

**Government of the People's Republic of Bangladesh
Directorate of Primary Education
Section 2 Mirpur, Dhaka-1216**

**2011 National Student Assessment for Grades 3 and 5
National Report**

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Acknowledgement

It is my great pleasure that the Monitoring & Evaluation Division of Directorate of Primary Education has published a very useful report of National Students Assessment (NSA) 2011. It gives a true picture of the learning performance of the children. The main objectives of the current NSA are to assess the levels of the learning achievement of the students of Bangla and Mathematics for grade 3 and grade 5. The current NSA report is significantly successful and the content of the report reflect the aims and objectives. This report is a real diagnosis of Primary Education and will help effective future planning for ensuring quality Primary Education in Bangladesh.

Here, I would like to particularly thank to the Director of M & E Division for his leadership in managing and conducting such a robust study.

I also acknowledge the colleagues of the National Assessment Cell (NAC) of DPE for administering the test nationwide and preparing this report under the professional guidance of Mr. Md. Mezaul Islam, Deputy Director of M & E Division.

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Finally, I thank Ms. Ayesha Vawda, Senior educationist, World Bank for her active support and advice in conducting the NSA. I also recognise the contributions of other Development Partners (DPs) and thank them all.

Shyamal Kanti Ghosh
Director General
Directorate of Primary Education

Section 1

1.1 Acronyms

ACER	:	Australian Council <i>for</i> Educational Research
ADSL	:	Associates for Development Services Limited
AUEO	:	Assistant Upazila Education Officer
C-in-Ed	:	Certificate in Education
DPs	:	Development Partners
DPE	:	Directorate of Primary Education
DPEO	:	District Primary Education Officer
EFA	:	Education for All
GOB	:	Government of Bangladesh
GPS	:	Government Primary School
H.S.C.	:	Higher Secondary Certificate
IRT	:	Item Response Theory
JSC	:	Junior School Certificate
KPI	:	Key Performance Indicator
LO	:	Learning Outcome
LOC	:	Learning Outcome Category
MCQ	:	Multiple Choice Question
MDG	:	Millennium Development Goal
MLA	:	Monitoring Learning Achievement
MSQ	:	Mean Square
MoPME	:	Ministry of Primary and Mass Education
NSA	:	National Student Assessment
NAC	:	National Assessment Cell
NAPE	:	National Academy for Primary Education
NCTB	:	National Curriculum and Textbook Board
PEDP II	:	Second Primary Education Development Program
PISA	:	Program for International Student Assessment
PPS	:	Probability Proportional to Size
PTI	:	Primary Teachers' Training Institute
RNGPS	:	Registered Non-Government Primary Schools
S.S.C.	:	Secondary School Certificate
SD	:	Standard Deviation
SMC	:	School Management Committee
SSQ	:	Short Structured Question
TIMSS	:	Trend International Mathematics and Science Survey
UEO	:	Upazila Education Officer
UNESCO	:	United Nations Educational, Scientific and Cultural Organization
UNICEF	:	United Nations International Children's Emergency Fund
URC	:	Upazila Resource Centre

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1.3 Executive Summary

The Directorate of Primary Education (DPE) conducted National Assessment 2011 to assess the learning achievement of primary students. The main objectives of the current NSA are:

- a) To assess the levels of learning achievement of the pupils in respect of specified learning outcomes of the selected subjects (Bangla and Mathematics)
- b) To assess the influence of key school factors on pupils' learning achievement.

The National Students Assessment (NSA) also carried out in 2006 and 2008. But the national assessment (NSA) 2011 is the first robust learning assessment at grade 3 and grade 5 levels in Bangla and Mathematics. It allowed the valid comparison of grade performance and comparison over time.

The sample included 17,615 students of grade 3 and 13,854 students of grade 5 from 726 schools nationwide. The sample was covered 66 upazilas and 32 districts under 7 administrative divisions. This is a nationally representative sample of class 3 and class 5 with representation of Government Primary School (GPS) and Registered Non-Government Primary School (RNGPS).

Panels of specialists under the supervision of DPE developed the test instruments and NCTB. The tests were constructed to measure cognitive domains and cognitive skills. There were 35 questions each in Bangla and Mathematics tests for Class 3 and 40 questions each for class 5 tests.

Key findings:

Grade 3, Bangla: In the grade 3 tests the average scale score is 100.2 with standard deviation (S.D) 9.82. By the end of class 3, 67 % students achieved relevant competencies. On the other hand 33% students did not achieve relevant competencies. Among class 3 students 20% exhibit competency of above class 3 level (Band 4) and 1% exhibit even class 5 level competency (Band 5) & 6% of students were well below class 3 level (Band 1)

Grade 3, Mathematics: In Mathematics test the average scale is 100.8 with standard deviation (S.D) is 11. 62.50 percentage of students acquired relevant competencies. 14% of students achieve mastery above class 3 competencies (Band 4) and 1% show mastery of class 5 competencies (Band 5) and 18% of students of class 3 are well below class 3 level (Band 1)

Grade V Bangla: In Grade 5 in Bangla average scale score is 116.2 with standard deviation 8.69. At the end of class 5, 25% of students acquired relevant competencies, 57% of students had competencies above class 3 but below class 5 & 18% of students were well below i.e. class 3 level or below

Grade 5 Mathematics: Students average scale score is 118.6 with standard deviation 11. 4.33% students acquire mastery at the end of class5 & 34% were well below i.e. class 3 level or below.

In both the classes urban students performed better in Bangla while rural students performed better in mathematics. Students of GPS performed better than the students of RNGPS especially in Bangla. Class 3, there is already a difference in performance between the students of GPS and RNGPS, and the performance gap between GPS and RNGPS has widened at Class 5.

There are wide variances in students' achievement across different divisions in Bangla and Mathematics in Classes 3 .

In Bangla at Class 3, the rank order goes, from the lowest Sylhet, Rangpr, Rajshagi, Barishal, Khulna, Chittagong, and Dhaka divisions. Class size does not seem to have a significant impact on students' performances.

NSA 2011 clearly indicates the performance of children of grade 3 and 5 which gives us a picture of the quality of primary education in Bangladesh. Through this study it will be easy to identify the problems of children's learning achievement and thus to initiate the appropriate improvement measures.

1.4 Objectives of the Study

The major objective of the current national assessment is to assess the learning achievement of pupils of Grades 3 and 5 in the learning outcomes prescribed in the primary curriculum, with a view to feeding the findings to the primary education sub-sector programme to make further improvements in quality, especially in the primary level planning & management, and teacher education. More specifically the objectives of the study can be stated as follows:

- i. To assess the levels of learning achievement of the pupils of Grade 3 and 5 in learning outcomes of specified subjects.
- ii. To identify the status of key school factors relating to pupil learning achievement
- iii. To identify the important school factors influencing pupil learning achievement
- iv. To compare the school factors of best achieving schools with those of poorly achieving schools
- v. To recommend policy action for improving the quality of primary education and levels of pupil achievement

It is envisaged that the application of national assessment results in the planning & management, and teacher education will bring about improvements in the curriculum, textbooks, other instructional materials, academic supervision and classroom teaching/learning. Further, the findings will be able to contribute to formulation of reforms in the primary education and improving the internal efficiency of the system.

1.5 Background:

Human resource development is at the heart of Bangladesh's development efforts and the Government has placed high priority on education, particularly at the primary school level. Bangladesh runs one of the largest primary education systems in the world, with around eighteen million primary school age pupils, four hundred and fifty thousand teachers and about ninety thousand schools. For administrative purposes the country is divided into 7 Divisions, 64 Districts and 505 Upazilas (including Thanas) and so is the structure of primary education management.

Bangladesh has a primary education course of five years, with grades 1 to 5. The entry age in Grade 1 is 6 years. With a view to improving the quality of education a competency-based curriculum, developed by NCTB, has been implemented in the primary schools. The primary school curriculum consists of 9 subjects: (i) Bangla, (ii) Mathematics, (iii) English, (iv) Religious Studies (one from 4 religions: Islamic education, Hinduism, Buddhism and Christianity), (v) Environmental Studies: Science, (vi) Environmental Studies: Social, (vii) Arts and Crafts, (viii) Physical Education and (ix) Music. The primary curriculum developed by NCTB is implemented mainly in Government Primary Schools (GPS) and Registered Non-Government Primary Schools (RNGPS) and the other types of schools who provides primary level education in Bangladesh (except the English medium schools)

As a result of the multi-dimensional interventions implemented during the past two decades Bangladesh has seen a remarkable progress with regard to the quantitative development particularly in enrolment and gender parity of primary education.

A major shortcoming in the Bangladesh education system is that the *quality of primary education* which is not at a satisfactory level. It has been revealed from studies that many of the children do not attain the learning standards set through the competency-based curriculum. There is also evidence to the effect that many pupils who complete primary education do not attain the acceptable standards of literacy and numeracy.

Many factors seem to contribute to this real and perceived lack of quality education. Among them the following are considered as outstanding: weak organizational and institutional framework for delivery of primary education, lack of proper physical environment at schools, the shift or staggered system with its comparatively short school contact hours, lack of support materials, and inadequate number of trained teachers, traditional classroom teaching and learning practices .

According to these EFA assessments it is evident that Bangladesh has a challenging task to perform in order to reach the EFA goals by 2015.

Bangladesh is committed to the Millennium Development Goals (MDGs) adopted in 2000 at the Millennium Summit of world leaders held at the United Nations Headquarter. The overarching aim of MDG is to eradicate extreme poverty and improve the welfare of the people by the year 2015. Of the eight MDGs, two have a special education focus. These are: Goal 2 – Achieve universal primary education and Goal 3 - Promote gender equity and empower women. As noted above, Bangladesh has done well in respect of the gender parity goal at primary and secondary education, at least in terms of enrolment. Achieving universal primary education, and gender parity at all levels and in all

aspects of participation and quality in education are however tougher challenges ahead.

With a view to providing critical evidence of the efficacy of PEDP II interventions to improve the quality of education and pupil learning outcomes in cognitive and other skills, the DPE decided to conduct a series of National Assessments of Learning Achievement of primary pupils. The first in this series was conducted in 2006, and the study conducted in 2008 is the second one and NSA 2011 was the 3rd in the series.

The sample included 17,615 students of grade 3 and 13,854 pupils of grade 5 from 726 schools nationwide. The sample was covered 66 upazilas and 32 districts under 7 administrative divisions. This is a nationally representative sample of class 3 and class 5 with representation of Government Primary School (GPS) and Registered Non-Government Primary School (RNGPS).

Test instruments were developed by panels of specialists under the supervision of DPE and NCTB for Bangla and Mathematics.

1.6 Methodology:

The data needed to address the objectives of the study were gathered by administering tests to a sample of pupils and a pre-designed 'School Data Form' to the Head Teachers and teachers of sample schools. The sample included 17,626 students in Class 3 and 13,854 students in Class 5 in 726 schools. The sample covered 66 Upazilas from 32 Districts under 7 administrative Divisions.

Tests in two subjects (Bangla and Mathematics) were conducted for Grade 3 and 5 pupils. Each test consisted of two parts with different item types viz., Multiple Choice Questions (MCQs) and Short Structured Questions (SSQs). All test instruments were developed by panels of specialists under the supervision of Directorate of Primary Education (DPE) and National Curriculum and Textbook Board (NCTB). The 'Socio-economic and Teachers' Data Form' were developed by the NAC team by the guidance of the national consultant of World Bank. The validity and reliability of tests have been found to be acceptable.

Administration of tests and the 'Socio-economic and Teachers' Data Form' in the sample schools were carried out by trained personnel under the supervision of DPE Field Supervisors, in 19 December, 2011. Evaluations of answer scripts and data entry were conducted by Data International – a local consulting firm under the supervision of DPE. All the other related processes including data analysis were carried out by the ACER, paying special attention to ensuring quality throughout.

Data were analysed in depth to enable strata-wise differences in pupil achievement to be examined at national, divisional and district levels. Strata included gender, school location (urban & rural) and school type (GPS & RNGPS). Statistical analysis of test data focused mainly on IRT based scale score for the analysis and it will not analyze students' performance based on raw score or percentage of correct answer. Based on scale score, 5 bands were created with different competency levels. Also statistical analysis of test data addressed measures of central tendency and dispersion and percentage distributions of pupils by levels of achievement. Correlation matrices were estimated

and multiple regression models were constructed in order to examine the school related variables on achievement.

Limitations:

Conducting this National Assessment study was an enormous task as it involved large sample of pupils, teachers, schools, upazilas and teams of administering personnel. The administration of test in whole country was not at all smooth for DPE. Many adversities and hazards came in the way of test administration and the steps that followed.

Bangladesh runs one of the largest primary education systems in the world with ninety thousands schools. Due to various problems it was not possible to pick up ideal sample size .The sample size was 726 schools in 32 districts and 7 administrative divisions .

All personnels related to the field test administering in the whole country were not adequately trained up. Also the schools and the students were not familiar with such type of test items.

A list of item-wise learning outcomes for each of the 4 subjects of Grades 3 and 5 was supplied by DPE for carrying out the necessary analyses. After thorough analysis of the supplied lists, the consultants identified some discrepancies in stating proper learning outcomes for some of the items in some subjects. Subsequently the issue was discussed at a meeting attended by NCTB specialists and DPE officers, and was resolved.

All the items in the tests were based on learning outcomes stipulated in the primary curriculum. However, in the tests certain learning outcomes were not represented by adequate number of items. For example, in the Mathematics test the majority of learning outcomes included were represented by only one MCQ. This restricted the opportunities for examining achievement by learning outcomes.

Section 2:

Introduction

The National Student Assessment (NSA) 2011 is the first robust learning assessment conducted in Bangladesh at Class 3 and Class 5 level in Bangla and Mathematics. It was implemented in December 2011, involving 17,626 students in Class 3 and 13,854 students in Class 5¹ in 726 schools nationwide. This is a nationally representative sample of Class 3 and Class 5 students, with representations of Government Primary Schools (GPS) and Registered Non-Government Primary Schools (RNGPS).² Earlier, Ministry of Primary and Mass Education (MOPME) developed and conducted two rounds of national learning assessments in 2006 and 2008. However, the design of the earlier assessments did not allow valid comparison of grade performance and comparison over time. Therefore, the NSA 2011 is considered the first learning assessment that can be used as a methodological diagnosis of the primary education system and sets a baseline for future reference (ACER 2012).

The NSA, a learning assessment study, is different from public examinations by nature. The main objective of the study is to diagnose the health of the primary education system in Bangladesh by assessing the learning achievements of students. It also aims to examine how different factors, especially school inputs, student background, teacher quality may or may not be associated with higher learning achievements of students. A learning assessment study is usually conducted on a sample basis. It helps to determine the distribution of students' learning achievement and provide feedback to policy makers and other concerned stakeholders to improve the education system. On the other hand, public examinations, which are conducted annually at Class 5 (Primary Education Completion Examination), Class 8 (Junior Secondary Certificate – JSC), Class 10 (Secondary School Certificate – SSC), and Class 12 (Higher Secondary Certificate – HSC), for example, are designed to determine competency of individual students in completing specific educational level and eligibility to move onto the next level of education. Therefore, all students who wish to receive a certificate of completing a level are expected to take part in public examinations.

The NSA is developed specifically to measure competency of students in Bangladesh and it is based on the national curriculum. The NSA is a learning assessment that is based on the national curriculum. Unlike international learning assessment tests, such as TIMSS (Trends in International Mathematics and Science Studies) and PIRLS (Progress in International Reading Literacy Study), the NSA does not aim to compare learning levels of Bangladeshi students with students of other countries. It rather aims to measure the levels of competencies that students in Bangladesh acquire

¹ The number of students who participated are by class and subject: Bangla Class 3 – 17,615, Math Class 3 – 17,626; Bangla Class 5 – 13,854, Math Class 5 13,827.

² The national sample was drawn from 726 schools covering 7 Division, 32 Districts and 64 Upazilla. The national sample consisted of 548 (75 per cent) Government Primary Schools (GPS) and 178 (25 per cent) Registered Non-Government Primary Schools (RNGPS). From the selected schools, 25 students per school from grade 3 and 20 students per school for grade 5 were selected through a defined systematic random sampling method.

in Bangla and Mathematics as opposed to the expectations in the national curriculum. It also allows policy makers to understand what type of schools and students performs better in the education system and what type of support students, teachers and schools need to improve learning. The NSA 2011 is the first robust learning assessment and it is going to be used as the baseline for future years when subsequent rounds of NSA are implemented.

NSA 2011 also allows understanding various factors affecting students' learning. Students' learning is influenced by various factors, including schools, teachers, and household background. To capture these factors, specific instruments are developed to collect information about students' household background, teachers, and schools in addition to students' test scores. These sets of information will help policy makers understand correlates to the distribution of learning achievements among different school types, students' background, or geographical areas.

The National Curriculum and Textbook Board (NCTB) developed the test instruments for the NSA in collaboration with the National Assessment Cell (NAC) from the Directorate of Primary Education (DPE). Subject committees were convened by NCTB that included curriculum experts, practicing teachers, supervisors, and instructors. The committees were responsible for the development of two parallel tests for each subject in each grade that met specifications relating to questions type, and to curriculum coverage. Question types used were multiple choice questions (MCQ) and short structure questions (SSQ). The parallel forms in each subject in each grade were trialed and reduced to a single form in each subject in each grade for the NSA.

Most questions in Bangla and Mathematics tests are closely based on the content of the Grade 3 and 5 Bangla and Mathematics textbooks.³ The texts themselves were often from the textbook, and the contexts for both reading and writing questions were also highly familiar to students. Most reading comprehension questions were in MCQ format. The reading questions contained relatively simple and common vocabulary and the writing tasks were short (only five sentences required) and concrete.⁴ In the mathematics test, questions posed replicated those found in the textbook and tended not to require application of critical thinking.

The tests were constructed to measure cognitive domains (reading comprehension, grammar, number, etc), and cognitive skills. Cognitive skills assessed through the tests include knowledge, understanding, and application. There are 35 questions each in Bangla and Mathematics tests in Class 3 and 40 questions each in the Class 5 tests. Both Class 3 and Class 5 examinations were held for 60 minutes per subject. The number of questions in each cognitive domain and skill is listed in Table 1 and Table 2 for Class 3 and 5, respectively.

³ Before finalizing test items, the Australian Council for Educational Research (ACER) reviewed the questions by applying particular criteria for good test design in its review, by trialing two parallel forms for each subject and each grade, and by reviewing statistics from similar items used in the 2008 NSA.

⁴ PIRLS, for example, has reading texts of up to 800 words long, requiring students to read much longer and more complex texts than the NSA 2011 Bangla test, which has texts that consist of several short sentences.

2.2 Content of the test , class 3 & 5

Table 1: Contents of Bangla and Mathematics tests, Class 3

Subject	Content	Total			
		Number of Questions	Knowledge	Understanding	Application
Bangla	Reading Comprehension	18	3	14	1
	Grammar	2	-	-	2
	Punctuation	3	-	-	3
	Spelling	5	5	-	-
	Vocabulary	4	2	2	-
	Writing	3	-	-	3
	<i>Total Items</i>	35	<i>10</i>	<i>16</i>	<i>9</i>
Mathematics	Number	26	4	17	5
	Measurement	5	2	2	1
	Data	-	-	-	-
	Shape and Space	4	1	3	-
	<i>Total Items</i>	35	<i>7</i>	<i>22</i>	<i>6</i>

Source: ACER 2012

Table 2: Contents of Bangla and Mathematics tests, Class 5

Subject	Content	Total			
		Number of Questions	Knowledge	Understanding	Application
Bangla	Reading Comprehension	23	2	19	2
	Grammar	5	3	-	2
	Punctuation	3	-	-	3
	Spelling	2	2	-	-
	Vocabulary	3	2	-	1
	Writing	4	-	-	4
	<i>Total Items</i>	40	<i>9</i>	<i>19</i>	<i>12</i>
Mathematics	Number	28	4	18	6
	Measurement	6	3	2	1
	Data	2	-	2	-
	Shape and Space	4	1	2	1
	<i>Total Items</i>	40	<i>8</i>	<i>24</i>	<i>8</i>

Source: ACER 2012

A common measurement scale for Class 3 and Class 5 was constructed for each subject, Bangla and Mathematics, using Item Response Theory (IRT). The advantages of using the measurement scales constructed by the IRT analyses include:

- Comparability of performance between Class 3 and Class 5 students within each subject, which is achieved by equating the two tests in each subject using common test items;
- Understanding a continuum of students' skills and understandings for the subject, which allows for the scales to be described and bands of achievement to be established; and
- Estimation of pupils' skills and understanding based on their performance in the test, in the form of Bangla and Mathematics scale scores.

This report will use this IRT-based scale score for the analysis and it will not analyze students' performance based on the raw score or percentage of correct answers.

Based on the scale score, five bands are created to classify students with different competency levels as follows.

- Band 1 – Well below Class 3 level
- Band 2 – Below Class 3 level
- Band 3 – Class 3 level
- Band 4 – Above Class 3 level
- Band 5 – Class 5 level

Cut-off scores for each band and competencies demonstrated at each band are described in **Tables 3 and 4** for Bangla and Mathematics, respectively. Descriptive statistics of the scale scores are listed and tabulated for each policy variable, which is discussed in this report, in the Annex 1.

2.3 Band descriptions for Bangla & Mathematics

Table 3: Band descriptors for Bangla

Band	Minimum BSS ⁵ score	Band description	Competency demonstrated at the band
Band 5	122	Grade 5 level	<ul style="list-style-type: none"> • Write in some detail about relevant experiences, events, information and ideas in the required range of writing forms, using correct spelling and punctuation • Read a range of short, more challenging texts, identifying literal and implied meaning and connecting ideas in different parts of a text
Band 4	108	Above Grade 3 level	<ul style="list-style-type: none"> • Write about relevant experiences, events, information and ideas in some writing forms using mainly correct spelling and punctuation • Read a range of short texts with some unfamiliar vocabulary; identify main ideas, literal meaning and simple inferences
Band 3	96	Grade 3 level	<ul style="list-style-type: none"> • Write about relevant experiences, events, information and ideas in some writing forms, spelling familiar words correctly and using correct punctuation • Read short texts; locate and interpret directly stated information and make some simple inferences
Band 2	85	Below Grade 3 level	<ul style="list-style-type: none"> • Write short texts about events and information, spelling most familiar words correctly and using mainly correct punctuation • Read short, simple texts to locate directly stated information; identify correct spelling of high-frequency words and recognize correct use of sentence punctuation
Band 1		Well below Grade 3 level	<ul style="list-style-type: none"> • Write to record simple personal details • Read simple, short, highly familiar texts, such as signs that contain strong visual support to interpret and locate information; recognize correct word order

Source: ACER 2012

⁵ Bangla Scale Score

Table 4: Band descriptors for Mathematics

Band	Minimum MSS ⁶ score	Band description	Competency demonstrated at the band
Band 5	124	Grade 5 level	<ul style="list-style-type: none"> Apply strategies to simplify numerical expressions and solve word problems on percentages and unitary method Apply geometric properties and relationships in solving simple problems on angles
Band 4	113	Above Grade 3 level	<ul style="list-style-type: none"> Apply strategies to solve word problems including money transactions using skills of addition, subtraction, multiplication and division of whole numbers; add/subtract and simplify decimals; find the HCF of small numbers; identify and represent fractions; multiply and divide whole numbers by fractions; solve word problems related to addition and subtraction of fractions Set up a mathematical expression (equation) for a given situation; find the value of an unknown in a given simple mathematical expression Convert different units of measure (cm/ mm to cm/m, kg to gm) Identify the distinguishing properties of 2D objects
Band 3	101	Grade 3 level	<ul style="list-style-type: none"> Add and subtract 6 digit numbers (negative numbers excluded); identify the remainder on division by 100; find the LCM of given numbers; uses addition; subtraction and multiplication to solve 2 stage word problems; convert fractions to mixed fractions, percentages and decimals; add, subtract and multiply like fractions Calculate elapsed time and read a 24-hour clock format Measure the volume of a liquid shown in a graduated cylinder and calculate area of a rectangle Identify 3D shapes and classify triangles Use tally charts and frequency tables
Band 2	90	Below Grade 3 level	<ul style="list-style-type: none"> Identify place value in numbers up to 4-digit numbers; order 2-digit numbers; compare two numerical expressions Add and subtract numbers up to 4 digits (without carryover); divide a 3-digit number by a 1-digit number; use addition, subtraction and multiplication to solve two-stage problems; recognize and order simple fractions Recognize and name currency in words and figures Read time on an analogue clock to the nearest quarter hour; convert hours to days Convert meters and centimeters to meters
Band 1		Well below Grade 3 level	<ul style="list-style-type: none"> Identify, cont and compare numbers up to 3-digits; add and subtract numbers up to 4-digits (without carryover), identify even and odd numbers Read dates and day on a calendar Read simple graphs Recognize and draw simple 2D shapes

Source: ACER 2012

⁶ Mathematics Scale Score

Section 3: Results of NSA 2011

This section presents and discusses the general outcomes of the NSA 2011 at the national and regional level. It will first discuss general distribution of scores among Class 3 and Class 5 students in mathematics and Bangla. Following an analysis of score distribution at the national level, geographical distribution of scores will be discussed.

3.1. General result of the National Students Assessment in Class 3

Nationally, by the end of Class 3 two-thirds (67%) of students master Class 3 Bangla competencies and half (50%) of the students master Class 3 Mathematics competencies. On the other hand, 33% of students do not acquire competency in Bangla that need to be acquired by the end of Class 3, and 50% of students do not acquire competency in Mathematics by the end of Class 3. This finding shows an issue of low learning achievement stats from an early grade in Bangladesh.

Table 5: General result of Class 3 tests, Bangla and Mathematics

	Number of students	Scale Score				% of students achieving Class 3 competencies (Bands 3-5)
		Average Score	Standard Error	Standard Deviation	Min Max	
Bangla	17,615	100.2	0.07	9.82	69 131	67
Math	17,626	100.8	0.09	11.62	65 134	50

Source: Authors' analysis using NSA 2011

Note: Percentage of students achieving Class 3 competencies include students who are in Bands 3 to 5.

In Bangla, competencies that Class 3 students are expected to master (Band 3) are:

- *Writing*: Writing about relevant experiences, events, information, and ideas in some writing forms, spelling familiar words correctly and using correct punctuation.
- *Reading*: Reading short texts; locate and interpret directly stated information and make some simple inferences.

In Mathematics, competencies that Class 3 students are expected to master (Band 3) are:

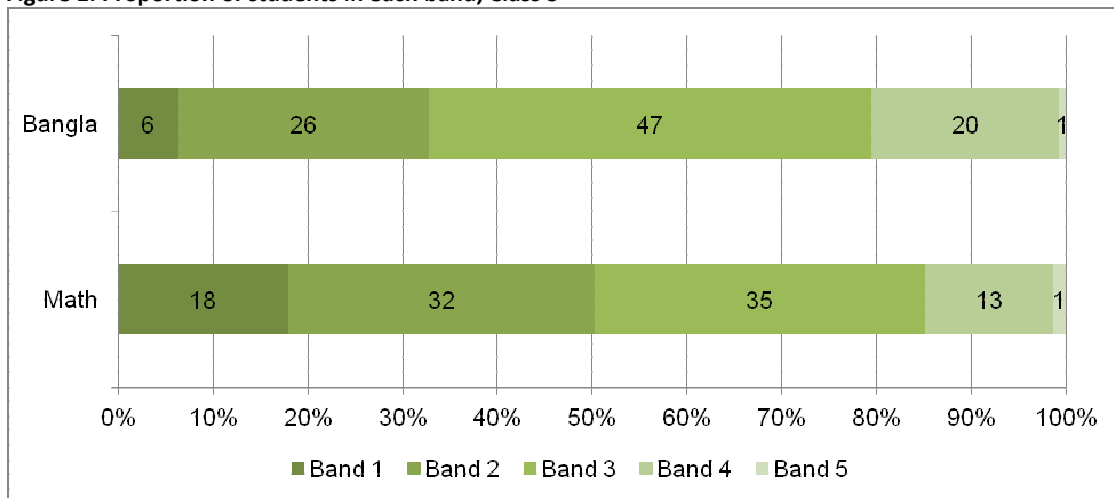
- *Numbers*: Add and subtract 6 digit numbers (negative numbers excluded); identify the remainder on division by 100; find the least common multiples of given numbers; uses addition/ subtraction and multiplication to solve 2 stage word problems; convert fractions to mixed fractions, percentages and decimals; add, subtract and multiply like fractions.
- *Measurement*: Calculate elapsed time and read a 24-hour clock format.
- Measure the volume of a liquid shown in a graduated cylinder and calculate area of a rectangle.
- *Shape and Space*: Identify 3-D shapes and classify triangles.
- *Data*: Use tally charts and frequency tables.

Low mastery of curriculum contents and academic skills at early grades has an important learning implication at upper grades. Comprehension of Bangla is important not only for Bangla subject but also for understanding other subjects. The fact that 33% of students do not acquire adequate reading and writing skills by the end of Class 3 requires urgent attention.

Low comprehension is more pronounced in Mathematics where only half of Class 3 students master what is expected in the curriculum. If the low level of mastery is a result of too ambitious curriculum, the ongoing curriculum and textbook reform would need to consider revising what can and should be mastered by Class 3 students. However, if the low level of mastery is a result of insufficient teaching and learning practices or other factors, it is necessary that policy makers review good and bad classroom examples in Mathematics classes and provide necessary support to the needed groups (including teachers, schools, students).

The distribution of students by band show that there are a good proportion of very good performers who demonstrated above Class 3 level competencies and some poor performers who demonstrated way below Class 3 level competencies. There are very good Class 3 performers in both Bangla and Mathematics. Among Class 3 students, 20% exhibit competency of above Class 3 level in Bangla (Band 4) and 1% exhibit even Class 5 level competency (Band 5). In Mathematics, 14% master above Class 3 competency (Band 4) and 1% show mastery of Class 5 competency (Band 5). On the other hand, the problem of low comprehension is very serious for a particular share of students especially in Mathematics. By the end of Class 3, 6% and 18% of students have acquired Bangla and Mathematics competencies, respectively, well below Class 3 level (Band 1). An urgent intervention is required for these students.

Figure 1: Proportion of students in each band, Class 3



Source: Authors' analysis using NSA 2011

3.2. General result of the National Students Assessment in Class 5

At the end of Class 5, only one-quarter (25%) of students master Class 5 Bangla competencies and one-third (33%) of students master Class 5 Mathematics competencies. The share of students who acquire relevant competencies by the end of Class 5 is even smaller than the share found in Class 3. This is natural considering that those who are already behind at Class 3 remain to be behind and additional students are failing behind Classes 4 and 5. The statistics is eye-opening for the primary education system. Even though students complete Class 5 and the number of graduate is increasing

year by year, a very small fraction of these students have the competencies expected of them in the national curriculum.

Table 6: General result of Class 5 tests, Bangla and Mathematics

	Number of students	Scale Score			Min	Max	% of students achieving Class 5 competencies (Band 5)
		Average Score	Standard Error	Standard Deviation			
Bangla	13854	116.2	0.07	8.69	85	144	25
Math	13797	118.6	0.09	11.14	82	152	33

Source: Authors' analysis using NSA 2011

Note: Percentage of students achieving Class 5 competencies include students who are in Band 5.

In Bangla, competencies that Class 5 students are expected to master (Band 5) are:

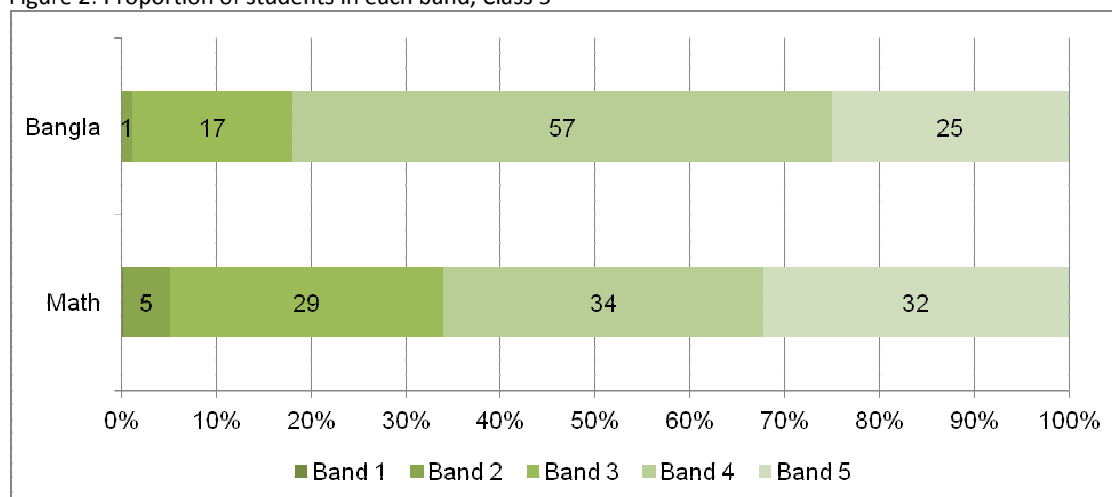
- *Writing*: Write in some detail about relevant experiences, events, information and ideas in the required range of writing forms, using correct spelling and punctuation
- *Reading*: Read a range of short, more challenging texts, identifying literal and implied meaning and connecting ideas in different parts of a text.

In Mathematics, competencies that Class 5 students are expected to master (Band 5) are:

- Apply strategies to simplify numerical expressions and solve word problems on percentages and unitary method.
- Apply geometric properties and relationships in solving simple problems on angles.

The distribution of students by bands shows that a considerable share of students are performing much lower than at Class 5 – 18% and 34% of Class 5 students have Class 3 level competency or less in Bangla and Mathematics, respectively . Learning achievements of the 18% and 34% students in Bangla and Mathematics, who master only Class 3 or below competencies, are more than two years behind. The share of low performers is larger for Mathematics than for Bangla.

Figure 2: Proportion of students in each band, Class 5

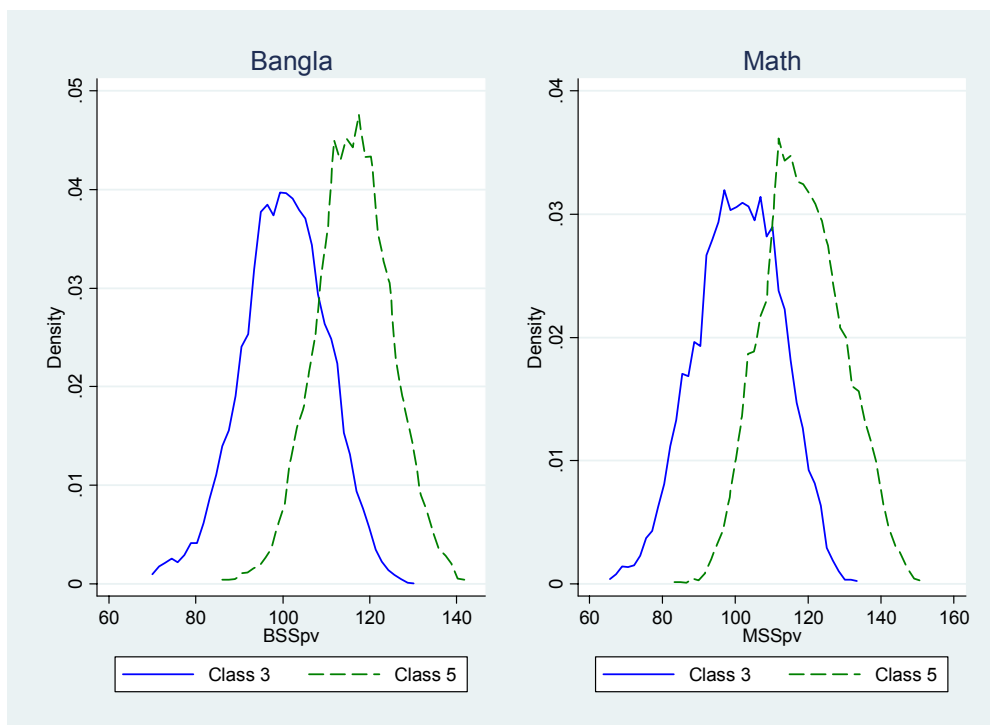


Source: Authors' analysis using NSA 2011

An interesting reversal trend is observed between Bangla and Mathematics between Class 3 and Class 5. In Class 3, 67% of students master Bangla competencies and only 50% master Mathematics competencies. However, by the end of Class 5, the share of students who master Bangla competencies is smaller than that of Mathematics, at 25%, while 33% of students master Mathematics competencies. An analysis of the Bands show that 57% of Class 5 students have Bangla competencies of above Class 3 but below Class 5. This implies that the majority of students who continue in school learn very basic Bangla by Class 3, but face difficulties of acquiring upper level Bangla at Class 4 and 5 level.

20% of best performers in Class 3 perform better than bottom 20% of Class 5 students in Bangla and bottom 30% of Class 5 students in Mathematics. One of the advantages and uniqueness of the NSA 2011 is that it measures performance of Class 3 and 5 students along the same scale. Comparison of Class 3 and 5 students in Bangla and Mathematics indicates that quite a number of students in Class 3 are actually performing better than Class 5 students. Top 20% of students in Class 3 (in Bangla and Mathematics respectively) perform better than bottom 20% and 30% of Class 5 students in Bangla and Mathematics, respectively. This also means that the bottom 20% or 30% of performers in Class 5 have lower competencies than top 20% of Class 3 students despite their attendance in school for 2 more years. This finding calls for an urgent need to identify and assist weak performers of Class 5 in earlier grades. **Figure 3** shows distribution of scores by Class 3 and 5 students. A triangle below the cross point of Class 3 and 5 curves is the area where performance of Class 3 students is better than Class 5 students.

Figure 3: Comparison of performance between Class 3 and 5 students, Bangla and Mathematics



Source: Authors' analysis using NSA 2011

3.3. Distribution of Scores by Divisions and Geographical Locations

There are wide variances in students' achievement across different divisions in Bangla and Mathematics in Classes 3 and 5. An analysis of score distribution by divisions shows that there are wide ranges of score distribution in both subjects in both classes. While nationally 67% of students at Class 3 achieve Class 3 level competencies in Bangla, the proportion ranges between 59% in Sylhet and 73% in Dhaka.⁷ In Mathematics, the proportion of students achieving level 3 competencies ranges between 36% and 57% as opposed to the national average of 50%. In Bangla, the score rank order goes, from the lowest, Sylhet, Rangpur, Rajshahi, Barisal, Khulna, Chittagong, and Dhaka divisions.

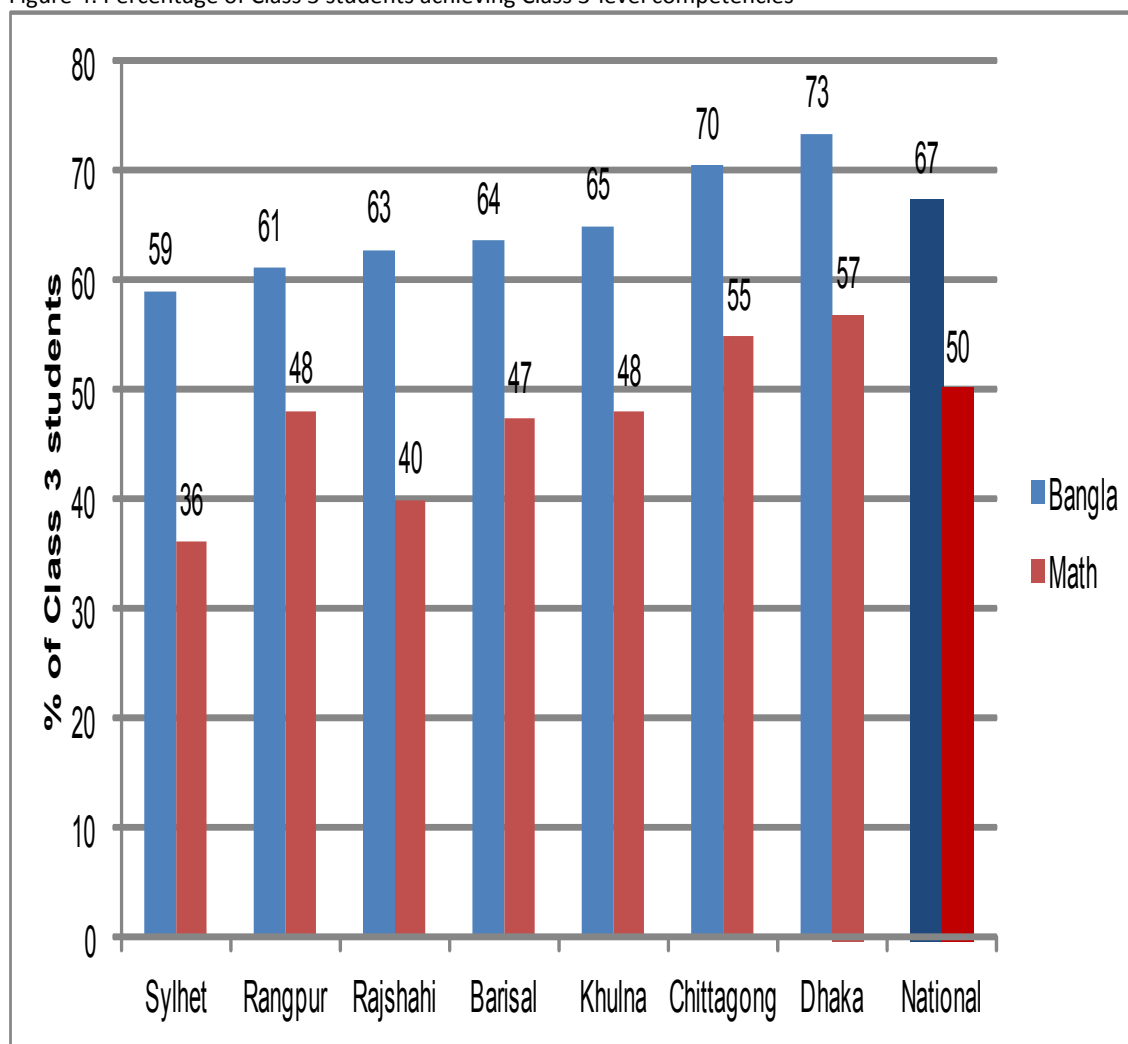
Distribution of scores are also similar at Class 5. Percentage of Class 5 students acquiring Class-5 level Bangla ranges from 21% to 28% compared to 25% nationally and in Mathematics ranges from 15% to 42% compared to 33% nationally. The unequal distribution of Mathematics in Class 5 is very large. While 42% of students at Class 5 master Class-5 competencies in Chittagong, only 15% of students master in Sylhet. In fact, only Sylhet division exhibited lower proportion of students achieving Class 5 competency in Mathematics (15%) than in Bangla (21%) while other divisions show a larger proportion of students achieving relevant competencies in Mathematics than in Bangla. The rank order of divisions is similar to Class 3 but the order of top 2 divisions changed; the divisions line

⁷ Scale score distribution is listed in Annex 1.

up from the lowest: Sylhet, Rajshahi, Barisal, Khulna, Rangpur, Dhaka, and Chittagong for both subjects.⁸

From distribution of scores in Class 3 and Class 5, performance of Chittagong in Mathematics is worth examining. In Chittagong division, 55% of students acquire relevant competency at Class 3 and 42% acquire relevant competency at Class 5 in Mathematics (gap of 13%). This gap is much smaller, for example when compared to Dhaka, where the gap is 24% (57%-33%). It may imply that mathematical teaching and learning practices at Class 4 and 5 in Chittagong has something unique and that has successfully contributed to retaining relatively high level of accomplishments in Class 5 Mathematics. Such a trend is not observed in case of Bangla.

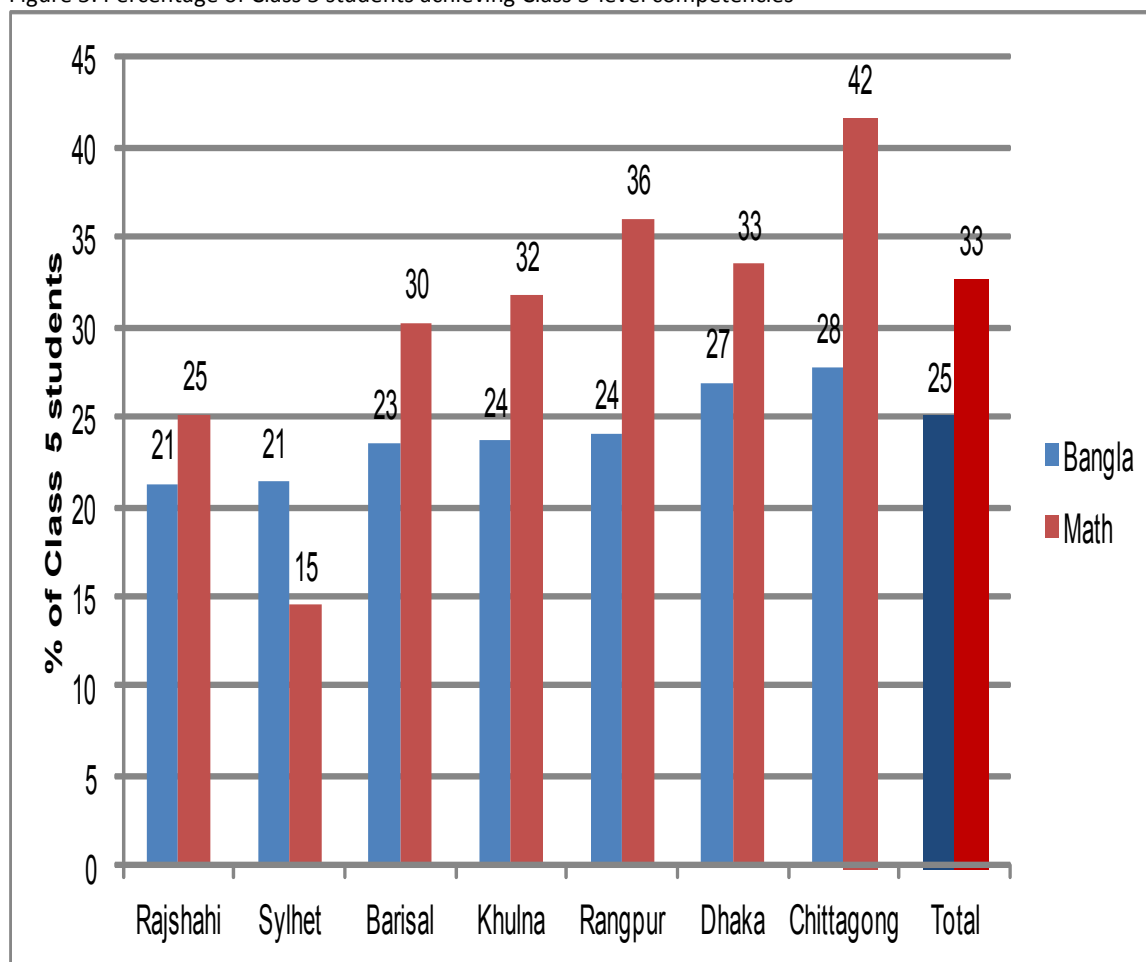
Figure 4: Percentage of Class 3 students achieving Class 3-level competencies



Source: Authors' analysis using NSA 2011

⁸ While the rank order is obtained from NSA2011, it is based on scores of sampled students. There are certain ranges of sampling errors and hence the order may be different in the entire population (see Annex 1). For example, scores of Rajshahi, Barisal, and Khulna are not different in statistical terms in both Bangla and Mathematics.

Figure 5: Percentage of Class 5 students achieving Class 5-level competencies

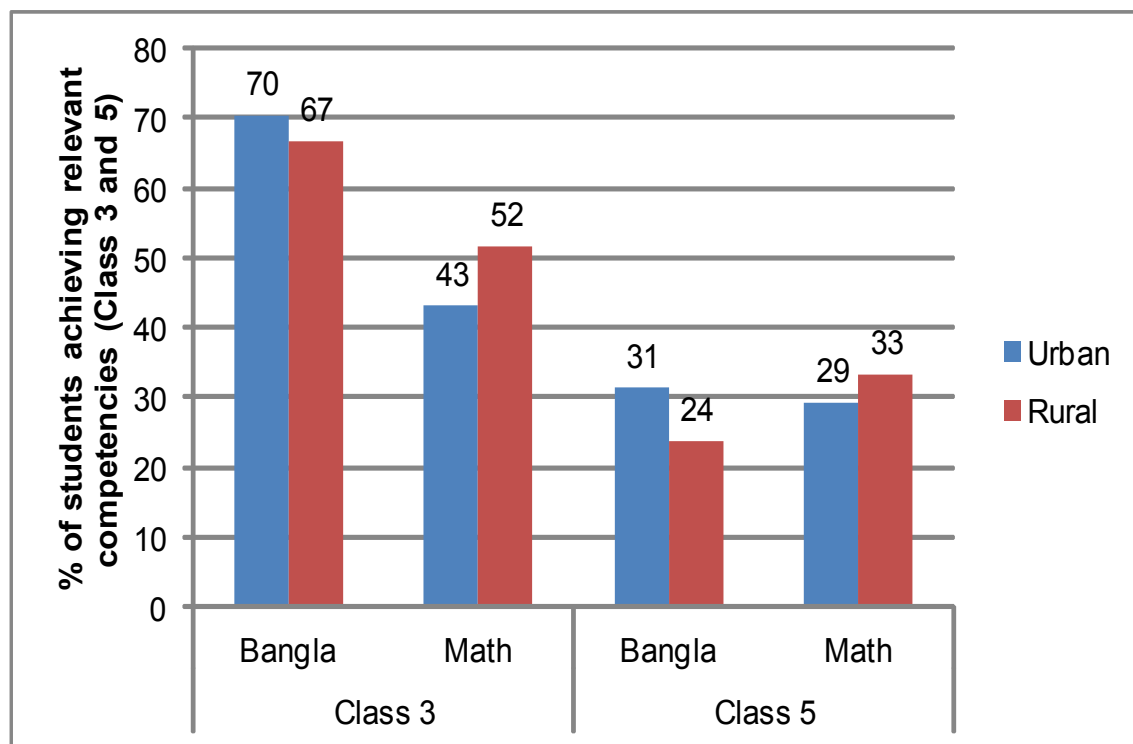


Source: Authors' analysis using NSA 2011

Urban students perform better in Bangla while rural students perform better in Mathematics. An interesting trend is observed from NSA 2011. Both in Classes 3 and 5, urban students outperform in Bangla while rural students outperform in Mathematics. The difference between urban and rural students in Mathematics is statistically significant in all cases. This finding is by and large consistent with the findings of NSA 2008.⁹ In 2008, urban students outperformed in Bangla in both Class 3 and 5, but there was no statistically significant difference in Mathematics (ADSL 2009). Although a more detailed investigation is required to understand the factors behind this trend, the perception that rural schools are generally disadvantaged is not valid in case of Mathematics.

⁹ While NSA 2008 is not for comparison across different years and for Classes 3 and 5, average score difference between urban and rural areas is relevant.

Figure 6: Percentage of Class 3 and 5 students achieving respective competencies, by urban-rural areas



Source: Authors' analysis using NSA 2011

Note: Differences in average score is statistically significant at 1% in both subjects in both Classes.

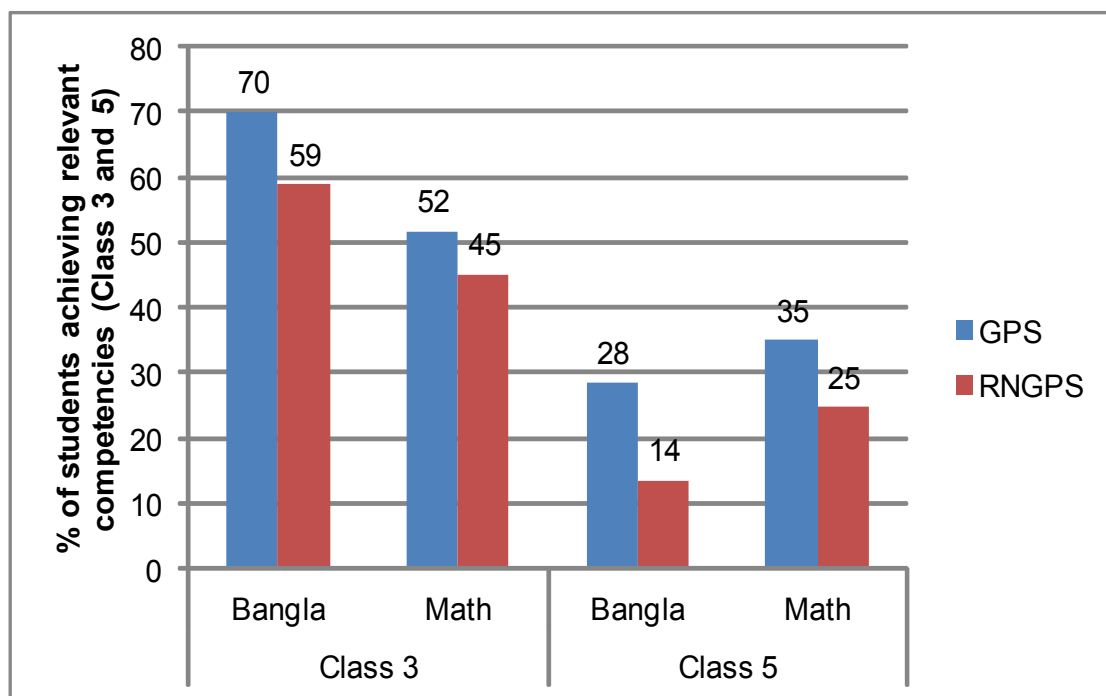
3.4. Distribution of Scores by School Characteristics

In Bangladesh, there are 10 different types of schools that provide primary education. Although the NSA collects information from the largest two types of schools, including Government Primary Schools (GPS) and Registered Non-Government Primary Schools (RNGPS), it is important to understand how different school environments affect students' learning outcomes.

Students in Government Primary Schools (GPS) perform better than students in Registered Non-Government Primary Schools (RNGPS), especially in Bangla. About 24% of Class 3 students and 23% of Class 5 students were enrolled in RNGPS in the NSA 2011 sample. In both Class 3 and 5 and in both subjects, students in GPS perform better on average than students in RNGPS. The difference is relatively large in Bangla. Percentage of students who acquire relevant competencies at Class 3 in Bangla is 70% in GPS and 59% in RNGPS (11 percentage points gap), and for Class 5, it is 28% to 14% (14 percentage points gap). Performance gap is also in favor of GPS students in Mathematics, but gaps are slightly narrower. Gaps in the proportion of students who achieved relevant competencies at Class 3 and 5 in Mathematics are 7 percentage points (52% to 45%) in Class 3 and 10 percentage points (35% to 25%) in Class 5.

By Class 3, there is already a difference in performance, and the performance gap between GPS and RNGPS is widened at Class 5. The trend shows that the RNGPS has generally lower quality of education at both grades. The gap that emerges at a lower grade is only worsened by the end of primary education cycle. As a result, low level of mastering Class 5 competency in RNGPS is especially worrisome. In RNGPS, only 14% of students at Class 5 actually have a competency of Class 5 Bangla (Figure 7).

Figure 7: Percentage of Class 3 and 5 students achieving respective competencies, by school type



Source: Authors' analysis using NSA 2011

Note: Differences in average score is statistically significant at 1% in both subjects in both Classes.

Large quality gaps between GPS and RNGPS are found in Barisal and Sylhet divisions. Differences in the proportion of students acquiring relevant competency at Class 3 between GPS and RNGPS are 18 and 23 percentage points for Bangla and Mathematics in Barisal and 21 and 22 percentage points in Sylhet while the national average is 11 and 7 percentage points. Interestingly, performance gaps between GPS and RNGPS are narrowing at Class 5 only in Barisal and Sylhet. These sets of findings imply that difference in the quality of education is particularly poor in lower grades of RNGPS in Barisal and Sylhet. While GPSs generally perform better than RNGPS, in rare cases RNGPS perform better than GPS. Although reason is unknown from this statistics, in Khulna, proportion of students mastering Class 3 Mathematics competency is larger among RNGPS.¹⁰

¹⁰ In Chittagong, performance of Class 3 Mathematics seems higher for RNGPS, but the difference is not statistically significant even at 10%. In Khulna, RNGPS outperform in Class Mathematics with a statistical significance of 5%.

Table 7: Percentage of Class 3 and 5 students achieving respective competencies, by school type

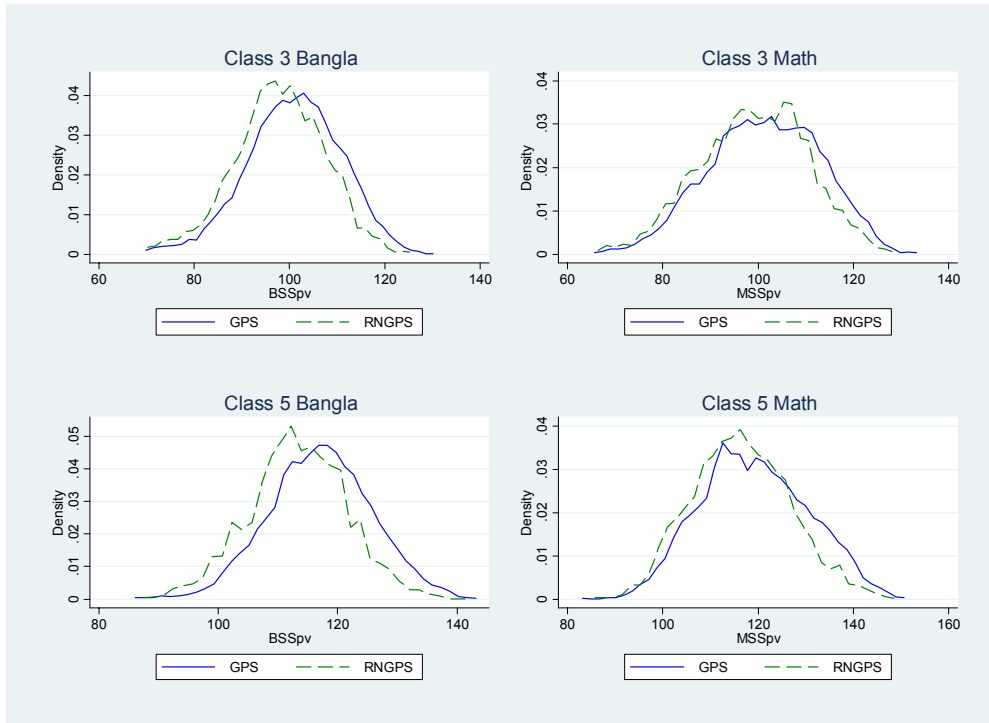
	Division	Class 3		Class 5	
		Bangla	Math	Bangla	Math
GPS	Barisal	69	54	27	34
	Chittagong	72	54	31	42
	Dhaka	76	58	29	35
	Khulna	68	46	28	34
	Rajshahi	65	43	24	29
	Sylhet	63	41	23	16
	Rangpur	63	49	31	40
	<i>Total</i>	<i>70</i>	<i>52</i>	<i>28</i>	<i>35</i>
RNGPS	Barisal	51	32	15	18
	Chittagong	65	58	9	38
	Dhaka	63	53	17	24
	Khulna	59	51	14	26
	Rajshahi	59	33	13	16
	Sylhet	42	18	15	8
	Rangpur	58	47	13	28
	<i>Total</i>	<i>59</i>	<i>45</i>	<i>14</i>	<i>25</i>

Source: Authors' analysis using NSA 2011

While the average score is higher in GPS than in RNGPS, performance inequality is larger in GPS.

In both Class 3 and Class 5 and in both Bangla and Mathematics, average scores are higher among the students in GPS (see details in Annex 1). However, distribution of scores or performance inequality is narrower among students in RNGPS. This finding tells that while average performance is generally higher among GPS students, gaps between best-performing and worst-performing students are wider among GPS students.

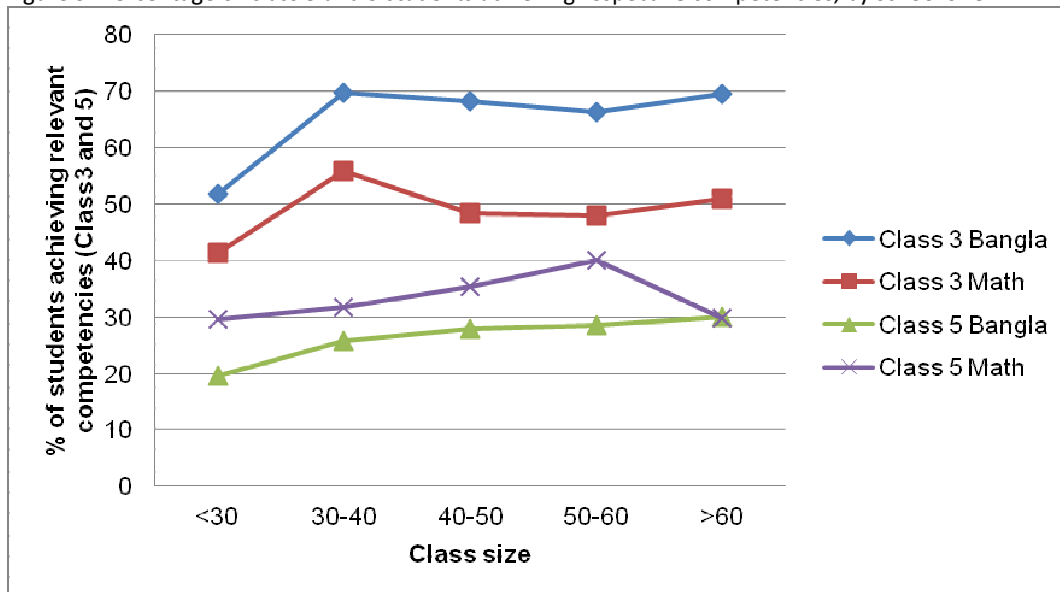
Figure 8: Distribution of Bangla and Mathematics scores in Class 3 and 5, by school type



Source: Authors' analysis using NSA 2011

Class size does not seem to have a significant impact on students' performance. While it is often discussed that an overcrowded classroom is a major obstacle to students' learning, no clear evidence is found in NSA 2011 about the effects of class size on students' learning.

Figure 9: Percentage of Class 3 and 5 students achieving respective competencies, by school size



Source: Authors' analysis using NSA 2011

Section 4: Summary of Key Findings

Nationally, students' achievement of competencies is improving and need more effort to achieve the satisfactory level. By the end of primary education cycle (i.e. at the end of Class 5), only one-quarters (25%) of students master Class 5 Bangla competencies, and one-thirds (33%) of students master Class 5 Mathematics competencies. The rest of students finish primary education with knowledge and competency that is short of expectations in the Bangla and Mathematics curriculum. In Class 3, two-thirds (67%) of students master Class 3 Bangla competencies by the end of Class 3 and half (50%) of students master Class 3 Mathematics competencies. This finding tells that a significant number of students are falling short of achieving relevant competencies at early grades of primary education.

There are very poorly performing students in both Class 3 and 5, who need urgent attention. In Class 3, while 21% and 14% of students perform higher than Class 3 competencies in Bangla and Mathematics, 6% and 18% of students in Bangla and Mathematics perform at well below Class 3 level. In Class 5, 18% and 34% of students in Bangla and Mathematics perform competencies of Class 3 or lower, implying that they are about 2 years behind in terms of cognitive development in these subjects. By comparing performance of Class 3 and Class 5, 20% of best performers in Class 3 perform better than bottom 20% of Class 5 students in Bangla and bottom 30% of Class 5 students in Mathematics. While a larger proportion of students acquire necessary competencies in Bangla than in Mathematics in Class 3, a larger proportion of students acquire competencies in Mathematics than in Bangla in Class 5.

Geographical variations in achievement are wide across divisions and between urban-rural areas. Percentage of students who master Class 5 Mathematics competencies ranges between 42% in Chittagong to 15% in Sylhet. Between urban and rural areas, urban students perform better in Bangla and rural students perform better in Mathematics on average.

Students in Government Primary Schools (GPS) perform better than students in Registered Non-Government Primary Schools (RNGPS). Large performance gaps between these school types are found in Barisal and Sylhet divisions. Performance gap is especially large in Bangla. In Class 5, 28% of GPS students acquire relevant Bangla competencies while only 14% of RNGPS students achieve it.

5.1 Annex 1: Descriptive Statistics for Classes 3 and 5 Test Results

Class 3

	Number of students	Bangla			Mathematics		
		Average Score	Standard Error	Standard Deviation	Average Score	Standard Error	Standard Deviation
Total	17615	100.2	0.07	9.82	100.8	0.09	11.62
Division							
Barisal	1259	99.4	0.26	9.08	100.6	0.31	10.90
Chittagong	3715	101.2	0.17	10.17	102.2	0.20	11.99
Dhaka	5161	101.7	0.13	9.25	102.2	0.15	10.99
Khulna	1901	99.6	0.22	9.59	100.2	0.26	11.30
Rajshahi	2186	99.0	0.21	9.83	98.5	0.25	11.72
Sylhet	1340	97.9	0.29	10.54	96.9	0.32	11.61
Rangpur	2028	98.7	0.22	9.97	100.1	0.27	12.06
Urban-Rural							
Urban	3002	100.8	0.17	9.34	99.4	0.20	10.71
Rural	14588	100.1	0.08	9.91	101.0	0.10	11.79
School Type							
RNGPS	4292	97.9	0.14	9.42	99.0	0.17	11.24
GPS	13323	101.0	0.09	9.83	101.3	0.10	11.68
Class 3 Class-size							
less than 30 cla	1364	96.9	0.28	10.25	98.3	0.32	11.69
30-40 class size	3342	100.8	0.17	9.74	102.2	0.20	11.75
40-50 class size	3264	100.4	0.17	9.61	100.4	0.20	11.28
50-60 class size	3494	100.2	0.17	9.98	100.3	0.20	11.83
60+ class size	6126	100.7	0.12	9.65	101.0	0.15	11.49

Class 5

	Number of students	Bangla			Mathematics		
		Average Score	Standard Error	Standard Deviation	Average Score	Standard Error	Standard Deviation
Total	13854	116.2	0.07	8.69	118.6	0.09	11.14
Division							
Barisal	937	115.9	0.27	8.37	117.6	0.35	10.82
Chittagong	2977	116.8	0.16	8.86	121.4	0.21	11.44
Dhaka	4039	116.5	0.14	8.74	119.0	0.17	10.93
Khulna	1536	116.1	0.23	9.00	118.3	0.29	11.14
Rajshahi	1740	115.5	0.20	8.34	116.6	0.25	10.32
Sylhet	1041	115.0	0.27	8.86	112.8	0.30	9.56
Rangpur	1564	116.4	0.21	8.22	119.1	0.28	11.19
Urban-Rural							
Urban	2440	117.9	0.18	8.69	118.1	0.22	10.73
Rural	11394	115.9	0.08	8.65	118.7	0.11	11.22
School Type							
RNGPS	3179	113.3	0.15	8.20	116.4	0.18	10.28
GPS	10675	117.1	0.08	8.64	119.2	0.11	11.31
Class 5 class-size							
less than 30 cla	4532	114.9	0.13	8.75	117.5	0.16	11.07
30-40 class size	3242	116.3	0.15	8.54	119.0	0.19	10.64
40-50 class size	2323	117.2	0.17	8.30	119.2	0.22	10.66
50-60 class size	1971	117.2	0.20	8.91	120.7	0.28	12.13
60+ class size	1766	117.2	0.21	8.63	117.7	0.27	11.27

Section 5

5.2 References

ACER (The Australian Council for Educational Research). 2012. *2011 National Student Assessment Grades 3 & 5. Revised report*. June 2012.

ACER (The Australian Council for Educational Research). 2012. *Analysis of the National Assessment of Pupils of Grades 3 & 5, 2011. Draft Technical Report*.

ADSL (Associates for Development Services Limited). 2009. *National Assessment of Pupils of Grades 3 & 5, 2008. Final Report*.