

Measuring the Performance of e-Primary School Systems in Bangladesh

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Abstract—The government of Bangladesh (GoB) recently have introduced the concept of Digital Bangladesh. Education is one of the most vital sectors to make the digital nation. For that reason, the GoB has started to convert primary to e-primary schools. The main objective of this study is to investigate the current Information and Communication Technology (ICT) implementation status in e-primary schools by the GoB. The study is quantitative in nature. The study also develops an ICT implementation status model from the e-primary school systems in Bangladesh. This model has identified the ICT equipment, analyzed the ICT support & equipment, given weighted to each factor and investigated the current state of ICT implementation of e-primary schools in Bangladesh. The study has taken 800 sample schools from 8 divisions to investigate the current ICT implementation status. The study suggested that before implementing the ICT they will make sure all the infrastructure of ICT is available in those primary schools.

Index Terms—Information Communication Technology (ICT), e-Primary Schools, Digital Education, e-School Model, Government of Bangladesh (GOB)

I. INTRODUCTION

Bangladesh could be a country with an outsized pool of intelligent citizens are often become a valuable human resource with correct education. solely correct education will create a correct, civilized and developed nation [1]. To reform our education sector, arrange the schoolroom surroundings and redesigning the tools of learning is a vital hub [2] easy the data & Communication Technology (ICT) accelerated reform has been given the utmost importance, as a results of its state and price effectiveness. Being (Government of Bangladesh) GoB's flagship ICT for Development program has so been chosen to guide the reform through ICT primarily based education initiatives [3]. The governments and educators all round

the world have recognized or returning to acknowledge the exceptional promise of ICT to foster teaching and learning within the previous decades [4].

The role of ICT within the education sector plays a vital role [5] particularly within the method of empowering the technology into the tutorial activities [6]. This sector is often the foremost effective sector to anticipate and eliminate the negative impact of ICT [7]. Technology are often the foremost effective thanks to increase the student's [8] information and sophistication area participation [9]. Usage of ICT in education adds price in teaching and learning by enhancing the effectiveness of learning method [10]. ICT additional a singular dimension to be told that wasn't antecedently accessible in our country [11], once the beginning of ICT in faculties was started [12], students found learning in an exceedingly technology [13] increased surroundings a lot of stimulating and fascinating than in exceedingly ancient schoolroom surroundings [14].

The new economic and social manner of handling [15] the speedy development of knowledge and communication technologies (ICT) and their wide usage all told areas of life provoke new necessities and changes in education [16] . For many decades computers were remodeled from exotic tools into the image of the society and its progress [17], the foremost necessary part of latest education is that the initial forming and development of competences that give a high level of realization of temperament in very competitive surroundings with relevancy solid information, intelligence [18] , mobility, ability, entrepreneurship, and confidence[19] in one's own talents [20]. A competent individual is ready to mix information, skills and attitudes, and to use and create use of previous [21]. National ICT policy of Bangladesh framed in 2009, perceived ICT as suggests that of holistic development of the state [15,16]. ICT based mostly education for the long run must accommodate ever-changing views of technology and its teaching, and ever-changing views of skilled development [22]. The

National Education Policy, 2010 meant to bring necessary reforms in course of study, pedagogy and teachers' capability building wherever ICT would be an efficient tool [23].

Education system is being progressed for creating [24] science-based, pro-active generation [25], non-communal and progressive nation by increasing the literacy rate of 100 percent, developing digital Bangladesh, by spreading education and improving its quality, Bangladesh has already been promoted to a middle-income nation all over the world [26]. The use of information and communication technologies (ICT) in the education system in accordance with other countries [27], make it modern and work-oriented for proper education [28]. Now, the ruling government has already been worked vastly in every wings of education in the mood of ICT oriented facilities [29], such as, Multimedia classroom have been started in 4 thousand and 500 primary schools and 33 thousand secondary [21], higher secondary and higher level institutions, 21 lakhs teachers are engaged with this system and 7.5 million students are getting better classroom performance of teaching-learning techniques [30]. Near about 20,000 computer labs have been set up, 1700 computers have already been supplied to the institutions and many teachers have been given foreign training on ICT, ICT Training and Resource Center (UTTRCE) in 125 upazilas has been established, from this ICT Center 37 [31] thousand teachers have been given ICT training in the year 2017 and 2018, computer lab have been set up in 3,544 educational institutions since 2009, computer education has been compulsory for secondary and higher secondary/equivalent level [32], to encourage education and information technology 17 ICT mobile van launched [33], 19 Digital Language Laboratories have been set up and from it training programs have been started [34,35], Computer Aided Learning (CAL) program, as a pilot project, is being operated in 50 schools. The government has done extensive work in the last 10 years in the field of education. ICT in education makes the whole education system modern and significant. Bangladesh is ranked the fifth in Asia to have used the internet most [36], with more than 80 million having internet access as of December 2017[37], up from 0.1 million in 2000 [21]. The ICT oriented class room and class facilities has been started in most of the primary schools in Bangladesh [38].

II. OBJECTIVES OF THE STUDY

The main objective of this study is to investigation the implementation status of ICT support provided by the government of Bangladesh for primary schools.

In order to achieve the main objective, the following specific objectives must be achieved as follows:

- i. To justify the ICT supporting facilities in primary schools and how much implementation they may achieved.

- ii. To justify by using a model how much implementation of ICT support in primary schools has been done by each division in Bangladesh.
- iii. To suggest some key points that how can the Government of Bangladesh be implemented the ICT support in primary schools.

III. METHODOLOGY

A. Study design

A model has developed for the measuring the ICT implementation status in the e-primary schools of Bangladesh.

B. Study population

The study has been selected 100 primary schools from Rajshahi division, 100 primary schools from Khulna division, 100 primary schools from Dhaka division, 100 primary schools from Chittagong division, 100 primary schools from Barisal division, 100 primary schools from Sylhet division, 100 primary schools from Rangpur division, 100 primary schools from Mymensingh division. A total 800 primary schools from the e-primary school systems of Bangladesh is the population of the study.

C. Sampling design

The sample size is 800 primary schools among the eight divisions which was taken from the e-primary school systems database under the directorate of primary education of Bangladesh.

IV. DATA ANALYSIS

In this model from the fig.1., there are five major factors f_1 (Projectors), f_2 (PC/Laptop), f_3 (Projector Screen), f_4 (Modem), f_5 (Printer) and three sub factors for f_1 ($f_{1.1}$, $f_{1.2}$, $f_{1.3}$ respectively for Electricity, ICT skilled Teachers, ICT oriented class facilities), three sub factors for f_2 ($f_{2.1}$, $f_{2.2}$, $f_{2.3}$ respectively for projector, projector screen, electricity), three sub factors for f_3 ($f_{3.1}$, $f_{3.2}$, $f_{3.3}$ respectively for projector, PC/Laptop, electricity), two sub factors for f_4 ($f_{4.1}$, $f_{4.2}$ respectively for electricity, PC/Laptop), two sub factors for f_5 ($f_{5.1}$, $f_{5.2}$ respectively for PC/Laptop, electricity).

In this model each factor is considered as equal to 10 weight, by that reason the f_1 is 10, f_2 is 10, f_3 is 10, f_4 is 10 and f_5 is 10 then the full weight is ($f_1+f_2+f_3+f_4+f_5=50$) 50. If a school can get 50 out of 50 then it can be considered as best ICT implemented primary schools in Bangladesh. So, implementation of ICT in school is the sum of f_1 , f_2 , f_3 , f_4 and f_5 .

$$\begin{aligned} \text{Here, } f_1 &= 10, f_{1.1} = 5, f_{1.2} = 2.5, f_{1.3} = 2.5 & (1) \\ f_2 &= 10, f_{2.1} = 2.5, f_{2.2} = 2.5, f_{2.3} = 5 \\ f_3 &= 10, f_{3.1} = 3.5, f_{3.2} = 3, f_{3.3} = 3.5 \\ f_4 &= 10, f_{4.1} = 2, f_{4.2} = 8 \\ f_5 &= 10, f_{5.1} = 5, f_{5.2} = 5 \end{aligned}$$

From the fig.2.in this model f1(Projector) is equal to 10 weight and this 10 is divided into three segments first is f1.1=5 (electricity), second is f1.2=2.5 (ICT skilled teachers) and third is f1.3=2.5 (ICT oriented class facilities). In the second formula, f2 (PC/Laptop) is equal to 10 weight and this 10 is divided into three segments first is f2.1=2.5 (projector), second is f2.2=2.5 (projector screen) and third is f2.3=5 (electricity). In the third formula, f3 (Projector screen) is equal to 10 weight and

this 10 is divided into three segments first is f3.1=3.5 (projector), second is f3.2=3 (PC/Laptop) and third is f3.3=3.5 (electricity). In the fourth formula, f4 (Modem) is equal to 10 weight and this 10 is divided into two segments first is f4.1=2 (electricity), second is f4.2=8 (PC/Laptop). In the fifth formula, f5 (Printer) is equal to 10 weight and this 10 is divided into two segments first is f5.1=5 (PC/Laptop), second is f5.2=5 (electricity).

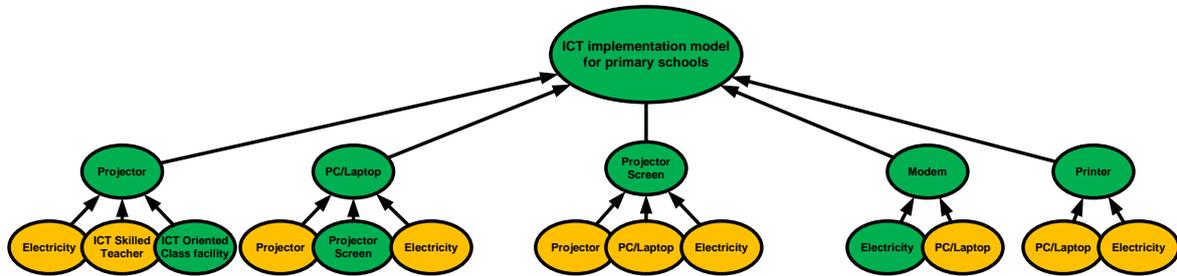


Fig. 1. Model of ICT implementation status in primary schools of Bangladesh

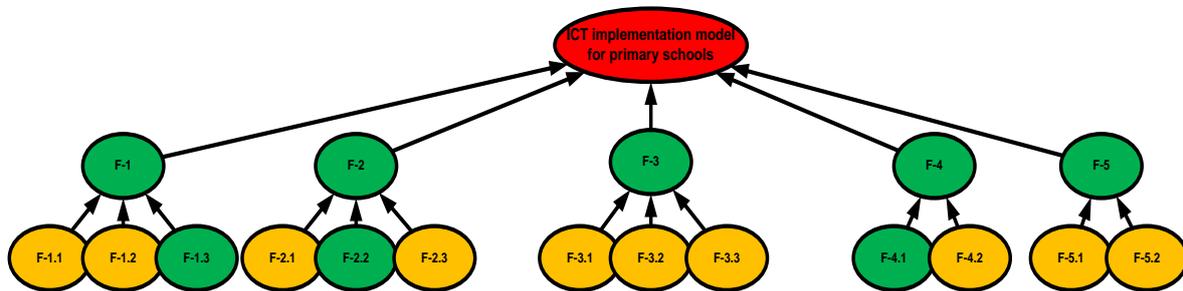


Fig.2. ICT implementation status model with factors

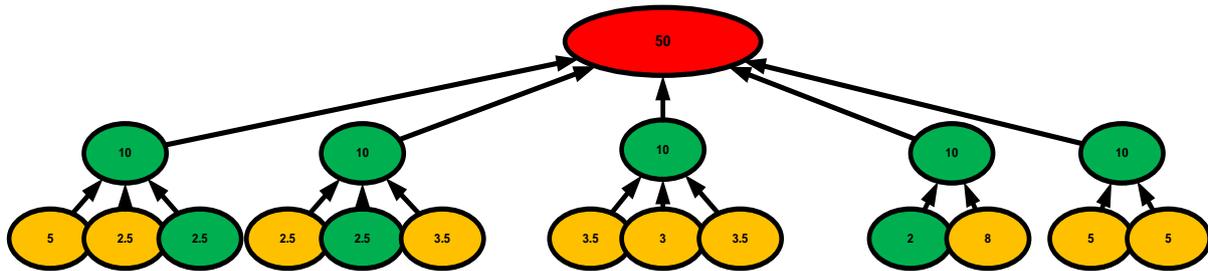


Fig. 3. ICT implementation status model with weights

Table 1. Number of ICT equipment provided by the government of Bangladesh in among 800 primary schools

Divisions	Rajshahi	Khulna	Dhaka	Chittagong	Barisal	Sylhet	Rangpur	Mymensingh
No of Computer	10	3	0	3	0	5	8	0
No of Laptop	90	93	29	9	90	90	14	91
No of Printer	9	3	0	3	0	5	4	0
No of Projector	28	37	6	5	89	90	7	90
No of Modem	6	4	2	0	0	2	3	3

Source: E-primary school systems 2019

Table 2. Number of ICT equipment provided by the government of Bangladesh in among 800 schools

Divisions	Rajshahi	Khulna	Dhaka	Chittagong	Barisal	Sylhet	Rangpur	Mymensingh
Comparison of Computer/ Laptop to								
Printer (in %)	9%	3.13%	3.45%	25%	1.11%	5.26%	18.18%	1.11%
Projector (in %)	28%	38.54%	20.69%	41.67%	98.89%	94.74%	31.82%	98.90%
Modem (in %)	6%	4.17%	6.90%	8.33%	1.11%	2.11%	13.64%	3.30%

Source: E-primary school systems 2019

Table 3. Division wise ICT equipment's and their supporting capacity

Division	ICT Equipment out of 800 e-primary schools	Computer/ Laptop	Projector	Modem
Rajshahi	ICT equipment	100%	28%	6%
	Supporting capacity for ICT equipment	28%	50%	100%
Khulna	ICT equipment	96%	37%	4%
	Supporting capacity for ICT equipment	39%	100%	100%
Dhaka	ICT equipment	29%	6%	4%
	Supporting capacity for ICT equipment	20%	100%	100%
Chittagong	ICT equipment	12%	5%	0%
	Supporting capacity for ICT equipment	41%	100%	0%
Barisal	ICT equipment	90%	89%	0%
	Supporting capacity for ICT equipment	99%	100%	0%
Sylhet	ICT equipment	95%	89%	2%
	Supporting capacity for ICT equipment	94%	100%	100%
Rangpur	ICT equipment	22%	7%	3%
	Supporting capacity for ICT equipment	32%	100%	100%
Mymensingh	ICT equipment	91%	90%	3%
	Supporting capacity for ICT equipment	99%	100%	100%

Source: E-primary school systems 2019

From the table 1. ,it was shown that in Rajshahi division, out of 100 primary schools from the e-primary school systems,100 schools have one PC or Laptop, 9 schools have printers,28 schools have projectors and 6 schools have modem facilities; 96 schools have one PC or Laptop, 3 schools have printers,37 schools have projectors and 4 schools have modem facilities in Khulna division; 29 schools have one PC or Laptop, no schools have printers,6 schools have projectors and 2 schools have modem facilities in Dhaka division; 12 schools have one PC or Laptop, 3 schools have printers,5 schools have projectors and no schools have modem facilities in Chittagong division; 90 schools have one PC or Laptop, no schools have printers,89 schools have projectors and 2 schools have modem facilities in Barisal division; 95 schools have one PC or Laptop, 5 schools have printers,90 schools have projectors and 2 schools have modem facilities in Sylhet division; 22 schools have one

PC or Laptop, 4 schools have printers, 7 schools have projectors and 3 schools have modem facilities in Rangpur division; 91 schools have one PC or Laptop, no schools have printers, 90schools have projectors and 3 schools have modem facilities in Mymensingh division

In the table 2. the calculation was done on the basis total number of computer/Laptop in comparison to printer, projector and modem. From the table 2..it was drawn that the Rajshahi division the comparison to the laptop or computer to printer utilization rate is 9%,projector utilization rate is 28%,modem utilization rate is 6%; in Khulna division the comparison to the laptop or computer to printer utilization rate is 3.13%,projector utilization rate is 38.54%,modem utilization rate is 4.17%; in Dhaka division the comparison to the laptop or computer to printer utilization rate is 3.45%,projector utilization rate is 20.69%,modem utilization rate is 6.90%; in Chittagong division the comparison to the laptop or computer to

printer utilization rate is 25%, projector utilization rate is 41.67%, modem utilization rate is 8.33%; in Barisal division the comparison to the laptop or computer to printer utilization rate is 1.11%, projector utilization rate is 98.89%, modem utilization rate is 1.11%; in Sylhet division the comparison to the laptop or computer to printer utilization rate is 5.26%, projector utilization rate is 94.74%, modem utilization rate is 2.11%; in Rangpur division the comparison to the laptop or computer to printer utilization rate is 18.18%, projector utilization rate is 31.82%, modem utilization rate is 13.64%; in Mymensingh division the comparison to the laptop or computer to printer utilization rate is 1.11%, projector utilization rate is 98.90%, modem utilization rate is 3.30%.

From the Table 3. it was concluded that in Rajshahi division there was 100% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 28%, as the same way 28% schools has projector capacity but supporting capacity has 50%, in 6% school there was modem facility and 100% supporting facility for modem. In Khulna division there was 96% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 39%, as the same way 37% schools has projector capacity but supporting capacity has 100%, in 4% school there was modem facility and 100% supporting facility for modem. In Dhaka division there was 29% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 20%, as the same way 6% schools has projector capacity but supporting capacity has 100%, in 4% school there was modem facility and 100% supporting facility for modem. In Chittagong division there was 12% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 41%, as the same way 5% schools has projector capacity but supporting capacity has 100%, in 0% school there was modem facility and 0% supporting facility for modem. In Barisal division there was 90% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 99%, as the same way 89% schools has projector capacity but supporting capacity has 100%, in 0% school there was modem facility and 0% supporting facility for modem. In Sylhet division there was 100% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 28%, as the same way 28% schools has projector capacity but supporting capacity has 50%, in 6% school there was modem facility and 100% supporting facility for modem.

From the table 3. in Rangpur division there was 22% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 32%, as the same way 7% schools has projector capacity but supporting capacity has 100%, in 3% school there was modem facility and 100% supporting facility for modem. In Mymensingh division there was 91% computer or laptop in 100 from e-primary school but supporting capacity of PC/Laptop was 99%, as the same way 90% schools has projector capacity but supporting capacity has 100%, in 3% school there was modem facility and 100% supporting facility for modem

V. FINDINGS

- i. In Bangladesh most of the primary schools have been introduced with ICT and ICT facilities. But in Dhaka division the rate of ICT facilities and support provided by the Government of Bangladesh (GoB) is lowest among all other divisions in Bangladesh.
- ii. Government of Bangladesh (GoB) has provided one or two or three ICT equipment for most of the primary schools in Bangladesh, such as one school get a Laptop and another school get a projector but none can get all the ICT equipment and support.
- iii. In some cases, some primary schools get all ICT equipment but they don't get any ICT supporting facilities that means some school have their PC, projector, projector screen and modem by the Government of Bangladesh (GoB). This ICT equipment and facilities can't they utilized because of ICT trained or ICT oriented class room facilities.
- iv. There is a huge limitation to coordinate the ICT support provider and ICT support receivers. The provider just has provided the ICT facilities but they don't look in to the implementation status. On the other hand, the ICT support recipient just have received the ICT support but they don't have any capacity to use the ICT support. As a result, many school have 100% ICT facilities but they can implement only 20-30% of their ICT support at best which was identified in this study.

VI. RECOMMENDATIONS

- i. Every division should get the equal priority in getting ICT support. All out efforts (ICT facilities & ICT equipment) should be introduced in all primary schools in Bangladesh. Though the ICT implementation in Bangladesh has been going on step by step process, the proper return can't get until all kind of ICT facilities provided to all primary schools.
- ii. The Government of Bangladesh should re-modified their planning in the implementation of ICT support in primary schools. At the same time all kinds of ICT equipment and facilities should be provided that can make a good sign for implementing ICT in primary schools.
- iii. The current process is one school get one laptop another school get a projector and other school get a projector screen but no school get all kinds of ICT equipment and facilities at the same time as a result no one can go to their proper implementation stage.
- iv. Government should be introduced one by one ICT enable (all ICT equipment and supporting facilities) model primary school that will be set up in each Upazila or Thana. Then step by step it will be expanded each and every year.
- v. Training facilities for the primary school's teacher who usually teach the ICT related subjects, should

be introduced all primary schools in Bangladesh.

VII. CONCLUSIONS

ICT have been using in various primary schools in Bangladesh though it's in small amount, it can mostly impact on our future nation. The Government of Bangladesh (GoB) has taken ICT use in primary education and it create in huge success. In this paper all elements of ICT being used in primary schools in Bangladesh has been considered in a model. This model has analyzed and examined how it works and what impact of it on our future nation. The future research can identify the planning and execution limitation of ICT used not only in primary schools but also in secondary & higher secondary schools for Bangladesh.

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