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## Factors Affecting Variations in the Achievement of Competencies: A Case Study of BRAC Primary School

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## **ABSTRACT**

Under a broader aim of exploring the quality of BRAC Education Programme (BEP), this study aims to examine the level of competency achievement of the BRAC primary school students graduated in 2005. Randomly selected 5,946 students (65% girls) from 298 schools under 150 BEP programme areas were sampled for the test. In addition, background information of the students, schools, teachers, programme organizers, and area managers were collected. In general, the students did very well in the test with an average achievement of 22.7 competencies, and 10% of the students achieved all the 27 competencies under test. Proportion of contents in the textbooks taught in the classes, duration of attachment of programme organizers with the schools, experience of area managers and religion of the students came out as significant predictors of performance of the schools. A number of suggestions were also made.

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## INTRODUCTION

Competency-based primary education has been introduced in Bangladesh soon after the implementation of the compulsory primary education in 1992. There are 50 competencies in total, which are broken into learning continuum and distributed in different grades of primary education. It is expected that the children would achieve the full range of competencies through the teaching learning activities of five academic years (NCTB and UNICEF 1988, NCTB undated).

Although the National Curriculum and Textbook Board (NCTB) has introduced the competency-based curriculum, but testing the students based on a competency-based test instrument was done first under the second *Education Watch* study in 2000 (Nath and Chowdhury 2001). This measures achievement of competencies of the students at the end of grade V.

BRAC provides primary education to the children who never went to school and dropped out through its non-formal primary schools called BRAC Primary Schools (BPS). These are one room, single teacher schools with 33 students on an average. A cohort of children enrolls in school and continues there for four calendar years to learn the full primary curriculum of five academic years. There is no head teacher in these schools. However, a cluster of 12-13 schools are supervised by a person called Programme Organizer (PO). POs' roles and responsibilities are similar to that of the head teachers in formal schools. The BRAC schools follow the same curriculum of NCTB. Some of the textbooks are made by BRAC itself and some are published by NCTB. Beside the textbooks, a number of supplementary books are also used in BRAC schools. Students take part in various co-curricular activities including publication of wall magazine.

The national sample of the *Education Watch* study contained a good number of BPS students in the non-formal category. However, the scope of separate analysis of BPS data was limited in *Education Watch* report. The management of BEP requested Research and Evaluation Division (RED) of BRAC to do a separate study on the BPS students in 2001. Since then a study is being conducted each year on the BPS graduates to see their level of competency achievement. This report provides information from the latest survey done on the graduates of 2005, who started the course in 2002.

## **OBJECTIVES**

Under a broader aim of exploring the quality of BEP, this study aims to examine the level of competency achievement of the BPS students graduated in 2005. The specific objectives are as follows.

1. Explore the socioeconomic background of the pupils of BRAC schools,
2. Explore educational as well as training related information of the teachers of BPS,
3. Explore some basic information about the programme organizers (PO) and the area managers (AM) and their school-related activities,
4. Examine the level of competencies of the graduates of 2005 and the factors affecting student level variation in learning achievement, and
5. Examine the school level variation in competency achievement and the factors affecting such variation.

## METHODOLOGY

### THE INSTRUMENTS

Competency-based test instrument developed for *Education Watch 2000* was used in this study. The instrument covered 27 of the 29 cognitive competencies in the NCTB list of competencies. Six subjects were covered in it - Bangla, English, mathematics, social studies, general science, and religious studies. Sixty-four question items of various types were put in the instrument. It is a paper-pencil based test. Table 1 presents the number of competencies and the test items against the subjects mentioned.

**Table 1. Number of competencies and question items by subjects**

Subject	Number of competencies addressed	Number of question items in the test
Bangla	3	10
English	3	7
Mathematics	5	15
Social studies	6	13
General science	9	18
Religious studies	1	1
All	27	64

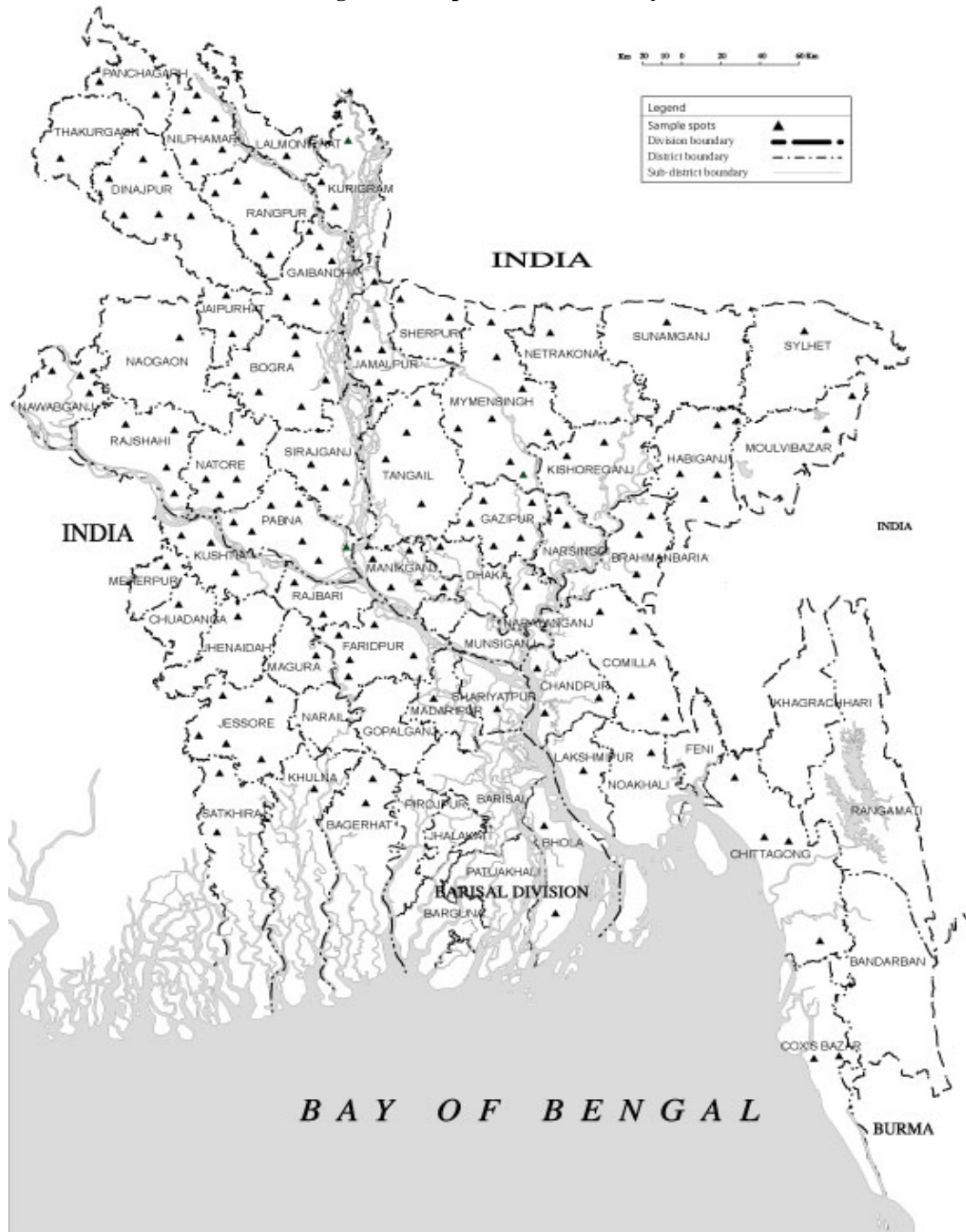
Besides, another three questionnaires were developed to collect students' socioeconomic profile, teachers' background and other information, and information of the POs, AMs and the school programme in the areas.

### SAMPLING

BRAC school programme is implemented all over the country through 411 area offices under 46 regional offices. The students of 7,304 schools were graduated in 2005. Keeping the objectives in mind sample size and the sampling strategy were adopted in such a way that both school and student level analyses are possible.

A three-stage cluster sampling strategy was followed in this study. At the first stage, 150 areas were randomly selected from the whole country. In each area, two schools were selected in the same manner, totalling 300. In each selected school, 20 students were selected in the similar fashion from those attended on the test date. Thus, 6,000 (300 x 20) students were selected. Two schools had to be discarded after the fieldwork due to faulty sampling. Thus, finally 5,946 students from 298 schools were successfully brought under the test. Numbers of girls and boys were 3,901 and 2,045 respectively in the sample. Figure 1 shows the sample spots.

Figure 1. Sample areas under study



### ADMINISTERING THE TEST

In each selected school, 20 students were tested at a time in their own classroom. The unselected students and their teacher were not allowed to stay in the classroom. A team of two research assistants administered the test in each school. Twenty-five such teams worked in the process. Each team was responsible to work in 12 schools located in six areas.

The test was divided into three parts. In the first part, one hour was allotted for taking Bangla and English language test. In the second part, another one hour was allotted for mathematics, social studies, general science and religious studies. In the third part, listening test for Bangla and English took 10 minutes. Ten minutes break was given between every two parts. The test administrators, at the beginning, took the opportunity to make the students understand the rules and regulations of the test, Flipcharts and blackboards were used to do so along with the lecture on the procedure. The test was administered in December 2005, just before the end of the course. Other information was collected in January 2006.

## FINDINGS

### THE AREAS UNDER STUDY

A total of 150 areas were sampled from 411 areas clustered in 46 regions. Two regions were not covered in the sample due to unavailability of schools completing grade V. Of these areas, 57 were from Rajshahi division, 48 from Dhaka division, 17 from Khulna division, 18 from Chittagong division, eight from Sylhet division, and two from Barisal division. BRAC school programme has been started in some of these areas since 1985. As stated by the area managers, BRAC started education programme in 16.7% of the sampled areas before 1990, nearly half of the areas during 1990-94, and in 34% of the areas afterwards.

A total of 13,354 schools were completed in these areas during last six years (from 2000 to 2005); nearly 54% during first three years and the rest afterwards. Area-wise analysis shows that the number of completing schools ranges from 5 to 455, with a mean of 89 schools in an area. In a half of the areas the number of completing schools ranges from 5-82 in the same period. In a quarter of the areas the number of completing schools was 5-60 and it was more than 110 schools in another quarter of the areas.

As reported, 2,661 schools were opened in 2002 in these areas, of which 85 (3.2% of total) had to be closed down after completing grade III due to various reasons. These schools were located in 49 areas. Number of schools opened in the sampled areas ranges from 6 to 45, with a median of 17 schools. Twelve or less number of schools were opened in each of a quarter of the areas and 22 or more schools in each of another quarter of the areas. The area managers also reported that 43 schools were not competent enough to proceed up to grade V; however, they were also taken up to class V. These schools were located in 14 areas.

The area managers were asked to mention three prominent reasons which are, in general, obstacles for proceeding with all the schools up to grade V. The most prominent reason they mentioned was the incapability of the teachers to teach the students of grade IV and V – nearly three quarters of the AMs reported this. The second most important reason was related to absenteeism of the pupils. It occurred in three ways. Firstly, the parents were unwilling to continue their children's education due to lack of consciousness (58%), secondly, some students moved from BRAC schools to the nearer formal schools for government stipend (*upabritti*) (52.7%), and thirdly, due to higher absenteeism during the first three grades majority of the pupils laid them unprepared for grade IV (26%). It is to be noted that in a broad sense, all these three reasons are generated from poverty. The third most important reason of closing the schools was due to dropout of the teachers. The teachers' dropout accounts for migration due to marriage, personal/family-related problems, and inadequate remuneration from BRAC.

### THE AREA MANAGERS

Some basic information of the area managers (AM) was collected. Over a fifth of the 150 AMs were females. Their age ranges from 27 to 44 years with an average age of 33.9 years; males 34.4 years and females 32.3 years. Regarding educational qualification, 13.3% completed Higher Secondary Certificate (HSC), 42% had bachelor degree, and 44.7% had masters degree. Gender-wise, 84.8% of the male and 93.7% of the female AMs had bachelor or masters degree.

The AMs had, on average, 8.4 years of experience in BRAC with a wide variation from two to 14 years. The average length of experience of the male AMs was 8.5 years and female AMs 7.7 years. A half of the managers had 9.7 or more years of experience. A quarter of the managers had less than 4.4 years of experience and another quarter had more than 11.7 years of experience.

Duration of service in the present office was found much lower than their experience. The average duration of the AMs in the present office was only two years, with very little difference between the males and the females. Range of duration in present office was from two months to six years. A quarter of the area managers were at their present place for less than a year and another quarter for more than 2.8 years.

The AMs had three months to nearly 12 years of experience as managers of the area offices. The average length of experience as AM was 3.4 years with a median of 2.9 years. The difference between the first and the third quartiles was only one year (2.3 years to 3.3 years).

## **THE PROGRAMME ORGANIZERS**

Information of the programme organizers (PO), who are the first line supervisors of the BRAC schools, was collected. It was not possible to collect the information of all the POs who supervised the schools during the whole period of four years. Rather those supervised the schools at the fifth grade were considered.

A total of 391 POs were responsible to look after the 298 schools under study. This means that a reasonable number of the schools were supervised by more than one PO at their fifth grade. As the area managers reported, nearly 60% of the schools were supervised by one PO, 31.2% by two, 8.4% by three, and 0.7% by four.

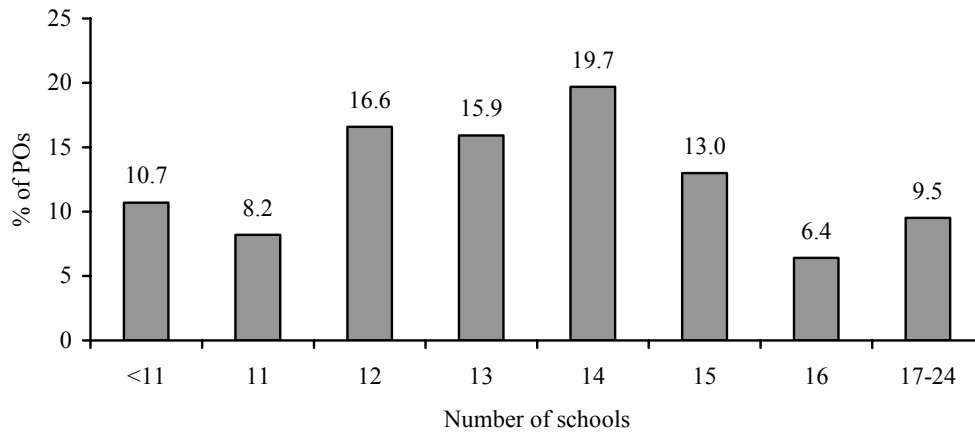
Over 23% of the POs who supervised the study schools at their fifth grade were females. A third of the POs completed HSC, another quarter had bachelor degree and the rest quarter had masters degree. Duration of service of these POs with BRAC ranges from four months to 18 years. On average, the POs had 6.4 years of experience with BRAC; 6.7 years for the males and 5.5 years for the females. Half of the POs had more than 6.2 years of experience.

None of the POs had involvement with their present school for more than one year, indicating a frequent transfer of POs from one area to another. The average length of involvement was 6.5 months. A quarter of the POs started to look after the study schools only three months before the completion of the course, half of the POs started to do so seven months before, and another quarter were looking after the schools for the last 10 months.

In addition to pre-service foundation, school management and other training courses, a good number of the POs had subject-based master training (MT). They were 88% of the total number of the POs. Of the POs, 22.3% had such training in one subject, 38.2% in two, 21.5% in three, 5.1% in four, and 1% in five subjects. Majority of the POs received master training in mathematics (36.1%), followed by Bangla (32.2%), *paribesh parichiti* (including social and general sciences) (28.6%) and English (27.6%). Nearly 8% of the POs had training on inclusive education and there was no provision of master training in religious studies.

Number of schools supervised by each PO is a reflection of their workload in the programme. On average, each PO was responsible for 13.4 schools; 13.6 for the males and 12.8 for the females. Twelve or lesser number of the schools were under the supervision of a quarter of the POs, for another quarter it was more than 15 schools. Figure 2 provides the percentage distribution of POs by number of schools they were looking after.

**Figure 2. Percentage distribution of POs by number of schools under their supervision**



### **THE TEACHERS OF BPS**

A total of 296 teachers were interviewed, mostly females (98.3%). Age of the teachers ranged from 17-50 years. The average age of the teachers was 29.6 years with half of them below 28 years. A quarter of the teachers were below 25 years and another quarter above 35 years. Nearly 79% of the teachers were currently married, 16.6% were unmarried, and less than 5% had other status.

On average, the teachers had 10.5 years of schooling. Of them, 17.8% studied up to grade nine or ten but could not complete secondary education, 53% completed secondary education, 22% completed higher secondary, and 7.2% were graduates. Those studied at least up to secondary grades, 82.8% studied science, 13.5% humanities, and 3.7% commerce. It is to be noted that none of them appeared in the public examination under the madrasa stream.

**Table 2. Distribution of teachers by marks obtained in school final exam in three core subjects**

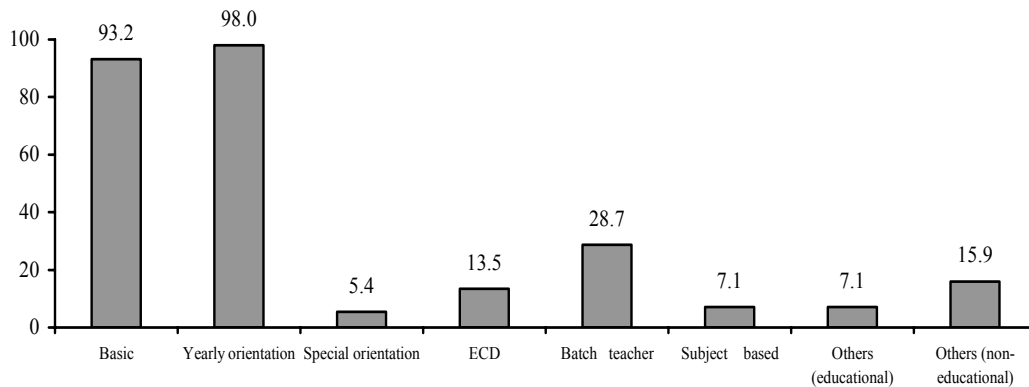
Marks (in %)	Bangla		English		Mathematics	
	Number of teachers	%	Number of teachers	%	Number of teachers	%
33-39	31	13.4	69	29.9	66	28.0
40-49	75	32.2	92	39.8	57	24.2
50-59	72	34.0	46	19.9	52	22.0
60+	54	23.3	24	10.4	61	25.8
Total	232	100.0	231	100.0	236	100.0
Range	33 – 80		33 – 75		33 – 86	
Mean	51.6		45.5		50.4	
Median	50.0		45.0		48.0	
S.d.	10.4		9.5		13.7	

In order to get a sense of quality of education that the teachers received during their student life, percentage of marks they obtained in three core subjects in the school final examination (SSC) were collected (Table 2). The subjects were Bangla, English, and general mathematics. In general, the teachers did best in Bangla and worst in English; the score in mathematics was in between. Over 57% of the teachers received a score more than half of the total marks in Bangla, nearly 48% did so in mathematics and only 30% in English.

Nearly 18% of the teachers joined BRAC as teachers before 1995, 42.6% between 1995 and 2000, and 39.5% in 2001 and onwards. Half of them joined after 1998 and a fifth in 2002. Seventy-two percent of the teachers were continuously working with BRAC since their joining. Nearly a fifth of the teachers had a break of 1-11 months, 4.4% had a break of 12-23 months, and 4.1% had so for two years or more. The current batch was the first batch of pupils for more than half of the teachers, it was the second batch for 36.8% of them, third batch for 6.8%, and fourth batch for 4.3% of the teachers.

Teacher training is an integral part of BEP. Various types of training are provided to the teachers to keep them updated with the lessons. These include basic training for the beginners, orientation course at the beginning of each academic year, special orientation course, training on early childhood development, subject based training, and others. Some of these in other category had educational contains and some had not. Ninety-eight percent of the teachers under this survey received at least one of these training. Two major training that the teachers received are teacher training (93.2%) and the yearly orientation (98%). Nearly 29% of the teachers received batch training, 13.5% received training on early childhood development (ECD), and about 16% received some non-educational training courses (Figure 3).

**Figure 3. Percentage of teachers received training by type of training**



It is obvious that the teachers would receive the yearly orientation more than once. However, it was observed that some teachers received other training more than once including the basic training. It occurred especially due to their discontinuation from service mentioned above. On average, the surveyed teachers participated in 11 training courses ranging from nil to 35. Half of the teachers participated in more than 11 training courses. Forty-three percent of the teachers received less than 10 training courses, 53% received 10-20, and others more than 20.

The teachers were asked in a four point scale to mention how easy the textbooks of class V to them were. The points in the scale were 25% of the contents was easy, 50% easy, 75% easy and fully easy. The teachers expressed their opinion separately for each subject. According to them the social science part of the *Paribesh Parichiti* was the easiest subject to them – 68% of the teachers mentioned it as fully easy (Table 3). The general science part of *Paribesh Parichiti* and the mathematics followed the above – these subjects were fully easy to 52-54% of the teachers. The full contents of Bangla were easy to 48% of the teachers and it was for 46.3% of the teachers in the case of religious studies. English was the hardest subject to the teachers of BPS. Less than a third of them found it fully easy, three quarters of the contents were easy to another 50.3% of the teachers. Half of the English textbook was difficult to 11.6% of the teachers, and a quarter of the teachers faced similar difficulty with religious studies.

**Table 3. Percentage distribution of teachers by various difficulty levels of the textbooks they used in class V**

Textbooks	Number of teachers	Various difficulty levels					Total
		None	25% easy	50% easy	75% easy	Fully easy	
Bangla	294	-	2.4	6.5	43.2	48.0	100.0
English	294	-	5.8	11.6	50.3	32.3	100.0
Mathematics	294	-	-	5.8	42.2	52.0	100.0
Social science	294	-	-	2.4	29.6	68.0	100.0
General science	294	-	-	6.5	39.8	53.7	100.0
Religious studies	294	1.0	9.2	24.5	19.0	46.3	100.0

A textbook difficulty index was calculated to have a sense of overall difficulty level of the textbooks used in class V. To make the calculation easy an additive model was followed. A value was put for each of the difficulty level the teachers mentioned for each of the subjects. For instance, 25% easy = 1, 50% easy = 2, 75% easy = 3, and fully easy = 4. The values were then added to have overall difficulty score and again recoded as follows: 6-11 = 25-49% of the contents easy, 12-17 = 50-74% of the contents easy, 18-23 = 75-99% of the contents easy and 24 = full contents easy. The findings reveal that the value of the difficulty index varied from 13 to 24 with an average of 20 and standard deviation 2.7. Over half but less than three quarters of the contents were easy to about a fifth of the teachers. Over three quarters of the contents but not the full were easy to 74.8% of the teachers. The full contents of class V were easy to 5.8% of the teachers.

The teachers were also asked to mention the proportion of the contents they taught in class V. As it was the easiest subject to them highest proportion of the teachers (84.7%) taught more than three quarters of social science contents, followed by respectively mathematics and general science (Table 4). Serious problem was found in the cases of Bangla, English and religious studies. Nearly half of the teachers taught less than 50% of the Bangla contents to their students. Nearly 52% of the teachers showed similar performance in the case of English; only 5.8% of them taught at least three quarters and 23.8% taught less than a quarter of the English contents. Thirty-five percent of the teachers taught below a quarter of the religious studies contents, 28.6% taught 25-49%, 18% taught 50-74%, and 17.3% taught three quarters or more. One percent of the teachers reported that they did not teach any content of religious studies.

**Table 4. Percentage distribution of teachers by proportion of the contents in the textbooks covered (taught) in class V**

Textbooks	Number of teachers	Proportion completed in class V					Total
		None	<25%	25-49%	50-74%	75%+	
Bangla	294	-	1.7	46.9	36.4	15.0	100.0
English	294	-	23.8	27.9	42.5	5.8	100.0
Mathematics	294	-	-	2.0	17.7	80.3	100.0
Social science	294	-	-	1.7	13.6	84.7	100.0
General science	294	-	-	2.7	21.8	75.5	100.0
Religious studies	294	1.0	35.0	28.6	18.0	17.3	100.0

Similar to the textbook difficulty index, another index called textbook coverage index was calculated to have a sense of overall coverage of the textbooks used in class V. The calculation procedure was similar to the textbook difficulty index. For instance, the teachers responses were given value in the following way: 25% covered = 1, 50% covered = 2, 75% covered = 3, and fully covered = 4. The values were then added to have overall difficulty score and again recoded as 6-11 = 25-49% of the contents were covered, 12-17 = 50-74% of the

contents were covered, 18-23 = 75-99% of the contents were covered, and 24 = full contents were covered. The findings reveal that the value of the textbook coverage index varied from 12-24 with an average of 18.4 and standard deviation 2.7. Thirty-seven percent of the teachers covered over half of the contents but less than three quarters, 61% covered over three quarters of the contents but not the full, and only 2% of them covered the full contents in the textbooks of class V.

The teachers were asked to distribute their pupils at various categories of competency achievement. Basis for the teachers' categorization was their observation and assessment during class time. Of the 9,049 pupils they distributed, 43.3% fell in a category of achieving the full length of competencies, 25.9% fell in a category of achieving three quarters of the competencies but not all. According to the teachers' observation and assessment, 19% of their pupils were able to achieve 50-74% of the competencies and 11.7% were able to achieve 25-49% of the competencies. We can check the validity of this assessment with the test results presented later.

The Pearson's correlation coefficient between the two indices (textbook difficulty and coverage) was positive ( $r = 0.56$ ;  $p < 0.01$ ). This means that the teachers who found the contents of the textbooks easy were more likely to cover those most. Again, these two indices were positively correlated with the teachers' assessment of their pupils. The correlation coefficient of teachers assessment of the students achievement of competencies with the textbook difficulty index was 0.31 ( $p < 0.01$ ) and with the textbook coverage index was 0.37 ( $p < 0.01$ ).

## **THE SCHOOLS**

The schools completing the full cycle of primary education in December 2005 were suppose to start in January 2002 (total duration of schools is 48 months). Again, the official distribution of this period among five grades is nine months for each of the first two grades and 10 months for each of the rest three grades. However, it was not the case for each of the schools under study. As reported by the area managers, schools of this cohort opened during August 2001 to June 2002. This means that the students completing primary course in December 2005 received varying duration of schooling. About 12% of the study schools were opened before January 2002. These schools get longer duration than they were supposed to.

Table 5 provides distribution of schools by duration in various grades and also some statistics like mean, median, mode and range. Following are some of the salient features:

- On average, the graduates of 2005 received 46.4 months schooling to complete their primary education, which ranges from 43-53 months.
- Total duration for half of the schools was 46 months or less.
- Nearly 14% of the schools maintained the official duration of the course (with  $\pm 1$  month), 75.9% less and 10.2% more.

**Table 5. Duration of schools in various grades (n=295 schools)**

Grade	Official duration (month)	% of schools			Some basic statistics			
		Less	Exactly ( $\pm 1$ month)	More	Mean	Median	Mode	Range
I	9.0	5.1	90.5	4.4	8.8	9.0	9.0	7-14
II	9.0	0.7	96.9	2.4	8.7	9.0	9.0	7-13
III	10.0	16.9	83.1	0.0	9.2	9.0	9.0	6-11
IV	10.0	4.4	91.6	4.1	9.9	10.0	10.0	7-13
V	10.0	5.7	93.6	0.7	9.8	10.0	10.0	7-13
All	48.0	75.9	13.9	10.2	46.4	46.0	46.0	43-53

- Grade-wise analysis shows that in most of the classes the schools maintained the official duration in more than 90% of the cases.
- The students got lesser time in grade III, where 83.1% of the schools maintained the official duration.
- Percentage distribution of schools by duration showed that 2.7% of the schools continued for less than 45 months, 20.3% for 45 months, 52.9% for 46 months, 12.2% for 47 months, 1.7% for 48 months, and 10.2% for more than 48 months. (not shown in the table)

BPS teachers are supposed to receive monthly refreshers training. On average, the teachers received 43 refreshers training course during the last four calendar years. A quarter of the teachers received less than 40 such training, a half received less than 43, and a quarter received more than 46. As the area managers reported, on average, they visited each school 11 times during grade V and the programme organizers 47.7 times.

According to the existing school evaluation system nearly 60% of the study schools were categorised as A grade, 38.3% B grade, and 2.3% C grade. The area managers were also asked to put their opinion on the schools and the teachers under their supervision in terms of quality education. A five point scale was used. The points were very good, good, average, poor, and very poor. According to the AMs, 36.9% of the teachers were 'very good', 48% were 'good', 14.1% were 'average' and the rest 1% 'poor' or 'very poor'. On the other hand, the AMs categorised the students of 28.9% of the schools as 'very good', 58.7% as 'good', 11.7% as 'average' and rest as 'poor'. No students of any school was categorised as 'very poor'.

A significantly positive correlation was observed between the grades of the teachers and the students ( $r= 0.70$ ;  $p<0.001$ ). Other way, the students of the 63.6% of the 'very good' category teachers were categorised as 'very good' and the rest as 'good'. The students of 82.2% of the 'good' quality teachers were categorised as 'good'. Again, the students of 38% of the 'average' category teachers were categorised as 'good' and 62% as 'average'.

**Table 6. Consistency between POs school evaluation and AMs opinions about the quality of the teachers and the students**

Five point scale used by AMs	About the teachers			About the students		
	Grade A (175)	Grade B (113)	Grade C (7)	Grade A (175)	Grade B (113)	Grade C (7)
Very good	54.3	11.5	-	46.9	3.5	-
Good	37.7	68.1	-	50.3	74.3	14.3
Average	8.0	20.4	57.1	2.9	22.1	57.1
Poor	-	-	28.6	-	-	28.6
Very poor	-	-	14.3	-	-	-
Total	100.0	100.0	100.0	100.0	100.0	100.0

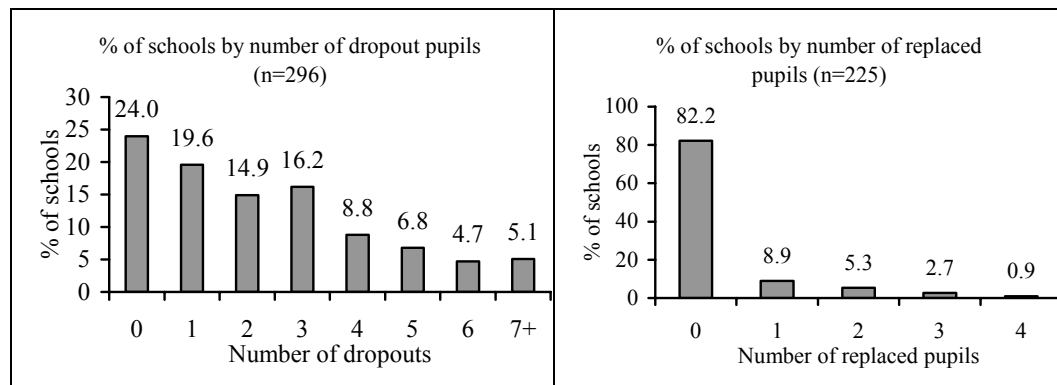
Figures in the parentheses indicate number of schools

An attempt was made to see the consistency between the school category based on the POs regular evaluation and the opinion of the area managers (Table 6). A fairly consistent result was found. However, 8% of the teachers of the A grade schools were categorised as ‘average’ by the AMs and 11.5% of the teachers of the B grade schools were categorised as ‘very good’. Interestingly, the AMs categorised 8% of the teachers of the A grade, 20.4% of those of B grade and 57.1% of those of C grade schools as ‘average’. Again, according to them, 2.9% of the students of the A grade schools, 22.1% of those of B grade schools and 57.1% of those of C grade schools were with ‘average’ standard.

### ENROLMENT, DROPOUT AND REPLACEMENT

A total of 9,743 students enrolled in 296 schools at their beginning with an average of 32.9 per school. Three percent of the schools started with less than 33 pupils each, 96% with 33 pupils and 1% with 34 or more number of pupils. About 7.2% of the initially enrolled students (701 in number) dropped out during the cycle, of which 10% were replaced. Although we do not know when did these students dropout and when were they replaced. It can be mentioned that no replacement is allowed after six months of initiating of a school. No dropout case was found in 24% of the schools. Number of dropout varied from 1 to 14 in other schools. The number of dropout was only one in each of the 19.6% of the schools, two in 14.9% of the schools, three in 16.2% of the schools and more in other schools. No replacement was occurred in 82.2% of the schools where at least one dropout case was there. Number of replaced pupils was limited to below four. Figure 4 provides more on dropout and replacement.

**Figure 4. Percentage distribution of schools by number of dropped out and replaced pupils**



After all these dropout and replacement 9,112 pupils graduated from these schools with an average of 30.8 per school. They were 93.5% of the initial number of the pupils. The number of graduates varied from one school to another ranging from 22 to 33. It was less than 30 in 23.6% of the schools, 30 in 14.5% of the schools, 31 in 14.9% of the schools, 32 in 19.6% of the schools and 33 in 27.3% of the schools.

Combining all the schools, the proportion of girls was 65% among the graduates. It was less than 65% in 48.3% of the schools. The number of boys ranges from 5 to 23 among the graduates and it was 10 to 28 among the girls. The number of boys was higher than the girls in 3% of the schools. The share of the girls varied between 51-60% in about one fifth of the schools, it was 61-65% in a quarter of the schools, between 66-70% in 28.4% of the schools, and over 70% in 23.3% of the schools (Table 7).

**Table 7. Distribution of schools by percentage of girls among the graduates**

Percentage of girls among the graduates	Number of schools	Percentage of schools
30 – 50	9	3.0
51 – 60	60	20.3
61 – 65	74	25.0
66 – 70	84	28.4
71 – 85	69	23.3
Total	296	100.0

Division-wise analysis shows that the proportion of girls was less than 60% in 35.3% of the schools in Khulna division, 27% of the schools in Rajshahi, 25% of the schools in Barisal, 21% of the schools in Dhaka, 18.8% of the schools in Sylhet and 8.4% of the schools in Chittagong.

## BACKGROUND OF THE PUPILS

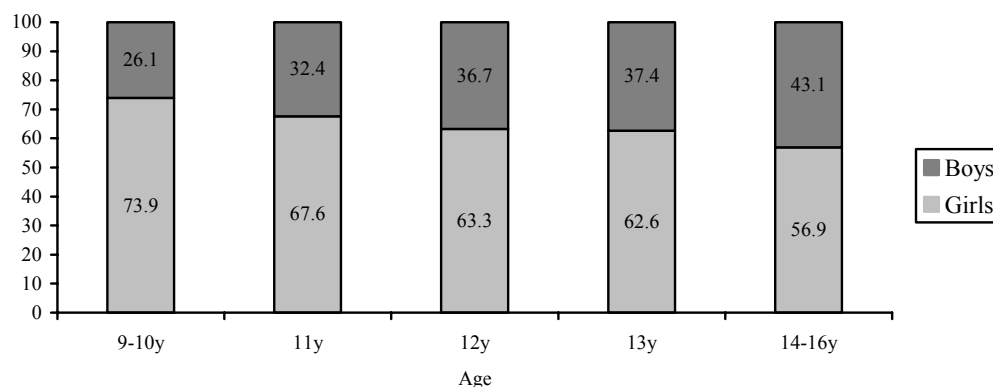
Of the 5,946 graduates brought under the competency achievement test, 5,912 were covered under socioeconomic survey. On average, the pupils were 11.8 years old during graduation, ranging from 9-16 years. The mean age was 11.92 years among the boys and 11.67 years among the girls; a difference of 0.25 years. This means that the boys in the BPS were three months older than the girls. Nearly 60% of the graduates were between 11-12 years, 15.6% were 9-10 years, and others 13 years or more (Table 8).

**Table 8. Percentage distribution of the pupils by age and sex**

Age (in year)	Sex		Both (5,912)
	Boys (2,040)	Girls (3,872)	
9-10	11.8	17.7	15.6
11	26.9	29.6	28.7
12	32.8	29.8	30.9
13	17.0	14.9	15.6
14-16	11.4	8.0	9.2
Total	100.0	100.0	100.0

A clear age difference between the boys and the girls was observed. Table 8 shows that 38.7% of the boys were 11 years or below, whereas it was 47.3% among the girls. Again the girl-boy ratio was 74:26 among those 9-10 years, 65:35 among those 11-12 years, and 60:40 among those 13-16 years – indicating a significant increase of older boys in the BPS classrooms. Figure 5 shows a decreasing share of girls with the increase of age of the pupils ( $p < 0.001$ ). The household size of the graduates varied from 2 to 27 with an average of 5.8 persons per household. This figure is much higher than the national average of 4.8 (BBS, 2001). Majority of the graduates belonged to a household with 4-6 members.

**Figure 5. Percentage share of girls and boys by age**



The mean age of the pupils varied from school to school, ranging from 10.5 to 13.2 years. It was 10 years<sup>1</sup> in 7.4% of the schools, 11 years in 60% of the schools, 12 years in 31.6% of the schools, and 13 years in 1% of the schools.

Information on parental education of the graduates was also collected. Nearly 60% of the mothers and 53.6% of the fathers had never been to school (Table 9). Among the fathers, 12.2% completed primary education, 13.3% went for secondary education but did not complete, and 5% completed secondary education or more. Similar figures for the mothers were respectively 12.4%, 8.3% and 0.8%. Nearly 3% of the parents studied in the non-graded madrasas. Over 40% of the graduates were first generation learners; meaning that both the parents of these pupils had never been to any school. This figure was 44.3% for the boys and 40.8% for the girls.

**Table 9. Percentage distribution of the pupils by various levels of parental education**

Level of education	Parents	
	Fathers (5,838)	Mothers (5,764)
Never schooled	53.6	59.8
Primary incomplete	15.9	18.7
Primary complete	12.2	12.4
Secondary incomplete	13.3	8.3
Secondary complete and more	5.0	0.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

Parental education of the pupils varied from one school to another. In 5% of the schools, more than three quarters of the fathers had at least one year of schooling and in 7.4% of the schools less than a quarter of the fathers had schooling. Below 66% of the fathers in a quarter of the schools had at least one year of schooling, it was 36-45% for second quarter of the schools, 46-58% for third quarter of the schools and more than 58% in the fourth quarter of the schools. Similar situation was also observed in the case of mothers' education. Percentage of first generation learners varied from nil to 95% in the schools. More than half of the students of 26.2% of the schools were first generation learners.

The main source of income of 34.2% of the households was agriculture, 24.5% selling manual labour, 18.7% business, 6.4% service, and 16.2% others. Over 60% of the households

<sup>1</sup> Mean age 10.01 to 10.99 years was considered as 10 years and so on

had less than 50 decimals of land, 14.3% had 50-99 decimals, 13.1% had 100-199 decimals, and 12.4% had 200 decimals or more. According the respondents, at least one person of 37% of the households was selling manual labour. Yearly food security status of the households was reported in a four point scale considering household income from various sources and expenditure for various items during the last one year. Of the graduates, 12.6% fell in a category of 'always in deficit' household, 30.4% 'sometimes in deficit' category, 30.4% 'breakeven' and 26.7% 'surplus'. Nearly half of the students came from such households where at least one person was NGO member.

The proportion of non-Muslim students was 6.8% - lesser than the national average. In 70.5% of the schools, all the students were from Muslim families, the proportion of Muslim students was found 95% in another 10.4% of the schools. There was no Muslim student in only 1% of the schools.

Nearly 34% of the students had electricity facilities at home. No students of 16.4% of the schools had such facility and all students of 2% of the schools had this facility. In half of the schools, the proportion of students having electricity facility at home varied from nil to 30%. More than 55% of the students had this facility in a quarter of the schools.

Nearly 47% of the graduates received help in their study at home from any household member during the last year, 47.5% among the boys and 46.6% among the girls. However, we do not know who these members were or what type of help they had provided to the students. Help may vary from asking for seating for study to actual supervision of study and help in pedagogic matters. Provision of private tutor was there for a quarter of the graduates, 26.3% boys and 23.8% girls ( $p < 0.05$ ). Combining the above two information, it can be said that 42.3% of the graduates did not get any help in study at home, a third received help from the household members only, 10.7% did so from the private tutor only, and 14% received help from both household members and the private tutor (Table 10). Sixty-three percent of the first generation learners did not get any help at home neither from household members nor from private tutor (boys 60.5%, girls 64.2%;  $p < 0.05$ ). This figure was 28.6% among the second generation learners. Those had the provision of private tutor, on an average, they utilized it for 4.5 months during the last year with no gender difference.

**Table 10. Percentage distribution of the pupils by help provider in study at home**

Help provider in study at home	Sex		Both (5,912)
	Boys (2,040)	Girls (3,872)	
None	40.9	43.1	42.3
Household member	32.8	33.1	33.0
Private tutor	11.6	10.2	10.7
Both	14.7	13.6	14.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Receiving help in study at home or having private tutor was significantly correlated with the parental education of the pupils. The educated parents were more likely to provide these facilities to their children compared to the less educated or never schooled parents. For instance, 18.7% of the pupils with no education of the fathers had private tutor, which rose to 25.4% with fathers having incomplete primary education, and to 34.5% with complete primary education of the fathers (Table 11).

**Table 11. Relationship between parental education and supplementary tutoring**

Level of parental education	Fathers' education		Mothers' education	
	% of pupils received help at home	% of pupils had private tutor	% of pupils received help at home	% of pupils had private tutor
Never schooled	31.3	18.7	34.2	18.8
Primary incomplete	47.7	25.4	48.4	28.9
Primary complete and more	74.6	34.5	80.6	34.5
Level of significance	p<0.001	p<0.001	p<0.001	p<0.001

Information on the pupils' involvement in work was collected. The reference period was three days prior to the interview. As reported, 72.4% of the graduates were involved in work at home or outside during the reference period. This rate was 62% among the boys and 77.9% among the girls. Work duration varied from less than one hour to 11 hours per day. On average, 5.3 hours for all graduates, 5.9 hours for the boys and 5.1 hours for the girls. If we consider at least one hour involvement per day as participation in work the rate reduced to 61.3% at the aggregate level, 52.6% for the boys and 65.9% for the girls.

Major involvement in work was at home, where 71.8% of the graduates participated. On the other hand, 1.6% of the graduates were involved in work outside home. The rate of work involvement at home was higher for the girls than the boys (77.8% vs. 60.4%) and vice versa in case of work involvement outside home (0.8% vs. 3.1%).

An attempt was made to see whether there is any difference among the boys and the girls in respect to their socioeconomic characteristics. No difference was observed among them in terms of parental education, food security status of household, electricity availability at home, religion and having household members help in study at home. However, the boys were ahead of the girls in respect to having private tutor facilities in addition to schooling. Again, age of the boys was higher than the girls in the same class. The girls were more likely to involve in work than the boys.

## STUDENTS ACHIEVEMENT OF COMPETENCIES

There are four competencies in Bangla and four in English. Of them, three were assessed in each. These are *Reading*, *Writing*, and *Listening*. No vocabulary test was taken. A summary of the competencies, question items and minimum level of qualifying each of the competencies is provided in Annex 1. Total number of questions in Bangla was 10 and in English was seven.

The highest performance in Bangla was observed in listening skills, which was achieved by 93.6% of the students (Table 12). This was followed by reading skills (91.6%) and writing skills (88.6%). The boys outperformed the girls in two skills - reading and listening. However, no such difference was observed in writing skills. The Table also shows that 78.5% of the students achieved all three competencies in Bangla; 79.5% among the boys and 77.9% among the girls.

**Table 12. Percentage of students achieving the competencies in Bangla by sex**

Competencies	Sex			Level of significance
	Boys (2,045)	Girls (3,901)	Both (5,946)	
Reading	93.5	90.6	91.6	p<0.001
Writing	87.8	89.0	88.6	ns
Listening	95.2	93.3	93.9	p<0.01
All three	79.5	77.9	78.5	ns

Figures in the parentheses indicate number of student under test  
ns = gender difference is not significant at p=0.05

In English, the highest performance was observed in reading skills, followed by listening – respectively 92.1% and 86.6% of the students achieved these competencies (Table 13). The students showed very poor performance in writing skills in English. About 22.3% of them were successful. The boys outperformed the girls in reading and listening skills. However, the girls were ahead of the boys in writing skills. Over a fifth of the students achieved all three competencies in English – 19.1% among the boys and 21.3% among the girls ( $p<0.05$ ). Nearly 62% of the students achieved two competencies in English, 15.7% achieved one, and 2% achieved none.

**Table 13. Percentage of graduates achieving the competencies in English by sex**

Competencies	Sex			Level of significance
	Boys (2,045)	Girls (3,901)	Both (5,946)	
Reading	93.2	91.5	92.1	p<0.05
Writing	20.5	23.1	22.3	p<0.05
Listening	88.2	85.7	86.6	p<0.01
All three	19.1	21.3	20.5	p<0.05

Figures in the parentheses indicate number of student under test  
ns = gender difference is not significant at p=0.05

Both arithmetic skills and geometric knowledge were included in the mathematics part of the test. The five competencies in mathematics are basic number skills, four rules in arithmetic, problem solving, measurement units, and geometric figures. Fifteen items were given in the test. The competencies, question items and minimum level of qualifying each of the competencies are provided in Annex 2.

Of the five competencies, the students did best in ‘four basic rules of arithmetic’ followed by respectively basic number skills, geometric figures, measurement unit, and word problem solving (Table 14). Three quarters of the students achieved each of the competencies separately. The boys outperformed the girls in each of the competencies. Over 53% of the students achieved all the mathematics competencies; boys 57.6% and girls 51.3% ( $p<0.001$ ).

**Table 14. Percentage of students achieving the competencies in mathematics by sex**

Competencies	Sex			Level of significance
	Boys (2,045)	Girls (3,901)	Both (5,946)	
Basic number	91.0	88.4	89.3	p<0.01
Four basic rules	92.2	89.7	90.6	p<0.01
Word problem solving	77.6	72.4	74.2	p<0.001
Measurement unit	80.6	75.6	77.3	p<0.001
Geometric figures	84.1	82.0	82.7	p<0.05
All five	57.6	51.3	53.4	p<0.001

Figures in the parentheses indicate number of student under test

Six competencies were assessed in social studies. The competencies, test items and the minimum criteria for achieving the competencies are provided in Annex 3. The students performed well in almost all the competencies. The level of achievement was over 90% in three competencies and over 80% in other three (Table 15). The boys outperformed the girls in four competencies viz., duties as family members, members of society, and citizens of Bangladesh, and knowledge about the country. No gender difference was observed in the rest two competencies. Nearly 60% of the students correctly answered all the six competencies. The boys were ahead of the girls in this case too (61.6% vs. 58.4%; p<0.05).

**Table 15. Percentage of students achieving the competencies in social studies by sex**

Competencies	Year			Level of significance
	Boys (2,045)	Girls (3,901)	Both (5,946)	
Duties as family members	91.8	90.2	90.8	p<0.05
Duties as members of society	96.6	94.3	95.1	p<0.001
Duties as citizens of Bangladesh	90.2	86.3	87.6	p<0.001
Knowledge about the country	83.5	79.7	81.0	p<0.001
Manners with other people	93.5	92.4	92.8	ns
Children of other countries	80.5	80.4	80.4	ns
All six	61.6	58.4	59.5	p<0.05

Figures in the parentheses indicate number of student under test  
ns = gender difference is not significant at p=0.05

Nine competencies were assessed in general science – four of them fall under physical and environmental health and five under science and technology. Two multiple choice questions were placed for accessing each of the competencies; correctly answering any one was considered as minimum level for achieving them (Annex 4). The students, in general, did well in all the competencies. The level of achievement was over 90% in six competencies and over 80% in three (Table 16). The boys outperformed the girls in six competencies – three of them are under physical and environmental health and three under science and technology. No gender difference was observed in the rest three competencies. Over 58% of the students achieved all the nine competencies under general science. This was 60.5% among the boys and 57.2% among the girls (p<0.05).

**Table 16. Percentage of students achieving the competencies in general science by sex**

Competencies	Sex			Level of significance
	Boys (2,045)	Girls (3,901)	Both (5,946)	
Importance of good health	97.0	95.2	95.8	p<0.001
Physical and environmental health systems	95.5	94.7	95.0	ns
Importance of balanced diet	90.1	87.7	88.5	p<0.01
Prevention of common diseases	82.2	79.3	80.3	p<0.01
Information collection ability	95.5	94.3	94.7	ns
Observation skills on natural objects	91.2	91.5	91.4	ns
Scientific investigation skills	88.7	84.1	85.6	p<0.001
Cause and effect relationship	93.1	90.7	91.5	p<0.001
Science and technology in everyday life	93.6	91.7	92.4	p<0.01
All nine	60.5	57.2	58.3	p<0.05

Figures in the parentheses indicate number of student under test  
ns = gender difference is not significant at p=0.05

The only competency assessed under religious studies was ‘knowledge on life history of prophet Mohammed (SM) or the preachers of own religion’. The students were asked to write five sentences on any of the following: Mohammed (SM), Jesus Christ, Goutam Buddha, and Shree Ramakrishna. Correctly writing three sentences were considered the minimum level for achieving the competency. Forty-five percent of the girls and 39.5% of the boys achieved this competency (Table 17). The performance of the girls was significantly higher than that of the boys ( $p<0.001$ ). On average, 43.1% of the students achieved this competency.

**Table 17. Percentage of students achieving a competency in religious studies by sex**

Competency	Sex			Level of significance
	Boys (2,045)	Girls (3,901)	Both (5,946)	
Knowledge on life history of prophet Mohammed (SM) or the preachers of own religion	39.5	45.0	43.1	p<0.001

Figures in the parentheses indicate number of student under test

The competencies were classified into four categories according to the performance of the students. The categories are *Very Difficult*, *Difficult*, *Easy*, and *Very Easy*. Following are the definitions of this classification:

- Very difficult:* If less than 40% of the students attain a particular competency (the level of achievement is ‘poor’);
- Difficult:* If 40–59.9% of the students attain a particular competency (the level of achievement is ‘mediocre’);
- Easy:* If 60–79.9% of the students attain a particular competency (the level of achievement is ‘satisfactory’);
- Very easy:* If 80% or more students attain a particular competency (the level of achievement is ‘excellent’).

Of the 27 competencies under this assessment, the students showed ‘excellent’ performance in 23 competencies, ‘satisfactory’ in two, ‘mediocre’ in one, and ‘poor’ in one. The two competencies, where the students had a ‘satisfactory’ level of performance are in mathematics – ‘arithmetical word problem solving’ and ‘measurement unit’. A ‘mediocre’

performance was observed in the competency under religious studies, and ‘poor’ performance in ‘writing skills’ in English.

Gender-wise separate analysis shows that the boys showed ‘excellent’ performance in 24 competencies and the girls in 21. The boys showed ‘satisfactory’ level of performance in one competency and ‘poor’ in two. On the other hand, the girls showed ‘satisfactory’ level of performance in four competencies, ‘mediocre’ in one, and ‘poor’ in one.

Percentage of students achieving all the competencies by subject and sex is provided in Table 18. The best performance was observed in the case of Bangla, where the highest proportion of students achieved all the competencies with no gender variation. About 53-60% of the students achieved all the competencies in mathematics, social studies and science, where the boys outperformed the girls. The lowest performing subject was the English, where only a fifth of the students achieved all the competencies. The girls outperformed the boys only in English. On average, 10.4% of the students achieved all the 27 competencies. This was 9.4% among the boys and 11% among the girls. The boys outperformed the girls in 19 competencies, the girls were ahead of the boys in two and no significant difference was observed in six competencies.

**Table 18. Percentage of students achieving all the competencies by subject and sex**

Subject	No. of competencies	Sex		Both (5,946)	Level of significance
		Boys (2,045)	Girls (3,901)		
Bangla	3	79.5	77.9	78.5	ns
English	3	19.1	21.3	20.5	p<0.05
Mathematics	5	57.6	51.3	53.4	p<0.001
Social studies	6	61.6	58.4	59.5	p<0.05
General science	9	60.5	57.2	58.3	p<0.05
All*	27	9.4	11.0	10.4	ns

\* Including the competency on religious studies

Figures in the parentheses indicate number of student under test

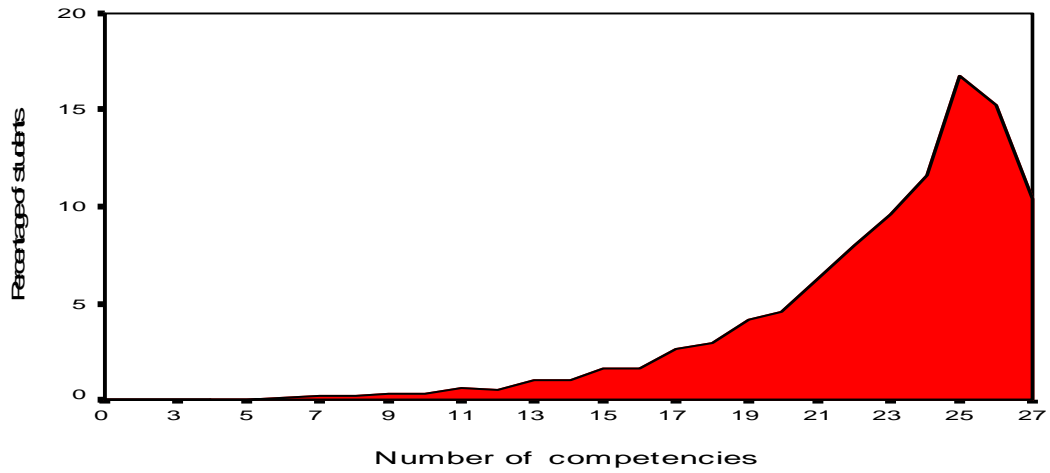
ns = gender difference is not significant at p=0.05

Table 18 provides some basic statistics on number of competencies achieved by the students. On average, the students achieved 22.8 competencies. The boys achieved 23.1 competencies and the girls 22.6. In other words, the students achieved 84.4% of the competencies under the test; boys 85.6% and girls 83.7%. The average performance of the boys was significantly higher than that of the girls. However, no gender difference was observed in the median and modal values of total number of competencies achievement. Fifty-four percent of the students achieved 24 or more competencies.

**Table 19. Some basic statistics on number of competencies achieved by the students**

Sex	Mean	Median	Mode	Standard deviation	Coefficient of variation	Quartiles		
						Q1	Q2	Q3
Boys	23.1	24.0	25.0	3.4	14.7	22.0	24.0	26.0
Girls	22.6	24.0	25.0	4.1	18.1	21.0	24.0	26.0
Both	22.8	24.0	25.0	3.9	17.1	21.0	24.0	26.0

**Figure 6. Percentage distribution of students by number of competencies achieved**



On average, the students of the schools in Dhaka division achieved 23.7 competencies; it was 21.2 for Chittagong, 22.1 for Rajshahi, 24.2 for Khulna, 23.7 for Barisal, and 21.7 for Sylhet. Gender difference in achievement was observed in two divisions – Chittagong and Rajshahi; in both, the boys were ahead of the girls. Figure 6 shows how negatively skewed was the distribution of total number of competencies achieved by the students.

Table 20 provides an analysis based on the number of correctly answering items. Of the 64 items under test, on average, the students correctly answered 47.2 items. This average was 47.9 for the boys and 46.8 for the girls. In other words, the students correctly answered nearly three quarters of the items provided in the test. Proportionately highest number of correct answers was found in Bangla (86%) and lowest in mathematics (67.3%). It was about 72-75% for other three subjects.

**Table 20. Mean number of items correctly answering by the graduates by subjects and sex**

Subjects	Number of items	Boys (2,045)		Girls (3,901)		Both (5,946)	
		Mean	%	Mean	%	Mean	%
Bangla	10	8.7	87.0	8.6	86.0	8.6	86.0
English	7	5.2	74.3	5.2	74.3	5.2	74.3
Mathematics	15	10.3	68.7	9.9	66.0	10.1	67.3
Social science	13	9.6	73.8	9.4	72.3	9.4	72.3
General science	18	13.8	76.7	13.4	74.4	13.5	75.0
All	64	47.9	74.8	46.8	73.1	47.2	73.8

Figures in the parentheses indicate number of student under test

Let us now analyze the data considering the school as unit of analysis. This helps seeing how far the achievement of the students varies from one school to another. The students of the poorest school, on average, achieved 12.6 competencies and the best school 27 competencies, indicating a range of 14.4 competencies. On average, the students of each school achieved 22.7 competencies with a standard deviation of 2.8. Thus, the estimated coefficient of variation among the schools was 12.3%. This is the percentage variation in the mean, standard deviation being considered as the total variation in the mean. The average achievement of half of the schools was more than 23.2 competencies. The students of a quarter of the schools achieved

less than 20.8 competencies, another quarter from 20.8 to 23.2, another quarter from 23.2 to 25, and the rest quarter more than 25 competencies.

The average performance of the boys and the girls was exactly equal in only 2.3% of the surveyed schools. The girls were ahead of the boys in 35.6% of the schools – the difference was below one competency in 22.8% and one or more in 12.8% of the schools. On the other hand, the boys were ahead of the girls in 63.1% of the schools – the difference was less than one competency in 32.6% of the schools and one or more in 29.5% of the schools. However, in general, the average performance of the girls was found highly and positively correlated with that of the boys ( $r = 0.87$ ;  $p < 0.01$ ). This means that schools where the average performance of the boys were higher, the girls also showed a higher performance and vice versa. The boys were ahead of the girls in 72.3% of the schools in Chittagong division, 66% of the schools in Khulna, 60.4% of the schools in Dhaka, and half of the schools in other divisions.

Table 21 provides trends in mean number of competencies achievement in BPS during 2000-05 including standard deviation and coefficient of variation. Both student and school level analyses were done considering each of them as unit of analysis. It clearly shows that the average performance of the students increased over time and the standard deviation decreased. Hence the coefficient of variation decreased. School level analysis also shows the same. Indicating the system is being more equitable over time. None of the previous cohort of the students performed well like as those of 2005.

**Table 21. Progress in the achievement of competencies, 2000-5**

Graduation year	Assessment coverage		School level analysis			Student level analysis		
	No. of schools	No. of students	Mean	S.d.	C.V.	Mean	S.d.	C.V.
2000	26	357	18.2	4.8	26.4	18.1	5.6	30.9
2001	30	420	18.1	3.3	18.2	17.9	5.3	29.6
2002	30	420	18.5	3.3	17.8	18.2	5.1	28.0
2003	62	867	20.0	3.0	15.0	19.9	4.8	24.1
2004	60	845	18.9	2.9	15.3	18.9	5.1	27.0
2005	298	5,946	22.7	2.8	12.3	22.8	3.9	17.1

Coefficient of variation (c.v.) = (standard deviation / mean) x 100

## CORRELATES OF COMPETENCY ACHIEVEMENT

Correlates of pupils' competency achievement in BPS have examined at two levels – individual and school. Thus, the two questions in this regard are 1) What are the factors predicting achievement of competencies of the pupils', and 2) What are the factors predicting school-to-school variation in pupils' achievement of competencies? The first question requires exploration at the pupil level and the second one at the school level.

A number of variables concerning the pupils, schools, teachers, area managers, and programme organizers were considered. The variables with their measurement are provided in Annex 5.

### Exploration of school level variation

The analysis started with calculating the correlation coefficients between school-wise means of pupils' achievement and various background characteristics. Among the background variables of the pupils only the 'proportion of Muslim students in school' was found significantly correlated with the schools mean achievement ( $r = 0.17$ ,  $p < 0.01$ ). This means that average

achievement of the schools increased with the increase of proportion of Muslim students. Supplementary information is that the school mean was 21.3 where the proportion of Muslims was  $\leq 50$ , it increased to 21.9 for the schools with 51-94% Muslim students and to 23.0 for the schools with 95-100% Muslim students. No significant relationship was observed with students' age, parental education, provision of private tutor, household members help in education, or electricity facility at home (Annex 6). Proportion of the first generation learners in the school was also found un-correlated with schools average performance.

Teachers' age and length of service were positively correlated with schools' average achievement of competencies. The correlation coefficients were equal in both the cases ( $r=0.13$ ,  $p<0.05$ ) because of strong correlation between these two variables (Annex 7). Aged teachers were more likely to have longer duration of experience and hence influenced in learning achievement of the pupils. Statistically significant relationships among textbook difficulty index, textbook coverage index and average achievement of schools have important policy implication. Teachers who were facing difficulty with the textbooks taught larger portion of it in the classrooms and thus their schools did less well than others.

AMs assessment of the teachers were also positively correlated with the schools average achievement ( $r = 0.42$ ,  $p<0.01$ ). The teachers who were assessed as 'very good' by the AMs their pupils on average achieved 24.1 competencies, pupils of the 'good' teachers achieved 22.3 competencies, pupils of the 'satisfactory' teachers achieved 21 competencies, pupils of the 'bad' teachers achieved 20.6 competencies, and 'very bad' teachers' pupils achieved 15.4 competencies. Teachers marital status, years of schooling, stream of education, marks obtained in Secondary School Certificate examination, and in-service training received had no correlation with the average competency achievement of the schools (Annex 7).

Class size, proportion of girls in the classrooms, and duration of course had no relationship with the schools average achievement (Annex 8). However, POs assessment of the schools (school grade), AMs and teachers assessment of the pupils were positively correlated with the schools average achievement. The correlation coefficients were respectively 0.33 ( $p<0.01$ ), 0.46 ( $p<0.01$ ), and 0.23 ( $p<0.01$ ). The A grade schools achieved 23.5 competencies and combined achievement of the B and C grade schools was 21.6. The students who were assessed as 'very good' by the AMs achieved, on average, 24.5 competencies, schools assessed as 'good' achieved 22.4 competencies, 'satisfactory' levelled schools achieved 20.7 competencies, and 'bad' levelled schools achieved 16.9 competencies.

Average achievement of competencies had no correlation with gender, years of schooling, length of service, and number of schools under supervision of the POs (Annex 9). The correlation coefficient between the number of POs and the highest duration of a PO in the schools was found 0.80 ( $p<0.01$ ). This means that if the immediate supervisors of the schools i.e. the POs are changed frequently, it increases the chance of shorter duration of supervision by a single PO and simultaneously increases the number of PO against schools. Such a situation negatively affects average performance of the schools. For instance, the correlation coefficient between average achievement of the schools and the number of POs was -0.12 ( $p<0.01$ ) and between the highest duration of a PO and schools average achievement was 0.15 ( $p<0.01$ ). As the number of subject based master training of the POs increased the performance of the schools also increased significantly ( $r= 0.13$ ;  $p<0.01$ ).

Average achievement of competencies of the schools was also positively correlated with the length of service of the AMs at their present position ( $r = 0.13$ ,  $p<0.01$ ) and with the duration of school programme in the areas ( $r = 0.14$ ;  $p<0.01$ ). However, it has no relationship with age, years of schooling, length of service of the AMs, and number of schools in the areas (Annex 10).

### Regression analysis

To explore the factors predicting the average achievement of the schools a linear regression analysis (OLS method) was performed. Selection of independent variables for this was done carefully. Firstly, the variables uncorrelated with the dependent variable were excluded. Secondly, to reduce the chance of multi-co-linearity the inter-correlated independent variables were kept out of the analysis. Thus, the explanatory variables considered for this analysis were as follows: length of service of the teachers, proportion of contents of the textbooks taught in the classrooms, AMs length of service, duration of programme in the area, highest duration of supervision of PO, number of master training received by a PO, and proportion of Muslim students in the schools.

A step-wise approach was followed to select the most economic model. This considered only the factors significantly predicting the dependent variable. The non-selected variables were excluded from the model. The analysis reveals that the final model considered only four variables. These are proportion of contents of the textbooks taught in the classrooms (COVE), AMs length of service (TEXY), highest duration of supervision of PO (DSUP), and proportion of Muslims in the schools (RELI). Following is the model for predicting average achievement of the schools:

$$SCSCOR = 13.2 + 0.22 \text{ COVE} + 0.18 \text{ RELI} + 0.16 \text{ DSUP} + 0.13 \text{ TEXY}$$

Regarding predicting the average achievement of the schools, the most important variable was the proportion of contents of the textbooks taught in the classrooms. As much as the teachers covered the contents of the textbooks the pupils were more likely to do well in the test. The second important predictor was the proportion of Muslim students in the schools. Increase of the proportion of Muslim students in the schools also increased the average performance of the pupils. The third important predictor in this regard was highest duration of supervision by POs. If the POs were not changed frequently they were able to supervise schools for longer period which resulted in an increased performance of the schools. AMs experience came out as the fourth predictor of average performance of the schools. These four variables collectively explained 13% of the total variation in the average performance of the schools.

### **Exploration of student level variation**

The distribution of number of competencies achieved by the students is negatively skewed (Figure 6), which is very much exponential type. It would not be wise to do ordinary regression analysis to see the predictors of student level variation in competencies achievement, because of the dependent variable's failure to meet the normality assumption of such analysis. Thus, considering the distribution as exponential it was decided to cut the line at its median point to make it suitable for binomial logistic regression. Considering above in mind bivariate analysis was done first to see the relationship between the dependent and the independent variables. The dependent variable – number of competencies achieved by the students was divided into the two: well performance and not so well performance. Well performance means students achieving 24 or more competencies<sup>2</sup> and not so well performance means students achieving less than 24 competencies. The list of independent variables and their measurements are provided in Annex 11.

All the background characteristics of the pupils were significantly correlated with their achievement of competencies. The students were more likely to do well if the level of education of their parents increased. Pupils aged 11-12 years did better than young and old-aged pupils. The boys, those having household members help in study at home, having private

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<sup>2</sup> 24 is the median value

tutor and electricity at home, and the Muslim pupils did significantly better compared to their respective counterparts (Annex 12).

No smooth direction was observed in the proportion of students performing well against various characteristics of the teachers. As the age of the teachers increased, the proportion of students doing well also increased significantly ( $p < 0.001$ ). However, a U-shape relationship was observed in students' performance when assessed against years of experience of the teachers. The students of the married teachers did significantly well than the students of the single (unmarried/ divorced) teachers ( $p < 0.001$ ). No trend was observed in the students' performance against teachers' educational qualifications. The teachers who had some years of education (below SSC) and who had HSC, their students' performed well than those had teachers with other qualifications (SSC passed, Bachelor and Masters). Teachers with science background in SSC were more likely to help the students do better in the test compared to those with humanities or commerce background. The students of the teachers those got 60% or more marks in SSC did significantly well in the test compared to others (Annex 13).

The performance of the students were found higher if the PO was a female, having Bachelors or Masters level education, continuously monitored a school more than 10 months, and had master training (MT) in more than one subject (Annex 14). However, no common trend was observed in students' performance regarding length of service of the POs and the number of their visits to the schools.

The AMs aged more than 30 years, having more than six years of experience in BRAC of which more than three years as AM were more likely to contribute more in the students' performance (Annex 15). As the number of school visit of the AMs increased the performance of the students also improved significantly. No difference was observed in students' performance in respect to sex of the AMs. A U-shape relationship was observed between students' performance and AMs level of education.

If the schools had less than 31 students and the proportion of girls were below than the current average (66%) the performance of the students was poorer than those with bigger class-size with standard proportion of girls (Annex 16). The students of A grade schools did better than those of others (B or C grade schools). A U-shape pattern was observed in students' performance when it was cross-tabulated with the duration of BRAC school programme in the area. For instance, 53.2% of the students did well in the test if the duration of the programme in the area was less than 10 years, 50.3% of the students did well where the duration of the programme was 11-15 years, and it was 67.3% where the programme was 15 years old. A strong as well as positive relationship of students performance was observed with the quality of students and teachers assessed by the AMs and the proportion of contents in the textbooks taught by the teachers.

### Regression analysis

Binary logistic regression analysis was performed to explore the factors predicting the students doing well in the competency test, because the dependent variable was categorised dichotomously. Selection of independent variables for this was also made in the similar ways done before. That is, the variables uncorrelated with the dependent variable and the inter-correlated independent variables were kept out of the analysis. Thus, following 13 variables were considered for this analysis: age and sex of the students, fathers education, religion, class-size, proportion of girls in the class, proportion of contents of the textbooks taught in the class, AMs length of service as manager, duration of programme in the area, sex of POs, education of POs, highest duration of supervision of POs, and the number of master training received by POs.

Like as before, a stepwise approach was followed to select the most economic model. The analysis reveals that the final model considered 11 variables (Table 22). Chronologically the variables entered in the model are highest duration of supervision of school by PO, length of service of AM as manager, duration of programme in the area, religion, education of PO, proportion of girls in school, proportion of contents in the textbooks taught, fathers education, age of students, sex of student, and class-size. Two variables, sex of PO and number of master training they had, did not appear in the model. Three of the first four variables are common with the previous model indicating their importance in explaining the variation in competency achievement. Again, except religion, other individual level background variables were found less important than the school level variables in predicting the competencies achievement of the students. This means that the influence of the background characteristics in competencies achievement have been minimized through schooling with BRAC programme. However, it is unfortunate that the students' performance varied with the variation in their religious belief.

**Table 22. Logistic regression model predicting achievement of competencies of the students**

Predicted variables	Regression coefficients	Odds ratios
<b>Age of students</b>		
9 – 10y	0	1.00
11 – 12y	0.23	1.26 $\phi$
13 – 16y	0.04	1.05
<b>Sex of student</b>		
Girls	0	1.00
Boys	0.18	1.20*
<b>Fathers education</b>		
Nil	0	1.00
Primary	0.16	1.17 $\phi$
Secondary +	0.29	1.34*
<b>Religion</b>		
Non-Muslim	0	1.00
Muslim	0.80	2.22*
<b>Textbook coverage</b>		
Less than three quarters	0	1.00
Three quarters or more	0.29	1.34*
<b>Education of PO</b>		
SSC or HSC	0	1.00
Bachelor or Masters	0.34	1.40*
<b>Duration of supervision by PO</b>		
1 – 9 moths	0	1.00
10+ months	0.60	1.82*
<b>Class size</b>		
22 – 30	0	1.00
31 – 34	0.15	1.17 $\phi$
<b>Proportion of girls in school</b>		
30 – 65%	0	1.00
66%+	0.34	1.41*
<b>Length of service of AM as manager</b>		
0 – 3y	0	1.00
4 – 10y	0.56	1.75*
<b>Duration of school programme in the area</b>		
<10y	0	1.00
11 – 15y	-0.30	0.74*
16 – 20y	0.48	1.62*
Constant	-1.94	0.14*
- 2 loglikelihood		7474.86
Cox & Snell R <sup>2</sup>		0.08

### Further regression

We have three levels of information in hand; these are students' characteristics at household level, schools' and teachers' characteristics at school level, and POs' and AMs' characteristics at the area level. An attempt was made to see which level of information explains more in order to predict students' achievement in the test. Thus, three more regression models were built with the above-mentioned three sets of variables. Logistic regression analysis was done for the first set of variables and ordinary regression analyses for the rest.

Six household level variables came out as the significant predictors of competency achievement of the students (Annex 17). These are age and sex of the students, mothers education, provision of private tutor, religion, and availability of electricity at home. The religion came out as the most important predictor of students' achievement followed by provision of private tutor, and availability of electricity at home. Age of students, mothers' education, and sex came out as the fourth, fifth and sixth variables in the model. All the six variables together explained only 3% of the total variation in the dependent variable.

Of the 14 school level variables (including teacher characteristics) only two appeared as the significant predictors of schools performance in competency test (Annex 18). These are school grade (assigned by POs during supervision and monitoring of the schools) and proportion of contents in the textbooks taught. School grade appeared as the most important variable. Although the variables together explained 16% of the total variation in the dependent variable, share of the first variable was 75%.

Four of the 14 variables at area and office level appeared as significant predictors of schools performance in the competency test (Annex 19). These are (chronologically as they appeared in the model) highest duration of supervision by the POs, AMs length of experience as manager, education of POs, and the number of master training of POs. These variables collectively explained 7% of the total variation in the average performance of the schools.

From the above-mentioned three models it is clear that the school level variables have more contribution than others in predicting the learning achievement of the pupils in BRAC schools and the contribution of the household level variables was the least.

## DISCUSSION AND CONCLUSION

On achieving school enrolment at a certain level the major concern at both primary and secondary levels is the quality of education. Quality of education cannot be measured through a single indicator. It is a combination of a number of indicators dealing with input, process and output of the system (Nath 2006, UNESCO 2005, Mayeer *et al.* 2000). A holistic approach is required if one wants to look at the issue with justice. However, it is not an easy task to cover all the quality issues in a single study. A handy approach is to look at bunches of indicators through a number of studies within a reasonable duration of time and then combine the findings to view the system holistically.

Like as previous, the main intention of this year's assessment of competencies is to explore the level of achievement of the students and see whether there is any gender difference in it. However, in addition, we aimed to identify the factors leading to create variation in achievement – at both student and school levels. This created an opportunity to see the issues related to the background characteristics of the pupils, schools, the teachers, the POs, and the area offices. However, it can be noted here that compared to any other provisions, less variation was observed in BRAC school system (Nath and Chowdhury 2001). On the other hand, the last year's study of this kind identified a higher variation in the BPS compared to other two types of BRAC schools viz., the community and formal (Nath *et al.* 2005).

BRAC provides primary education through a non-formal approach. By nature, as it was constructed, this programme creates education facilities to the poorer section of the society. Thus, the children of economically vulnerable households, never schooled parents, and those living in a hard to reach areas are target population for BPS. Emphasis on girls' access to education is a unique feature of BRAC schools, where 65% of the pupils are girls. As found in this study, over two-fifth of the pupils were first generation learners, 43% of the pupils came from deficit households, 70% having no electricity facility at home, and majority of the pupils had to help their parents at home in various household activities.

Of the six assessments held on BPS, the cohort of 2005 showed the best performance. On average, this cohort of students achieved 22.7 out of 27 competencies under assessment. This group of pupils, on average, achieved 3.8 competencies more than the previous cohort. This is the highest difference between the performances of two successive years. For instance, on average, the students of the first three cohorts (2000-02) achieved little over 18 competencies, which increased to 20 in 2003, again dropped to 19 in 2004, and again increased to 22.7 in 2005. Thus, excerpt in 2004, an upward trend could be noticed in the performance of various cohorts of pupils. However, interestingly, the standard deviation of the performance gradually decreased over the period, and so in case of coefficient of variation. This indicates that the students became homogenous more and more over the period and school-to-school variation also reduced. This is a very positive sign of the programme in respect to steps towards equity.

Let us now take a look at the factors responsible for variations among the schools, whatever noticed so far. The teachers in BPS found various levels of difficulty in digesting the textbooks used in the schools. Such a situation had strong relationship with the proportion of contents they taught to their pupils. It was found through regression analysis that the proportion of contents taught in the classrooms was the most important predictors of school-to-school variation in BPS. This finding has a serious implication in teacher preparation, which is often claimed as the heart of all success in quality. As we did not see any importance of teachers' level of education in the performance of the schools, it is probably no matter in BRAC case.

But basic intellects including skills and competencies of a person might be an important factor on how much s/he will be able to grasp in the process of preparation for a particular job like teaching. Careful selection of the teachers may improve the situation. Again, there is still scope to improve the strength of teacher training in BPS, especially the refreshers training held once each month. Care is needed in the development of basic intellectual skills and abilities of the teachers. Side by side, an inquiry is required whether time is a constraint in completing the full contents of the textbooks. If this is so, the programme should extend its duration from four years to five years.

Frequent transfer of the POs from one school to another came out as another important predictor of performance of the schools. We saw no PO supervised a school more than one year. Average length of involvement of POs with a school was 6.5 months. Even a quarter of the POs were transferred three months before completion of the course. This study identified a negative effect of this process. As the duration of supervision of the POs increased it helped increase students' performance significantly and hence the overall performance of the schools. Again, importance of area managers' length of service in competencies achievement of the pupils indicates the need of experienced persons as managers. It was observed that a quarter of the AMs had two to 4.4 years of experience. Serious attention of the BEP field operations unit is required in order to have a fruitful solution of these problems.

It is interesting to see that the individual level characteristics were less important than the characteristics related to teacher, PO and AM in predicting performance of the students. This is another positive sign of BRAC school system. The findings reveal that the system itself was more influential in this regard than the individual characteristics of the pupils. Other way, the influence of personal characteristics could be reduced, if not eliminated, through the schooling with BRAC. However, sadly, religious belief of the students came out as one of the important predictors of students' performance. This is also responsible for school-to-school variation. This study did not collect any information to see the reasons of why the religious minorities were doing less well than the Muslims in BRAC schools. Future research can explore the issue.

Gender difference against the girls is a long time problem in BPS. Although the boys were ahead of the girls in eight competencies in 2004, it increased to 19 competencies in 2005. The average performance of the two groups also reflected the similar findings. Although the boys and the girls were similar in respect to many household level indicators, they were found different in three aspects like age, having private tutor and involvement in work. On average, the boys of BPS were three months older than the girls, proportionately more boys received support from private tutor and they were less likely to involve in work at home compared to the girls. Thus, such an advantageous position of the boys might have influenced their performance to be higher than the girls. In addition, the programme can have a look at the issue and see whether there is any scope to address this at school level. In an earlier study Shahjamal (2000) identified some reasons related to home, school and local level management, behind the gender difference in schools.

One interesting observation in this study is the knowledge of the teachers and the area managers about their students. Their assessment on the quality of students was found positively and highly correlated with the test performance. Again, programme organizers categorisation of the schools (based on regular assessment of the teachers' performance, students attendance and performance, etc.) was also very much consistent with the test results. All these findings indicate how much the teachers, the POs and the AMs were aware about their pupils. This was possible due to the system itself – small class-size, close interaction between the teacher and the pupils, and regular school and home visit of the POs and the AMs. These factors were so common in all the BRAC schools under study that no variation existed among the schools.

Finally, very well performance of the schools needs to be kept up through continuous programme initiative at various levels. Issues related to teachers facing difficulty with the textbooks and keeping the contents incomplete needs to be addressed soon. Frequent transfer of the POs should be discouraged. Differential performances regarding gender and religious beliefs are serious indeed but may need to take longer time to be eliminated; however, the process can start now.

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## ANNEXES

### Annex 1. Competencies, test items, and minimum levels for Bangla and English

Competency	Test items	Minimum level
<b>Bangla</b>		
Reading	<ul style="list-style-type: none"> <li>• Answer two questions from a printed paragraph</li> <li>• Answer two questions from a hand written paragraph</li> </ul>	<p>Answer one correctly</p> <p>Answer one correctly</p>
Writing	<ul style="list-style-type: none"> <li>• Describe a given scenery in four sentences</li> <li>• Describe own home in four sentences</li> <li>• Fill out a form with eight blanks (any six is acceptable)</li> <li>• Write an application with date, salutation, and closing (message with any two acceptable)</li> </ul>	Answer correctly any three on the left
Listening	Answer two questions based on a pre-recorded paragraph	Answer one correctly
<b>English</b>		
Reading	<ul style="list-style-type: none"> <li>• Answer two questions from a printed paragraph</li> <li>• Answer two questions from a handwritten paragraph</li> </ul>	<p>Answer one correctly</p> <p>Answer one correctly</p>
Writing	Describe a given picture in five sentences	Write three sentences
Listening	Answer two questions based on a pre-recorded dialogue between two friends	Answer one correctly

### Annex 2. Competencies, test items and minimum levels for Mathematics

Competency	Test items	Minimum level
Basic numbers	<ul style="list-style-type: none"> <li>• Arrange four given numbers in ascending order</li> <li>• Identify the largest from four given digits</li> </ul>	Answer correctly any one of the items on the left.
Four basic rules	<ul style="list-style-type: none"> <li>• An addition</li> <li>• A subtraction</li> <li>• A multiplication</li> <li>• A division</li> <li>• A simplification</li> </ul>	Do the simplification correctly or any three of the four others
Problem solving	<p>Four sums needing skills on</p> <ul style="list-style-type: none"> <li>• Basic arithmetic operation</li> <li>• Unitary method</li> <li>• Percentage</li> <li>• Graph</li> </ul>	Answer correctly any two of the items on the left
Measurement units	<ul style="list-style-type: none"> <li>• Convert 5 hours and 25 minutes to seconds</li> <li>• Find the length of a pencil</li> </ul>	Answer correctly any one of the items on the left
Geometric figures	<ul style="list-style-type: none"> <li>• Find the number of triangles and rectangles in a figure</li> <li>• Identify four geometric figures</li> </ul>	Answer correctly any one of the items on the left

### Annex 3. Competencies, test items and minimum levels in Social Studies

Competency	Test items	Minimum level
Duties as family member	<ul style="list-style-type: none"> <li>• How a family becomes a happy family</li> <li>• Responsibility of family members</li> </ul>	Answer correctly any one of the items on the left
Duties as a member of the society	<ul style="list-style-type: none"> <li>• Responsibility as a member of the society</li> <li>• Why one should not play radio/TV loudly</li> </ul>	Answer correctly any one of the items on the left
Duties as citizen of Bangladesh	<ul style="list-style-type: none"> <li>• Responsibility as a citizen</li> <li>• Eligibility to vote in national elections</li> </ul>	Answer correctly any one of the items on the left
Knowledge about the country	<ul style="list-style-type: none"> <li>• Independence day</li> <li>• Major transportation system</li> <li>• Place of highest rainfall</li> </ul>	Answer correctly any two of the items on the left
Manners with other people	<ul style="list-style-type: none"> <li>• Right manners with teachers</li> <li>• Right manners with younger siblings</li> </ul>	Answer correctly any one of the items on the left
Knowledge about children of other countries	<ul style="list-style-type: none"> <li>• Main food of the children of Maldives</li> <li>• Popular games in Nepal</li> </ul>	Answer correctly any one of the items on the left

### Annex 4. Competencies, test items and minimum levels for General Science

Competency	Test items	Minimum level
Knowledge about importance of good health	<ul style="list-style-type: none"> <li>• How good health is achieved</li> <li>• Why one takes carbohydrate</li> </ul>	Answer correctly any of the items on the left
Knowledge about physical and environmental health	<ul style="list-style-type: none"> <li>• Which tube well water is safe</li> <li>• How diarrhoea spreads</li> </ul>	Answer correctly any of the items on the left
Knowledge of balanced diet	<ul style="list-style-type: none"> <li>• What is a balanced diet</li> <li>• Why should adolescents take extra food</li> </ul>	Answer correctly any of the items on the left
Knowledge about prevention of common illnesses	<ul style="list-style-type: none"> <li>• Transmission of worms</li> <li>• Skin diseases</li> </ul>	Answer correctly any of the items on the left
Information collection ability	<ul style="list-style-type: none"> <li>• What is the fastest mass media</li> <li>• Highest and lowest temperatures during summer</li> </ul>	Answer correctly any of the items on the left
Observation skills	<ul style="list-style-type: none"> <li>• Which tree has no branch</li> <li>• Plant without a flower</li> </ul>	Answer correctly any of the items on the left
Scientific investigation	<ul style="list-style-type: none"> <li>• Identification of preventive measures for given illness</li> <li>• Identify effects of over population</li> </ul>	Answer correctly any of the items on the left
Cause and effect relationship	<ul style="list-style-type: none"> <li>• Energy that causes a boiling kettle lid to move up</li> <li>• Energy which drives a bullock cart</li> </ul>	Answer correctly any of the items on the left
Everyday science	<ul style="list-style-type: none"> <li>• What is information communication</li> <li>• What are modern agricultural technologies</li> </ul>	Answer correctly any of the items on the left

**Annex 5. Description of variables used in the analysis of school level variation**

<b>Variable name</b>	<b>Description</b>	<b>Numeric expression</b>
TAGE	Age of teacher in years	17 – 50
TMAR	Marital status of teacher	1= Married, 2= Single
TEDU	Years of education of teacher	7 – 16
TSTR	Stream of education of teacher	1= Science, 2= Humanities/Commerce
TBAN	Teacher obtained marks in Bangla in public exam at the end of secondary education	33 – 80
TENG	Teacher obtained marks in English in public exam at the end of secondary education	33 – 75
TMAT	Teacher obtained marks in mathematics in public exam at the end of secondary education	33 – 86
TMAR	Teacher obtained marks in above three core subjects in public exam at the end of secondary education	99 – 215
JYER	Length of service of teacher in BRAC	1985 – 2005
STUD	Class size	22 – 34
GIRL	% of girls in class	
COVE	Textbook coverage index	12 – 24
DIFF	Textbook difficulty index	13 – 24
AVCM	Average number of competencies achieved by the students according to teachers verbal report	17.6 – 27
SCGR	School grade	1= A, 2= B or C
AMVI	Number of visit provided by Area Manager (AM)	1 – 25
POVI	Number of visit provided by Programme Organizer (PO)	19 – 87
QUAS	Quality of students assessed by AM	1 – 5
QUAT	Quality of teachers assessed by AM	1 – 5
DURA	Duration of school (in month)	43 – 53
REFR	Number of refresher course attended by teacher	4 – 52
SAGE	Mean age of students in school	10.5 – 13.2
FEDU	Percentage of fathers with schooling	5 – 90
MEDU	Percentage of mothers with schooling	0 – 100
FGEN	Percentage of first generation learner in school	0 – 95
HELP	Percentage of students getting help in study at home	0 – 90
PTUT	Percentage of students having private tutor	0 – 95
ELEC	Percentage of student having electricity facility at home	0 – 95
RELI	Percentage of Muslim students in school	0 – 100
AMSE	Sex of Area Manager (AM)	1= Male, 2= Female
AMAG	Age of Area Manager	27 – 44
AMED	Years of schooling of AM	12 – 16
BEXY	AM's experience in BRAC (in year)	2 – 13
TEXY	AM's experience in present position (in years)	0 – 10
COM5	Number of school completed in this year	5 – 45
SCH5	Number of school competed in this area during last five years	5 – 168
PSEX	Sex of Programme Organizer (PO)	1 = Male, 2= Female
PEDU	Years of schooling of PO	10 – 16
PEXP	PO's length of experience in BRAC in years	6 – 223
NOMT	Number of subjects as Master Trainer (MT)	0 – 5
NOPO	Number of POs supervised school in grade V	1 – 4
NOSC	Number of school under supervision of PO	5 – 22
DSUP	Highest duration of supervision by a single PO	1 – 12

**Annex 6. Correlation coefficient between average number of competencies achievement by the pupils and their background**

Pupils background	Correlation coefficient	Level of significance
Mean age of students	- 0.06	ns
% of fathers with schooling	0.02	ns
% of mothers with schooling	0.06	ns
% of first generation learner	- 0.06	ns
% of pupils getting help from HH members	0.11	ns
% of pupils having private tutor	0.05	ns
% of pupils having electricity facility at home	0.09	ns
% of Muslim pupils in school	0.17	p<0.01

**Annex 7. Correlation coefficient between average number of competencies achievement by the pupils of the schools and teachers characteristics**

Characteristics of teachers	Correlation coefficient	Level of significance
Age (in year)	0.13	p<0.05
Marital status	0.04	ns
Years of schooling	- 0.02	ns
Stream of education	0.09	ns
Marks obtained in SSC exam: Bangla	0.05	ns
English	- 0.01	ns
Mathematics	0.08	ns
Total in above three	0.06	ns
Refreshers course received (in number)	0.04	ns
AMs assessment of teacher	0.42	p<0.01
Textbook coverage index	0.25	p<0.01
Textbook difficulty index	0.21	p<0.01
Length of service	0.13	p<0.05

**Annex 8. Correlation coefficient between average number of competencies achievement by the pupils of the schools and school characteristics**

Characteristics of schools	Correlation coefficient	Level of significance
School grade	0.33	p<0.01
Class size at graduation	0.00	ns
Proportion of girls in classes	0.10	ns
AMs assessment of pupils	0.46	p<0.01
Teachers assessment of pupils	0.23	p<0.01
Duration of course (in month)	0.06	ns

**Annex 9. Correlation coefficient between average number of competencies achievement by the pupils of the schools and characteristics of PO**

Characteristics of PO	Correlation coefficient	Level of significance
Sex of PO	0.05	ns
Years of schooling	0.10	ns
Length of experience in BRAC	- 0.05	ns
Number of subjects as MT	0.13	p<0.01
Number of PO in grade V	- 0.12	p<0.01
Number of schools under supervision	0.01	ns
Duration of supervision by a single PO	0.15	p<0.01

**Annex 10. Correlation coefficient between average number of competencies achievement by the pupils of the schools and characteristics of AM**

Characteristics of AM	Correlation coefficient	Level of significance
Age	- 0.02	ns
Sex		
Years of schooling	0.04	ns
Length of experience in BRAC	0.04	ns
Length of experience as AM	0.13	p<0.01
Duration of education programme in the area	0.14	p<0.01
No of school at present	- 0.03	ns
No of schools completed during last six years	0.04	ns

**Annex 11. Description of variables used in the analysis of student level variation**

Variable name	Description	Numeric expression
SAGE	Age of students in years	9-10y=1, 11-12y=2, 13-16y=3
FEDU	Years of schooling completed by father	Nil=1, 1-5y=2, 6+y=3
MEDU	Years of schooling completed by mother	Nil=1, 1-5y=2, 6+y=3
HELP	Whether household members help in study at home	No=1, Yes=2
PTUT	Whether there is provision of private tutor	No=1, Yes=2
ELEC	Availability of electricity at home	No=1, Yes=2
RELI	Religion	Non-Muslim=1, Muslim=2
TAGE	Age of teachers in years	17-25y=1, 26-35y=2, 36-50y=3
TMAR	Marital status of teacher	Married=1, Unmarried=2
TEDU	Years of schooling completed by teacher	7-9y=1, 10y=2, 12y=3, 14-16y=4
TSTR	Stream of education of teacher	Science=1, Humanities/commerce=2
TEXP	Length of experience of teacher in years	0-4y=1, 5-8y=2, 9-20y=3
MARK	Marks obtained by teacher in three core subjects in SSC exam	Not attended=1, 33-44%=2, 45-59%=3, 60%+=4
COVE	Proportion of contents in the textbooks taught	Less than three quarters=1, More than three quarters=2
DIFF		
PSEX	Sex of Programme Organizer	Male=, Female=2
PEDU	Years of schooling completed by PO	SSC or HSC=1, Bachelors or Masters=2
PEXP	Length of service of PO in years	≤3y=1, 4-10y=2, 11y+=3
DSUP	Highest duration of supervision by PO	1-9months=1, 10+months=2
NOMT	Number of subject trained as master trainer	0-1=1, 2=2, 3-4=3
POVI	Number of school visit of PO	19-42=1, 43-51=2, 52+=3
NOPO	Number of PO during last one year	1=1, 2=2, 3-4=3
AMAG	Age of Area Managers in years	27-30y=1, 31-35y=2, 36-44y=3
AMSE	Sex of AM	Male=1, Female=2
AMED	Education of AM	HSC=1, Bachelor=2, Masters=3
BEXY	Length of experience of AM in BRAC	2-6y=1, 7-10y=2, 11-13y=3
TEXY	Length of service of AM as manager	≤3y=1, 4-10y=2
AMVI	Number of school visit by AM	≤9=1, 10-12=2, 13-25=3
QUAS	Quality of students assessed by AM	Bad=1, Satisfactory=2, Good=3
QUAT	Quality of teachers assessed by AM	Very bad=1, Bad=2, Satisfactory=3, Good=4
DUSC	Duration of school programme in the area	≤10y=1, 11-15y=2, 16-20y=3
SIZE	Class size	22-30=1, 31-34=2
GIRL	Proportion of girls in the schools	30-65%=1, 66%+=2
SCGD	School grade through POs continuous assessment	A=1, B or C=2

**Annex 12. Percentage of students did well in the test by their socioeconomic background**

Socioeconomic status	Boys	Girls	Both
<b>Student's age at graduation</b>			
9–10y	52.3 (241)	50.5 (683)	51.0 (924)
11–12y	57.3 (1219)	55.4 (2302)	56.1 (3521)
13–16y	55.0 (580)	49.2 (887)	51.5 (1467)
Level of significance	ns	p<0.01	p<0.001
<b>Mothers education</b>			
Nil	54.0 (1201)	51.4 (2247)	52.3 (3448)
Primary	58.1 (664)	53.5 (1265)	55.1 (1929)
Secondary or more	62.1 (174)	62.9 (353)	62.6 (527)
Level of significance	ns	p<0.001	p<0.001
<b>Fathers education</b>			
Never schooled	53.7 (1081)	51.0 (2048)	51.9 (3129)
Primary	58.5 (579)	53.7 (1087)	55.4 (1666)
Secondary +	59.5 (363)	58.2 (705)	58.6 (1068)
Level of significance	ns	p<0.01	p<0.001
<b>Religion</b>			
Muslim	57.1 (1896)	54.4 (3613)	55.4 (5509)
Non-Muslim	42.4 (144)	34.4 (259)	37.2 (403)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Help in study at home</b>			
No	55.4 (1071)	50.8 (2066)	52.3 (3137)
Yes	56.9 (969)	55.8 (1806)	56.1 (2775)
Level of significance	ns	p<0.01	p<0.01
<b>Having private tutor</b>			
No	54.0 (1504)	51.2 (2951)	52.1 (4455)
Yes	61.9 (536)	59.2 (921)	60.2 (1457)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Having electricity at home</b>			
No	54.5 (1336)	50.9 (2574)	52.1 (3910)
Yes	59.1 (704)	57.4 (1298)	58.0 (2002)
Level of significance	p<.05	p<0.001	p<0.001

Well means belonging at the upper half of the students in respect to competencies achievement i.e., achieving at least 24 competencies (median)

**Annex 13. Percentage of students did well in the test by teachers' characteristics**

Teachers' characteristics	Boys	Girls	Both
<b>Age of teacher</b>			
17 – 25	52.8 (597)	48.5 (1166)	50.0 (1763)
26 – 35	57.1 (997)	54.4 (1925)	55.3 (2922)
36 – 50	58.9 (431)	56.3 (756)	57.3 (1187)
Level of significance	ns	p<0.001	p<0.001
<b>Marital status of teacher</b>			
Married	56.4 (1604)	54.2 (3011)	55.0 (4615)
Single	55.3 (421)	48.7 (836)	50.9 (1257)
Level of significance	ns	p<0.01	p<0.01
<b>Education of teacher</b>			
Below SSC	58.7 (361)	55.5 (692)	56.6 (1053)
SSC	56.3 (1085)	50.8 (2032)	52.7 (3117)
HSC	55.9 (438)	57.6 (852)	57.1 (1290)
Bachelors and Masters	49.6 (141)	49.1 (271)	49.3 (412)
Level of significance	ns	p<0.01	p<0.01
<b>Stream of education of teacher</b>			
Science	56.4 (1686)	53.7 (3174)	54.6 (4860)
Humanities	54.3 (326)	48.3 (646)	50.3 (972)
Level of significance	ns	p<0.01	p<0.01
<b>Experience of teacher (in year)</b>			
0 – 4	56.6 (779)	52.0 (1537)	53.6 (2316)
5 – 8	51.3 (557)	50.5 (1046)	50.8 (1603)
9 – 20	59.7 (689)	56.3 (1264)	57.5 (1933)
Level of significance	p<0.05	p<0.05	p<0.001
<b>Marks obtained by teacher (%)</b>			
No attended	56.6 (463)	54.0 (869)	54.9 (1332)
33 – 44%	53.4 (597)	55.0 (1031)	54.4 (1628)
45 – 59%	54.8 (799)	50.5 (1596)	51.9 (2395)
60%+	69.1 (181)	56.9 (376)	60.9 (557)
Level of significance	p<0.01	p<0.05	p<0.01
<b>Proportion of contents in the textbooks taught</b>			
Less than three quarter	52.0 (756)	46.6 (1392)	48.5 (2148)
More than three quarter	58.7 (1250)	56.3 (2436)	57.5 (3685)
Level of significance	p<0.001	p<0.001	p<0.001

**Annex 14. Percentage of students did well in the test by POs characteristics**

Characteristics of PO	Boys	Girls	Both
<b>Sex of PO</b>			
Male	55.0 (1575)	51.9 (2961)	53.0 (4536)
Female	59.8 (465)	57.0 (911)	57.9 (1376)
Level of significance	ns	p<0.01	p<0.001
<b>Education of PO</b>			
SSC or HSC	51.3 (690)	48.3 (1331)	49.3 (2021)
Degree or Masters	58.5 (1350)	55.6 (2541)	56.6 (3891)
Level of significance	p<0.01	p<0.001	p<0.001
<b>Duration of supervision by PO</b>			
1 – 9 months	49.1 (1101)	46.5 (2059)	47.4 (3160)
10+ months	64.1 (939)	60.6 (1813)	61.8 (2752)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Number of subjects as MT</b>			
0 – 1	52.7 (581)	48.8 (1107)	50.1 (1688)
2	57.5 (862)	52.4 (1564)	54.2 (2424)
3+	57.3 (597)	58.0 (1201)	57.8 (1798)
Level of significance	ns	p<0.001	p<0.001
<b>Number of visit of PO</b>			
19 – 42	55.4 (681)	53.2 (1283)	53.9 (1964)
43 – 51	56.5 (685)	54.9 (1225)	55.5 (1910)
52 – 87	56.5 (657)	51.6 (1339)	53.2 (1996)
Level of significance	ns	ns	ns
<b>Number of PO during one year</b>			
1	60.3 (1211)	56.8 (2318)	58.0 (3529)
2	49.2 (650)	45.0 (1198)	46.5 (1848)
3-4	52.5 (179)	56.2 (356)	55.0 (535)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Length of service of PO</b>			
0 – 3y	57.2 (699)	53.4 (1281)	54.7 (1980)
4 – 10y	58.4 (666)	55.6 (1306)	56.5 (1972)
11y+	52.6 (675)	50.3 (1285)	51.1 (1960)
Level of significance	ns	p<0.05	p<0.01

**Annex 15. Percentage of students did well in the test by AMs characteristics**

Socioeconomic status	Boys	Girls	Both
<b>Age of AM</b>			
27 – 30y	49.0 (335)	50.4 (617)	49.9 (952)
31 – 35y	57.4 (1149)	54.1 (2112)	55.3 (3261)
36 – 44y	57.6 (556)	52.8 (1143)	54.3 (1699)
Level of significance	p<0.05	ns	p<0.01
<b>Sex of AM</b>			
Male	55.8 (1589)	53.3 (3049)	54.2 (4638)
Female	57.0 (451)	52.4 (823)	54.0 (1274)
Level of significance	ns	ns	ns
<b>Education of AM</b>			
HSC	57.3 (253)	57.1 (517)	57.1 (770)
Bachelors	56.2 (837)	50.1 (1673)	52.2 (2510)
Masters	55.7 (950)	54.8 (1682)	55.1 (2632)
Level of significance	ns	p<0.01	p<0.05
<b>Length of service of AM an AM</b>			
0 – 3 y	52.9 (1330)	49.4 (2504)	50.6 (3834)
4 – 10 y	62.1 (710)	59.8 (1368)	60.6 (2078)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Length of experience of AM</b>			
2 – 6y	52.4 (717)	51.5 (1285)	51.8 (2002)
7 – 10y	58.0 (621)	53.5 (1241)	55.0 (1862)
11 – 13y	58.1 (702)	54.2 (1346)	55.6 (2048)
Level of significance	ns	ns	p<0.05
<b>Number of school visit by AM</b>			
1 – 9	49.5 (770)	48.5 (1420)	48.8 (2190)
10 – 12	58.4 (615)	54.1 (1021)	55.7 (1636)
13 – 25	61.9 (638)	57.3 (1406)	58.8 (2044)
Level of significance	ns	p<0.001	p<0.001

**Annex 16. Percentage of students did well in the test by school characteristics**

<b>Class size</b>			
22 – 30	54.9 (768)	48.5 (1460)	50.7 (2228)
31 – 34	57.0 (1257)	55.8 (2387)	56.2 (3644)
Level of significance	ns	p<0.001	p<0.001
<b>% of girls in the class</b>			
30 – 65	52.2 (1243)	48.6 (1879)	50.0 (3122)
66+	62.5 (782)	57.3 (1968)	58.8 (2750)
Level of significance	p<0.001	p<0.001	p<0.001
<b>School grade</b>			
A	63.8 (1192)	62.5 (2318)	62.9 (3510)
B or C	45.3 (848)	39.1 (1554)	41.3 (2402)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Duration of school programme in the area</b>			
<10y	54.1 (698)	52.8 (1298)	53.2 (1997)
11 – 15y	52.7 (997)	49.0 (1924)	50.3 (2921)
16 – 20y	70.1 (344)	65.8 (650)	67.3 (994)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Quality of students assessed by AM</b>			
Bad	6.3 (16)	0.0 (24)	2.5 (40)
Satisfactory	37.6 (226)	25.7 (471)	29.6 (697)
Good	52.6 (1247)	48.2 (2222)	49.8 (3469)
Level of significance	p<0.001	p<0.001	p<0.001
<b>Quality of teachers assessed by AM</b>			
Very bad	13.6 (22)	21.1 (38)	18.3 (60)
Bad	39.4 (279)	32.9 (560)	35.0 (839)
Satisfactory	50.3 (997)	46.5 (1833)	47.8 (2830)
Good	71.4 (742)	70.2 (1441)	70.6 (2183)
Level of significance	p<0.001	p<0.001	p<0.001

**Annex 17. Logistic regression analysis predicting students doing well in the competency test against their background variables as predictors**

Predicting variables	Regression coefficient	Odds ratio	Level of significance
<b>Sex of student</b>			
Girls	0	1.00	
Boys	0.12	1.13	p<0.05
<b>Age of student</b>			
9-10y	0	1.00	
11-12y	0.23	1.25	p<0.01
13-16y	0.06	1.06	ns
<b>Mothers education</b>			
Nil	0	1.00	
Primary	0.03	1.03	ns
Secondary+	0.35	1.43	p<0.001
<b>Private tutor</b>			
No	0	1.00	
Yes	0.27	1.30	p<0.001
<b>Religion</b>			
Non-Muslim	0	1.00	
Muslim	0.71	2.04	p<0.001
<b>Electricity at home</b>			
Not available	0	1.00	
Available	0.18	1.19	p<0.01
Constant	-0.85	0.42	
-2 log likelihood	7965.60		
Cox & Snell R <sup>2</sup>	0.02		
Nagelkeke R <sup>2</sup>	0.03		

Fathers' education and help of household members in study at home were not appeared in the model

**Annex 18. Ordinary regression analysis predicting schools performance in the competency test against school and teacher centric variables as predictors**

Predicting variables	Un-standardized regression coefficient	Standardized regression coefficient	Level of significance
School grade	1.88	0.31	p<0.001
Coverage of contents in textbooks	0.23	0.21	p<0.001
Constant	21.00		p<0.001
Adjusted R <sup>2</sup>	0.16		

Variables not included in the model are: Duration of programme in the area, class size, proportion of girls in the class, teachers age, teachers marital status, teachers education, stream of education of teacher, length of service of teachers, marks obtained by teachers in SSC, textbook difficulty index, number of refresher training received by teacher, and duration of course

**Annex 19. Ordinary regression analysis predicting schools performance in the competency test against area and office centric variables as predictors**

Predicting variables	Un-standardized regression coefficient	Standardized regression coefficient	Level of significance
Highest duration of supervision by PO	0.24	0.17	p<0.01
AMs length of experience as manager	0.24	0.16	p<0.01
Education of PO	0.27	0.17	p<0.01
Number of master training of PO	0.38	0.14	p<0.02
Constant	15.43		p<0.001
Adjusted R <sup>2</sup>	0.07		

Variables not included in the model are: Sex of PO, length of experience of PO, Number of POs supervised the school, number of school visit by PO, age of AM, sex of AM, education of AM, length of experience of AM, number of school visit by AM, and number of school in the area.