

Working Paper No. 134
June, 2014

**Classroom Process, Teacher Ability and Student
Performance: Evidence from School based Component
of Young Lives in Undivided Andhra Pradesh**

**S. Galab
P. Prudhvikar Reddy
V. N. Reddy**



CENTRE FOR ECONOMIC AND SOCIAL STUDIES
Begumpet, Hyderabad-500016

Classroom Process, Teacher Ability and Student Performance: Evidence from School based Component of Young Lives in Undivided Andhra Pradesh

S. Galab, P. Prudhvikar Reddy and V. N. Reddy¹

Abstract

There is ample evidence in the existing literature to show increased enrolment in school but mere achieving universalization of education in terms of enrolment may not be sufficient; rather there is a need for the completion of primary education with quality. Understanding the classroom processes is vital for improving the quality of education. It is thus crucial to critically examine the teaching-learning processes and the activities of teachers and children in the classrooms and in the schools for a comprehensive understanding of the quality of education. The interaction of the teachers and students, attitude of the children towards schooling, presence and absence of teachers in the prescribed class hours, and the activities of teachers and students during the teaching hours is vital in the learning process. But unfortunately and for many reasons, there is very limited evidence on these issues and the present study tries to fill this gap with the help of school based component of young lives study in the undivided Andhra Pradesh.

¹ First and second authors are working with Centre for Economic and Social Studies, Hyderabad and the third author is working at IBS (IFHE), Hyderabad

Introduction

It is well recognized that education in terms of both formal schooling and numerous informal contexts for learning has emerged as the most significant part of children's lives. It is also imperative to assess the classroom process, teaching and learning in consistence with the aspirations of Education for All. School-based data as a part of young lives study has potential to answer most of the issues stated about children's primary education. This study presents the situation of 2010-11 coinciding the year of implementation of Right to Education (RTE) act and serves as a baseline of RTE covering important issues in the act.

There is ample evidence in the existing literature to show that there is substantial increase in the enrollment of children (both boys and girls) at the primary level due to concerted efforts by both at national and international levels. The NSSO 68th round data on employment and unemployment indicates that at All India (also in undivided Andhra Pradesh), enrollment numbers remain very high i.e. over 96% of all children in the age group 6 to 14 years are enrolled in schools. The District Information System for Education (DISE) data on school enrollment, Annual Status of Education Report (ASER) 2012 and Young lives study (2013) indicate that at the all India level private school enrollment has been increasing steadily since 2006. Evidence clearly indicates faster growth of low fee private schools in the recent past due to cynicism with the quality and functioning of the government schools coupled with overall economic development (Pratham, 2012 and Woodhead et al, 2013). The positive effect is substantial increase in the enrollment rate at primary level².

Mere achieving universal primary education in terms of enrolment may not be sufficient; rather there is need for the completion of primary education with quality. ASER reports year after year based on schools in rural areas show that reading levels of primary school children continue to be a cause for serious concern (ASER 2012). Analysis of District Information System for Education (DISE) data on facilities in Primary and Upper Primary Schools in India by National University of Educational Planning and Administration (NUEPA) indicates that many schools in the country are still not equipped with basic facilities. In addition to infrastructure, there is inadequate literature especially in the Indian context on the classroom and learning process, assessment of

² Also see Galab et al, "Primary Schooling in Andhra Pradesh: Evidence from Young Lives School Based Component" CESS Monograph No.30, May 2013; and also CESS MDG report 2014, forthcoming.

ability of teacher, children's attitude to school and children's experience of school which will have major impact on the performance of the children and the present study fill this gap.

Though many changes witnessed in education - widespread of private players and grounding of many government programmes to improve access and quality of education, we could not achieve improvement in quality of education both in government and private schools. This raises the need for some controls even in the case of the private schools with a vision; otherwise mushrooming of institutions may result in producing low quality of education.

Scholars differed on schooling and learning since long. For instance, Tagore in the year 1906 opined that there is lack of connection between what we learn in school and what we get in the environment we live, and the schools became "machine-schools". But, Dewey observed that schools foster social solidarity and serve as a critical "social intelligence" (see Mooij and Mujumdar 2009 for more details). He also agreed mere formal education may become bookish and there is need for relation between what we learn in the school and the actual life experience. Protagonists of *right to basic education for all*, consider school education as a condition for positive social change.

It is crucial to critically examine the teaching-learning processes and the activities of teachers and children in the classrooms and in the schools for a comprehensive understanding of the quality of education. The interaction of the teachers and students, between the students, presence and absence of teachers in the prescribed class hours, and the activities of teachers and students during the teaching hours is vital in the learning process. But unfortunately and for many reasons, this area has very limited evidence on what is happening in the classrooms which is very vital for assessing the quality of schooling.

Against this backdrop, this study attempts to examine children's attitude to school and their experience of school, performance of children, mathematical ability of teachers and classroom process, as all these have bearing on the quality of education and the present study tries to fill the research gap and is confined to the state of Andhra Pradesh. The study mainly based on the school based component of Young Lives - an international study on childhood poverty which was started in 2001 with the goal of providing evidence for the reduction of childhood poverty³.

³ See Young Lives web site for more details and also CESS Monograph-30 titled "Primary Schooling in Andhra Pradesh. May 2013" by the same authors

Objectives

The specific objectives of the present study in examining various issues in Andhra Pradesh across rural and urban areas and by type of school are as follows:

- i) To assess the primary school children's attitudes to schooling and their experience of school
- ii) To examine the performance of children in numeracy, mathematics and in languages
- iii) To study the Teacher evaluation of student responses in mathematics i.e. an assessment of teacher ability and
- iv) To appraise the processes in classroom, observation of teachers and students

Methodology

Young Lives is largely a household survey based study with limited information on education. As a part of it a systematic school-based data on individual children were collected. The entire sample design is centered on the cohort of younger children⁴. The process of sampling of the schools prepared by the young lives team at Oxford is as follows.

- Created a list of younger cohort children still enrolled in school according to the young lives Round-3 data (collected in 2009-10) ordered by the characteristic on which we wanted to stratify. Similarly, younger cohort children attending the schools are stratified to accommodate required number of private/public schools.
- Thus index children have been divided into different strata (groups)⁵.
- A random sample of children in each stratum has been adopted to get the required number of children in each stratum.
- Got the list of schools attended by these children.
- This gives the list of schools and grades to survey for the sample.
- We finally figured out the actual classrooms in which the index children are when we visited the schools, because we don't know which class/section children are in young lives round-3 data which is available with us.

⁴ For the Young Lives methodology see Appendix-2

⁵ A random sample may not include enough group members to facilitate analysis of that group. The stratified sample design is used to select children of different characteristics.

This is the same as if we take a random sample of schools attended by Young Lives children weighted by the number of children in the school (i.e. with probability the school is sampled proportional to size, where size is the number of Young Lives children in the school).

Decision rules for children whose schools are out of area

- If children have migrated into another Young Lives site we have considered these children for selection of schools.
- If children live in a Young Lives site but going to the school which is outside that site/district, we have included in the sample if the school is close enough to the site to visit during the field visit.
- If we noticed that sample children are dropouts, then replaced with other young lives child of similar characteristic within the site at random.

Thus the sample design of the present research on schools and the children is different from the normal selection process. But the advantage of the present research is the availability of household characteristics of the sample children studied in the main young lives study which may facilitate to do a robust statistical analysis linking the performance of children to the household characteristics. Number of sample schools across districts, number of young lives sample children attending these schools and number of children studying in sample schools are given in the tables 1.1 to 1.3.

Table 1.1: Number of Sample Schools across Districts in Andhra Pradesh

District	Rural			Urban			Total			All
	Govt	Private		Govt	Private		Govt	Private		
		Aided	Unaided		Aided	Unaided		Aided	Unaided	
West Godavari	8	.	3	6	.	8	14	.	11	25
Srikakulam	26	2	5	2	1	14	28	3	19	50
Kadapa	8	.	9	.	.	8	8	.	17	25
Ananthapur	15	.	3	4	.	9	19	.	12	31
Karimnagar	4	3	1	5	.	6	9	3	7	19
Mahaboobnagar	17	1	12	.	2	6	17	3	18	38
Hyderabad	1	.	2	1	2	16	2	2	18	22
Non-YL Districts	2	.	3	1	4	7	3	4	10	17
Total	81	6	38	19	9	74	100	15	112	227

Note: Govt=Government

Organization of the Study

The study is organized into six sections. The first section deals with the context, objectives and methodology of the study. In the second section, the analysis relating to primary school children's attitudes to schooling and their experience of school in Andhra Pradesh

is presented. The analysis on the performance of children in numeracy, mathematics and languages is dealt with in the third section. The teacher evaluation of student responses in mathematics i.e. an assessment of teacher ability is examined in the fourth section. The processes in classroom, observation of teachers and students are discussed in the fifth section and the last section deals with the summary of the major findings of the study and the policy implications of these findings.

Table 1.2: Number of Young Lives Children Studying in Sample Schools in Andhra Pradesh

District	Rural			Urban			All		
	Govt	Private		Govt	Private		Govt	Private	
		Aided	Unaided		Aided	Unaided		Aided	Unaided
West Godavari	38		3	9		30	47		33
Srikakulam	155	9	37	4		32	159	9	69
Kadapa	46		64			2	46		66
Ananthapur	142		31	7		31	149		62
Karimnagar	19	15		6		30	25	15	30
Mahaboobnagar	167	8	87				167	8	87
Hyderabad			1	2	4	40	2	4	41
Non-YL Districts	3	1	4		3	7	3	4	11
All	570	33	227	28	7	172	598	40	399

Note: Govt=Government

Table 1.3: Total Number of Children Studying in Sample Schools across Districts in Andhra Pradesh

District	Rural			Urban			All		
	Govt	Private		Govt	Private		Govt	Private	
		Aided	Unaided		Aided	Unaided		Aided	Unaided
West Godavari	556	.	905	524	.	4637	1080	.	5542
Srikakulam	1540	249	913	164	162	5031	1704	411	5944
Kadapa	241	.	1774	.	.	1836	241	.	3610
Ananthapur	1159	.	1042	358	.	2509	1517	.	3551
Karimnagar	216	803	350	804	.	1682	1020	803	2032
Mahaboobnagar	1955	98	3292	.	960	2028	1955	1058	5320
Hyderabad	63	.	299	106	353	5901	169	353	6200
Non-YL Districts	315	.	566	345	1141	2094	660	1141	2660
Total	6045	1150	9141	2301	2616	25718	8346	3766	34859

Note: Govt=Government

II

Children's Attitude towards School and their Experience of School

Children's attitude

We have explored the views and attitude of children towards schooling. This has been captured through a questionnaire administered to the children. The questionnaire has been conducted only to the Young Lives children studying in the sample school. Field personnel were asked to read some statements that will indicate about the children's feelings and attitudes about school. For instance, the statements cover whether anyone at home helps the child in homework; feel bored in listening lessons; whether feel lonely when in school; about treatment of teachers; on medium of instruction; and about clothes the child wears to school etc. Children asked to think about whether he/she strongly agree, agree, disagree or strongly disagree with the statement. If it sounds like something that the child might agree with, he/she was asked to choose one of the smiley faces on the chart that is available with the field staff. Similarly, if it sounds very unlikely, or the opposite, the child he/she was asked to choose other than the smiling faces in the chart. It indicates the level to which the children agree or disagree with the statements. It is important to know the profile of the children whose attitude towards school and their experience of schooling we are capturing.

Profile of the Children

As informed earlier that we are examining the attitude of the young lives sample children and on an average they are about 8.84 year old when we conducted school based component (2010-11). We find that about 54% of the young lives children are boys and boys are predominant in private schools. At the time of survey about 84% of the young lives children were continuing their studies and most (95%) were in classes II to V. Almost all these children were in regular day schools. We observed that about 16% of the children dropped out or moved out of the schools. Among these dropped out or moved out children, only about 6% dropped permanently and about 86% moved out to other schools. Out of these moved out, 30% moved out to private English medium schools, about 35% moved to government schools and about 19% have moved to schools having hostels. Not interested in studies, domestic work, agricultural work, ill health and migration are the main reasons for dropout of young lives children permanently from schools. These reasons are consistent with the other studies. However, the present study confined to the attitudes of those children who are continuing their studies.

Children's Attitude towards School

A questionnaire having 37 statements reflecting various situations i.e. at school; at home; moving with peers; performance in school and learning attitudes; and moving with teachers etc was administered to the children. These statements have been administered to the children sitting apart so that their answers cannot be influenced by their peers/neighbors. All the 37 statements focuses on the attitudes of the children and for each of these statements the children are asked to respond by identifying one of the four pictures i.e. four different faces to symbolize their answer i.e. strongly agree, agree, disagree or strongly disagree with the statement. The responses are summarized below.

Most of the children (over 79%) feel that they can get good marks if they work hard. It is true across all categories of schools and also across gender. However, 26 per cent of the children indicated that making an extra effort rarely leads to success. Interestingly the attitude of 32 per cent of girls is that extra effort may not lead to success as against 19 per cent of boys. About 25% of the children feel bored while listening to the lessons in the school. This phenomenon is higher (46%) in the case of urban government school children equally among boys and girls. The question arise here is whether the teacher is not engaging the children properly or there is need for counseling of such children by the teachers towards right direction. Similarly, about 22% of the children are not happy in the class and it is the same across boys and girls and also across all categories of schools. The phenomenon of teasing is felt by about 27% of the children and it is relatively higher (30%) among boys in the government schools.

It is heartening to note that about 81% of the children feel proud to go to their respective schools and it is relatively higher among boys in all the categories of schools. Further, 82% of the children enjoy their lessons at their schools and it is the same across boys and also across all categories of schools. Three fourths of the children feel that they are good at learning Mathematics. This confidence is relatively higher (91%) among girls in the urban government schools. However, about 32% of the children feel that doing mathematics is very difficult and this lack of confidence is relatively higher (41%) among boys in the urban schools compared to the same of girls (24%). About 60% of the children feel that they are good at learning English and as expected the confidence of good at learning English is relatively higher (74%) among children in the urban schools as compared to 56% among children in the rural schools. However about 39% of the children feel that it is difficult to understand when the lessons are in English and this figure is relatively higher among boys (43%) in the urban private schools. There is a need to examine whether this is due to mushrooming of private schools without qualified and trained teachers?

Nearly 35% of the children in the rural primary schools do not ask teacher for help when they get stuck with any problem as compared to about 22% of the children in the urban primary schools. Little over half (56%) of the children feel that most of the children in their class score better than them and it is the same across all categories of schools and equally among boys and girls. It is of interest to note that about 87% of the urban school children and 83% of the children belonging to rural government schools feel happy going to school every day. Nearly one third (31%) of the children in the rural primary schools are ashamed of the clothes they wear to school as compared to about 25% of the children in the urban primary schools. Poor socio-economic background of these children might be the reason for not wearing pleasant clothes. Further, about 59% of the children of urban government schools are often embarrassed because they do not have the right books with them. The corresponding figures are 44%, 41% and 36% in the cases of school children of rural government, rural private and urban private respectively. Lack of right books will surely have impact on the performance of the children. Unfortunately, 29% of the children of rural government schools feel that going to school is of no use to them. The corresponding figures are 25%, 18% and 18% in the cases of school children of rural private, urban government and urban private respectively. Interest on studies and in-turn interest in going to school depends upon school environment, teaching and learning process. Perhaps proper training of the teachers and giving more attention to the cultural values in teaching may help in these cases. Also 31% of the children of rural government schools feel nervous (worried) about being at school. Same is the case with 29%, 28% and 28% respectively in the cases of school children of rural private, urban government and urban private. All these vindicate the need for right atmosphere in the school - more importantly children friendly attitude of teachers and commitment towards quality education.

Children studying in urban schools are comparatively more proud of their achievement in their schools. For instance, 82% of the urban school children are proud of their achievements in the schools compared to 74% of the rural school children. Similarly, majority (about 60%) of the school children are confident of doing their class work without help from any one. Turning to the learning of languages, 81% of the children observed that they are really good at learning Telugu / Urdu. About 90% of the children from private schools feel that the schools which they attend are the best as compared to 82% of the government school children. It is unfortunate to note that nearly one third (31%) of the rural school children feel that girls are unfairly treated by their class teachers as compared to 21% of the school children from urban schools. These observations indicate the need to create more awareness on gender sensitivity among the teachers. About half of (49%) of the children feel bad when others do better and little efforts on

the part of these children and encouragement by teachers may enhance the performance of these children. About 61 per cent of girls talk to class teachers relatively freely about anything that concerns them compared to boys (56%) across all categories of schools. Little over three fourths (78%) of the children can ask help from another students if they get stuck with their school home-work. Similarly, 88% of the children from urban schools feel that their teachers treat them fairly as against 78% in the case of rural school children. This is to some extent corroborated by the fact that about 21% of the urban school children feel that their teachers treat them worse than other children as compared to 29% of the children from rural schools feeling the same. About 77% of the children from urban schools state that they can ask someone at home if they need help for their school homework as against 64% in the case of children from rural schools. This is to some extent is corroborated by the fact that for about 40% of the children of rural children do not have any one at home to help school homework and the corresponding figure for urban school children is about 28%. About one fourth of the children feel bored while listening to classes and relatively 31% of girls feel lonely at school compared to boys (31%). All these vindicate the need of right atmosphere of schooling both at school and outside the school.

Children's Experience of School

15 questions (statements) are posed to the children with 'Yes or No' options, i.e. if the children agree with the sentence or statement they were asked to circle around 'Yes' option and if they do not agree with the statement they were asked to circle around 'No' option. These statements reflect the availability of playground in school, teachers and students' punctuality, classroom environment, punishments and whether parents checking the homework regularly and whether they are aware of the student's performance etc. The experiences of children are summarized below.

Around 92% of the rural school children and 85% of urban school children agree that there is a place in the school for play. Access to books other than the text books is better in government schools compared to the private schools. About 38% of the children from rural government schools indicated that they are afraid of going to toilet in the school. In the case of the all other categories of schools, the corresponding figure is about 27%. Further, about 44% of the girls from government schools and 29% of the girls from private schools indicated that they are afraid to go to the toilet at school. These observations clearly point out the inadequate (bare minimum) infrastructure which has impact on the overall quality of schooling. Around one fourth of the children admitted that their teacher will not question if they do not bring the correct books and pencils to schools clearly pointing out the lack of seriousness on the part of the teachers. Half of the students observed that they do not have suitable place to learn, i.e. classrooms have lot of noise from outside for about 55% and 48% of the government and private schools respectively.

It is unfortunate to know that children from about 39% of the government schools and 31% from private schools indicated that their class-teacher often does not attend to school. Further, about 60% of the children observed that their teachers are often late in attending to schools across all categories of schools. These observations of the children are indicative of callous attitude of teachers towards their duty and a clear case of lack of supervision by higher officials. Only about 45% and 27% of the children from government and private schools respectively also indicated that their class-teacher never uses physical punishment. This is corroborated by the fact that children from about 64% and 70% of the government and private schools respectively observed that their teachers have physically hurt someone else in their class in the current year.

It is interesting to note that children from about 88% of the schools opined that they feel safe when they are at school. About 82% of the children from government schools and 87% from private schools indicated that at least one of their parents or a member from the household knows their rank in the class. It is heartening to note that 75% of the children from government schools (82% in case of private schools) indicated that their homework is checked regularly by parents or other household members.

The experiences of children clearly show callous attitude of teachers towards their duty in terms of punctuality, correcting homework of the students, questioning the students when they do not bring the correct books to the school, lack of bare minimum infrastructure in the schools, and about physical punishment in their school. These observations of the children indicate the urgency of cleansing the system.

III

Performance of Children in Numeracy Cards/Mathematics and Languages

The primary school children of age around 9 years are assessed about their mathematical ability. Simple mathematical problems involving addition, subtraction and multiplications and also solving problems using these concepts were assessed using 21 items. These tests include encircling a specified two digit, three digit, four digit numbers, filling the blank with appropriate number, questions involving simple additions, subtraction, and numerical calculations including multiplication and division. That means one can achieve a maximum score of 21. All these simple mathematical problems are supposed to be easily done by the students of this age group. The results are summarized below.

The mean scores of the children belonging to Rural Government (RG), Rural Private (RP), Urban Government (UG), Urban Private (UP), Urban, Rural, Government, Private schools and also for Boys, Girls, Rural Boys, Rural Girls, Urban Boys and Urban Girls together with the standard deviation (sd) of the mean scores are tabulated and presented below in table 3:

Table 3: Performance of Children in Mathematics and in Languages by Type and Location of School

Variable	Number	Numeracy/ Mathematics (Max. score 21)		Verbal ability in English (Max. score 29)		Verbal ability in Telugu (Max. score 32)	
		Mean	Sd	Mean	Sd	Mean	Sd
Rural Govt	554	11.38	5.33	11.20	6.21	20.40	7.43
Rural Private	189	13.31	5.00	17.30	4.30	22.20	5.29
Rural	743	11.87	5.31	12.75	6.36	20.86	6.99
Urban Govt	22	13.68	5.78	12.27	5.14	23.50	7.40
Urban Private	188	13.09	4.93	18.22	4.07	20.27	8.09
Urban	210	13.15	5.01	17.60	4.56	20.61	8.06
Govt	576	11.47	5.36	11.24	6.17	20.52	7.45
Private	377	13.20	4.96	17.76	4.20	21.24	6.89
All	953	12.16	5.27	13.82	5.74	20.80	7.28
Boys	512	11.90	5.28	13.94	6.22	20.33	7.07
Girls	441	12.45	5.26	13.68	6.47	21.35	7.40
Rural Boys	404	11.72	5.36	13.04	6.36	20.58	6.77
Rural Girls	339	12.05	5.26	12.41	6.36	21.19	7.24
Urban Boys	108	12.57	4.92	17.29	4.26	19.40	8.05
Urban Girls	102	13.76	5.06	17.93	4.86	21.89	7.92

Source: Field survey data

We have assessed the performance of children in mathematics across various types of schools and also across gender and location by comparing the respective mean scores statistics. We used t-statistic/Z- statistic depending upon whether the variances are equal or unequal. Important conclusions are drawn after examining the t-statics / z- statistics and the results of numeracy/ mathematics are summarized below:

- i. Though the mean scores of the children belonging to RP, UG and UP schools are the same, the mean score of the children belonging to RG schools is significantly smaller than that of the mean scores of children belonging to other categories.
- ii. Overall, the performance of children belonging to rural areas is significantly smaller than that of their counterparts in urban areas.
- iii. Similarly, the performance of children belonging to government schools is significantly smaller than that of the children belonging to private schools. Further, the variability in the mean score of children belonging to government schools is significantly higher than that of the variability in the mean score of children belonging to private schools. In other words, between the children, there is a significant variation in the marks scored in the government schools.
- iv. There are no significant differences in the mean scores of rural boys and rural girls. However, the mean score of the urban boys is significantly smaller than that of the mean score of urban girls.
- v. The mean score of the rural boys is significantly smaller than that of the mean score of urban boys. Similarly, the mean score of the rural girls is significantly smaller than that of the mean score of urban girls.

Verbal ability of children in English

To assess the children's language learning a verbal ability test in English is conducted using 29 items. As mentioned in numeracy/mathematics test, the language test is also a simple one and every child in the group of sample children are supposed to write very easily. These simple tests include reading comprehension - linking the pictures and words, matching the sentences and pictures, circling around a word that completes the given sentence, read and understanding a paragraph and tick marking the correct answer for the given questions, filling the blanks with a suitable words, and writing a complete sentence on the given picture which include at least 5 words. The mean scores of the children in English language together with the standard deviation (sd) by type of school and location of school are given in the earlier table 3.1. The results are summarized below.

- i. There is no significant difference in the average performance of the children in English language between rural government and urban government schools.

However, the variability in the mean score of children belonging to RG schools is significantly higher than that of the variability in mean score of children belonging to RP schools.

- ii. The mean scores of the children belonging to RG and UG schools are significantly smaller than the mean score of the children belonging to RP schools.
- iii. The mean scores of the children of RG, RP, UG and UP schools satisfy the relation $RG = UG < RP < UP$. Also we note that the variability in the mean score of children belonging to RG schools is significantly higher than that of the variability in mean score of children belonging to UP schools and the variability in the mean score of children belonging to UG schools is significantly higher than that of the variability in mean score of children belonging to RP schools.
- iv. The performance of children belonging to rural areas is significantly smaller than that of the performance of children belonging to urban areas. However, as seen in numeracy/mathematics test, the variability in the mean score of children belonging to rural area schools is significantly higher than that of the variability in mean score of children belonging to urban area schools.
- v. The performance of children belonging to government schools is significantly smaller than that of the performance of children belonging to private schools. Further, the variability in the mean score of children belonging to government schools is significantly higher than that of the variability in mean score of children belonging to private schools.
- vi. With regard to comparison of other categories, the results depicted in the case of numeracy/math test are true even in English language test.

Verbal ability of children in Telugu

To assess the verbal ability of children in Telugu, a simple test is conducted using 32 items. The pattern followed in English language test was adopted even in testing the Telugu language ability. The mean scores together with the standard deviation (sd) by type of school and location of the school are presented in the earlier table. The results of Telugu language test are summarized below:

- i. The mean score of the children belong to RG schools is significantly smaller than the mean score of the children belonging to RP schools. Further, the variability in the mean score of children belonging to RG schools is significantly higher than the variability in mean score of children belonging to RP schools.
- ii. As seen in other two tests, the mean score of the children belong to RG schools is significantly smaller than the mean score of the children belonging to UG schools

- iii. The mean scores of the children belonging to RG and UP schools are the same. Similar observation holds good in the case of RP and UG schools. We find the variability in the mean score of children belonging to RP schools is significantly smaller than the variability in mean score of children belonging to UG schools.
- iv. The mean score of the children belongs to RP schools is significantly higher than the mean score of the children belonging to UP schools. Further, the variability in the mean score of children belonging to RP schools is significantly smaller than the variability in mean score of children belonging to UP schools.
- v. The mean score of the children belongs to UG schools is significantly higher than the mean score of the children belonging to UP schools.
- vi. The mean scores of the children belong to RG, RP, UG and UP schools satisfy the relation $RG = UG < RP < UP$.
- vii. The performances of children belonging to rural area schools and urban area schools are the same. The variability in the mean score of children belonging to rural area schools is significantly smaller than the variability in the mean score of children belonging to urban area schools.
- viii. The performance of children belonging to government schools is significantly smaller than the performance of children belonging to private schools. Further, the variability in the mean score of children belonging to government schools is significantly higher than the variability in mean score of children belonging to private schools.
- ix. The performance of boys is significantly smaller than the performance of girls.
- x. There are no significant differences in the mean scores of the boys and girls belonging to rural schools.
- xi. The mean score of the boys belonging to urban schools is significantly smaller than the mean score of the girls belonging to urban schools.
- xii. There are no significant differences in the mean scores of the boys belonging to rural and urban schools and the variability in the mean score of boys belonging to rural schools is significantly smaller than the variability in the mean score of boys belonging to urban schools.
- xiii. There are no significant differences in the mean scores of the girls belonging to rural and urban schools.

IV

Teacher Evaluation of Student Responses in Mathematics

An Assessment of Teacher Ability

Mathematical ability of Teachers

Assessment of teacher ability is vital for the overall assessment of quality of schooling. Though it is important, it is a difficult and delicate task. Given the sensitive situation, we tried to assess the mathematical ability of primary school teachers who teach mathematics. We thought mathematics is an important subject and assessing the ability of these teachers may be useful rather than assessing all the teachers which may become unwieldy. Math teachers are assessed indirectly about their mathematical ability. We informed the teachers that we are trying to understand how teachers provide feedback when students make a mistake. We have provided some math exercises that have been solved by primary grade students and requested the teachers to examine these responses, analyze them pedagogically and then answer the questions that follow. For instance, we have given an example exercise of a student solving a division problem and requested the teacher to look at the way/procedure the student has followed in the division work. Suppose if the student follows the same procedure in another example, the teacher was asked to answer, whether the student is likely to get the example exercise of division work correct or not. Such student exercises (step by step procedure of solving an exercise by a student and giving unsolved exercise) covering addition, subtraction, multiplications, identifications of angles, ascending and descending series are given in the questionnaire and requested the teacher whether student will do the unsolved exercises correctly or not based on the model exercise, if not, to identify where the student is committing mistakes. 21 such items are given to the teachers with a request to answer and the results are given in the table below. The mean scores of the teachers by type of school, location of school and by gender of the teachers with the standard deviation (sd) are tabulated and presented in the table. The performance of the teachers in the mathematical ability test across various types of schools and also across gender and location by comparing the respective mean scores statistics. We used t-statistic / Z- statistic depending upon whether the variances are equal or unequal. After examining the t-statics / z- statistics, the important conclusions are summarized in table 4.1.

Table 4.1: Performance of Teachers in the Mathematical Ability by Type and Location of School

Variable	Number of Observations	Mean score (max score 21)	Standard deviation of mean score
Rural Govt	183	18.13	4.06
Rural Private	74	17.03	4.39
Urban Govt	20	16.45	4.99
Urban Private	124	16.62	4.64
Rural	257	17.81	4.18
Urban	144	16.60	4.67
Govt	203	17.97	4.17
Private	198	16.73	4.54
Male teacher	193	17.65	4.30
Female teacher	208	17.13	4.47
Rural male teacher	164	17.97	4.29
Rural female teacher	93	17.54	3.97
Urban male teacher	29	15.83	3.94
Urban female teacher	115	16.79	4.83
All	401	17.36	4.37

Source: Field survey data

- i. It is highly satisfying that the average score of the teachers is about 82.7%.
- ii. It is heartening to note that the performance of the rural government teachers is significantly higher than the performance of the rural private teachers and also higher than the performance of urban government teachers as well as urban private teachers.
- iii. Further, there are no significant differences among the performances of rural private, urban private and urban government teachers.
- iv. Added to this, the variability in the performance of teachers belonging to rural government schools is significantly smaller than the performance of teachers belonging to urban private schools. In other words, the performance of the teachers in rural government schools is consistently uniform compared to teachers in urban private schools.
- v. Overall, the performance of the rural teachers is significantly higher than the performance of the urban teachers.
- vi. Similarly, the performance of the government school teachers is significantly higher than the performance of the private school teachers.

- vii. The performance of the rural school male teachers is significantly higher than the performance of the urban school male teachers. It may be noted that the average score of the urban male teachers is above 75%. There are no significant differences among the performances of all the other categories of school teachers namely rural male, rural female and urban females. It is apt to recall some of the earlier findings on the mathematical ability of teachers in India⁶.

Determinants of the Teachers' mathematical Ability

We have already compared separately the performance differences (if any) in teachers by examining their mean scores in the mathematical ability test between rural and urban school teachers, between government and private school teachers and between male and female teachers. The social background, teaching service and teachers' educational and training qualifications will also have impact on the performance of teachers in their mathematical ability test. To explain the variability in the performance of teachers in their mathematical ability, we have used following control and independent variables.

Control variables: To capture the location and type of school where the teachers are working we have used the following dummy variables:

RG: It takes value 1 if a teacher belongs to rural government school and 0 otherwise

RP: It takes value 1 if a teacher belongs to rural private school and 0 otherwise

UG: It takes value 1 if a teacher belongs to urban government school and 0 otherwise

We have teachers belonging to urban private schools as reference category

Male: It takes value 1 if a teacher is male 0 otherwise

OC: It takes value 1 if a teacher belongs to other category caste and 0 otherwise

⁶ Geeta and Banerji (2009) found that worrying levels of teacher competence to teach the material in the primary school textbooks: For example, they pointed out that only 28% of teachers could correctly do an area problem which is usually introduced in grade 4 or 5 in the north Indian states and only 25% could do a percentage problem at the grade 5 level of difficulty. About 45% could give the correct meaning of difficult words and meaningfully summarize text at grade 4 level of difficulty. 60% of teachers had spelling mistakes in their own write-ups when they were asked to summarize a section of text from the textbook. 80% admit to having problems with their students' maths queries. These findings have implications for teacher recruitment policy as well as for pre- and in-service teacher training/curriculum policy. On Teacher competency, The School TELLS study is unique in its attempt to evaluate teachers' ability to teach in India. While there is no established best practice on how to assess teachers' ability to teach, they focused on three aspects of teaching ability: teachers' own knowledge, their ability to spot mistakes and their ability to explain. The tests are aligned with standard tasks that teachers would routinely be required to do in the classroom. They found considerable deficits in teachers' skills to tackle the material that is in the primary school textbooks. For example, only 25% of teachers could do a percentage sum and 28% an area sum of the kind found in grade 4 or 5 math textbooks. 80% of teachers admit to having difficulties in dealing with the maths queries of their students.

Independent variables:

Teaching service: Number of years of teaching;

Technical: Index of educational and training qualifications.

Using the score of a teacher in the mathematical ability test as dependent variable and the above mentioned control and independent variables, we have estimated the multiple linear regressions (using robust standard error method) and the estimated regression coefficients together with the goodness of fit measures are given below in table 4.2:

Table 4.2: Estimated regression coefficients together with standard errors and goodness of fit measures explaining teachers' performance in mathematical ability

Variable	Coef	SE	T	P>(t)
Rural Government	1.8588	0.5557	3.34	0.001
Rural Private	0.4840	0.6768	0.72	0.475
Urban Government	0.0174	1.1740	0.01	0.988
Male	-0.0915	0.4657	-0.2	0.844
Teaching service	-0.0288	0.0319	-0.9	0.368
OC	0.1339	0.5060	0.26	0.791
Teacher qualification	0.1078	0.0281	3.84	0.000
Constant	13.2149	1.0264	12.87	0.000
Number of observations = 400				
R-squared = 0.0630 Root MSE = 4.2951: F (7, 392) = 3.72 Prob > F= 0.0007				

Note: There is no multi-collinearity among explanatory variables as reflected from low VIFs.

Important findings from table 4.2 are summarized as follows:

- i. The performance of teachers belonging to rural government teachers is superior to other category of teachers (teachers belonging to, rural government, urban government and urban private schools)
- ii. There are no significant differences in the performance of teachers belong to urban government, rural government and urban private schools.
- iii. There are no caste and gender differences in the performance of teachers.
- iv. Teacher's educational and training qualification is positively and significantly influencing the ability of the teachers.
- v. But the length of service of a teacher is not significantly influencing the ability.

Determinants of children's performance in Mathematics, English and in Telugu

We have already compared separately the performance differences of children in the mathematics test by examining their scores in the mathematics, English and Telugu

tests between children of rural and urban schools, between government and private schools and between boys and girls. The social background, socio-economic and educational status of the children's parents, number of children in the household and mathematics teacher's ability as reflected in the score of the teacher in the mathematical ability test will also have impact on the performance of the children teachers in the mathematics test. To explain the variability in the performance of children in these tests, we have used following control and independent variables.

Control variables: To capture the location and type of school where the children are studying, we have used the following dummy variables:

RG: It takes value 1 if a child belongs to rural government school and 0 otherwise

RP: It takes value 1 if a child belongs to rural private school and 0 otherwise

UG: It takes value 1 if a child belongs to urban government school and 0 otherwise

We have used children belonging to urban private schools as reference category

Male: It takes value 1 if a child is boy and 0 otherwise

OC: It takes value 1 if a child belongs to other category caste and 0 otherwise

Age: Age of a child in years

Hhgrade5: Educational level of child's father

Mothgrade5: Educational level of child' mother

WI5: Wealth index of child's parents

No.of child: Number of children in the child's family

Independent variable: Math teacher score: The score of child's teacher in the mathematical ability test is used for mathematics test only.

Using the score of a child in these tests i.e. mathematics, English and Telugu as the case may be as dependent variables and the above mentioned control and independent variable (in case of Math test only) we have estimated the multiple linear regression (using robust standard errors method) and estimated the regression coefficients together with the goodness of fit measures and they are tabulated in tables 4.3 to 4.5.

Table 4.3: Estimated regression coefficients together with standard errors and goodness of fit measures explaining students' performance in mathematics

Variable	Coefficient	SE	T	P>(t)
Age	0.1176	0.0443	2.66	0.008
Male	-0.2596	0.3160	-0.82	0.411
OC	1.0867	0.4110	2.64	0.008
Rural Govt	0.4299	0.3972	1.01	0.311
Rural Private	3.4810	0.8732	3.99	0
Urban Govt.	1.3296	1.1118	1.19	0.235
Hhgrade5	0.0738	0.0419	1.76	0.078
Mothgrade5	0.1726	0.0475	3.63	0.000
W15	4.1449	1.1204	5.22	0.000
No.of Child	-0.7748	0.1483	-4.79	0.000
Math teacher score	0.1786	0.0372	5.50	0.000
Constant	6.4541	1.1745	5.50	0.000
Number of observations = 952				
F (11, 940) = 25.30, Prob > F = 0.0000 R-squared = 0.1927 Root MSE = 4.7677				

Table 4.4: Estimated regression coefficients together with standard errors and goodness of fit measures explaining students' performance in English

Variable	Coefficient	SE	T	P>(t)
Age	0.0879	0.0484	1.82	0.069
Male	-0.2131	0.3438	-0.06	0.951
OC	1.4209	0.4214	3.37	0.001
Rural Government	-3.9800	0.4120	-9.66	0.000
Rural Private	0.7306	0.7166	1.02	0.308
Urban Government	-4.5466	1.0437	-4.36	0.000
Hhgrade5	0.0751	0.0459	1.64	0.102
Mothgrade5	0.1515	0.0522	2.90	0.004
W15	5.5469	1.2154	4.56	0.000
No.of Child	-0.6700	0.1730	-3.87	0.000
Constant	13.2546	1.0619	12.48	0.000
Number of observations = 953				
R-squared = 0.343, RootMSE = 5.16, F(10,942) = 63.5, Prob > F = 0.0000				

Table 4.5: Estimated regression coefficients together with standard errors and goodness of fit measures explaining students' performance in Telugu

Variable	Coefficient	SE	T	P>(t)
Age	0.2245	0.0665	3.37	0.001
Male	-0.6306	0.4598	-1.37	0.171
OC	0.3145	0.6112	0.51	0.607
Rural Government	1.2384	0.5099	2.43	0.015
Rural Private	3.2656	1.1146	2.93	0.003
Urban Government	3.8216	1.5315	2.50	0.013
Hhgrade5	0.1581	0.0576	2.74	0.006
Mothgrade5	0.1466	0.0673	2.18	0.030
W15	1.7072	1.5599	1.09	0.274
No.of Child	-1.1152	0.2194	-5.08	0.000
Constant	18.4457	1.3607	13.56	0.000
Number of observations = 953				
R-squared = 0.095, Root MSE = 6.92				

Important findings of these individual tests are summarized below.

- i. The age of the child has significant positive impact on the performance in all the three subjects i.e. mathematics, English and Telugu.
- ii. The gender has no significant impact on the performance in any of these tests. It implies that after taking into account other relevant factors explaining the performance of children in these tests, the performance of boys and girls is the same.
- iii. The children belonging to other category caste (OC) have superior performance over the others in mathematics and English tests but not in the case of Telugu test.
- iv. The performance of children belonging to rural private schools is superior to the children belonging to urban private, rural government and urban government schools in mathematics; performance of children belonging to both rural government and urban government schools is inferior to the performance of children belonging to both rural and urban private schools in English test; performance of children belonging to both rural government and urban government schools and also children of rural private school is superior over the performance of children in urban private schools in case of Telugu.
- v. There are no gender differences in the performance of children in the mathematics.
- vi. Educational levels of both father and mother have significant positive impact on the performance in mathematics.

- vii. The wealth index of parents has positive and significant impact on the performance of children in mathematics and English but not in the case of Telugu.
- viii. The number of children in the child's family has significant negative impact on the performance of children in all the three tests.
- ix. The mathematical ability of teacher (as reflected in the mathematical ability test score) has significant positive impact on the performance of children in the mathematics.
- x. Further, there is no multi-collinearity among the explanatory variables as reflected in the low values of VIFs in all the three tests.

Determinants of children's combined performance in Mathematics, English and Telugu
 We have already compared separately the performance differences of children in the mathematics, English and Telugu tests by examining their respective test scores between children

Table 4.6: Estimated regression coefficients together with standard errors and goodness of fit measures explaining students' combined performance in Mathematics, English and Telugu

Variable	Coefficient	SE	T	P>(t)
Age	0.5525	0.1705	3.24	0.001
Male	-1.0711	1.1909	-0.90	0.369
OC	3.0868	1.5131	2.04	0.042
Rural Government	-0.2091	1.5043	-0.14	0.889
Rural Private	10.4682	2.5587	4.09	0.000
Urban Government	2.7764	4.3804	0.63	0.526
Hhgrade5	0.3518	0.1528	2.30	0.022
Mothgrade5	0.4972	0.1809	2.75	0.006
WI5	16.3001	4.1532	3.92	0.000
No.of Child	-3.4184	0.5859	-5.83	0.000
Age of Principal / headmaster	-0.1307	0.0689	-1.89	0.058
Gender of Principal / headmaster	3.8407	1.4983	2.56	0.011
Cast of Principal / headmaster	5.1388	1.3717	3.75	0.000
Educational and training qualifications of principal / headmaster	0.1493	0.0937	1.59	0.111
Constant	43.8869	6.2022	7.08	0.000
Number of observations = 943				
R-squared = 0.2231, Root MSE = 17.9, F (14, 928) = 23.28 and Prob > F = 0.0000				

The important findings of the combined performance are summarized as follows:

- i. The age of the child has significant positive impact on the combined performance in mathematics, English and Telugu.
- ii. The gender has no significant impact on the combined performance in mathematics, English and Telugu. It implies that after taking into account other relevant factors explaining the combined performance of children in mathematics, English and Telugu, the performance of boys and girls is the same.
- iii. The children belonging to OCs have superior performance over the others
- iv. The combined performance of children belonging to rural private schools is superior to the combined performance of children belonging to urban private, rural government and urban government schools
- v. There are no significant differences in the combined performance of children belonging to urban government, rural government and rural private schools.
- vi. The gender differences of headmaster / principal has no significant impact on the combined performance of children in the mathematics, English and Telugu.
- vii. Educational levels of both father and mother have significant positive impact on the combined performance of children in mathematics, English and Telugu.
- viii. The wealth index of parents has positive and significant impact on the combined performance of children in mathematics, English and Telugu.
- ix. The number of children in the child's family has significant negative impact on the performance of children in the mathematics, English and Telugu.
- x. The age of the Principal / headmaster has significant negative impact on the combined performance of children in the mathematics, English and Telugu.
- xi. The principal / headmaster belonging to other caste have significant positive impact on the combined performance of children in mathematics, English and Telugu⁷.
- xii. R square is 0.2231 and F statistic is significant. Further, there is no multi-collinearity among the explanatory variables as reflected in the low values of VIFs.

⁷ Rema Henna (2009) in NBER working paper 15057, pointed out that that the discrimination against low caste students is driven by low caste teachers, while teachers who belong to higher caste groups do not appear to discriminate at all. The author also emphasized that this result runs counter to the previous literature, which tends to find that individuals discriminate in favor of members of their own groups.

Classroom Processes, Observation of Teachers and Students

The school-based component captured not only information on physical and human resources (i.e. buildings, textbooks, pupil teacher ratios) but also indicators of teacher quality, the quality of learner-teacher interaction and children's engagement. Thus rapport with children, learning levels and actual classroom environment were seen as pivotal in assessing the quality of schooling. Classroom observation was chosen for this purpose i.e. observation process is used for recording both the events i.e. behavior of the children as well as the teachers. It primarily focuses on the specific activities or types of activities periodically both by the teachers and correspondingly by the students in the class. In other words, the classroom observation is to examine the various interpersonal interactions between the teacher, teaching aids if any, and students in the classroom. For this purpose, the classroom observation is divided into two parts - a child observation and a teacher observation. One researcher is assigned to record the activities of the specified children and the other is asked to document the activities of the teacher that include behavior in the class, teaching methods, language of instruction, selected child specific questions and class specific questions in regular specified intervals⁸. Before

⁸ We have observed math teacher class. The teacher should be the regular math teacher. If the regular math teacher is absent, we waited until the regular teacher has returned i.e. conducting the observation on a different day. We also ensured that the lesson should be an ordinary lesson and not a test, exam, or remedial class. We also ensured that the teacher should not change it because of the observation. Explained the teacher that we don't want the teacher to talk to the observers during the lesson (except as an initial introduction), and we don't want to talk with the children during the lesson. The researchers also took the consent of teacher where they will sit. Normally, tried to sit to one side, ideally in a position where the researcher can see children's faces and get a sense of their level of engagement, but ensured that the children are not distracted by the researcher. Researchers were asked to sit in corners/ background, as far as possible. But once the lesson started, ensured not to move around and not talk to the teacher or students. One researcher entrusted to record the activities of always six children over a period of 30 minutes at regularly timed intervals i.e. every two minutes. However, sometimes there are more than 6 young lives children in the same class or less than 6 YL children in the same class. In these circumstances we have selected non-YL children for observation using the randomization protocol. We have ensured that the teacher does not know exactly which children we observing as this might change the way they conduct the lesson. The other researcher is asked to record the language/s the teacher is using and the activities of the teacher over a period of 30 minutes at regularly timed intervals i.e. every minute. The principle of one observation per class/section is followed even if the same math teacher teaches other young lives children in different class or different section. The fieldworker observing the teacher should also ask the teacher some questions after the lesson and conduct the teacher analysis of student responses. The fieldworker conducting the child observation is asked to collect homework books at the end of the lesson from the YL children in the classroom which has been observed for review. The fieldworker observing the children has been asked to conduct the child test and administer child questionnaire after the child observation.

discussing the results of the child observation and teacher observation, it is apt to know how the researchers recorded different activities. Given the experience, and based on the available literature and other documents, we have listed all the possible activities of both the students and teachers that normally happen and coded these activities for easy administration by the researchers. The researchers are asked to record the coded activity of students and teacher during the prescribed time⁹. In addition, we have recorded the language used by the teacher while doing every activity.

Observations on the Child Activities in the Lecture Sessions of Math Teachers

With the objective of knowing whether the children are able to concentrate on the teacher's lecturing, we have classified the activities observed as *desired (up to code 08 in child activities given in foot note)* and *undesired(rest of the child activities)* activities of children during the first 30 minutes of teachers' lecturing. We tabulated in table 5.1 the mean, standard deviation (sd) and standard error (se) of percent time children devoted to the desired activities by category of schools during the first 10 minutes, next 10 minutes and the last 10 minutes.

Table 5.1: Children Devoted to the Desired Activities by Category of School and Time Duration

Category of Schools	1st 10minutes			2nd 10minutes			3rd 10 minutes		
	Mean	Se	Sd	Mean	se	Sd	Mean	se	Sd
Rural Government	0.861	0.004	0.346	0.802	0.005	0.399	0.795	0.005	0.404
Rural Private	0.903	0.005	0.296	0.843	0.006	0.364	0.815	0.007	0.388
Urban Government	0.917	0.011	0.277	0.843	0.015	0.364	0.853	0.015	0.354
Urban Private	0.913	0.004	0.282	0.839	0.005	0.367	0.803	0.006	0.398
Rural	0.876	0.003	0.33	0.816	0.004	0.388	0.802	0.004	0.399
Urban	0.934	0.004	0.281	0.84	0.005	0.367	0.809	0.006	0.398
Government	0.866	0.004	0.341	0.805	0.005	0.396	0.799	0.005	0.400
Private	0.909	0.003	0.288	0.841	0.004	0.366	0.808	0.005	0.394
All	0.888	0.003	0.315	0.824	0.003	0.381	0.804	0.003	0.397

Note: The number of observations used in the calculations of RG, RP, UG and UP schools statistics are 6510, 3360, 600 and 4411 respectively.

⁹ The teacher activities include: Teacher-oriented whole class activities - 01=introducing/summarizing lesson; 02=lecturing; 03=group call-and-response; 04=questioning individual child in front of the whole class; 05=setting work/home work; Child-centered Activities - 06=discussion/interaction with whole class; 07=guiding group work; 08=talking/working with individual student; Other Activities - 09=disciplining child (ren); 10=administrative work; 12=correcting work; chatting/waiting; and 13=temporary absence.

The child activities include: 01=listening/watching teacher; 02=offering to teacher; 03=chanting; 04=responding in whole class environment; 05=responding/talking to teacher individually; 06=writing/drawing-teacher led; 07=writing/drawing-individual led; 08=group task/activity; 09=not concentrating on teacher; 10=not concentrating on individual work; 11=waiting; 12=non-lesson focused activity; 13=disciplined by teacher; and 14=others.

The important observations from the table 5.1 are:

- The percent of time devoted by children to desired activities displayed a significant decreasing trend during the first thirty minutes of lecturing by teachers across all categories of schools.
- The percent of time devoted to desired activities by children during the first 10 minutes, second 10 minutes and the last 10 minutes of teachers' lecturing are 89, 82 and 80 respectively.
- The percent of time devoted to desired activities by children in the private schools is significantly higher than that of the same by the children in the government schools during the first and second 10 minutes and it is the same during the third 10 minutes. Similar phenomenon is observed by children in the urban and rural area schools.
- The percent of time devoted to desired activities by children in the rural private schools is significantly higher than that of the same by the children in the rural government schools during the first and second 10 minutes and it is the same during the third 10 minutes.
- The percent of time devoted to desired activities by children in the urban private schools is the same as that of the same by the children in the government schools during the first and second 10 minutes and it is significantly higher in the urban government schools compared to urban private schools during the third 10 minutes.
- In fact the percent of time devoted to desired activities by children in the urban government schools is the highest compared to that of the children in the other categories of schools during the third 10 minutes.

The above findings suggest that the concentration among the children is gradually decreasing after 10 minutes of lecturing. Further, we note that the significant undesired activities in which children involved are: lack of concentration on teacher and simply waiting. The results hold across all categories of schools. It is the responsibility of teacher to see that the children are concentrating on what he/she is teaching. Possibly, suitable teacher training is desirable to take care of these undesired activities of children and thereby retain concentration of children on the teacher's lecture for a longer or desired period of time.

Researchers Observations of the Whole Class and the Teacher

Apart from the classroom activities of the children and teachers, we have also gathered information on the discipline of timetable, availability of text books with the children, use and availability of workbooks, use of language by the children during the lesson, materials used to support children's learning, computer equipment, on the learning

environment and the classroom physical environment etc. The researchers were asked to observe and record the details. The results indicate that on an average the class could last for the timetabled length of time in more than 90 percent of the schools and it is almost the same across all categories of schools. Similar is the case with regard to the lesson starting on time and almost all of them completed the lesson in time. It is heartening to note that the lesson ended in time in about 97% of the schools. The teachers could incorporate the use of textbooks in their lessons in about 76% and 59% of the private and government schools respectively. Similar pattern is observed in the rural and urban areas. All children in class were working from an individual text book in 77% and 53% of the private and government schools respectively. It is true even in the schools located in the rural and urban areas. More than 75% of the children in class were working from an individual text book in 11% and 24% of the private and government schools respectively. More or less similar pattern is observed in the private and government schools located in the rural and urban areas. The children in the class incorporating the use of class workbook or worksheet is observed in about 62% and 52% of the private and government schools respectively irrespective of the location of the school. The phenomenon of sharing textbook with other students (25% or less) and the others did not have access to any resources is found in about 13% of the rural government schools.

During the lesson, the child responding to teachers' questions in only Telugu is observed in 96% and 43% of the government and private schools respectively. On the other hand, the child responding to teacher's questions only in English is found in about 53% of the private schools. Children speak mostly Telugu but use one or two words in English in about 30% and 89% of the private and government schools respectively. More or less similar pattern is observed in the private and government schools located in the rural and urban areas. Similarly, children speak mostly English but use one or two words in Telugu in about 66% and 7% of the private and government schools respectively. Similar pattern is observed irrespective of the location of the school. The children's learning was visible in the classroom from diagrams / words written on the blackboard in almost all the schools. Boys and girls sit separately in the class in about 79% and 60% of the private and government schools respectively in the rural areas and in about 58% and 85% of the private and government schools respectively in the urban areas.

During the lesson, the teacher shouting at or scolding children is observed in about 42% and 25% of the private and government schools respectively and it is true irrespective of the location of the school. The teacher using a cane / stick / ruler to intimidate the children is observed in about 16% and 11% of the private and government schools respectively and it is true whether the school is located in rural or urban area. It is unfortunate to note that a child was physically beaten with a cane / stick / ruler or by

other form of hitting by teacher is observed in about 23% and 10% of the private and government schools respectively. Such trend is prevailing in schools irrespective of its location. The teacher's general behavior towards students is engaged, slightly engaged and disinterested is observed in about 41%, 50% and 9% of the schools respectively. The teacher praising a student or the class for answering a question or completing an exercise correctly is observed in about 50% of the schools. In other words, half of the teachers observed did not encourage / praise the students when they have done their work correctly which is very much essential for the teachers and a sense of moral boost for the students. All these reconfirm the need for thorough revision of training inputs of teachers or lack of intensive training.

The classrooms have appropriate ventilation and sufficient natural light in almost all the schools observed. But there is continuous noise that distracts children in about 21% of the schools. The average size of classroom of government and private schools are 196 and 215sft respectively. Further we note that the average size of classrooms in rural and urban schools is 195sft and 227sft respectively.

Observation of the Activities of Math Teachers in their Lecture Sessions of 30 Minutes
As noted earlier we have listed 13 activities of teachers in their lecture session in the classroom. Researchers observed the activity every minute of the session with the help of stopwatch and thus we have 30 observations on every teaching session observed. All these activities have been grouped in to three categories i.e. teacher-oriented whole class activities; child-centered activities and other activities. We have analyzed the percent time spent by teachers on these activities during their lessons in the first 10 minutes, next second 10 minutes and the last 10 minutes and the results are given in table 5.2.

Table 5.2: Percent Time Spent by Teachers on Various Activities by Type and Location of School

	Rural		All Rural	Urban		All Urban
	Government	Private		Government	Private	
1st 10 minutes						
Teacher activities	0.94	0.95	0.94	0.99	0.94	0.95
Child centered activities	0.05	0.03	0.04	0.01	0.03	0.03
Other activities	0.01	0.02	0.02	0	0.03	0.02
2nd 10 minutes						
Teacher activities	0.88	0.91	0.89	0.89	0.87	0.88
Child centered activities	0.08	0.06	0.07	0.1	0.07	0.08
Other activities	0.04	0.03	0.04	0.01	0.06	0.04
Last 10 minutes						
Teacher activities	0.83	0.87	0.84	0.82	0.82	0.82
Child centered activities	0.12	0.06	0.1	0.13	0.06	0.07
Other activities	0.05	0.07	0.06	0.05	0.12	0.11

Important observations on the teacher activities are:

- i) Teacher-oriented whole class activities such as introducing lesson, lecturing, group call, questioning and setting work/homework are dominating in all the three spells of time duration i.e. 1st 10 minutes, 2nd 10 minutes and last 10 minutes. Though the time spent on these is gradually decreasing but 85 to 90 percent of the time was spent on this.
- ii) On the other hand time spent by the teachers on child centered activities (discussion/interaction with whole class, guiding group work and talking/working with individual student) has increased progressively but overall time spent on these activities is less i.e. not exceeding 13 percent of time.
- iii) It is to be noted that the time spent on other activities such as disciplining children, administrative work, correcting work, chatting/waiting, and temporary absence account for 5 to 12 percent of time during the last 10 minutes of lecture session.
- iv) All these observations reinforce that there is a need for substantial change in the teacher training component and its methodology.
- v) Mere teacher-oriented activities may not yield desired results and sufficient time on child-centered activities may perhaps be the answer. If we examine the child activities, undesirable activities are increasing gradually during the 30 minutes of lecture session. If the children are engaged properly during the lecture session through discussion/interaction with whole class; guiding group work and talking/working with children, children will also be inspired to learn more¹⁰.
- vi) Efforts have to be made to reduce the time spent on other activities.

Responses of Math Teachers of Observed Class

We have also collected information from the math teachers on various issues such as: whether the math teacher will take all the subjects, number of children enrolled in the class, and reasons for absenteeism etc. The results are summarized below.

¹⁰ Vimala Ramachandran et al (2005) in their report established that both teachers and administrators gave a lot importance to daily presence, compiling and sending the necessary data and maintaining discipline. They valued justice and fair play. They were ready to work with administrators and political leaders who they felt were just, and appreciated and rewarded hard work. But rapport with children, learning levels and actual classroom environment were not seen as being a part of teacher motivation. These factors did not figure in any discussion with teachers or administrators! Strict monitoring - by a highly motivated head master or a block/district official - can tip the scales and ensure better functioning. Given the right stimulus, teachers are known to perform well. The fundamental problem is that this stimulus is lacking. Most educated middle-class professionals - those who form the backbone of the administration and the larger community of stakeholders - have abandoned government schools. Their children study in private aided or unaided schools. They do not have a personal stake in making the system work. Therefore, they just let the system drift along while making sure the data that is fed upwards is acceptable.

- i) The observed teachers are also the class teachers in about 89% and 29% of the government and private schools respectively. This is true irrespective of the location of the school.
- ii) The observed teachers are also teaching all the subjects in about 82% and 11% of the government and private schools respectively. More or less similar pattern is observed in the schools located in rural and urban areas.
- iii) The average number of children per school is 16 and 29 in the rural government and rural private schools respectively. Similarly, the average number of children per school is 24 and 33 in the urban government and urban private schools respectively.
- iv) The most important reason indicated for the absence of children from school across all categories of schools on the day of observation is "ill health" followed by "domestic work at home".
- v) "Agricultural work at home or work in family business" is also another important reason for the absence from school from rural schools.
- vi) If students are absent for a longer period, about 60% of the government school teachers indicated that they will visit the homes of the children, whereas about 42% of the private school teachers indicated that they will request parents of the children to come to schools.
- vii) The classes are grouped together with the other sections (of the same class) only in about 11% of the private schools.
- viii) The classes are grouped together with the other classes for teaching mostly in about 32% of the government schools.
- ix) We find instances of combining classes 1 to 5 with the other classes.
- x) The phenomenon of grouping classes together for teaching (multi-grade teaching) was indicated by about 85% of the government school teachers.
- xi) The phenomenon of grouping classes together for teaching (multi-grade teaching) was only sometimes in private schools.
- xii) About 42% and 30% of the teachers in government and private schools respectively prepare a lesson plan for the lesson. Similar pattern is observed among teachers in rural and urban areas.
- xiii) Majority of the teachers in all schools spend half an hour to two hours on the preparation of lesson. About 25% of the teachers in rural schools do not spend time on the preparation of lesson.

- xiv) The syllabus (curriculum) in Mathematics to the standard that was planned has been completed (at the time of the survey) by the teachers in about 71% and 92% of the rural government and rural private schools respectively. In the case of urban areas 93% of the schools have completed the Mathematics syllabus.
- xv) The Math syllabus has favorable impact on two-thirds of the teachers.
- xvi) Teachers in about 81% of the schools have indicated that the impact of Mathematics syllabus has resulted in the improvement of children's participation in the classes.
- xvii) Teachers in about 95% of the schools have indicated that the Math syllabus is relevant.
- xviii) Teachers in about 69% of the schools have indicated that the Math syllabus is easy and about 28% indicated that it is manageable.
- xix) About 85% of the teachers give homework to children every day and about 12% of the teachers give homework to children once in 2-3 days.
- xx) The homework given to children is corrected by about 76% of the teachers and another 18% of the teachers correct homework of children once in 2-3 days.
- xxi) About 92% of the teachers have indicated that they could satisfactorily mark / correct the homework of almost all the students.
- xxii) The main difficulties faced by the teachers in correcting the homework of the children are too many classes to teach (66%) and too many students in the class (21%).
- xxiii) If students do not complete their homework, about 43% of the teachers suggested punishment and another 45% of the teachers suggested counseling as the usual course of action.
- xxiv) 97% of the government teachers and 33% of the private school teachers in rural area; 85% of urban government teachers and 12% of urban private teachers indicated that the language of math text is Telugu. On the whole 75% of teachers in rural area and 21% in urban irrespective of the type of school indicated that the math text is in Telugu.
- xxv) 65% of rural private teachers and 86% of urban private teachers admitted that the math text is in English language.
- xxvi) We also noticed that math text is in Urdu language as informed by few teachers.
- xxvii) It may be noted that the main language used in teaching Math class is

predominantly Telugu in government schools and English in private schools. We also find that the Math class is taught in the Urdu language in about 15% of the urban government schools.

- xxviii) It may be noted that the Telugu language is used for informal communication in almost all the government schools and English language in private schools. We also find that the Urdu language is used for informal communication in about 15% of the urban government schools.
- xxix) As per the teachers' response, children in about 76% of the government schools understand the official medium of instruction as compared to children in about 32% of the private schools. We also find that less than quarter of children in about 36% of the private schools understand the official medium of instruction as compared to the children in about 13% of the government schools.
- xxx) Teachers from more than 80% of the schools have suggested using the local language assistant if children do not understand the official medium of instruction.
- xxxii) Teachers from about 64% of the schools have indicated that the language of the Math textbooks in aiding children's learning is good. Another 32% have indicated that it is very good.
- xxxiii) Teachers from about 66% of the schools have indicated that the pictures / illustrations contained in the Math textbooks in aiding children's learning is good. Another 30% have indicated that it is very good.
- xxxiv) Teachers from about 62% of the schools have indicated that the exercises / activities provided in the Math textbooks in aiding children's learning is good. Another 33% have indicated that it is very good.
- xxxv) Teachers from about 62% of the schools have indicated that examples used in the Math textbooks in aiding children's learning are good. Another 32% have indicated that it is very good.
- xxxvi) Teachers from about 50% of the schools have indicated that the space for local context in the Math textbooks in aiding children's learning is good. However, teachers from about 32% of the schools have indicated that it is bad.
- xxxvii) Teachers from about 49% of the schools have indicated that the space for local language / dialect in the Math textbooks in aiding children's learning is good. However, teachers from about 33% of the schools have indicated that it is bad.
- xxxviii) As per the math Teachers, the school children incurring various costs during the year 2010-11 are as follows:

- About 74% and 90% children in rural private and urban private schools respectively incur expenditure on school fee.
- About 23% of private school children incur expenditure on registration fees.
- About 51% of private school children incur expenditure on fees for all examinations or photocopying.
- About 16% of the rural private school children and about 5% of the urban private school children incur expenditure on fees for food provided at the school.
- About 14% of the rural private school children and about 9% of the urban private school children incur expenditure on accommodation provided by the school.
- About 30% of the private school children incur expenditure on other charges at the school.
- We do not find any significant proportion of government school children incurring expenditure on various school related items.

Teacher Response on Young Lives Children

Math teacher was requested to respond on some questions relating to the young lives children. The questions include parent teacher meetings, child's progress, performance of the child in the term examinations etc. The responses are summarized below.

- i) In about 80% of the schools, parents / caregivers of the child visit school to check the child's progress.
- ii) Since the beginning of this year, child's progress has been moderately improved in about 60% of the schools and it is moderately or severely deteriorated in about 22% of the schools.
- iii) Performance (grades) of young lives children in the quarterly examination in the language (Telugu / English / Urdu), Math and Overall is tabulated in the given in table 5.3. The results reveal that 45% of the young lives children studying in rural schools are scoring A grade in languages 38% in math subject and overall 33% getting A grade in rural schools. But those in urban areas are performing better.

Table 5.3: Performance (grades) of young lives children in the quarterly examination in the language (Telugu / English / Urdu), Math and Overall according to category of school

	Category of school					
	RG	RP	Rural	UG	UP	Urban
Language						
A grade	0.41	0.55	0.45	0.53	0.53	0.53
B grade	0.37	0.33	0.36	0.27	0.27	0.27
C grade	0.21	0.09	0.17	0.18	0.14	0.14
Math						
A grade	0.31	0.55	0.38	0.41	0.48	0.47
B grade	0.39	0.32	0.37	0.27	0.34	0.33
C grade	0.27	0.11	0.22	0.32	0.14	0.16
Overall						
A grade	0.27	0.49	0.33	0.41	0.45	0.44
B grade	0.44	0.38	0.42	0.41	0.36	0.37
C grade	0.26	0.11	0.22	0.18	0.12	0.13

It is heartening to note that misbehavior of young lives children is insignificant. We may note that about 9% of young lives children from private schools could not pay school fees. In the case of poor academic results, the important actions taken were reporting to Head Master (13%), inviting parent to school (19%) and talk to child (58%). In the case of failure to complete homework, the important actions taken were inviting parent to school (12%) and talk to child (72%). In the case of child's health problems, the important actions taken were visiting child's home (19%), inviting parent to school (54%) and talk to child (13%). In the case of lack of textbooks, notebooks or pens, the important actions taken were reporting to HM (14%), inviting parent to school (34%), talk to child (24%) and help through teacher (15%). If the family has not paid school fees, the important actions taken were reporting to Head Master (41%), visit child's home (12%), inviting parent to school (35%) and talk to child (12%).

Homework book Assessment by the Researchers

Researchers are asked to check the homework books of the children and answer questions which include whether teacher has corrected, marked by the teacher, and any corrections made in the books etc., and these responses are analyzed and indicated below.

- Researchers observed that about 91% of the children have class homework book
- Every exercise / piece of work has been marked by teacher in the cases of 19% and 55% of children belonging to government and private schools respectively.
- More than 75% of the homework in each book has been examined in the cases of 25% and 26% of children belonging to government and private schools respectively. None of the exercises / pieces of work has been corrected in about 11% of the government school children.

- Only simple symbol marking has been marked by teacher in the cases of 89% and 74% of children belonging to government and private schools respectively.
- Detailed marking of homework with comments is observed in the case of 18% of children belonging to private schools.
- The comments were only in Telugu in the cases of 46% and 7% of children notebooks belonging to government and private schools respectively.
- The comments were only in English in the cases of 9% and 55% of children notebooks belonging to government and private schools respectively.

Summary and Conclusions

Mere achieving a high enrolment in schools may not be sufficient; rather there is a need for achieving the learning levels appropriate to the grade studying/studied. The enrolment and learning levels are influenced by the attitude of children, classroom process, teacher ability and teaching. School-based data as a part of young lives study has potential to answer these parameters about children's primary education. These children are around nine year old spreading across all the regions in the state of Andhra Pradesh. We have examined math teacher ability and observed math teacher classes. The results relate to the year 2010-11 coinciding the year of implementation of Right to Education (RTE) act and can even serve as a baseline of RTE. Little over one fourth of the children irrespective of the gender indicated that making an extra effort rarely leads to success; feel bored while listening to the lessons and also noticed teasing in schools. Further, around one third of the children irrespective of the type of school do not ask teacher for help when they get stuck with any problem. All these vindicate the need for right atmosphere in the school - more importantly children friendly attitude of teachers and commitment towards quality education. Children experienced that access to books other than the text books is better in government schools compared to the private schools and about 38% of the children irrespective of gender and type of schools indicated that they are afraid of going to toilet (due to bad maintenance) in the school. Half of the children admitted that their classrooms are with full of noise and not suitable atmosphere for learning; over one fourth observed that their class teacher never questions them if they do not bring books and pencils; over one third pointed out that their class teacher does not attend to school; noticed incidence of physical punishments by the teachers and about 60% of the children admitted that their teachers are always late to the class. All these indicate callous attitude of teachers towards their duties.

Math teachers are assessed indirectly about their mathematical ability. We informed the teachers that we are trying to understand how teachers provide feedback when students make a mistake. It is heartening to note that the performance of the rural government teachers is significantly higher than the performance of the rural private teachers and also higher than the performance of urban government teachers as well as

urban private teachers. We also find that the performance of the teachers in rural government schools is consistently uniform compared to teachers in urban private schools.

With regard to the performance, the mean score of rural school children in numeracy and simple mathematics is smaller compared to urban school children; and similarly smaller in government schools compared to urban schools. However, there is no difference in performance between rural government school children and urban government school children in English language. Similar results hold even in the performance of Telugu language test. The wealth index of parents has positive and significant impact on the performance of children in mathematics and English but not in the case of Telugu. The number of children in the child's family has significant negative impact on the performance of children in all the three tests. The mathematical ability of teacher (as reflected in the mathematical ability test score) has significant positive impact on the performance of children in the mathematics.

Classroom observation was conducted to examine various interpersonal interactions between teachers, teaching aids if any, and students in the classroom. For this purpose, the classroom observation is divided into two parts - a child observation and a teacher observation by separate investigators. We have divided the activities of the children and teachers as desired and undesired for the purpose of analysis. The percent of time devoted by children to desired activities displayed a significant decreasing trend during the first thirty minutes of lecturing by teachers across all categories of schools indicating that the children are not able to retain concentration. The concentration among the children is gradually decreasing after 10 minutes of lecturing. The significant undesired activities in which children involved are: lack of concentration on teacher and simply waiting. The result holds well across all categories of schools. It is the responsibility of teacher to see that the children are concentrating on what he/she is teaching. Possibly, suitable teacher training is desirable to take care of these undesired activities of children and thereby retain concentration of children on the teacher's lecture for a longer or desired period of time.

The teachers could incorporate the use of textbooks in their lessons in about 76% and 59% of the private and government schools respectively. During the lesson, the teacher shouting at or scolding children is observed in about 42% and 25% of the private and government schools respectively and teacher using a cane / stick / ruler to intimidate the children is observed in about 16% and 11% of the private and government schools respectively. Half of the teachers observed did not encourage / praise the students when they have done their work correctly which is very much essential for the teachers and a sense of moral boost for the students. All these reconfirm the need for thorough revision

of training inputs of teachers or lack of intensive training. Mere teacher-oriented activities may not yield desired results and sufficient time on child-centered activities may perhaps be the answer. If we examine the child activities, undesirable activities are increasing gradually during the 30 minutes of lecture session. If the children are engaged properly during the lecture session through discussion/interaction with whole class; guiding group work and talking/working with children, children will also be inspired to learn more. Only simple symbol marking has been marked by teacher in the cases of 89% and 74% of children's homework books belonging to government and private schools respectively. Detailed marking of homework with comments is observed in the case of 18% of children belonging to private schools.

References

- Annual Status of Education Report, India (ASER), Pratham, New Delhi, 2012.
- MDG Reports prepared by CESS for Unicef and Government of A P, 2014 forthcoming
- Galab S, P. Prudhvikar Reddy and V N Reddy, "Primary Schooling in Andhra Pradesh: Evidence from Young Lives School Based Component"; CESS Monograph No.30, May 2013.
- Geeta Kingdon (Institute of Education, University of London), Rukmini Banerji (Pratham and ASER Centre) Policy Brief No.5 September 2009. Research Consortium on Educational Outcomes & Poverty; Addressing school quality: Some policy pointers from rural north India
- Rema Hanna (2009), NBER working paper series measuring discrimination in education, Leigh Linden, Working Paper 15057, NATIONAL BUREAU OF ECONOMIC RESEARCH, 1050, Massachusetts Avenue, Cambridge, MA 02138, <http://www.nber.org/papers/w15057>, June 2009)
- Vimala Ramachandran and Madhumita Pal, Educational Resource Unit and Dr. Sharada Jain, Sunil Shekar, Jitendra Sharma of Sandhan, Jaipur - Report April 2005 on Teacher Motivation in India.
- Woodhead, M Frost, & James., (2012), "*Does Growth in Private Schooling Contribute to Education to All?, Evidence from a Longitudinal, Two Cohort Study in Andhra Pradesh, India*" International Journal of Education Department, 2012.

Current CESS Working Papers

Working Paper	Paper No.
<p>Approach for Agricultural Development in Andhra Pradesh in the 12th Five Year Plan Period <i>S. Galab, P. Prudhvikar Reddy</i></p>	<p><i>May, 2013 (CESS Working Paper)</i> 133</p>
<p>Development through Community Participation in Pindiprolu during 1981 - 2006: A study under sustainable Livelihoods Approach <i>A. Venkateswarlu</i></p>	<p><i>January, 2014</i> 132</p>
<p>Soil Health: Issues and Concerns - A Review <i>B. Suresh Reddy</i></p>	<p><i>November, 2013 (RULNR Working Paper No. 23)</i> 131</p>
<p>Non-Pesticidal Management of Pests: Status, Issues and Prospects - A Review <i>B. Suresh Reddy</i></p>	<p><i>November, 2013 (RULNR Working Paper No. 22)</i> 130</p>
<p>A Comparative Analysis of The Patent Systems of The Brics Countries <i>C. Niranjan Rao</i></p>	<p><i>August 2013 (CESS Working Paper)....</i> 129</p>
<p>Industrial Development in Andhra Pradesh Inter-Regional Disparities in Post-Reform Period? <i>G. Alivelu</i></p>	<p><i>July, 2013 (CESS Working Paper)</i> 128</p>
<p>Decentralised Forest Governance, Institutions and Livelihoods in Odisha: A Study of Evolution of Policy Process and Politics <i>Bishnu Prasad Mohapatra</i></p>	<p><i>July, 2013 (RULNR Working Paper No. 21)</i> 127</p>
<p>Legalising Rights through Implementation of Forest Rights Act 2006: A Critical Review on Odisha and Jharkhand <i>Tapas Kumar Sarangi</i></p>	<p><i>May, 2013 (RULNR Working Paper No. 20)</i> 126</p>
<p>Food Prices and Child Nutrition in Andhra Pradesh <i>S. Galab, P. Prudhvikar Reddy</i></p>	<p><i>May, 2013 (CESS Working Paper)</i> 125</p>
<p>Plan Financing in Andhra Pradesh - Trends and Concerns <i>G R Reddy</i></p>	<p><i>November, 2012 (CESS Working Paper)</i> 124</p>
<p>Fiscal Transfers from Centre to Andhra Pradesh <i>R. Sudarsana Rao</i></p>	<p><i>November, 2012 (CESS Working Paper)</i> 123</p>