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Factors Affecting Quality of Universal Primary Education in Bangladesh: Evidence from Cumilla

Nobinkhor Kundu[1]
Asrarul Islam Chowdhury[2]

Abstract: The fundamental objective of this research is to identify the constraints and obstacles that rural primary schools confront in their efforts to provide a high-quality education. The goal of this study is to identify the conditions required for the expansion of high-quality primary education in low-income economies like Bangladesh. Cross-sectional data was obtained from respondents in the study area of Barura upazila in the Cumilla district in Bangladesh between January and February 2020. By analyzing non-probability purposive sampling techniques, econometric models such as multinomial logistic regression are utilized to find the major inputs of elementary education. The research concentrated on the coefficient of professional training and qualification, teaching experience, syllabus coverage, class testing of pupils, teacher per pupil, gross enrollment ratio, class attendance rate, average number of pupils per class, and classroom environment. However, when all regressors are combined, they have a statistically significant effect on the log of primary school completed and achieved grades, with a p-value of around 0.00. This shows that those who completed elementary school and earned a higher grade are more likely to be supported by variables impacting the quality of education than those who did not.

Keywords: Primary School, Quality Education, Sustainability, Logistic Regression, Bangladesh

JEL classification: I26, N35, C35, Q01

1. Introduction

Bangladesh is making significant progress toward achieving universal primary education (UPE), the second of the Millennium Development Goals (MDGs), which requires that every child enroll in a primary school. Bangladesh has made commendable strides in expanding equitable access to education, reducing dropout rates, raising cycle completion, and introducing a variety of quality-enhancing strategies in primary education. The government is now constructing a comprehensive National Education Policy (NEP, 2010) to accomplish its broad goals. Millennium Development Goals (MDGs), which were adopted in September 2000 at a United Nations (UN) summit of world leaders, is universal primary school enrollment for boys and girls. Additionally, it demands a 100% primary school graduation rate, which means that all kids entering grade 1 are held until they reach grade 5. The MDG expressed in these terms demonstrates a realization of the critical nature of primary (elementary) education (GoB and UN, 2005).

[1] Associate Professor, Department of Economics, Comilla University, Cumilla-3506, Bangladesh. Email: kundunobin@gmail.com
[2] Professor, Department of Economics, Jahangirnagar University, Dhaka. Bangladesh. Email: asrarul@juniv.edu

Quality of primary education is critical for developing the human capital necessary for the twenty-first century, which requires a new set of competences (Ouedraogo et al., 2022). National education and local educational environments, on the other hand, contribute to differing degrees to the definitions of quality in across economies. Adams (1993) stated that the quality of the universal primary education development program is centered on four pillars that contribute to the overall improvement of the primary education system. The first is improved educational quality; the second is increased involvement; the third is improved sector administration; and the fourth is improved infrastructure (Queiroz et al., 2020).

The primary goal of this research is to investigate the constraints and obstacles that rural primary schools confront in their efforts to provide a excellence education in Bangladesh. The aim of this study is to emphasize the critical importance of high-quality elementary education in the long-term development of the next generation in low-income economies. Apart from universal primary enrolment, another education-related MDG is student retention till fifth grade. If a child has finished grade 5, he or she is regarded as having completed primary school (Montalbo, 2021). The study's more specific purpose is to ascertain the circumstances necessary for the extension of quality education at the primary level to be fruitful and sustained in low-income nations such as Bangladesh. The following question was investigated: What are the elements that affect the quality of universal primary education in Bangladesh for the long-term development of future generations?

This study is divided into five sections: an introduction, a review of the literature including empirical studies in section ii, elementary education in Bangladesh in section iii, and data and methods in section iv. Section-v collects and analyzes empirical data on primary school completion and grade attainment. Finally, the paper's concluding observations emphasize the need to ensure the long-term development of future generations by examining the issues affecting the quality of universal primary education in Bangladesh. The appendix contains statistics on indicators of primary education in Bangladesh.

2. Literature Review

According to the rate of return, universal primary education is one of the most critical variables driving economic development in low-income economies (Mincer, 1974; Lau, et al. 1991; and Psacharopoulos, 1985 and 1994). In emerging economies, particularly in low-income nations, primary education is a necessary and sufficient component of economic growth and development (Papagergiou, 2003). This argument is based on the economic structures of these countries and the anticipated high rates of return on investment in the quality of elementary education.

The mere presence of schools does not guarantee quality educational growth; quality educational accomplishment is contingent upon accessible access to schools, improved school infrastructure, and a gender-inclusive educational environment (White, 2004, Sifuna, 2007, and Xu et al., 2022). Thus, in addition to educational achievements, other factors such as access, equity, infrastructure, and school quality are critical for a country's overall educational progress (Yadav and Srivastava, 2005).

Bangladesh is considered to be falling behind other developing countries in terms of elementary education quality (World Bank, 2008). The article examined the factors that contribute to poor performance in the quality of elementary education and made recommendations for developing synergistic relationships between various organizations at the local level. Attaining the quality of the universal primary education development program's objectives will not be easy. Inequalities in money, location, ethnic origin, gender, and other variables constrain opportunities for a high-quality education in Bangladesh (Favaro et al., 2020)

Numerous reasons contribute to this lack of access to quality education and "quality" schools, including parental poverty, a low value placed on education, and the absence of frequent government oversight and inspection of schools. Easterly (2009) and Haag et al. (2022) identified the root causes of unequal access to quality education in rural African schools, despite the government's efforts to ensure that all children of school-age receive a decent education. Grogan (2009) examined whether the capacities of teachers and students support or hinder the quality improvement envisioned by the 2007 adoption of the Thematic Curriculum.

Tangyong et al. (2010) analyzed data in East Java, Indonesia, using a quasi-experimental design and multilevel modeling techniques (with pupils, classroom, and school as levels). Prior accomplishment, classroom management, teacher attachment, and job pressure all had a role in children's school-level growth (Rena, 2011). Budgetary expenditures should be increased to upgrade infrastructure and to encourage children to attend primary school, thereby increasing the quality of primary education in Papua New Guinea.

Primary education is a crucial component of human development, and achievement of this aim will have a substantial impact on the achievement of the other MDGs. Primary education, on average, contributes more to economic growth than secondary education (Psacharopoulos and Richard, 2012). Dennis and Stahley (2012) investigated numerous factors that may reduce a child's likelihood of adhering to compulsory education. Our main attention was to the child's employment status, which appears to greatly lower the likelihood that he or she will attend school, whether at home or elsewhere. Delesalle (2021) suggested that, for certain households, the opportunity costs of school constitute a significant limitation. Principal component analysis to create weights for the metrics included in the multidimensional general education development index (Raihan and Ahmed, 2016).

The quality of the universal primary education development program has set the lofty goal of offering a high-quality education to all children by developing an "efficient, effective, and equitable primary education system". Overall educational performance is measured, as are the five components of the quality of primary educational development: access to school, improved school infrastructure, school quality, gender parity, and learning outcomes (Raihan and Ahmed, 2016). As a consequence, the superiority of elementary learning is critical, as is a nation's commitment to progress, advancement, and the successful returns that contribute to a nation's sustainable growth, which will benefit future generations (Islam and Kundu, 2017). A high-quality education provides a constructive example for our future generations and contributes to the nation's rapid development.

The aforementioned analysis points to the present study found constraints, challenges and factors affecting quality *of* universal primary educational development in Bangladesh. But there has no found multiple logistic regression approach how to use for determining key factors contributing to ensure quality of universal primary school completed and achieved grade.

3. Style and Facts: Primary Education in Bangladesh

After four decades, in January, the Prime Minister of Bangladesh made a historic declaration regarding the nationalization of all non-government elementary schools in the country. In an attempt to expand and ensure the quality of teaching and learning, the government has nationalized 26,193 primary schools and 1 lakh 4 thousand 776 teaching positions since January 2013 (GOB and BANBIES, 2015). Appendix-A1 summarizes primary education statistics for Bangladesh between 2015 and 2018.

Bangladesh has one of the world's largest compulsory primary education systems, with an estimated 19.06 million students (6–10 years) in 2015 and 17.34 million students in 2018 in primary school. Based on the BANBIES (2019) statistics, it seems that the number of students has gone down due to unforeseen factors that were not expected. Thus, we should find out what the causes are of the decrease in student numbers. There were a total of 52,798 teachers in 2015, and although this total number of teachers increased to 685,400 in 2018, it was at primary schools. Most importantly, the number of female teachers has increased from 60 percent to 62.5 percent, but the number of female students has decreased from 51 percent to 50.75 percent. Furthermore, the number of students per institution fell from 156 percent to 129.25 percent, while the number of teachers per institution increased from 4 percent to 5.11 percent. The challenges outlined in SDG 4 provide inclusive and equitable quality education and encourage opportunities for lifelong learning for all. Improving the quality of elementary and secondary education is a challenge that needs to be dealt with as soon as possible.

According to BANBIES (2021), the gross intake rate decreased from 110.51 percent (girls: 112.80 percent and boys: 107.62 percent) to 107.86 percent (where girls are 109.91 percent and boys are 105.95 percent), although the net intake rate is a minor difference between 2019 and 2020. Similarly, the gross enrollment rate decreased from 109.60 percent (where girls are 114.93 percent and boys are 104.49 percent) to 104.90 percent (where girls are 108.90 percent and boys are 100.10 percent). The gross enrollment rate and net enrollment rate are expressed as a percentage of the qualifying official age group's population. Moreover, the dropout rate, completion rate, survival rate, and repetition rate are minor differences between 2019 and 2020. Appendix-A2 compares participation indicators for primary education in Bangladesh between 2019 and 2020.

The Net Enrollment Ratio (NER) is uttered as a percentage of the qualifying official age group's population. According to GoB (2021), the country is well on track to meet the SDGs target for primary school enrollment, with a gross enrollment rate of 109.49 percent (girls: 113.2 percent and boys: 106.15 percent) and a net enrollment rate of 97.65 percent (girls: 97.65 percent and boys: 97.65 percent) in 2019, but in 2020 this rate is falling due to COVID-19 gross enrollment rate of 100.1 percent and net enrollment rate of 97.37 percent as shown in Appendix-A3. The government has been working to

improve the quality of education while raising literacy rates in order to achieve the Vision 2021 goals.

The statistics for 2021 shows a downward trend, but then reverses to a positive trend. While many students do not complete their primary education in government schools, a sizable proportion continue their education in non-formal or unregistered institutions such as madrasas and through non-formal education programmes. Appendix-A4 and A5 detail the primary school (grades I-V) enrollment, teacher and student status, and literacy rate (7+) in Cumilla between 2001 and 2011.

The purpose of this study is to identify strategies for improving the quality of primary education in order to achieve universal primary education in Bangladesh. It should determine the elements impacting the quality of primary education development programs upazila by upazila in Bangladesh that require policymakers' specific attention. This article discusses the critical role of quality education in ensuring low-income economies' gradual, sustained development over time. Bangladesh will undoubtedly benefit from investment in basic education. Primary education has the potential to significantly reduce poverty and inequality, improve health condition and social welfare, and lay the framework for sustained economic progress. Parents, teachers, students, and government-wide policies should all be involved in the design and administration of Bangladesh's primary education system.

4. Data and Methods

4.1 Data Sources

The questionnaire was developed with an emphasis on issues impacting the quality of education in Bangladesh. The survey examined a range of variables in schools but not on a consistent scale throughout the Barura upazila in the Cumilla district of Bangladesh. We examine the indicators of primary school completion and grade attainment. Each of them is analyzed independently for boys and girls. The primary school completion rate and grade attained is calculated as the ratio of children aged 6–11 who attend school to all children aged 6–11. A group of graduate students who had received brief instruction on question understanding performed the poll. In light of the study's objectives, a structured questionnaire and Focus Group Discussions (FGD) were developed, which will be supplemented by direct interview.

The most practical method of obtaining a non-probability sample is by using a purposive sampling strategy. Non-probability sampling refers to a sampling technique that provides no foundation for determining the chance that each item in the population will be included in the sample. We investigated non-probability sampling by selecting specific units of the universe for the sample on the assumption that the small mass they chose out of a massive one would be representative of the whole. Consequently, we believe the study's judgment plays a significant role in this sampling strategy (Kothari, 1990). Given the sample size and dispersion, it is clear that the study is not intended to create data representative of all primary schools in Bangladesh but rather to offer a rapid diagnostic of the factors affecting primary education quality in Bangladesh.

This research is based on a variety of original data sources. To analyze primary data obtained for a cross-sectional study in order to determine the elements that contribute to the quality of universal primary education. The quantitative method is used to determine

the causes and effects of influencing factors on the completion and achievement of primary school grades. Primary data was acquired from respondents in their capacity as teachers between January and February 2020. The study elicited responses from 75 elementary school teachers in the Barura upazila of the Cumilla district of Bangladesh. All completed questionnaires were thoroughly reviewed, and the resulting valid data was processed and evaluated to meet the research purpose.

4.2 Methodology: Logistic Regression Model

Multiple logistic regression models were utilized to determine the factors affecting primary school completion and grade attainment in Bangladesh's cumilla district. The model elucidates the relationship between a qualitative endogenous variable and a variety of qualitative and quantitative exogenous variables (Gujarati et al., 2009).

Let Y_i denote the i^{th} observation's dichotomous endogenous variable.

Where $Y_i = 1$, if primary school complete and achieved grade,

$= 0$, if primary school incomplete (fail)

The linear probability model (LPM) was used in this study

$$P_i = E(Y = 1 \mid Xi) = \beta_1 + \beta_2 X_i \tag{1}$$

Where X_i is an external variable and β_i the regression coefficients denote the regression coefficients. The procedure entails modeling the reaction using the logistic function defined by

$$P_i = E(Y = 1lXi) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}} \tag{2}$$

$$P_i = \frac{1}{1 + e^{-z_i}} = \frac{e^{z_i}}{1 + e^{z_i}} \tag{3}$$

Equation (3) represents that it is straightforward to demonstrate that as Z_i ranges from $-\alpha \ to + \alpha$, P_i ranges between 0 and 1 and that P_i is nonlinearly related to Z_i (i.e., X_i), thus satisfying the two requirements[3]. If P_i, the probability of primary school complete and achieved grade, is given by (3) then (1-P_i), the probability of primary school incomplete is

$$1 - P_i = \frac{1}{1 + e^{z_i}} \tag{4}$$

Therefore, we can write

[3] Note that as $Z_i \to +\infty, e^{-Zi}$ tends to zero and as $Z_i \to +\infty, e^{-Zi}$ increases indefinitely. Recall that e= 2.71828.

$$\frac{P_i}{1-P_i} = \frac{1+e^{z}}{1+e^{-z_i}} = e^{z} \tag{5}$$

Now $P_i \big/ 1-P_i$ is simply the odd ratio in favor of primary school completion - the ratio of the likelihood of completing primary school and attaining a grade to the probability of failing to complete primary school. By calculating the natural logarithm of (5), we find an intriguing result, namely,

$$L_i = In\left(\frac{P_i}{1-P_i}\right) = Z_i$$

$$= \beta_1 + \beta_2 X_i \tag{6}$$

That is, not only is L, the log of the odds ratio, linear in X, but also in parameters. L is referred to as the logit, and so the logit model is named after it.

$$L_i = In\left(\frac{P_i}{1-P_i}\right) = \beta_1 + \beta_2 X_i + u_i \tag{7}$$

To estimate (7), the regressand's, or logit's, L_i, values. This varies according to the type of data we are analyzing at the individual, or micro, level. The sign of the coefficient and the significance of the t-statistic indicate the direction and intensity of the relationship between the explanatory factors and log of primary school completed and achieved grade variability. Two methods are used to determine the model's validity: one is based on the signs and magnitudes of the variables' coefficients, and the other is based on statistical criteria, referred to as the R-square (R^2), McFadden R-squared (R^2_{MCF}), LR statistic (df) and Probability (LR stat).

5. Results and Discussion

5.1 Characteristics of Respondents

A widely used multiple logistic regression frameworks is used to estimate the model, equation no 7, in order to decouple the effects of key socioeconomic determinants on the quality of primary school completion and grades achieved. The dependent variable was used to estimate the likelihood of completing primary school and attaining grade level proficiency. Dependent variables dummy for six obtained grade statuses (= 1, if a primary school is completed and the achieved grade is GPA 5 = 'A+', GPA 4 = 'A', GPA 3.5 = 'A', GPA 3 = 'B', GPA 2 = 'C', and GPA 1 = 'D'; otherwise, primary school is incomplete and the achieved grade is 'F' (fail).

A logistic regression model was built using survey data to evaluate the factors of primary school completion and grade achievement by gender, professional training and qualification, teaching experience, syllabus coverage, class testing of pupils, teacher per students, gross enrollment ratio, class attendance rate, average number of pupils per class, classroom environment (walls, floors, desks, windows, doors, chalkboards, and roof)**,**

toilet per students, treated as dummy variable - schools with student's mid-day meal, multimedia and computer, easy access and safe water. Letting dichotomous endogenous variables of his/her completed primary achieved grade as predictors' teachers, shown below.

The survey respondents are evenly split between males and females of all ages, with the total female proportion somewhat higher than the male proportion, as shown in table 1. Professional training and qualification of primary school teachers have been bearing on the degree of understanding strategies through which educational quality can be improved. The head teachers were asked to provide information about the teacher qualifications in their schools. The study established that 20.6% of teachers have Masters Degree, 38.2% have Bachelor (Hon's) and Bachelor of education, 29.4% of teachers has Higher School Certificate and 11.8% of teachers have Secondary School Certificate.

Respondents were questioned about their teaching experience, with self-reported syllabus covering used to gauge response. It can be seen from Table 1 that 14.8% teachers have more than 25 years teaching experience, 22.0% teachers have 15 years to 24 years teaching experience, 30.8% teachers have 5 years to 14 years teaching experience, and 32.4% teachers have less than 4 years teaching experience. And teacher responses reveal that 51.5% of the teachers said that their syllabus is fairly covered, 20.6% said that their syllabus is averagely covered, 22.1% opinion that their syllabus is fully covered while only 5.8% of teachers said that syllabus coverage within their school is poor. The result shows that syllabus coverage is a hindrance to quality delivery of curriculum knowledge and skills to pupils in primary schools within Cumilla District.

Table -1: Analysis the Selected Covariates and their Measurements

Explanatory Variables:	**Classification and measurement**	**Percent**	**Frequency**
Gender	Male = 0	45.5	31
	Female = 1	54.5	37
Professional Training and Qualification	Masters = 1	20.6	14
	Bachelor (Hon's)/ B. Ed = 2	38.2	26
	H.S.C = 3	29.4	20
	S.S.C = 4	11.8	8
Teaching Experience	25 years and above=1	14.8	10
	15 years to 24 years=2	22.0	15
	05 years to 14 years=3	30.8	21
	04 years and below=4	32.4	22
Syllabus Coverage	Fairly covered =1	51.5	35
	Fully covered=2	20.6	14
	Average covered=3	22.1	15
	Poorly covered =4	05.8	04
Class Testing of Pupils	Weekly = 1	04.5	3
	Monthly= 2	20.5	14
	Quarterly = 3	42.7	29

Explanatory Variables:	Classification and measurement	Percent	Frequency
	Half Yearly= 4	32.3	22
Teacher per Students	Per 30 students = 1	07.4	5
	Per 40 students = 2	33.8	23
	Per 50 students = 3	44.1	30
	Per 60 students = 4	14.7	10
Gross Enrollment Ratio	From 110 and above =1	22.0	15
	From 100 to 109 =2	54.4	37
	From 90 to 99 =3	14.7	10
	From 89 and below =4	08.9	6
Class Attendance Rate	Present 90% and above=1	19.2	13
	Present 80% to 89% =2	63.2	43
	Present 70% to 79% =3	13.2	9
	Present 69% and below =4	04.4	3
Average Number of Pupils per Class	Class size 39 and below =1	10.3	7
	Class size 40-49 =2	19.1	13
	Class size 50-59 =3	30.9	21
	Class size 60 and above =4	39.7	27
Classroom Environment (walls, floors, desks, windows, doors, chalkboards, and roof)	Very conductive=1	13.2	9
	Conductive=2	33.8	23
	Not conductive=3	42.7	29
	Undecided =4	10.3	7
Toilet per Students	Per 100 students=1	05.9	4
	Per 200 students=2	23.5	16
	Per 300 students=3	61.8	42
	Per 400 students=4	08.8	6
Schools with student's mid-day meal dummy	No = 0	91.2	62
	Yes = 1	08.8	6
Schools with multimedia and computer dummy	No = 0	16.2	11
	Yes = 1	83.8	57
Schools with easy access dummy	No = 0	36.7	25
	Yes = 1	63.3	43
Schools with safe water dummy	No = 0	26.5	18
	Yes = 1	73.5	50
Total number of respondents, N=68			

The study sought from teachers how often they tested their pupils in terms of giving them examinations based on weekly, monthly, quarterly, half a year or yearly. Class testing was usually done once a fortnight, 4.5% of the respondents said it was done weekly, 20.5% of the respondents said they took a test their pupils on monthly, 42.7% said that they took a test their pupils on quarterly, and 32.3% of the respondents said testing was done two times in a term (midterm and end of term).

The study sought from the head teacher respondents the number of teachers in their schools. Nearly 7.4% respondents seem that teacher per 30 students, 33.8% respondents seems that teacher per 40 students, 44.1% respondents seems that teacher per 50 students, and 14.7% respondents seems that teacher per 60 students. The number is inadequate as most schools surveyed had double streams thereby affecting quality delivery of education in most primary schools within Barura upazila at Comilla district. The results coincide with UNESCO (2009) monitoring and evaluation results on EFA goals that established that staffing problems in many South Asian countries is the major factor affecting quality of learning in primary schools.

The quantity of pupils in a class determines how effectively a teacher can cater for differences among the learners, organisers and supervise learning (Hernes, 2001). The study established that 10.3% respondents seems that average number of pupils less than 40 per class, 19.1% respondents seems that average number of pupils range 40-49 per class, 30.9% respondents seems that average number of pupils range 50-59 per class, and 39.7% respondents seems that average number of pupils more than 60 per class. Large classes demand a lot on the teaching while small classes allow teachers to give attention to students. On the conditions of the classroom environment in primary schools surveyed, 13.2% of the respondents stated that the classrooms were very conducive, while another 33.8% said that classrooms were conducive, only 42.7% of the respondents said that the classrooms were not conducive. Conducive environment and safety are necessary in schools and they are important in ensuring teaching, and learning in primary schools.

A vast majority of respondents (54.4%) found that gross enrollment ratio was 100-109 and 63.2% respondents recorded class attendance rate was 80%-89%. Moreover, respondents were drawn from dichotomous variable, schools have easy access of all students (63.3%), schools have safe water for students (73.5%), Schools have multimedia and computer (83.8%) and others variables of factors affecting quality of primary education. The overwhelming majority of responders (91.2 percent) had not discovered schools that provided students with a mid-day lunch. The Mid-Day Meal Scheme (MDMS) is the world's leading school feeding program, serving over 120 million children in 1.3 million schools nationwide (UNESCO, 2015). MDMS has been proven in studies to contribute to minimizing classroom hunger, increasing school participation, creating social equality, and strengthening gender equity, all of which contribute to the overall quality of education. With the Government's committed endeavors and successful initiatives, the Country will achieve and sustain universal primary education, resulting in sustained educational quality.

5.2 Multivariate Logistic Regression Analyses

The purpose of this empirical analysis is to determine the factors that influence the quality of education received by students who completed primary school and earned a grade in the suburban and rural areas of Barura upazila in the Comilla District of Bangladesh. This analysis begins by attempting to comprehend the relationship between allied factors affecting the quality of primary education and the status of students who earned grades of 'A+', 'A', 'A-', 'B', 'C', 'D', and 'F'. Now, using the ungrouped data, let us interpret the regression results. The regression results from Eviews-9's aggregate data analysis are presented in Table 2.

We used a logistic regression approach to ascertain the critical factors that contribute to the quality of universal primary education. With other variables held constant, to capture the effect of gender, the sex of school teachers (female=1) has a significant effect on ensuring the quality of primary education, as females are more likely to contribute to education than males. Most of the professional training and qualification of primary school teachers are Bachelor (Hon's) and Bachelor of education (B.Ed.). The positive coefficient of the Bachelor (Hon's) and Bachelor of education is 1.54 reflects that when primary school teachers have been bearing on the degree of understanding strategies through which educational quality can be improved. Most of the respondents have received some training, but advanced training is rare. The result implies that the quantity of teachers having advanced qualification is very minimal in primary schools, which could influence curriculum delivery as teachers could be using old teaching methods that they learnt in college many years back without considering that curriculum has changed, and new teaching methodologies have evolved.

Table-2: Determinants of Quality of Primary Education: Results of Logistic Regression
Dependent Variable: Primary school completed and achieved grade

Explanatory Variables	**Coef.**	**Std. Error**	**t-Statistic**	**Prob.**
Constant	23.66	1.84	12.86	0.00
Gender				
Male (ref.)				
Female	1.31	0.38	3.45	0.00
Professional Training and Qualification				
Masters (ref.)	1.54	0.58	2.66	0.01
Bachelor (Hon's)/ B. Ed	0.86	0.19	4.44	0.00
H.S.C	0.29	0.12	2.47	0.01
S.S.C				
Teaching Experience				
25 years and above (ref.)				
15 years to 24 years	1.42	0.14	10.34	0.00
05 years to 14 years	1.95	0.91	2.15	0.03
04 years and below	0.23	0.13	1.76	0.00
Syllabus Coverage				
Fairly covered (ref.)				
Fully covered	1.74	0.59	2.94	0.00
Average covered	0.55	0.26	2.13	0.03
Poorly covered	-0.43	1.26	-0.34	0.00
Class Testing of Pupils				
Weekly (ref.)				
Monthly	1.72	0.72	2.38	0.00
Quarterly	1.06	0.22	4.71	0.00
Half Yearly	0.30	0.08	3.70	0.00

Explanatory Variables	Coef.	Std. Error	t-Statistic	Prob.
Teacher per Students				
Per 30 students (ref.)				
Per 40 students	0.68	0.22	3.09	0.00
Per 50 students	-0.81	0.41	-1.96	0.05
Per 60 students	-1.44	0.33	-4.31	0.00
Gross Enrollment Ratio				
From 110 and above (ref.)				
From 100 to 109	1.42	0.14	10.34	0.00
From 90 to 99	0.82	0.32	2.54	0.01
From 89 and below	0.54	0.30	1.81	0.07
Class Attendance Rate				
Present 90% and above (ref.)				
Present 80% to 89%	1.66	0.77	2.15	0.03
Present 70% to 79%	0.62	0.11	5.77	0.00
Present 69% and below	-0.32	0.16	-2.03	0.04
Average Number of Pupils per Class				
Class size 39 and below (ref.)				
Class size 40-49	0.26	0.03	8.98	0.00
Class size 50-59	0.08	0.04	2.22	0.03
Class size 60 and above	-0.09	0.03	-2.62	0.01
Classroom Environment				
Very conductive (ref.)				
Conductive	1.12	0.26	4.31	0.00
Not conductive	-0.19	0.04	-5.31	0.00
Undecided	-0.99	0.15	-6.72	0.00
Toilet per Students				
Per 100 students (ref.)				
Per 200 students	0.23	0.03	7.32	0.00
Per 300 students	0.04	0.02	2.16	0.03
Per 400 students	-0.12	0.03	-3.62	0.00
Schools with student's mid-day meal				
No (ref.)				
Yes	3.02	1.24	2.44	0.02
Schools with multimedia and computer				
No (ref.)	4.48	1.19	3.75	0.00
Yes				
Schools with easy access				
No (ref.)				
Yes	1.95	0.91	2.15	0.03
Schools with safe water				

Explanatory Variables	Coef.	Std. Error	t-Statistic	Prob.
No (ref.)				
Yes	1.73	0.43	4.02	0.00
McFadden R-squared	0.61			
LR statistic (14 df)	283.39			
Probability(LR stat)	0.00			
Total Observations	68			

Odds ratio for reference category (ref.) is 1.000. Significant at 0.10<10%; 0.05 <5%; 0.01 <1%

The study sought from teachers how fully they covered syllabus in their schools in one academic year. As shown in Table 2, the coefficient of the fully covered syllabus is 2.74, which means that if the fully covered syllabus increases by one unit, the estimated logit increases by approximately 1.74 units on average, indicates that there is a positive association between the two and that the relationship is statistically highly significant.

The form in which pupils are examined in school is a factor that determines quality education delivery in primary schools. The coefficient of monthly class test is 1.72 suggested that schools within the study area emphasize on monthly test to students understanding of the knowledge they have been taught thereby improving quality education delivery in schools. The number of teachers in a school determines the delivery of quality education in school. A teacher forms the basic pillar for teaching and learning in schools. The coefficient of teacher per 40 students is 0.68, implying that if the average number of teachers per 40 students increases by one unit, the estimated logit increases by approximately 0.68 units. The study sought from the results suggested that staffing problems in primary schools is the major factor affecting quality of education.

However, empirical evidence to date indicates that the coefficient of average number of pupils 40-49 per class is 0.26, implying that if the average number of pupils 40-49 increases by a unit on average, the estimated logit increases by approximately 0.26 units, and the coefficient of average number of pupils above 60 per class is -0.09, implying that if the average number of pupils 40-49 decreases by a unit on average, the estimated logit decreases by approximately 0.09 units. This means that the quality of education can be affected by the presence of large or small classes. This is because overcrowding poses a challenge in ensuring quality since learners cannot get individual attention. The results also imply that large classroom sizes can affect retention since unique individual needs will not be addressed hence drop out.

The characteristics of the classroom environment are critical in ensuring that a high standard of education is reached. The research concentrated on the coefficient of conductive classroom environment, which is 1.12, implying that if the classroom environment (walls, floors, desks, windows, and doors) increases by a unit on average, the estimated logit increases by around 1.12 units. On the other hand, the coefficient of nonconductive classroom environment in primary schools is -0.19, indicating that the calculated logit reduces by roughly 0.19 units on average.

A vast majority of respondents (52.9 %) found that coefficient of the gross enrollment ratio from 100 to 109 is 1.42, 62.6% respondents recorded coefficient of the class attendance rate from 80% to 89% is 1.66. The empirical approach used to examine the

outcome of a dichotomous variable is as follows: the coefficient of easy access for all students is 1.95, the coefficient of safe water for students is 1.73, the coefficient of multimedia and computer is 4.48, and the coefficient of the mid-day meal program is 3.02. Both coefficients indicate that increases by a unit on average the estimated logit increases, ensuring the quality of primary education. According to UNESCO (2015), the Mid-Day Meal Scheme (MDMS) has aided in minimizing classroom hunger, increasing school participation, improving social equality, and enhancing gender equity, all of which contribute to the overall quality of education. With the Government's committed endeavors and successful initiatives, the Country will achieve and sustain universal primary education, resulting in sustained educational quality.

However, when all regressors are combined, they have a statistically significant consequence on the log of primary school completed and obtained grade, as the LR statistic is 283.39, with a p-value of about 0.00. In terms of odds, we take the antilog of the coefficients of 'conductive classroom environment' is 1.12 we get $3.06\left(\approx e^{1.12}\right)$. This suggests that those who completed primary school and achieved grade supported by conductive classroom environment are 3.06 times more likely to get a quality of education than those who have not got conductive classroom environment, *ceteris paribus*. While the McFadden R^2 (R^2_{MCF}) value is 0.61, this figure overstates the significance of goodness of fit in models with a dichotomous regressand.

6. Concluding Remarks

The study's findings indicate that issues of quality and retention persist as an upshot of the implementation of free primary education in Barura upazila primary schools. Inadequate personnel, overcrowded classrooms, insufficient syllabus coverage, insufficient classrooms, insufficient instructional materials, and insufficient lesson preparations are only a few of the variables affecting the quality of education in schools. The report proposes that teacher, parents, and the government use efforts to solve quality issues in schools in order to assure the realization and sustainability of primary education's quality. Numerous factors must be considered in regulate to ensure the quality of universal primary education in the Cumilla district of Bangladesh:

i. Access to education is insufficient. The teaching must be of a high standard and improve the educational quality.

ii. Assisting in the formulation and implementation of efficient sector-based policies. Enhancing educational systems' efficacy is a necessary condition for their expansion and overall efficiency.

iii. Assist in the implementation of participatory school management through the growth of increased levels of responsibility as well as in the management, monitoring, and assessment of the primary education system.

iv. Strengthen and sustain national political commitments required for universal free and compulsory primary education, including technical and financial resources availability.

v. The entire primary education sector is deploying strengthened planning and implementation processes under the broader development policy and budgetary frameworks.

vi. Inclusive and effective education systems have to be developed by enhancing governance and efficiency and strengthening capacities.

vii. The government of Bangladesh should increase access to primary education potential and more accessible and adaptable schools and classrooms considering financial and geographic constraints.

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Appendices

Table A1: Indicators of Education System in Bangladesh, 2015 and 2018

Primary Education	**2015**	**2018**
No. of Institution	122176	134147
No. of Total Teacher	527798	685400
Female	314299	426651
% of Female	60	62.25
No. of Total Student	19067761	17338100
Girl	9698682	8799033
% of Girl	51	50.75
Teacher Student Ratio (TSR)	36	25.30
Students per Institution (SPI)	156	129.25
Teacher per Institution (TPI)	4	5.11

Source: DPE (APSC 2019), BANBIES, 2019

Table A2: Participation Indicators: Primary Education in Bangladesh, 2019-20

Participation Indicators	**2019**			**2020**		
	Total	**Boys**	**Girls**	**Total**	**Boys**	**Girls**
Gross Intake Rate	110.51	107.62	112.80	107.86	105.95	109.91
Net Intake Rate	96.50	96.29	96.80	96.62	96.43	96.82
Gross Enrolment Rate	109.60	104.49	114.93	104.90	100.10	108.90
Net Enrolment Rate	97.74	97.65	98.01	97.81	97.37	98.25
Dropout Rate	17.90	19.20	15.70	17.20	19.00	15.50
Completion Rate	82.10	80.80	83.20	82.80	81.00	84.50
Survival Rate	85.20	84.10	86.10	84.70	83.30	85.90
Repetition Rate	5.10	5.10	4.90	5.00	5.00	4.90

Source: DPE (APSC 2021), BANBIES, 2021

Table-A3: Gross and Net Enrollment Rate in Primary Education, Bangladesh 2021

Year	**GER (%)**			**NER (%)**		
	Boys	**Girls**	**Total**	**Boys**	**Girls**	**Total**
2005	91.2	96.2	93.7	84.6	90.1	87.2
2006	92.9	103	97.7	87.6	94.5	90.9
2007	93.4	104.6	98.8	87.8	94.7	91.1
2008	92.8	102.9	97.6	87.9	90.4	90.8
2009	100.1	107.1	103.5	89.1	99.1	93.9

Year	GER (%)			NER (%)		
	Boys	**Girls**	**Total**	**Boys**	**Girls**	**Total**
2010	103.2	112.4	107.7	92.2	97.6	94.8
2011	97.5	105.6	101.5	92.7	97.3	94.9
2012	101.3	107.6	104.4	95.4	98.1	96.7
2013	106.8	110.5	108.6	96.2	98.4	97.3
2014	104.6	112.3	108.4	96.6	98.8	97.7
2015	105.0	113.4	109.2	97.1	98.8	97.7
2016	109.3	115.0	122.1	97.01	97.01	97.01
2017	108.1	115.4	111.7	97.66	97.66	97.66
2018	110.32	118.30	114.23	97.55	97.55	97.55
2019	106.15	113.20	109.49	97.65	97.65	97.65
2020	100.1	108.9	104.9	97.37	97.37	97.37

Source: DPE (APSC 2021), BANBIES, 2021

Table-A4: Literacy (7+) rate of 2001 and 2011, Cumilla

	2001			2011		
Comilla	**Male**	**Female**	**Both**	**Male**	**Female**	**Both**
Barura	47.3	42.6	44.9	51.1	52.9	52.1
Total	49.4	42.6	46.0	54.1	52.6	53.3

Source: Comilla District Statistics, BBS, 2013

Table-A5: Primary school (class I-V), teacher and student 2011, Cumilla

		Number of teacher			Number of student			
Types of Primary School	No. of primary school	Male	Female	Total	Male	Female	Total	Students per teacher
Government at Barura	97	297	381	678	12920	19379	32290	48
Total Govt. at Comilla	1318	3745	4645	8352	243452	270315	513696	62
Registered at Barura	49	80	90	170	4077	6114	10191	60
Total Reg. at Comilla	647	998	1297	2305	74507	80219	154826	67
Non-registered at Barura	8	12	18	30	440	810	1350	45
Total Non-Reg. at Comilla	56	89	150	239	5676	6786	12562	53

Source: Comilla District Statistics, BBS, 2013