Teaching-Learning Practices of Information and Communication Technology in Secondary Schools of Bangladesh

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Abstract

In Bangladesh, secondary school curricula have made Information and Communication Technology (ICT) education compulsory considering the importance of technology and innovation. Students' performance varies highly across schools compared to within school. This study is conducted in an effort to know what teachers accomplish in ICT classes. The study follows a qualitative research design. 5 ICT teachers and 250 students from 5 secondary schools of Dhaka city were chosen as sample. Data were collected from students and teachers through semi-structured questionnaire, interviews and classroom observations. The major findings of this study reveal that teachers practice mostly lecture, demonstration and book reading method in ICT classes to engage the students in teaching-learning process. Moreover, students are given feedback based on individual assessment. Furthermore, most of the schools have sufficient infrastructure to conduct laboratory work and sometimes practical classes are taken in ICT labs. It is asserted that ICT teachers are punctual to prepare lesson plans and use text books as well as e-learning resources for preparation. However, further study is suggested to explore the overall scenario of ICT teaching learning practices in secondary level education of Bangladesh by comparing rural and urban secondary schools in large scale.

Keywords: teaching-learning, ICT, secondary schools

1. Introduction

Information and Communication Technology (ICT) can impact student learning when teachers are digitally literate and understand how to integrate it into the curriculum. Now a days, ICT has become integral to the teaching-learning process replacing chalkboards with interactive digital whiteboards as well as for "flipped classroom" model where students watch lectures at home on the computer and use classroom time for more interactive exercises. As such, "One Laptop per Child" (OLPC) initiative had been taken by the United Nations Educational, Scientific and Cultural Organization (UNESCO) to close the digital gap between developed and developing nations on the use of ICT. In this regard, Bangladesh, like many other countries, is investing heavily in the education system considering it as one of the core strategies to alleviate poverty and facilitate development including raising the ICT skills of Bangladeshis and moving towards the information society (Rahman 2010). With the development of ICT and its use in education, the developed countries have brought positive changes in classroom teaching-learning. In this circumstance, it is necessary to introduce and properly use ICT in all the levels of education including secondary education level to raise the quality of education in Bangladesh.

In Bangladesh, ICT education has become compulsory in the secondary level considering the importance and demands. Lack of basic infrastructure needed for ICT as well as shortage of skilled and dedicated teacher in ICT teaching leaning in secondary schools are the major challenges to achieve the expected benchmark (Tithi et al. 2017). The performance of the students, measured by the marks obtained in the Secondary School Certificate (SSC) examination, varies over a wide range from very poor to satisfactory level. In an effort the study attempts to explore the effective teaching-learning practices of ICT teachers in secondary level in Dhaka city. The study

also aims to identify present practice, approaches and strategies that teachers use in secondary level ICT classroom which can help the students to improve the quality of learning.

2. Purpose and Research Questions of Study

The study wants to explore what activities are done by the teachers in secondary level ICT classes to help students to learn ICT effectively. This research will answer to the following research questions mainly:

i.   How do the teachers teach ICT to their students in secondary school classrooms?
ii. How do teachers' teaching practice help students to learn ICT at secondary level?

3. Literature Review

ICTs stand for information and communication technologies and are defined, for the purpose of this primer, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information" (Blurton 2002). Collins (2018) stated that ICT refers to activities or studies involving computers and other electronic technology including internet, broadcasting technologies (radio and television), and telephony. ICT is generally used to represent a broader, more comprehensive list of all components related to computer and digital technologies than IT.

The findings of prior studies indicate that ICT can lead to improve students' learning and ensure better teaching methods. A report of National Institute of Multimedia Education, Japan (2009) showed that an increase in student exposure to educational ICT through curriculum integration has a significant and positive impact on student achievement, especially in terms of "Knowledge" and "Comprehension"· The Organization for Economic Co-operation and Development suggests that we live in a "Knowledge Economy", hence we need to think carefully distinct types of knowledge: "know what", "know why", "know how" and "know who". In this connection, some schools that are technologically sound have adopted programs which focus on "Learning to learn" and "Enquiry based learning" which move learning away from simple subject knowledge to higher level thinking skills in all subjects. It is not about excessive concentration on ICT skills, but allowing those skills to support the delivery of a much wider and more relevant curriculum (Allen, 2018).

To cope with the demand of 21st century, National ICT policy of Bangladesh, revised in 2015 (framed in 2009), perceived ICT as means of holistic development of the nation. In addition, to produce a skilled workforce, Bangladesh developed a modern education policy 2010 where integration of ICT in education got importance. The policy intended to bring necessary reforms in curriculum, pedagogy and teachers' capacity building where ICT would be an effective tool. This includes provision of ICT literacy to the teachers and learners of primary, secondary, and tertiary levels. According to the policy, the government intends to extend the use of information and communication technology (ICT) instrumental in education process at every level. The policy reminded the curriculum and material developers to accommodate ICT in the teaching-learning process which has resulted in inclusion of ICT courses in the curriculum of different education levels and teacher training programs. As a consequence, the government has initiated Access to Information (a2i) project to enhance pedagogic improvement process by establishing Multimedia Classrooms (MMCs) at secondary schools, providing training of teachers on making ICT aided educational contents on hard-to-grasp topics and making electronic versions of the textbooks. In order to establish MMCs in schools, the government has provided ICT devices such as laptops and internet connections from early 2010. As of 2015, nearly 72% of the secondary schools got multimedia facilities and about 82% got computer facilities. Computer teachers were available in 61% of all secondary schools. Up to 2013, 18,500 secondary teachers received training on preparing digital multimedia contents independently (Babu & Nath 2017).

Technological Pedagogical Content Knowledge (TPACK) framework of (Mishra & Koehler 2006) identifies teachers need to teach content (knowledge) effectively with technology. Angeli & Valanides (2013) added that TPACK stands for the idea that what teachers knows about effective teaching, their subject matter and educational technology must be used together for them to be successful in their classrooms supporting students learning. It is widely acknowledged that teachers' educational beliefs are reliable indicators of their planning, instructional designs and classroom practices (Bandura 1989; Pajares 1992). In other words, training for teachers is one of the essential elements to implement ICT in classroom as well as to solve the pedagogical issues for the teachers. Changing attitude to use ICT in classroom activities can be influenced by some other factors like ICT competence, computer self-efficacy, government policy on ICT literacy and infrastructure facilities. Besides these, teaching experience, educational level, professional development, accessibility, technical support, the

leadership of the head teacher, the pressure to use ICT can also play a vital role in implementation (Ali et al. 2013).

In developed countries, teachers and experts are giving more importance on using ICT in classroom practices than the developing nations. Most of the teachers use internet to get access to information to upraise their knowledge which they can utilize while delivering lectures and preparing handouts or materials for the class. More than 50% teachers in EU believe that mobiles, digital games, and social technologies are important for teaching and learning (Cachia et al. 2010). Almost two-third of teachers of Europe agreed that they are guided for combining ICT and innovative teaching (Cachia et al. 2010). In Ireland, some schools have the facilities to handle ICT for every subject in the classroom, and some schools use the common room like computer lab to conduct a class with ICT facilities (Flanagan, 2008). Though many of the countries in Asia and Pacific region have developed policies on teacher training on ICT, they need to link the policies with the broader perspective of ICT for development and education goals (UNESCO 2004). In Malaysia, teachers who are genuinely interested in using ICT in classroom practice are trained. Trained teachers share their idea and learning with other teachers of the same or another school and motivate them continuously to integrate ICT in the teaching-learning process (Gutterman et al. 2009).

Some case studies have especially examined the impact of using ICT on the changes in pedagogical practices. ICT skills were taught in a context integrated into the curriculum and as part of complex skills like information handling, collaboration and communication, in an authentic context (Kozma 2003; Voogt & Pelgrum 2005). The teacher's role shifted from that of primary source of information to facilitator of providing advice for students, monitoring their progress, assessing their accomplishments (Condie et al. 2007; Kozma 2003; Lowther et al. 2003; Yuen et al. 2004) considering the nature of the teacher's role has the strongest impact on the student's learning outcomes (Yuen et al. 2004). Bullard (2003) believes that applying constructivist principles in the teaching and learning process will generate a new way of teaching with computers, constituting a shift from a teacher-centered to learner-centered pedagogy.

The U.S. Department of Education (2010) urges that the content and structure of education must effectively integrate technology in order to adequately prepare students to live and act in the world in which they are growing up. Voogt & Pelgrum (2005) supported the idea that curriculum needs to be reformed for students to develop competencies that will help them to survive in this 21st century. However, there is a need for rigorous academic research that identifies how digital education can be deliberately and effectively used to positively transform teaching and learning across subject matter areas.

4. Methodology

The study follows a qualitative research design. A total of 5 ICT teachers and 250 students from five secondary schools of Dhaka city were chosen as sample through purposive sampling technique. A questionnaire was used to collect data from students whereas data from teachers were collected through interviews. An observation schedule, combination of checklist and field note approach was used to collect detailed description and significant evidence for exploring the real scenario of classrooms. Researchers observed every classroom procedure for two times and took necessary notes based on need.

The data and evidence of this study were analyzed basically through thematic analysis. Data from classroom observation, field note, interview of teachers and questionnaire from the students were analyzed in narrative form. The qualitative data is presented based on the significant emerged themes and concepts. A small portion of quantitative analysis was also used to specify and draw attention to some qualitative data. The quantitative data was analyzed with the help of descriptive statistics. Validation of data was examined through triangulation of methods by comparing students' perception, teachers' perspective and classroom observation.

5. Findings

The findings of the study consist of exploratory data of teaching-learning practices in ICT classes along with ICT feasibility of the mentioned schools.

Table 1. Responses from Student

	Yes	No
Motivation in teaching-learning Process	96%	4%
Engagement in teaching-learning Process	70%	30%
Participation of all students in assessment	74%	26%
Feedback is provided by their teacher after assessment in the classroom	96%	4%
Having sufficient opportunity in ICT labs	61%	39%
Regularity of ICT class	86%	14%
ICT class is taken by assigned subject teacher regularly	96%	4%

According to Table 1, scarcity of ICT infrastructure in laboratory along with students' engagement in teaching-learning process as well as assessment were major concerns to ensure efficacy. In addition, Absenteeism of regular practical and poor motivation are founded in ICT classroom practices (Table 2).

Table 2. Findings from classroom observation of ICT classes

Determination of learning objectives	Yes	100.0%
	No	0%
Participatory teaching-learning	Yes	100.0%
	No	0%
Motivation in the classroom	Yes	66.7%
	No	11.1%
	No comments	22.2%
Conducting practical work	Yes	33.0%
	No	11.1%
	No comments	55.6%
Any feedback	Yes	88.9%
	No	11.1%
Attaining learning outcome	Yes	66.7%
	No	11.1%
	No comments	22.2%
Assessment pattern	Closed	33.30%
	Open	66.70%
Examine prior knowledge	Yes	66.70%
	No	33.30%
Assessment by	Group	33.30%
	Individual	66.70%

In the support of quantitative data some qualitative data were collected, which disclosed that teaching-learning methods and techniques were selected on the basis of specific topic rather adopting common strategy. In most of the cases, participatory methods were adopted and classes were conducted through lectures, demonstrations etc. It was found that in most of the cases, teachers conducted ICT class based on lesson plan. Teachers mostly used text book, pictures within text book, digital material (power point slide) as teaching aids. In some occasions, practical classes were conducted to enrich students' learning.

Teacher$_1$ expressed,

> I believe in student-centered teaching-learning activities. Because student's learning outcome can be higher if the teaching-learning is conducted in student-friendly environment. Though ICT is a technical subject, I always try to teach the student in a joyful manner and make students active in the classroom by applying question-answer method. I conduct practical class by hands on activities in ICT lab.

Some of the teachers played the role of advocate on importance of learning ICT in present era to motivate the students to be attentive. For the clear understanding of particular topic, storytelling method relating to real life examples was also used. As it was tough to evaluate learning outcome of all students, some of them were drawn as samples and then got assessed. For assessing student's learning outcome of theoretical part, teachers preferred both written and oral question-answer method, while, for practical part, lab practical test was conducted in ICT Lab. To ensure formative assessment of all students, class works & home works were given to students. If any student failed to understand the topic properly, teacher re-discussed and recapped the topic by peer or group discussion. In addition, some of the teachers tried to re-instruct lessons as remedial steps until the student achieve satisfactory outcome. Teacher$_2$ disclosed that,

> If any student needs further discussion to understand the topic clearly I always try to recap the topic by myself or by peer/ group discussion until he/ she gets the topic properly. To assess the student's learning outcome I use written test and homework or class work and evaluate them by formative assessment in the classroom.

On the contrary, one of the teachers claimed that 'sometimes it feels so challenging to ensure all students' participation in the classroom and assess their learning outcomes in a short period of time'. According to the data, most of the teachers used self-observation, self-motivation and peer-reflection with other teachers in the school to improve their teaching quality. Some of the teachers also assessed their performance by getting question-answers from the students for further improvement. Some teachers facilitate teaching-learning activities and let students to conduct the class to them responsible for effective group learning. Teacher$_3$ claimed,

> As we are living in a technology based civilization, I try to do advocacy on ICT literacy and other ICT skills focusing on the importance of ICT in present era. I always try to be punctual and responsible to maintain discipline in classroom management which is most important to achieve the expected learning outcome of the students.

6. Discussion

The data revealed that in most cases teachers use only book reading technique to engage the students in the teaching-learning process. This data discloses that the teaching learning activities of ICT class are mostly teacher-oriented in these schools. In contrary, according to March (2006), higher order goals such as the development of critical thinking or autonomous learning can achieved more effectively and appropriately through student-centered methods ensuring maximization of students' participation. Further, some studies show that using active learning can improve student's results in certain fields of knowledge (Freeman et al. 2014). Besides, According to Githua and Mwangi (2003), academic self-concept and students' motivation are important factors to influence student learning. We found that teachers try to motivate students to achieve learning objectives.

The study reveals that teachers prepare lesson plan regularly before the class and they take preparation about content knowledge from text book as well as e-learning resources. Besides, teachers conduct ICT class based on lesson plan. The mostly used teaching aids in ICT class include text book, picture in text book, multimedia materials like projector. According to Yuen et al. (2004), teacher's role has the strongest impact on the student's role, and thus for the learning outcomes. Besides, oral and written tests are used to assess the student's learning outcome individually by using Q/A technique. Open and closed both assessments are found in these schools. Usually feedback is provided by written or oral instruction. In this support, Cotton (2001) outlined that

instruction which includes posing questions is more effective in producing achievement gains than instruction carried out without questioning students'.

According to demographic data, most of the teachers have professional degrees and training. Moreover, participant teachers claimed that learning objectives are achieved and in most of the cases learning outcomes are achieved also in classroom practices. Flanagan (2008) commented the teacher's motivation to use ICT in the classroom highly depends on their competency. The study further investigates that ICT subject is not fearful to the students at all. If any student feels unsatisfactory or fails to understand the topic properly, teacher re-discusses and recaps the topic by peer or group discussion. Mishra and Koelher (2006) added that students can receive incorrect information and develop misconception in the subject area at the cost of not having a comprehensive content knowledge. Previous studies have found that limited ICT capacities make trouble to use ICT in a classroom (Kennewell et al. 2000; Chigona & Chigona 2010; UNESCO 2002; Zhao & Cziko 2001). Our data further disclosed that most of the schools have sufficient infrastructure to conduct ICT lab and sometimes practical classes are taken in ICT lab.

7. Limitation of the study

It should be noted that participants' selection were based on purposive sampling techniques instead of being random. A different scenario and perspective could be found if the schools from rural areas of Bangladesh could be reported on. The infrastructural capabilities and resources of rural schools usually varies from those of secondary schools of urban areas. So, further study is suggested to explore the overall scenario of ICT teaching-learning practices in secondary level education in Bangladesh comparing rural and urban secondary schools in large scale.

8. Conclusion

Based on the findings above, we can conclude that most of the teachers conducted classes guided by lesion plans and also achieved learning outcomes in teaching-learning activities. However, ICT lab classes were taken place occasionally. To ensure students' active participation in teaching-learning process as well as assessment shifting towards student-centered approach from teacher-centered approach is highly appreciated.

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