National ASSESSMENT findings 2007

Contents

NEAS Main Findings Grade 8

National Education Assessment System (NEAS) conducted national large scale assessment of grade 8 students in the subjects of mathematics and languages (urdu and sindhi) in April 2007. This was the first national assessment of grade 8 students in Pakistan and was conducted as per Project Implementation Plan (PIP) based on Project Appraisal Document (PAD).

Grade 8 level being the terminal stage of elementary education, is considered to be the internationally desired population for national assessment. Like other international assessments (TIMSS, SACMEQ, PISA, PIRLS) measurement scale used for students' achievements by NEAS is 0-1000 with scaled mean score of 500 and standard deviation of 100. Other grades (4, 5, 6) are also assessed in these international assessment studies.

Results for the 2007 National Assessment show that the average score of grade 8 students are below the average mean score of 500 in the subject of mathematics (458) and slightly higher in language (512).

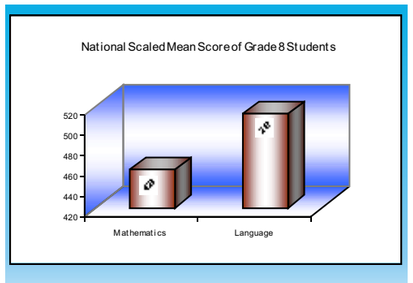

Figure 1: An overview of Scaled Mean Score of National Assessment 2007

In the mathematics test only 25% of the students scored greater than the scaled mean score of 500.

In the language (urdu and sindhi) test 58% of the students scored greater than the set scaled mean score of 500.

NEAS FINDINGS

In this document only statistically significant results are being reported.

It should be noted that every test score has a standard error - a range of points plus or minus the reported score. This accounts for a score fluctuation due to a possible sampling error and measurement error.

These national assessment results are important as they provide empirical evidence of the "health" of the education system.

All stakeholders interested in improving the quality of education in Pakistan are invited to review the information in the light of their own ground realities/experiences, and send these comments to Prof. S. Kamal-ud-Din, Country Coordinator NEAS, Ministry of Education, at the address/contact numbers given at the end of this booklet.

Teachers' subject knowledge in relation to age, experience, qualifications and student learning achievement

- Low association exists between teachers' subject knowledge and students' achievement score both in mathematics and language.
- Association of female rural teachers' subject knowledge in relation to student achievement score is highly better than male teachers' subject knowledge in relation to student achievement score.
- Association of female urban teachers' subject knowledge in relation to student achievement score is quite better than male teachers' subject knowledge in relation to student achievement score.
- Correlation of teachers' subject knowledge who were less than 25 years of age in relation to the student achievement score is better than the teachers who were 25 years of age.
- Correlation of teachers subject knowledge who have academic qualification higher than masters in relation to the student achievement score is better than those teachers who have lesser qualification.
- Correlation of teachers subject knowledge who have the professional qualification of PTC, in relation to student achievement score is better than those teachers who have other professional qualification.
- Low association exists between teachers' subject knowledge and students' achievement score in relation to teaching experience.

NEAS team and key stakeholders with
Mr. Shahid Ahmed, Additional Secretary, Ministry of Education.

National Education Assessment System
Government of Pakistan, Ministry of Education
For more information:
Call: +(92-51) 4445931, 4446875 Fax: +(92-51) 9257188
E-mail: neas_moe05Whotmail.com
Website: http://www.neas.gov.pk

NEAS Assessment Instruments

Based on national curriculum, the NEAS tests for mathematics and language covered a broad range of competencies required at grade 8 level in both the subjects. These tests were developed by national and provincial subject experts through extensive collaboration in the test development workshops conducted at NEAS and in provinces/ areas. Test development guidelines were provided by international consultants of NEAS. Tests were developed according to the assessment frameworks reflecting the required competencies of each subject, mathematics and languages. The tests were piloted and extensively reviewed for content relevance, ability coverage, and reliability. The tests were assembled in such a way that each version contained different items of various cognitive abilities in different orders but a few common items were also included in each version to equate assessment results of two forms/booklets of instruments. Two parallel forms/booklets for mathematics and two parallel forms/booklets for language(urdu and sindhi) were administered to prevent student cheating. The following are the assessments in each subject according to the subject assessment frameworks.

Mathematics	Language
Mathematical content ■ Number sense, properties and operations ■ Measurement, geometry, spatial sense ■ Information handling ■ Algebra and functions **Mathematical Abilities** ■ Conceptual understanding ■ Procedural Knowledge ■ Problem solving	**Context for reading, i.e.** Reading for literary experience, Information, and to perform a task **Aspects of reading, i.e.** Forming a general understanding, developing interpretation, making reader text connections, and examining structure and content, knowledge of language and vocabulary **Writing** Narrative writing, Informative writing, persuasive writing

Table 1: Brief introduction of NEAS Assessments Frameworks

The NEAS Sample

Across the nation 15260 students from 770 Government schools participated in this national assessment. Two stage random stratified cluster samples were selected. In the first stage, schools were selected from four provinces and four areas, while in the second stage students were randomly selected from these schools. The sample was adequately representative of the population and reflected the diversity across the nation. Participation rate at both the students (93%) and all school levels (99%) was remarkably better than previous national assessments conducted by NEAS for grade 4 students (92%) and schools (70%) in 2006.

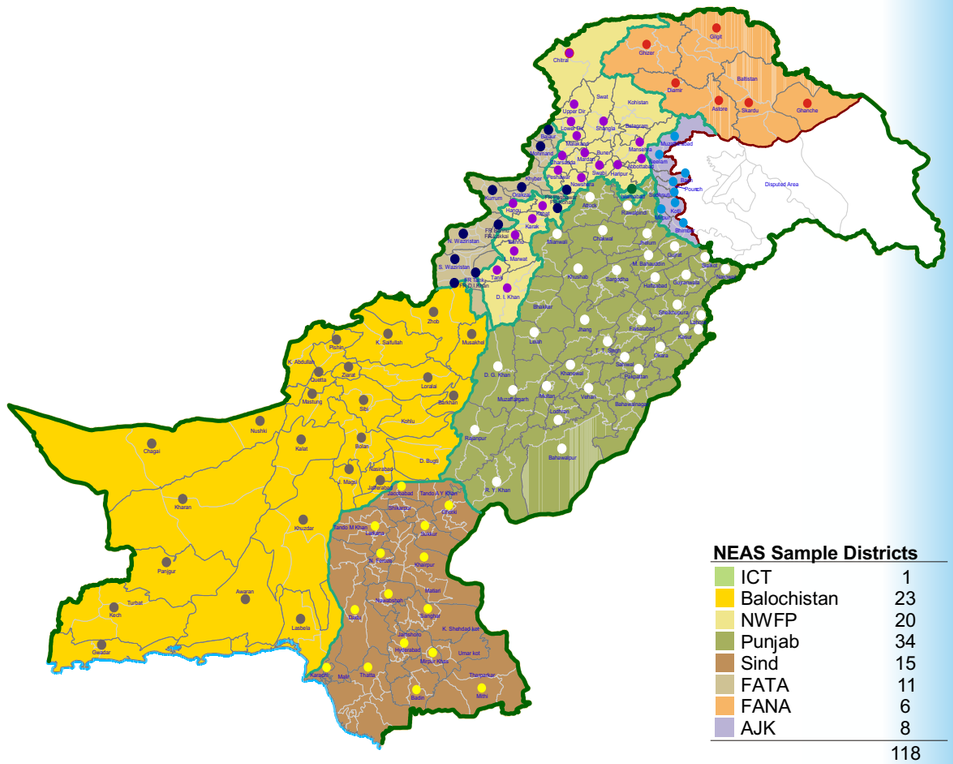

Figure 2: NEAS Sample Map – Dots on map show sample districts across the country

Main features of NEAS sample

The sample includes explicit strata:

- gender: male and female
- location: urban and rural
- province/area: four provinces and four areas

- The basic sampling frames were taken from the National Education Management Information System (NEMIS) database.
- Within strata all schools were included, with selection probability proportional to size (PPS).
- A maximum of 20 and minimum 6 students were selected from each school.

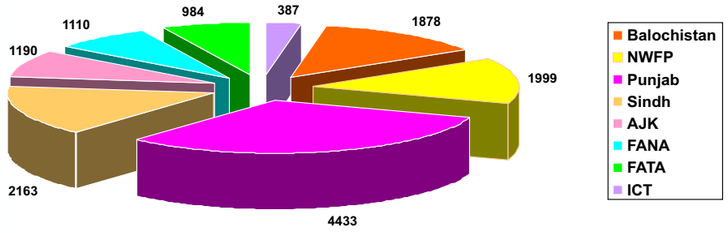

Figure 3: National Sample of Students

- from schools which had more than 20 students or more than one section of grade 8, the students were selected randomly according to the Random Number Table, provided to the Test Administrators. The random number table was especially designed for the selection of students within a school, in order to assess students from all ability levels.
- in some rural areas, up to 2% of students in the smallest schools were eliminated from frames, and 10% additional schools were sampled.

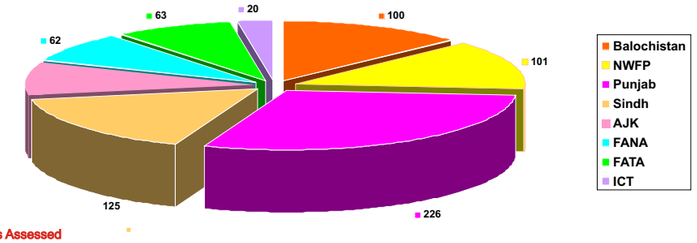

Figure 4: Number of Schools Assessed

Background Questionnaires

Along with the subject tests, NEAS also administered a broad array of questionnaires to collect data on the educational context for student achievement. The questionnaires included expert input regarding the structuring and nature of questions to make them more useful for policy planners. The students answered questions related to their attitudes towards the NEAS tested subjects, their academic self-concept, classroom activities, co-curricular activities, home background, and out-of-school activities. Parents answered questions regarding their education, occupation, and their children's in-house activities. They also answered questions about the performance of the teachers who taught their children at school. The subject teachers of the sampled students also responded to questions about teaching on the topics in the curriculum documents, their instructional practices, professional training and education, and their views on mathematics and language tests. The heads of schools responded to questions about school staffing and resources, school infrastructure, facilities, and teacher support.

Test Administration Training and Data Collection

Each participating Province/Area was responsible for carrying out all aspects of data collection, using standardized procedures developed for the assessment. The preliminary strategy for conducting national testing involved the selection of Lead Master Trainers (LMTs) from various educational institutions. These LMTs received training at NEAS Islamabad with a view to prepare more Test Administrators (TAs) in their respective provinces/areas. Training manuals (Test Administrator's Guidelines and Test Administrator's File) were developed for LMTs, test administrators at NEAS and team of test administrators in provinces /areas. During the national and Provincial Area workshops, procedures for receipt and distribution of materials as well as for the activities related to the testing sessions were also explained along with demonstration. The training manuals covered procedures for test security, standardized instructions to regulate directions and timing, rules for answering test items practice items to be solved before the start of

achievement test and steps to ensure that identification on the test booklets and questionnaires corresponded to the information on the sheets used to track students.

Approximately 1652 test administrators were trained all over Pakistan to administer the NEAS assessment instruments. Each Province/Area was responsible for conducting quality control procedures during test administration. In addition, NEAS selected various personnel to monitor testing activity and compliance with standardized procedures. Provinces/ partnering institution of NEAS were asked to nominate one or more persons not directly related with the provincial center to serve as quality control monitors for test administration. In all, about 55 quality control monitors drawn from the provinces areas and partnering institutions participated in national assessment.

Administration of National Assessment

The Test Administrators were responsible for administering the tests and background questionnaires. Specific responsibilities for test administration were described in the NEAS 2007 Test Administrator's Guidelines and Test Administrator's File.

Test administrators were also responsible for returning both used and unused test booklets/materials to their respective province/area assessment centers. For each participating school, the test booklets and student questionnaires were collated with the teacher questionnaires, the head teacher questionnaire, and the materials prepared for Test Administrators, and were sent to the respective province/area assessment centers.

For quality assurance, administration of the national assessment was monitored across the country. The main objective of monitoring was to ensure the validity of the National Assessment 2007 data. It is important that all aspects of national assessment are standardized, including the administration of the assessment instruments. The monitors consisted of the Test Administration Specialists, Subject Specialists, Test Development Specialists, Coordinators, Directors, LMTs from NEAS, Provincial Education Assessment Centres (PEACEs) and Area Education Assessment Centres (AEACEs), experts from Policy and Planning Wing, Planning Division, Monitoring Cell of the Ministry of Education, Federal College of Education, Federal Directorate of Education, Institutes of Education and Research and Allama Iqbal Open University. The monitors monitored the assessment activity and reported back to NEAS on how well the test administrators followed the guidelines given during the test administration training on specific monitoring proformas. Two types of monitoring proformas were designed, one brief proforma for the high officials and a detailed proforma for the experts. Designated monitors filled up the structured proforma, which was specially designed for the monitoring of National Assessment-2007. Based on the observations and recommendations of the monitoring teams, a separate report has also been prepared for improvement of test administrators' training, test administration, logistic of systematic shifting of data from the field and its management at provincial/area assessment centers.

Marking and Coding of the Assessment Instruments

For National Assessment 2007, marking and coding methodologies were developed by the Subject Specialists for each subject including developing rubrics for the constructed response items (language only). For the constructed response items exemplars of the correct answers were provided to the markers and coders and agreement was reached as to what was acceptable for a mark to be allocated.

Coding sheets for each subject were further developed, using the excel program. Each possible answer was given a specific code. The markers did not mark questions right or wrong. For multiple choice questions (MCQs), if the first possible answer was chosen a code of 1 was given; for answer 2 a code of 2 was given; for answer 3 a code of 3 was given for answer 4 a code of 4 was given. Where a student had not answered a code of 8 was given and where a student has not yet reached the question a code of 9 was given. Guidelines were prepared for all the marking and coding to be carried out in a standardized way.

The PEACEs and AEACEs hired appropriate personnel for the manual marking and coding of the language test booklets in their provinces and areas. The markers and coders were instructed on how to enter the data on the coding sheets before the start of the marking and coding process. The subject experts of NEAS, PEACEs, AEACEs and Assessment Training Centre (ATC) were involved in the monitoring of this activity i.e. checking 25% of the data. Checking the data involved taking every sheet and checking five out of the 20 students on each sheet. This was an onerous task. Where mistakes were found, the markers and coders employed were asked to recheck their sheets and correct the mistakes.

Students' Achievement in National Assessment

To summarize and describe student achievement on the mathematics and language tests, the same scale as previous, for grade 4 national assessments was used. The mean was set at 500 with a standard deviation (SD) of 100 (an international standard used by several international assessments and computer adaptive tests). The raw scores were rescaled based on Item Response Theory (IRT) calibrations centering person abilities on the average item difficulty, in order to have a statement on how well the group performed in relation to the desired level of achievement. This procedure not only gives information on distribution of scores but also provides an indicator of adequacy of average performance.

The Language Achievement Score

The results on language achievement revealed that scores on urdu test for nation are slightly above (512) the set mean of 500. Scores were significantly high on reading as compared to other domains of language tested (grammar and writing). Students got the lowest scores on writing domain. Very few students were able to structure the task according to the set criteria on writing domain.

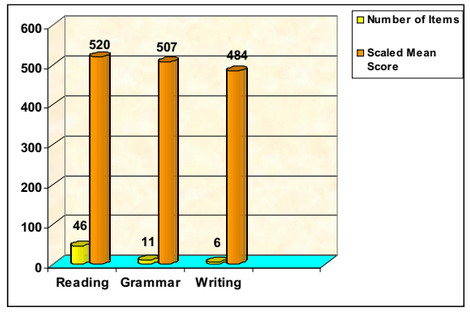

Figure 5: Graphic presentation of scaled mean score of Language domains

Sub-test	Number of Items	Scaled Mean Score
Reading	46	520
Grammar	11	507
Writing	6	484
Language Total	63	512
Difference		Total vs. Reading Total vs. Grammar Total vs. Writing

Table 2: An overview of Language domains' achievement scores

Sindhi and Urdu Medium Students Scores in Sindh

In Sindh the tests were administered in Sindhi for Sindhi medium schools and in Urdu for Urdu medium schools. Comparable Sindhi translated versions of the national tests were prepared with the consultation of bilingual expert. The results indicated that there was no significant difference in the performance of Urdu vs. Sindhi medium schools in both the tests.

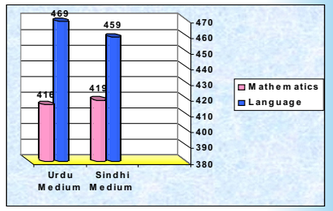

Figure 6: Students' achievement in Urdu and Sindhi medium schools

The Mathematics Achievement Score

On mathematics achievement the scaled mean score (458) was below the set scaled mean scale of 500. Similarly, the scaled mean scores were below the set scaled mean of content domains (number sense, algebra, and geometry). In information handling the students scored slightly higher than the scaled mean score.

Contents	Number of Items	Scaled Mean Score
Number Sense	24	455
Algebra	15	453
Information Handling	04	461
Geometry	13	451
Mathematics Total	56	458
Difference significant		Total vs all Contents

Table 3: An overview of Mathematics domains' achievement scores

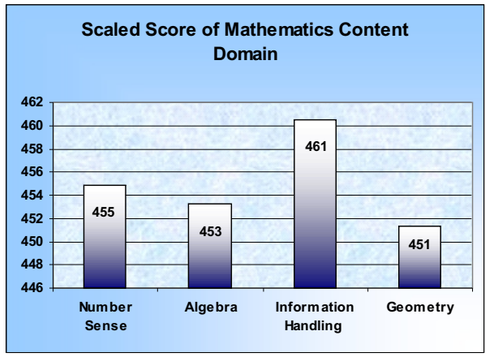

Figure 7: An overview of Mathematics content domains' scores

Students' scores in Mathematics were below 500 on all three cognitive domains with no significant difference across them

Gender Wise Performance on Language and Mathematics Subjects

The trend in gender-wise performance on language test seems to be consistent with the previous national assessments at grade 4 level. Girls performed significantly better on language test whereas boys performed significantly better on Mathematics test.

Gender	%	Language	Mathematics
Boys	63	503	520
Girls	37	529	507
Difference		Significant	Significant

Table 4: Gender performance on Language and Mathematics

Both the genders have consistent performance on Language in NAT 2006 and 2007

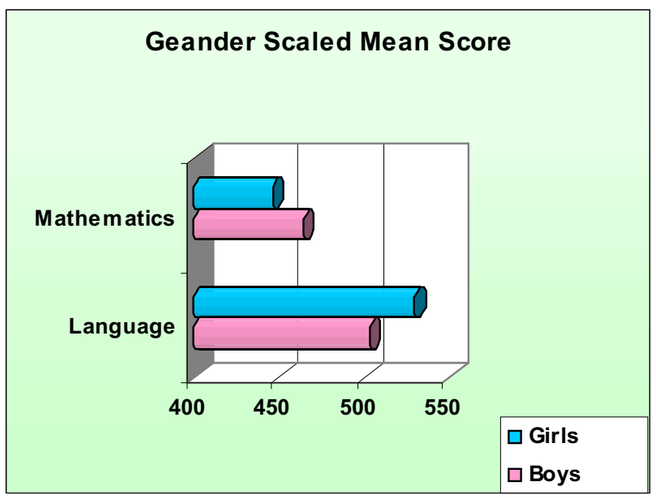

Figure 8: An overview of gender performance on Mathematics and Language scaled mean scores

Girls' schools performed significantly better on language test as compared to boys' schools. There was no significant difference between girls' and mixed schools on language test. Boys' schools performed significantly better on mathematics test as compared to girls schools .There was no significant difference between boys and mixed schools on mathematics test.

School Gender	%	Mathematics	Language
Boys	49	463	368
Girls	45	446	394
Mixed	06	470	403
Difference No-Sig. Difference		Boys vs. Girls	Girls vs. Boy
		Girls vs. Mixed	

Table 5: An impact of school gender on Language and Mathematics scores

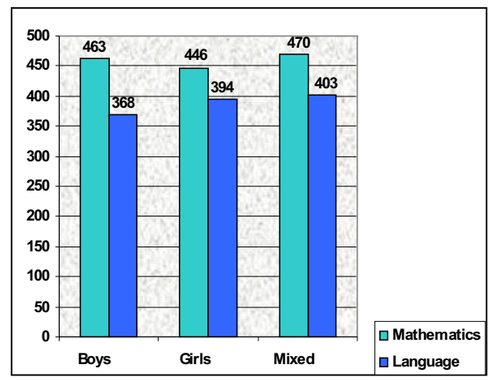

Figure 9: Graphic comparison of administrative gender of school and learning achievement

Middle age and above teachers contribute significantly better in learning achievement than the younger ones

Location-wise Achievement Scores

There were significant differences in the achievement of rural and urban students on mathematics and language tests. Students in rural schools performed significantly better on mathematics test whereas urban students scored significantly high on urdu test.

Location	%	Mathematics	Language
Rural	58	471	503
Urban	42	439	525
Difference		Significant	Significant

Table 6: An impact of location on Mathematics and Language scores

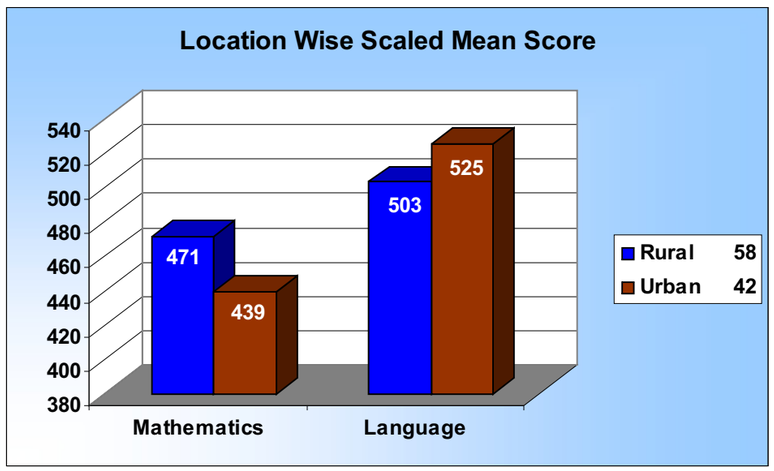

Figure 10: Graphic comparison of location of school and learning achievement

School Facilities in the NEAS selected Schools

About 40% students are in schools which have a “high” standard of physical facilities (i.e. all six of school building, furniture, electricity supply, water supply, boundary wall, fans and toilets). Another 46% students in schools which have a “medium” level (two or three of them) and only 14% students in schools which have a “low” level of physical facilities (only one or two). An increase in the level of physical facilities is associated with a higher level of learning achievement in language, but not in mathematics.

Options	%	Mathematics	Language
Low	14	448	486
Medium	46	461	508
High	40	457	527
Difference		Non Significant	Significant

Table 7: An impact of physical facilities on learning achievement

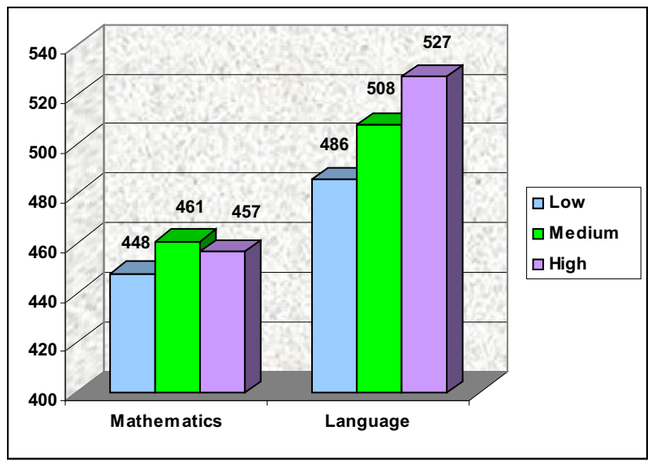

Figure 11: Graphic comparison of physical facilities and learning achievement

Boys' schools were more likely to have usable and adequate playgrounds as compared to girls and mixed schools. Girls' schools had better boundary wall facilities.

Administrative Gender	Adequate and usable Facility				
	Play ground %	Boundary wall %	Water %	Electricity%	Fan%
Boys	26	30	48	51	41
Girls	13	27	31	31	28
Mixed	01	01	02	41	01

Table 8: An overview of availability of physical facilities at schools

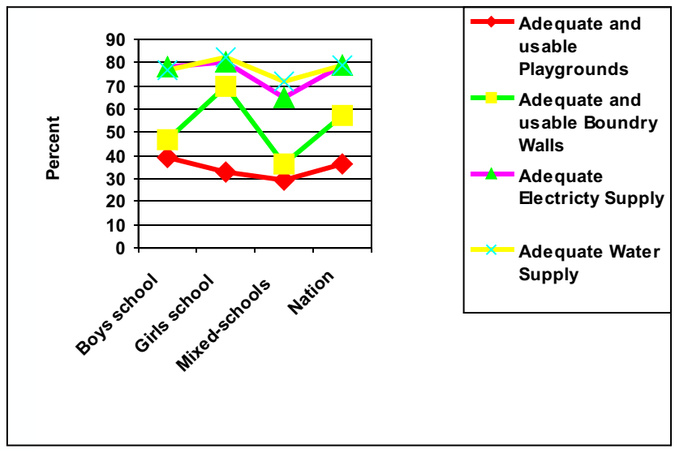

Figure 12: Graphic presentation of physical facilities at schools vs administrative gender

Availability of Usable Toilets

The number of students per usable toilet is generally high. Less than 3% students attend schools where there is at least one usable toilet per 40 students; three-quarters or more attend schools where there are at least 100 students per usable toilet. Students' performance is significantly better than those where no usable toilets reported for students. This reveals that number of students per usable toilet is associated with learning achievement; in fact, if anything, the larger the number of students per usable toilet, the higher the level of learning achievement. Urban schools are better supplied with 4 % more toilet facility than rural schools. There is no discrimination noticed regarding toilet facility in terms of gender

Usable toilets	%	Mathematics	Language
Up to 40 Students	03	445	469
41 to 100 Students	17	468	506
More than 100 Students	77	462	523
No Unusable Toilets	03	438	495
Difference		Sig.	Sig.

Table 9: An overview of scaled mean score with reference to availability of usable toilets

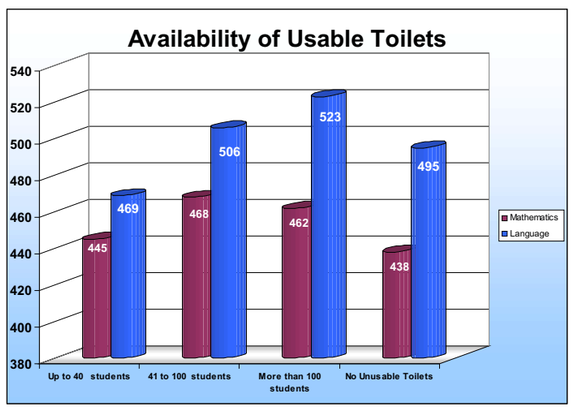

Figure 13: An impact of availability of usable toilets on learning achievements

'Reading' scores are significantly higher as compared to other domains of language

Gender and Location wise Availability of Toilets

Boys have 20% more usable toilets than those girls have. In urban areas students have 8% less facilities of usable toilets than in rural areas.

No. of usable Toilets for students			
Gender %		Location %	
Boy	Girl	Rural	Urban
60	40	54	46

Table 10: Gender and location wise availability of toilets

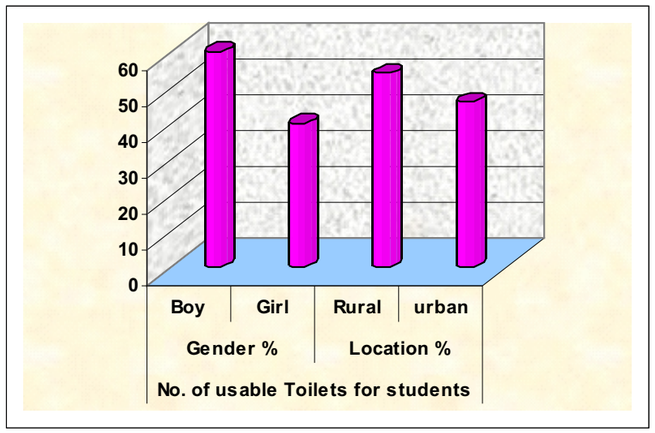

Figure 14: Graphic presentation of gender and location wise availability of toilets

78% schools did not have National Curriculum Document with them

Supply of Free Textbooks by the Government

Less than 30% schools across the nation reported to have free books from the government. Mixed schools were more likely to get free books from the government as compared to girls' or boys' schools for one year only.

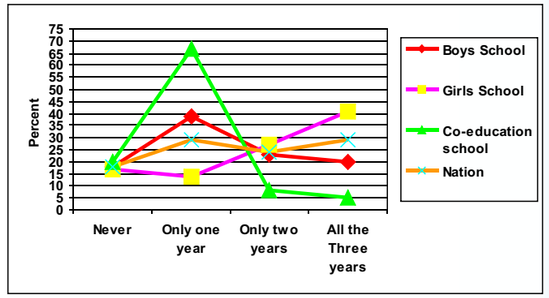

Figure 15: Graphic presentation of supply of free textbooks

Availability of the National Curriculum Document

Less than 20% schools reported availability of the national curriculum document of the Ministry of Education in either subject. The performance of students is significantly better for both mathematics and language whose teacher reported availability of curriculum document in school.

Curriculum Document	%	Mathematics	Language
Yes	22	467	524
No	78	456	510
Difference		Sig.	Sig.

Table 11: An overview of scaled mean score with reference to availability of curriculum documents

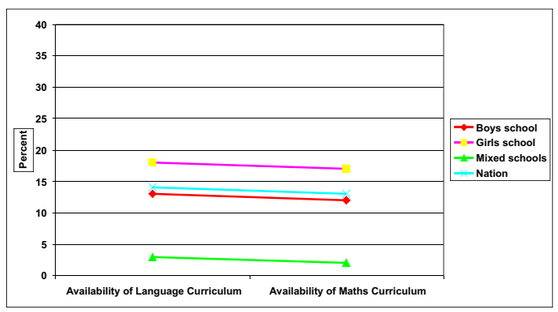

Figure 16: An overview of availability of national curriculum document at schools

Teaching Resources in the NEAS Tested Schools

Only about 16% of students are in schools which have a “High” level of facilities to support learning (i.e., library, books in the library, a science laboratory and a playground). About 44% students are in schools which have either none of these four features, or only one (“Low” level of facilities). The remaining 40% students are in the schools with two or three of the four facilities. A low level of facilities to support learning is associated with lower learning achievement in language, but not in mathematics; the difference between a “medium” and a “high” level of facilities is not associated with any significant difference in learning achievement.

Teaching Resources	Mathematics	Language
Low	461	504
Medium	461	529
High	461	549
Total	Non Significant	Significant

Table 12: An overview of scaled mean score with reference to categories of teaching resources

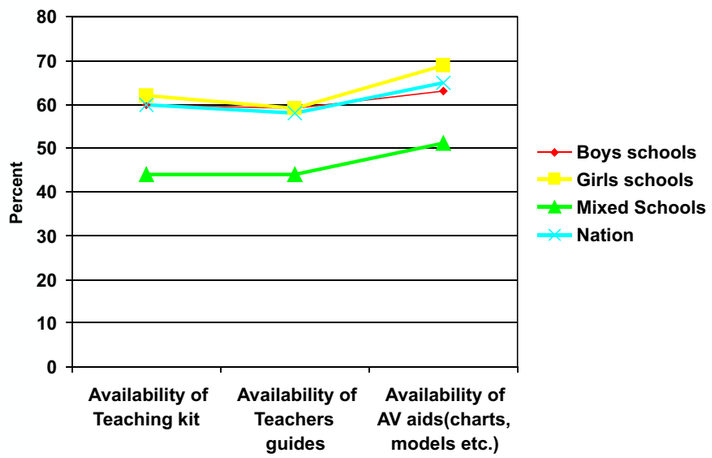

Figure 17: An Overview of Facilities to Support Learning

PTA/ SMC/PTSMC in School: Head Teachers' Report

- Around 80% head teachers reported presence of parent association (PTA)/ school management committees (SMC's)/parent teacher school management committees (PTSMC's) in school.
- Presence, need, funding, or role of PTA/SMC/PTSMC's did not increase students performance in any of the NEAS tested school.
- Only 39% head teachers reported getting funds from Government.
- 97% head teachers reported need for PTA/SMC/PTSMC's in schools.

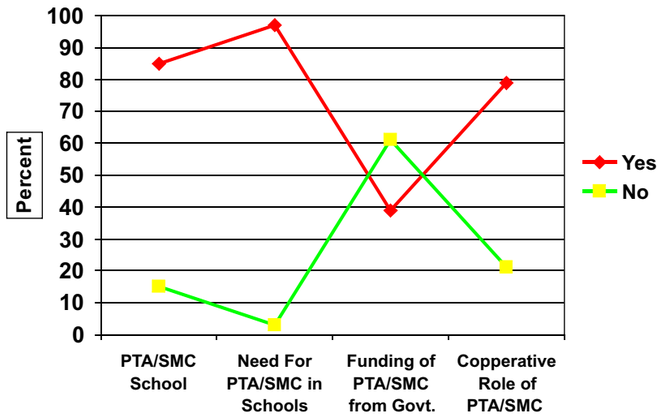

Figure 18: Graphic presentation of PTA/SMC/PTSMC at schools

Rewards and Punishment in School

- 87% students reported getting rewards for good performance.
- Rewarding students' performance increased achievement in both the subjects.
- Only 3% students reported that they were never punished in school.

Time Spent on Home Work and Achievement

- Greater length of time spent on home work did not increase performance.
- 85% students reported they spend up to 30 minutes on mathematics homework.
- 82% students reported they spend up to 30 minutes on language homework.
- In mathematics test students who reported spending less time on homework performed significantly better.

Option	Language	Mathematics
Less than 15 minutes	471	439
15-30 minutes	516	463
31-60 minutes	507	444
More than 60 minutes	516	443
Difference	less than 15 min vs 15-30,31-60,more than 60 minutes 15-30 vs 31-60	less than 15 min vs 15-30 15-30 vs 31-60,more than 60 minutes

Table 13: An impact of time spent on homework vs achievement

The Study Resources at Home

The resources at home for study were listed as calculator, desk, dictionary, atlas and books. A “low” level of resources is defined as having one of these five items, or none. A “medium” level is defined as having two or three of them, and a “high” level of resources is defined as having four or five. In language, there is a significant positive association between the levels of resources at home to support study; but in mathematics, no association is apparent.

Tutoring and Achievement

Outside School Tutoring and Achievement

14% students reported daily extra lessons in mathematics. This percentage was slightly higher for language. High frequency of extra lessons was not associated with better performance in either subject.

Tuition Taken	Mathematics	%	Language	%
Almost never	465	27	523	40
Once or twice a week	459	59	502	41
Daily	451	14	519	19
Difference	Non Significant		Significant	

Table 14: An impact of tuition taken on learning achievement

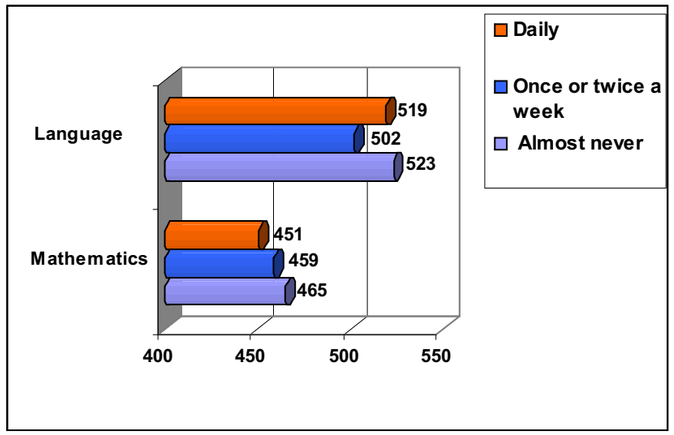

Figure 19: Graphic presentation of tutoring impact on achievement

Least multi-grade teaching enhances performance of both students and teachers

Tutorial Support at Home

Tutorial support at home was reported to have come from the family, from a tutor, or both. Most students reported having some form of support; about 62% reported having support from both family and tutor; less than 3% reported having support from neither. There is no significant association between tutorial support and measured learning achievement.

Tutorial Support	Mathematics	Language
None	453	520
Either tutor or family member	467	522
Both tutor and family member	457	515
Difference	Non Significant	Non Significant

Table 15: An impact of tutorial support on learning achievement

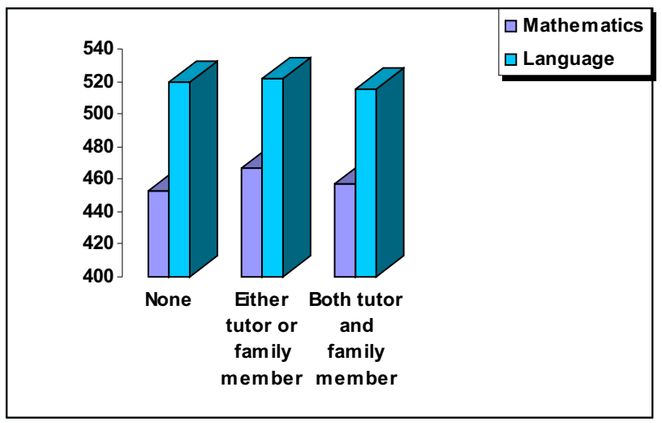

Figure 20: Graphic comparison of tutorial support at home and learning achievement

Parental Education, Occupation and Achievement

There is no clear relationship between parental education or occupation and student learning achievement. This may be partly due to the very low levels of education, especially amongst mothers, where about 58% of all mothers were reported not to have completed class V, and 27% to have completed only class V. Maternal occupation was almost a non-issue. 92% of students for whom maternal occupation was reported had mothers who were housewives.

Father's Education	Mathematics	Language
Illiterate	457	501
Completed primary school	459	509
Matriculate (class X passed)	464	523
Intermediate (class XII passed)	457	532
Higher Education	451	523
Difference	Illiterate vs Higher education	Illiterate vs completed primary school, matric, inter Illiterate vs Higher education Primary vs matric, intermediate Matric vs intermediate

Table 16: An impact of father's education on scaled mean scores

Multi-grade Teaching and Achievement

- 22% teachers reported they have to teach more than one classes in one period.
- Students, of those teachers who do not teach multi-grades at one time, have performed significantly better.
- Lower frequency of multi-grade teaching is linked with increased performance for both students and teachers.

Options	%	Mathematics	Language
Yes	22	439	493
No	78	462	520
Difference		Significant	Significant

Table 16: An impact of multi-grade teaching on scaled mean scores