia classrooms effective from the perspective of your school’s infrastructure, man-power, resources, teachers, and students?
   B. Is technology-based or hands-on teaching-learning more suitable for your school?
   C. Do you promote the best practices of technology with rewards or encouragements for teachers or students?

9. To what extent are the teachers and students comfortable or satisfied with the use of Multimedia Classroom (MMC)?
   A. What are the suitable subjects or areas that teachers and students are interested or comfortable in using technology?
   B. When are they not interested or comfortable?
   C. Do you play any role in making them interested in or comfortable with technology?
APPENDIX E. DATA COLLECTION TOOL FOR TEACHERS

Thesis Title

Quality education in Bangladesh: Leadership roles of school heads and teachers to integrate technology in secondary school classrooms

Demographic Survey

1. Gender: a) Female  b) Male  c) Others
2. Age: ___________ years old
3. Position: a) Teacher  b) Principal /Head Teacher
4. School environment where you teach: a) Urban  b) Suburban  c) Rural  d) Other
5. Level of Education: a) HSC  b) Bachelor  c) Masters  d) Others
6. Teaching Experience: _________________ years

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   • Others ________
2. How many functioning computers does your school have?
   Answer:
3. How many students can use the computers?
   Answer:
4. Do you think that MMC contributes to higher quality education for students?
   Yes
   No
   Others _______________________________
5. MMC contributes to the student’s quality education in the following ways: (Check all that apply)
   • Raise classroom interaction
   • Increases active participation
   • Enhance students test scores on exams
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   • Decreases students’ dropout rate
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   • Uplifts attendance rate
   • None of the above
   • Others ________________
6. Computer technology in our school is used to: (Check all that apply)
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7. Please identify the problems related to the use of computer technology in your school:
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• Teachers feel more comfortable with hands-on teaching rather than using technology
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• None of the above
• Other _____________________

8. How does MMC assist teachers in the classroom? (Check all that apply)

• Enhances teaching capacity
• Reduces teacher’s workload
• Creates easy to learn materials for students
• Helps to organize lessons
• Reduces costs in the classroom
• Shortens the amount of time the teacher spends on preparation
• Increases student’s level of understanding
• The technology can be used to evaluate the students
• Reduces teaching problems
• None of the above
• Others _____________________

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10. Which subjects do students prefer to learn by using technology? (Check all that apply)

• Science
• Math
• English
• Bangla
• Bangladesh and global studies
• Business studies
• Agriculture studies
• Home science
• Physical education and health
• Religion and moral education
• Art and craft
• Information and communication technology (ICT)
• None
• Others ________________

11. How frequently do you use technology in your class?
• 100 % of their classes (every class)
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• 50% of their classes
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• Others ____________________

Semi-Structured Interview

Vision and Plan
1. What visions or plans are your school implementing to ensure quality education through Multimedia Classroom (MMC)?
   A How do these goals ensure quality education in classroom?
   B To what extent have these goals been achieved?
   C In what areas have these goals not been achieved?

2. What role do you play to implement these visions or plans?
   A To what extent are your students and principal assisting you to achieve these technology integration goals?
   B What are the problems you that you face when you communicate these visions to other stakeholders (teachers, students, staffs etc)?
   C What changes to these goals will better ensure quality education in the classroom?

Learning, Teaching and Professional Development

3. What types of assistance is made available to you to develop and present e-contents in your Multimedia Classroom (MMC)?
   A Have you received enough support to make an adequate use of technology in classroom?
   B When do you get no assistance?
   C What do you do to overcome these limitations?

4. How do you create an effective teaching and learning environment by using technology in the classrooms?
   A Does technology assist students to learn easily and effectively?
   B What are the barriers that inhibit teachers’ professional development in the use of classroom technology?
   C What do you suggest for teachers’ professional development in the use of classroom technology?

Managing Curriculum and Instruction

5. What types of support at management level do you receive to ensure quality education through Multimedia Classroom (MMC)?
   A How do you supervise and monitor Multimedia Classroom (MMC) to enhance teaching and learning?
   B To what extent have you received the funding support for the use of technology?
   C How frequently the computer hardware and software are upgraded, replaced or repaired?

6. What are the management roles that you play for students’ better learning achievements in Multimedia Classroom (MMC)?
   A How do you manage all the technological assistance that you receive to enhance teaching and learning in the classroom?
B How do you manage the curriculum and instructions with the technology?
C What are the suggestions you have for the managerial improvement of the Multimedia Classroom (MMC)?

Assessment and Evaluation

7. What role do you play in promoting technology-based assessment system to evaluate students’ performance?
   A Do you use technology-based assessment system to evaluate students’ performance?
   B Does the technology-based assessment have any impact in ensuring quality of education?
   C What type of assessment is more suitable to ensure quality education: technology-based or hands-on?

Attitude and Comfort with Technology

8. Do you feel that Multimedia Classroom (MMC) are necessary or effective to ensure quality education?
   A Are Multimedia Classrooms (MMC) effective from the perspective of your school’s infrastructure, man-power, resources, teachers, and students?
   B Is technology-based or hands-on teaching-learning more suitable for your school?
   C Are any technology related best practices by teachers or students promoted with rewards or encouragements?

9. To what extent are the teachers and students comfortable or satisfied with the use of Multimedia Classroom (MMC)?
   A What are the suitable subjects or areas that your students or colleague teachers are interested or comfortable in using technology?
   B When are they not interested or comfortable?
   C Do you play any roles in making them interested in or comfortable with technology?