

Teaching Quality Counts:

How Student Outcomes Relate to Quality of Teaching in
Private and Public Schools in India

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Young Lives, Oxford Department of International Development (ODID), University of Oxford,
Queen Elizabeth House, 3 Mansfield Road, Oxford OX1 3TB, UK

Tel: +44 (0)1865 281751 • E-mail: younglives@younglives.org.uk

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Abstract

This mixed-methods paper investigates whether the ‘private school premium’, as manifested in student learning outcomes, is the result of better-quality teaching in private schools. Using school-, community- and household-level data from the Young Lives longitudinal study in the state of Andhra Pradesh in India, this paper makes a detailed comparison of 227 government and private schools attended by the children in the sample. We use detailed information on school-based components and information from classroom observation, as well as household- and individual-level information and qualitative interviews, for our analysis.

We look at the effect of teaching quality on children’s test scores, controlling for lagged test scores of children and for several household-, child-, class- and school-level characteristics. The results from our regression analysis suggest that children in private schools have a significantly higher (at 1 per cent) mathematics score than children in government schools. A key finding is that specific teacher characteristics and practices have emerged as important factors in determining children’s learning outcomes. While standard characteristics of teachers like experience, gender, content knowledge and subject specialisation do not have any significant influence on children’s learning outcome, teaching practices such as regularity in checking homework and factors such as the proximity of the teacher’s residence to the school and teachers’ attitude towards the children, as well as teachers’ perceptions of their schools, have emerged as important determinants of students’ test scores. In short, it is what the teacher ‘believes and does’ in the classroom that has the maximum impact on children’s learning outcomes.

Another key finding of our analysis is that the students of teachers with professional qualifications have significantly higher outcomes (at 10 per cent in value-added specification) than children taught by teachers with only senior secondary education. Students of teachers with Bachelors or Masters degrees in Education do not have significantly better outcomes than those taught by teachers with general degrees, after controlling for other factors. This has significant implications for policy formulation regarding teacher recruitment and pre-service teacher training, as well as the development of regulatory frameworks for both the public and private education sectors, in light of the Right to Education Act, 2009. There is a need to shift from a focus on pure credentials, such as education-related qualifications, to an examination of the content and process adopted by pre-service training courses, with a view to enhancing teachers’ competencies in effective instructional strategies, so that students get the instruction they deserve. Setting standards for teaching and learning, to create appropriate benchmarks for both government and private schools, is the need of the hour and should be addressed as a matter of urgency.

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The authors

Renu Singh has over 20 years' experience in teaching, teacher education, education policy analysis and research, both in India and abroad. She was trained as a Montessorian and special educator. Her doctoral study was on the inclusion of marginalised children and her special interests remain early childhood development, teacher education and gender. She has held a number of prestigious positions at NGOs, including Save the Children, and in university departments. She has also advised the Indian Government by serving on a variety of working groups, committees and boards. Currently she is the Country Director at Young Lives India, a Senior Advisor at Save the Children and Visiting Professor at Jamia Millia Islamia University, New Delhi.

Sudipa Sarkar has an MA in Economics from Rabindra Bharati University, Kolkata. She has worked at the Indian Statistical Institute, the Indian Institute of Public Administration and the Institute of Rural Management in Anand. Her research has been related to the economics of education, occupational changes, returns to education and informal employment in India. She is currently working as Research Associate at Young Lives India.

About Young Lives

Young Lives is an international study of childhood poverty, following the lives of 12,000 children in 4 countries (Ethiopia, India, Peru and Vietnam) over 15 years. www.younglives.org.uk

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TEACHING QUALITY COUNTS: HOW STUDENT OUTCOMES RELATE TO QUALITY OF TEACHING
IN PRIVATE AND PUBLIC SCHOOLS IN INDIA

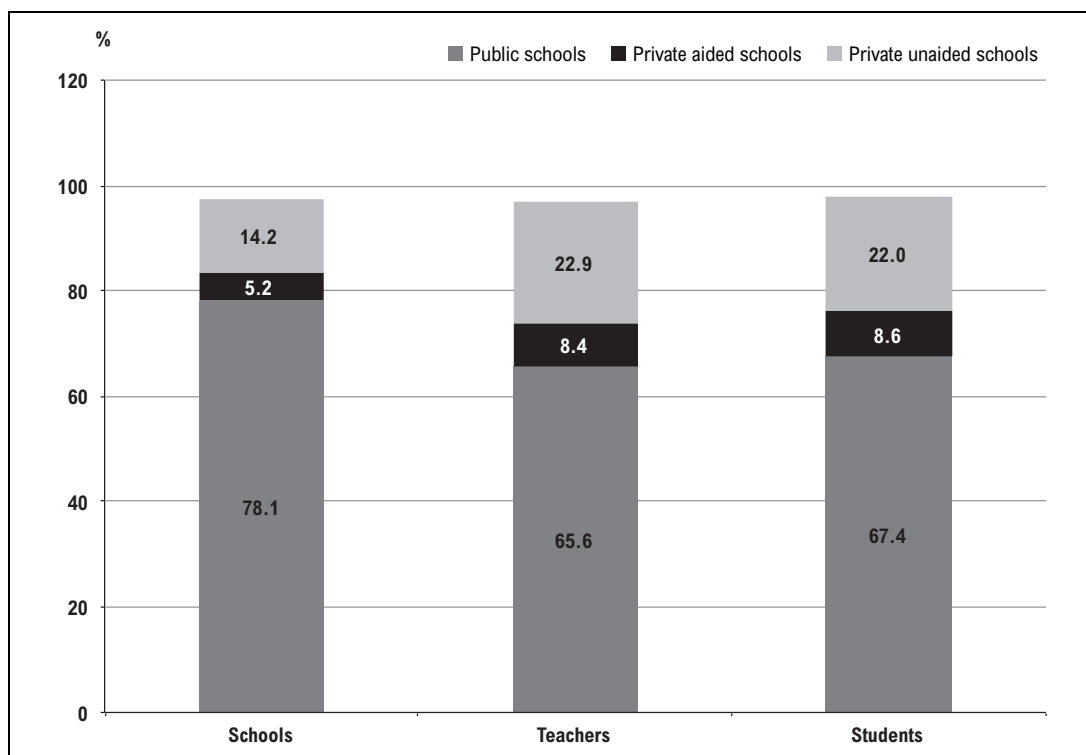
1. Introduction

“All children and young people of the world, with their individual strengths and weaknesses, with their hopes and expectations, have the right to education. It is not our education systems that have a right to certain types of children. Therefore, it is the school system of a country that must be adjusted to meet the needs of all children.”

B. Lindqvist, UN Rapporteur, 1994

India launched its flagship programme Sarva Shiksha Abhiyan (Education For All) in 2001, to achieve the second Millennium Development Goal (MDG 2) of universal primary education. As a result, recent years have witnessed a huge increase in enrolment in both government schools and private schools across the country. There is indisputably a growing shift towards private schooling, not only in urban areas, but also across rural India, where low-fee private schools have mushroomed, carrying the fashionable tag of ‘English medium’. Studies such as the Seventh Annual Survey of Education, show an increase in private school enrolment at national level (in the 6 to 14 age group) from 18.7 per cent in 2006 to 25.6 in 2011, except in Bihar the only state in which the proportion of students enrolled in private schools has decreased because large number of government schools were opened and teachers recruited (ASER 2011). National statistics reveal that in 2010–11, 193,051,999 students were enrolled in elementary classes in India (Grades 1 to 8), of which 67.4 per cent were enrolled in government schools and just over 30 per cent of students attended schools that are either private aided or unaided (DISE 2010–11). Thus, in spite of rising private school enrolment (seen in Figure 1), the majority of schools (78 per cent) are government schools, while 5.2 per cent of schools are private aided, and 14.2 per cent, private unaided (DISE 2010–11). Interestingly the proportion of teachers was 65.5 per cent in government schools, 8.4 per cent in private aided schools and 23 per cent in unaided schools (Figure 1). While it is evident that there are more government schools than private schools, private schools have a higher proportion of the available teachers.

Figure 1. *Percentage of government, private-aided and private unaided schools in India and of students and teachers at each type of school*



Source: DISE, 2010–11

1.1 School categories

It has become increasingly clear that Education For All (EFA) Goals cannot be achieved by merely achieving universal enrolment – quality education is and an inherent right of every single child, irrespective of gender, caste, ethnicity, religion, socio-economic background, ability or location, and this right must be realised. In India, schools are broadly divided into three categories: (1) government schools run by state education departments, i.e. government-owned and controlled and which do not charge fees; (2) private aided schools, i.e. schools managed by private bodies but receiving funds from the Government to pay the salaries of teachers, and which also do not charge fees; and lastly (3) private unaided schools, which are privately managed, do not get any aid from the Government and survive by charging fees. The private unaided schools, set their own admission rules and fee structure, and tuition fees vary from Rs30 to Rs3,000 (approximately US\$0.5 to US\$5.5) per month, depending on the location and services provided by the school. It is critical to mention at the outset that private schools are not homogeneous and that is why one can find very low-fee schools in rural areas and urban slums of India, and internationally competitive high-fee schools in urban areas, catering for rich families.

These three categories of schools are subsumed under the categories of recognised and unrecognised schools. Recognition is an official ‘stamp of approval’ given by the State Government to schools which fulfil certain requirements related to land area, the qualifications of its staff, pupil–teacher ratio, and so on. Unrecognised schools are not given certification by the state Government and are not affiliated to any examination board. Unrecognised schools are in effect operating in the informal sector of the economy. They

have either not applied for recognition, or have not succeeded in gaining recognition from the Government. The official statistics gathered under DISE, the District Information System for Education, do not include details of unrecognised schools.

1.2 Policy context

The Right to Free and Compulsory Education Act, 2009, ratified in April 2010 (RTE Act), has made it a constitutional obligation for all 35 states and Union Territories in India to provide children between the ages of 6 and 14 with access to free and compulsory education in a neighbourhood school until the completion of elementary education (Article 3). At the time the Act was notified, it was estimated that approximately 1.2 million additional teachers were required to meet the prescribed pupil–teacher ratio in government schools was, in addition to ensuring that 0.5 million currently employed unqualified teachers got the requisite qualifications within three years. The total number of contract teachers (those appointed on temporary basis) across the various states was a significant 718,443 or 11.2 per cent of the total number of teachers within both government and private schools (DISE 2010–11).

With enrolment in elementary schools reaching almost universal levels, shortages of teachers (due in part to failure to recruit staff on time), multi-grade classrooms, and low achievement levels by students have become a grim reality in schools across India. This situation has been further aggravated by the pupil–teacher ratios prescribed by the Right to Education Act, 2009: 30 to 1 in primary schools (Grades 1 to 5) and 35 to 1 in upper primary classes (Grades 6 to 8). Although schools with fewer than 60 students, of which there are many, are required to have two teachers, this has still resulted in many government primary schools in the country having multi-grade classrooms.

According to DISE (2010–11), 42.4 per cent of primary schools continue to have a pupil–teacher ratio of over 30:1, owing to a shortage of teachers. Even after the notification of the RTE Act, the percentage of single-teacher primary schools remains at 11.8 per cent, with states like Arunachal Pradesh having 61 per cent single-teacher primary schools. As a result, the critical foundation years in the lower grades are sorely neglected and students from lower grades merely come to school for their midday meal, since teachers tend to focus on Grades 4 and 5. This is further exacerbated by teacher absenteeism and lack of accountability (Ramachandran et al. 2005). A range of quantitative and qualitative studies carried out in the past two decades (PROBE 1999; Ramachandran et al. 2004; De et al. 2001; Majumdar 2001) reveal a distressing picture of low achievement and learning levels among students. The Seventh Annual Survey of Education Report (ASER 2011) has also shown an alarming decline in mathematics skills, with the proportion of Grade 3 students able to solve subtraction problems falling from 36.6 per cent in 2010 to 29.9 per cent in 2011. According to the same report, the ability of children in Grade 5 to do a similar subtraction problem dropped from 70.9 per cent in 2010 to 61 per cent in 2011. The Recent PISA (Programme for International Student Assessment) results for 2009–10, put India in 72nd position out of 73 countries that participated in student assessments in mathematics, reading and science. Although many factors contribute to this situation, teachers undoubtedly play a key role. Public debates on the quality of education have invariably led to the question of how teachers can be made accountable and what the Government should do to ensure that teachers actually attend school and teach children (Ramachandran et al. 2005).

Policy planners are faced with a situation where even the poorest of families are opting for low-fee ‘English-medium’ private schools, which are often run by entrepreneurs such as young graduates or someone with rooms to spare. The XII Plan Approach Paper

(Government of India 2011) mooted the idea of a 'Public Private Partnership' (PPP) in education and 6,000 model schools are going to be developed across the country, with private players and the Government entering into partnership. The Right to Education Act also mandates the reservation of 25 per cent of places in private schools for students from economically weaker families, which will result in a further migration of poorer children into private schools. It is crucial in the wake of the RTE Act being rolled out that we understand the recent phenomenon of poor people spurning government schools with no tuition fees and free meals, and *choosing* private schools where significant payments have to be made. It is critical to note that at this stage no blueprint, standards or mechanisms exist to assure teaching quality comprehensively across government and private schools.

1.3 Teaching quality

The EFA goals and MDG 2 cannot be realised unless needs of all learners are met and this is highly dependent on teaching quality. Teaching and teacher quality have innumerable definitions and are sometimes linked together and sometimes treated as separate issues. This paper considers teaching quality to be an amalgamation of both teacher characteristics, such as inputs (professional qualifications, experience, place of residence, in-service training, etc.), and what the teacher 'does' and demonstrates in the classroom (practices, attitudes, content knowledge). This has been aptly elaborated by Fenstermacher and Richardson (2005):

Quality teaching can be understood as teaching that produces learning. In other words, there can indeed be a task sense of teaching, but any assertions that such teaching is quality teaching, depends on student learning we label this sense of teaching *successful teaching* [our emphasis]. (p. 186)

The assumption that good-quality teaching leads to better student outcomes is one that this paper adopts, since teaching is as seen as facilitating learning, and we focus on the learning and achievements of students in mathematics across both government and private schools.

1.4 Literature review

Global teaching research has provided evidence that the influence of teachers is the single most important factor in determining student achievement (Coleman et al. 1966; Sanders and Rivers 1996; Rice 2003). The European Commission Report, *Improving the Quality of Teacher Education* (2007) observed 'research shows that teacher quality is significantly and positively correlated with pupil attainment and it is the most important within-school aspect explaining students' performance' (p.3). Many recent studies undertaken in the USA focusing on school effectiveness have clearly shown that teacher quality – whether measured by content knowledge, experience, training and credentials, or general intellectual skills – is strongly related to student achievement (Center for Public Education 2005). Studies have found that while the impact upon the child of the teacher and the school may be as great in the area of social outcomes as in academic outcomes, the teaching and schooling factors associated with social outcomes were smaller in number than those that could be related to academic achievement (Mortimore et al. 1988; Sammons 1996). The Mortimore study, conducted in UK primary schools, focused not only on mathematics, reading, writing and attendance, but also on social outcomes such as self-esteem and attitude towards school. Hanushek and Rivkin (2006) highlight that teachers represent the most significant resource in schools contributing to academic achievement. Their research identifies teacher quality as the most important school-related factor influencing student achievement. They conclude from their analysis of 400,000 students in 3,000 schools in the USA that, while school quality

is an important determinant of student achievement, the most important predictor is teacher quality. In a study of primary schools in the UK, Muijs and Reynolds (2000) noted that there was a difference of over 20 mathematics 'points' between students taught by the most effective and least effective teachers in the sample of primary schools in the UK.

Darling-Hammond (2000) stresses that teacher quality is one of the most important factors contributing to student achievement, more significant than class size. Of all the variables associated with effective schools, the quality of teaching both has the most consistently demonstrated impact on student learning and is within the power of schools to do something about (Wyatt 1996). The McKinsey report (Barber and Mourshed 2007), which studied 25 school systems, identified teacher quality as being crucial to high-quality education.

Since India gained its independence, various policy documents have exalted the position of teachers. For example, the University Education Commission (Government of India 1966) professed that 'the destiny of India is now being shaped in her classrooms' (p. 2). Teaching quality has been noted to have a huge influence on student outcomes and in recent years this has been reiterated in the National Curriculum Framework (Government of India 2005) which highlighted that 'the quality and extent of learner achievement are determined primarily by teacher competence, sensitivity and teacher motivation'. Despite policymakers attributing considerable importance to the role of teachers (Government of India 2009a), very little evidence exists to qualify what constitutes 'good teaching' in the Indian context. While many studies have undertaken comparisons of private and government schools in India and proclaimed the cost-effectiveness of private schools (Kingdon 1996a, 1996b; Tooley et al. 2007) and also shown that they have higher test scores (PROBE 1999; Ramachandran and Saihjee 2002; Ramachandran et al. 2004; Muralidharan and Kremer 2006), not many studies have focused on quality of teaching within these schools and its effect on learning outcomes across private and government schools.

This paper examines how teaching and teacher quality in government and private schools are related to student outcomes in mathematics. These are measured by a variety of factors, including teacher characteristics (such as content knowledge, attitudes and professional qualifications), instructional dimensions (such as single- or multi-grade teaching, regularity of feedback given to students on their written work, and the distance of teachers' residences from their schools), and larger organisational dimensions (such as teacher accountability). The latter is measured by the level of maths achievement of children in the schools. The paper makes a critique of systemic issues related to the government education system, which is increasingly being abandoned by even the poorest of families, who are taking on debts but are convinced that their sacrifices will result in a 'better future' for their children. This paper is intended to contribute to the current policy debates about whether unrecognised private schools should be shut down by 2013 unless they comply with RTE norms; and whether 25 per cent of places at private schools should be reserved for economically weaker sections of society. At a time, when the country is trying to devise strategies for filling the gap of 1.2 million teachers needed to meet the RTE norms over the next few years, this paper, by examining not only teachers' qualifications, but also their characteristics and the teaching behaviours that impact on student learning outcomes, provides evidence for policymakers, who often focus solely on teachers' professional qualifications when considering teacher quality. The paper makes policy recommendations that attempt to shift the focus of attention from the current debates around elite private schools, to the quality of teaching in low-fee rural and urban private and government schools, and the implications of this for the education system as a whole.

1.5 Education statistics for Andhra Pradesh

Andhra Pradesh is the fifth-largest state in India, with a population of over 80 million, 73 per cent of whom live in rural areas. It is close to the all-India average on various measures of human development such as gross enrolment in primary school, literacy, and infant mortality, as well as on measures of service delivery such as teacher absence (Muralidharan and Sundaram 2010). It ranks 9 out of 35 states in India on the Composite Educational Index (DISE 2010–11), and has also been impacted by the phenomenon of increasing private school enrolment, similar to national trends discussed earlier. According to DISE 2010–11, in 2010–11 Andhra Pradesh had a total of 107,597 schools imparting elementary education, of which 73.8 per cent (79,358 schools) were government schools (comprising local body/council, tribal welfare and department of education schools) and 22.7 per cent (24,472 schools) were private schools. Amongst the latter, 19.6 per cent were private unaided schools, while a miniscule 3.12 per cent were aided private schools (Table 1).

Table 1. *Number and percentage of government and private schools in Andhra Pradesh, 2008–10*

	Government schools		Private schools		Private schools by management (%)	
	No.	% share	No.	% share	aided	unaided
2009–10	79,813	77.64	22,985	22.36	3.33	19.03
2010–11	79,358	73.75	24,472	22.74	3.12	19.62

Source: DISE 2010–11

In 2010–11, the average number of teachers in government schools in Andhra Pradesh was 4.4, whereas it was 8.7 for private unaided schools. It is important to highlight that the teachers in government schools further fall into the regular teacher and contract teacher (also called ‘vidya volunteer’) categories. Regular teachers in government schools enjoy permanency of employment and pension benefits, whereas contract teachers are much lower paid and are on yearly contracts that need to be renewed. Teachers in private schools, on the other hand, are largely contract teachers and do not get the financial and fringe benefits that the regular teachers in government schools accrue. According to the DISE report for 2010–11, in Andhra Pradesh, 20 per cent of the teachers in government schools and 18 per cent of those in private unaided schools are reported to be contract teachers. These data are problematic, since only part-time teachers in private unaided schools have been interpreted as contractual, whereas the data for government schools include untrained para-teachers not just regular class teachers. There also exists a wide variation in teacher qualifications, with 80 per cent of contract teachers in private schools and 57 per cent of those in government schools being professionally trained (DISE 2010–11).

According to ASER (2010), between 2009 and 2010, the percentage of children (age 6–14) enrolled in private school increased from 29.7 per cent to 36.1 per cent in Andhra Pradesh. Over the period 2001–8, the proportion of children enrolled in municipal schools in Andhra Pradesh dropped from 12 per cent to 8 per cent. This is mainly due to children seeking admission to low-fee private schools that have mushroomed across Andhra Pradesh, particularly in urban areas. It is critical to note that official statistics only capture recognised schools and the number of unrecognised schools remains anecdotal.

1.6 Teaching quality and student outcomes

In the existing literature, there are very few mixed-method papers that draw on longitudinal quantitative and qualitative data which provide information on teaching quality and student outcomes in government and private schools serving mainly poor people in India. In this paper we analyse data from the Young Lives Round 3 survey (2009), longitudinal qualitative research (data from 2010) and the 2010–11 school survey to investigate whether and how teaching quality affects students' learning outcomes.

Young Lives data enables us to examine children's school history and their maths achievement scores across survey rounds. This paper utilises the school survey and the qualitative data, as well as longitudinal survey data, to examine the variations that exist in teaching quality among and between government and private recognised schools in rural and urban Andhra Pradesh. The research question that guides the paper is whether better teaching in private schools is leading to higher mathematics achievement scores than in government schools, when the demographic characteristics of their schools are equalised. Given that parents perceive private schools to be of 'better quality', we have undertaken a factor analysis of teaching quality and its impact on the learning outcomes of children in both government and private schools of Andhra Pradesh. While there is clear evidence that teacher quality is a key determinant of student learning, little is known about which specific observable characteristics of teachers account for this impact (see, for example, Rockoff 2004; Rivkin et al. 2005). Factors that impinge on teaching quality, such as *teacher qualifications* (diplomas or degrees, experience); *teacher characteristics* (subject knowledge, attitude towards students, perception of their schools, absenteeism and distance they live from the school); and *teaching practices* (marking of books) are analysed for their effect on learning outcomes.

The rest of this paper is organised as follows: Section 2 describes the data and sampling technique, while Section 3 describes the methodology followed. Section 4 discusses the results of the analysis, Section 5 consists of discussion and recommendations, and we conclude with Section 6.

2. Data and sampling

2.1 Data

This paper draws on data from the Young Lives study in India (conducted in the state of Andhra Pradesh). So far, data on the Young Lives children, households and communities have been collected in three rounds: 2002, 2006 and 2009 respectively. In 2010–11, a school-based study was conducted on a subset of schools (government and private) attended by some of the Young Lives Younger Cohort, then aged 8 to 9 years, to investigate their quality in the light of a large number of children moving to private schools. After this, a qualitative sub-study, in which children who had frequently changed schools, and their caregivers, were interviewed, was undertaken in 2011. This paper draws on information gathered from the qualitative sub-study and the school-based study. While the child- and household-level data is longitudinal in nature, consisting of three time periods, the school survey data is cross-sectional. However, we have the advantage of also being able to use child- and household-level data from other rounds. In this way, while we mainly look at indicators from the school survey, we can control for background characteristics of the

children and their families by using the longitudinal data. In the following sub-section we briefly illustrate the sampling procedure which was followed for the school survey.

2.2. Sampling

The school-based study was conducted on a primary sample of 953 children in 250 schools in Andhra Pradesh in 2010–11. Child questionnaires were used to garner information about children’s perceptions of school and teaching quality, including teacher absenteeism and teacher behaviour in the classroom. School observations gathered information regarding school physical infrastructure, and classroom observations were used to collect information on classroom processes and teaching and learning methodologies adopted in the classroom. Headteachers were interviewed to provide further data on teacher qualifications, pupil–teacher ratios, teacher dismissal, parental involvement, etc. The school-based study also collected data on teachers employed in these schools. In particular, information was sought from teachers who taught maths to the Young Lives children, using a separate questionnaire. Many of these teachers were not subject teachers alone, and were often the class teacher or even the headteacher. Besides, this we conducted tests in English, mathematics and Telugu for each child. For this paper, we have analysed scores attained in the mathematics test. Since the diagnosis of a student’s errors in mathematics is a fundamental skill for teaching the subject, a test was devised for teacher’s responses to children’s mathematical errors, in order to examine their subject knowledge.

For the purpose of this paper we only take into consideration government and recognised private unaided schools; and we do not consider either private aided or unrecognised private schools. Our final sample consists of 227 schools, 357 teachers and 862 children in government and private unaided recognised schools in both urban and rural areas (Table 2). It is important to note that 63 per cent of the sampled students were enrolled in government schools, while 37 per cent were enrolled in private schools. All 862 children covered in the school survey, the majority of whom were in Grades 3 and 4, have been covered in the analysis.

Table 2. *Schools, teachers and students in sample, by urban/rural location (number and %)*

	Government		Private		Total
	No.	%	No.	%	No.
All schools					
Schools	109	45.73	118	54.27	227
Teachers	198	53.02	159	46.98	357
Students	556	63.19	306	36.81	862
Urban					
Schools	16	15.63	74	84.38	90
Teachers	19	13.85	97	86.15	116
Students	25	13.02	145	86.98	170
Rural					
Schools	93	66.67	44	33.33	137
Teachers	179	73.31	62	26.69	241
Students	531	76.41	161	23.59	692

Source: Young Lives school survey, Andhra Pradesh (2010–11)

The sub-study also captured 33 interviews with District Education Officers and Mandal Education Officers (MEOs) about their understanding of community perceptions of private and government schools, governance and quality issues, particularly within government schools. Figure 2 shows the distribution of private and government schools by school size. Table 3 shows the average number of teachers in government and private schools of differing sizes. Around half the government schools have fewer than 60 students enrolled at primary level, with an average of two teachers, and only 5.5 per cent of government schools have more than 250 students at primary level (Grades 1–5). This phenomenon is reversed in the case of private schools, where fewer than 1 per cent, i.e. a single private school, had fewer than 60 students and more than half had more than 250 students.

Figure 2. *Distribution of government and private schools by school size (up to Grade 5)*

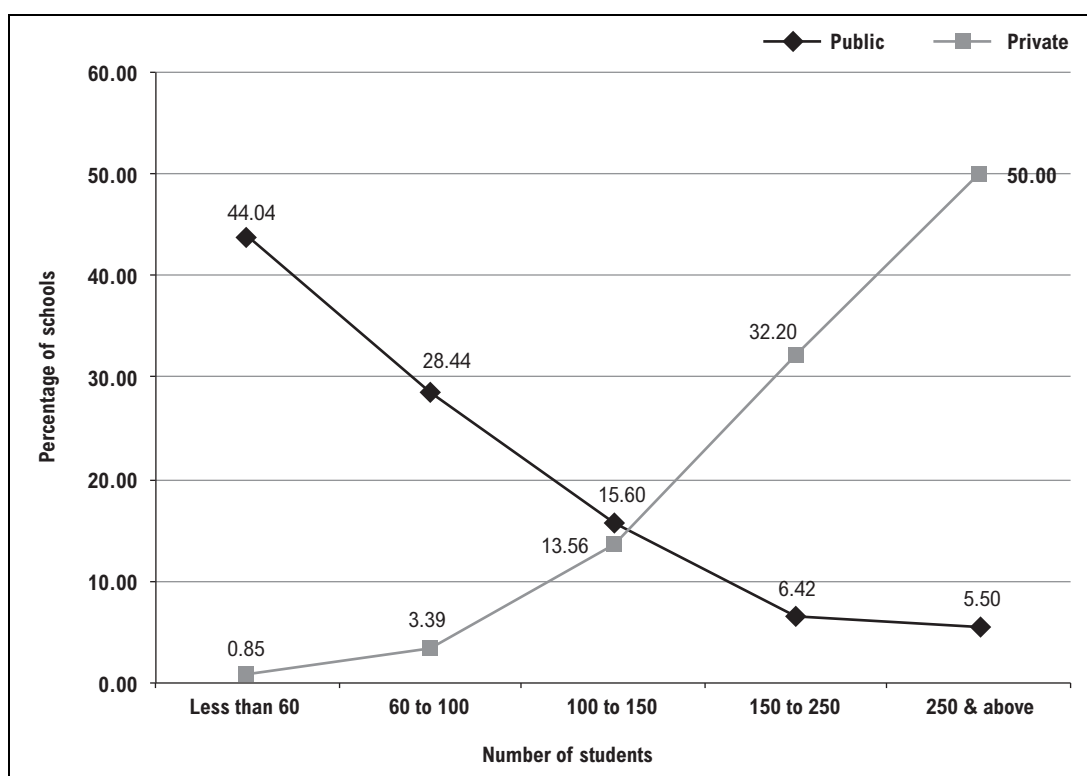


Table 3. *Number of students and respective average teachers in government and private schools up to Grade 5*

Number of students	Average number of teachers	
	Government schools	Private schools
Less than 60	2.38	7.00
60–100	3.61	5.75
100–150	4.59	7.63
150–250	5.29	8.21
250 and above	11.83	12.81
Total	3.78	10.34

Source: Young Lives School Survey, Andhra Pradesh (2010–11)

As mentioned earlier, most private school teachers are on yearly contracts and do not enjoy the same benefits as the regular teachers in the government schools. Private schools have a larger number of teachers across all schools of all sizes (Table 3), with an average of 7 teachers in schools with less than 60 students (i.e. three times that of government schools) and an average of 13 teachers in schools with more than 250 students. With low enrolment and an average of two teachers, the pupil–teacher ratio in 44 per cent of the government schools may very well fall ‘within RTE norms’ i.e. 1:30. However, these numbers are deceptive, since they do not reveal the existence of multi-grade classes within government schools, due to fewer teachers available to teach Grades 1 to 5. The diminishing student population in government schools and the pupil–teacher norm of 1:30 students as per the RTE Act has led to an increase in the multi-grade classrooms in government schools, and government school teachers often teach more than one or two grades within the same classroom.

3. Methodology

To examine the effect of teaching in government and private schools on students’ learning outcomes, we begin with descriptive statistics of teaching quality found in the private and government schools and link them with the students’ learning outcomes. Teaching quality is measured by examining *teacher characteristics* from the Teacher and Child Questionnaires, and *teaching practices* (see sub-section 1.6 for further details). To capture learning outcomes for children, scores from a mathematics test which was conducted during the school sub-study are used. The mathematics achievement test consists of two sections. The first section is aimed at measuring basic quantitative and number concepts. It included seven items on number identification, seriation and simple problem sums, with no time limit. The second section consists of 14 items which include two-digit and three-digit addition, subtraction, multiplication and division with a time limit of six minutes.

We begin with descriptive analysis related to teacher characteristics and practices in government and private schools. This is followed by an investigation of the bivariate relationships between students’ test scores with several relevant variables through cross-tabulation, graphical presentation, and some other statistical tests. However, we also acknowledge the fact that there can be several confounding factors such as socio-economic and other background characteristics coming into play and affecting children’s learning outcomes. To separate out these partial effects and identify the effect of each of these factors, we also carry out a multivariate regression analysis. We estimate two separate regressions. The second one has a similar specification to the first, but in addition it has a variable to capture lagged test scores of the children. In this sense, it is dynamic in nature. The reason for including the maths test score from the Round 3 survey (2009) is that it reflects children’s ability to perform in a similar test. Therefore, in this second specification, which is a lagged value-added specification, we control for the children’s ability to a large extent, in order to yield consistent estimates for the other variables which may be correlated with ability.

4. Analysis and results

In this section, we analyse data to investigate whether and how teaching quality affects students' learning outcomes. Our objective is to examine whether this effect varies across government and private schools. Therefore, we concentrate on the teachers and teaching quality pertaining to mathematics only.

The Round 3 Young Lives India Survey Report (Galab et al. 2011) highlighted that there was a significant increase in enrolment of Young Lives children in private schools at the age of 8 between 2002 and 2009. When the Younger Cohort were aged 8 in 2009, 44 per cent of them were enrolled in private schools, compared to only 23 per cent of the Older Cohort when they were 8 in 2002 (Table 4). It is interesting to note that choice of private schools is not limited only to more affluent families, but the largest number of first-generation learners continue to enrol in government schools (see Table A1 in the Appendix). Table 4 shows that private school enrolment has gone up for every group – male, female, rural, urban and all the different official caste and tribal groupings,¹ and that private school enrolment has approximately doubled in 2009, compared to 2002. However, serious equity concerns exist, with increased enrolment far from evenly distributed and gender-based school choices more prevalent (Woodhead et al. 2011).

Table 4. *Enrolment of 8-year-olds in government and private schools in 2002 and 2009, by gender, location and social grouping (%)*

	2002 (Older Cohort R1)		2009 (Younger Cohort R3)	
	Enrolled in school	of which, in private school	Enrolled in school	of which, in private school
Boys	98.2	25.1	99.2	50.4
Girls	97.0	21.4	99.1	37.1
Urban	97.9	62.3	99.8	80.3
Rural	97.5	10.6	98.9	31.3
Scheduled Castes	98.6	11.6	98.9	29.3
Scheduled Tribes	95.3	12.7	98.4	21.7
Backward Classes	97.6	20.4	99.2	44.2
Other Castes	97.7	45.7	99.8	70.4
Total	97.6	23.2	99.2	44.1

Source: Young Lives, Round 3 (2009)

4.1. Parental perceptions

Before delving into the quantitative measures of teacher characteristics in private and government schools, let us compare parents' perceptions of government and private schools. In 2009 (Round 3 survey), the parents of each child were asked about the main reason for choosing a particular school for that child. Table 5 contains the possible set of reasons and

¹ Scheduled Castes, Scheduled Tribes, Backward Classes and Other Tribes are official designations made by the Government of India. Disadvantaged groups are given legal protection and other benefits designed to compensate for the discrimination they have suffered for centuries.

the distribution of responses by the parents. It is interesting to notice that the reasons cited by majority of the parents who chose government schools are very different from the reasons stated by those parents who sent their children to private schools. Among the parents who sent their children to government schools, 53 per cent said that it was because the school was near to home, another 30 per cent gave the reason of no or low school fees, and only around 6 per cent said it was because of good-quality teaching. On the contrary, among the parents who sent their children to private schools, 63 per cent refer to the reason of good-quality teaching, and 22 per cent chose the private school due to proximity to their home. Thus, good-quality teaching happens to be the most compelling reason as perceived by the parents who decide to send their children to a private school. This observation strengthens the need for an extensive analysis of teaching-quality indicators across government and private schools, to know if the notion of better-quality teaching in private schools is actually true.

Table 5. *Main reason for choosing a particular school – reported by parents*

	Government	Private
School is near to home	52.8	22.6
No other option (only school)	6.0	1.8
No school fees	28.8	1.4
Low school fees	1.8	4.0
Good-quality teaching	5.8	62.7
Other	4.7	7.5
Total	100	100

Source: Young Lives, Round 3 (Younger Cohort)

Interviews with parents, conducted in the qualitative sub-study, to investigate the reasons for parents changing schools, provide us an insight into how parents are making school choices. Contrary to the popular belief that it is only educated parents who are sending their children to private schools.

Raghava a 9-year-old Scheduled Tribe boy whose parents have never attended school, was enrolled in a private school in Grade 5. His mother explains why she does not prefer the government school in their village for her three children: “[I]f we send them there [to government school], certain subjects won’t be taught ... children will be going here and there – going into trees and fields ... then why should we send them [to government schools]?”

(Young Lives qualitative sub-study 2011)

Many parents seem to be opting for private schools, since they want to ensure that their children will be ‘taken care of’ unlike in government schools, where they report a lack of effort and attention to the children.

Supraja’s father is a mason and her mother is a housewife. The family lives in an urban area. They prefer private schools even though they have to spend a large amount of money they can ill afford. Supraja’s mother believes that in government schools, the teachers are not at all bothered whether the students turn up or not to school. However, in the private school: “if my daughter is absent even for a single day they send a message home. They ask us the reason why the child was absent from school. They teach well and they take good care.”

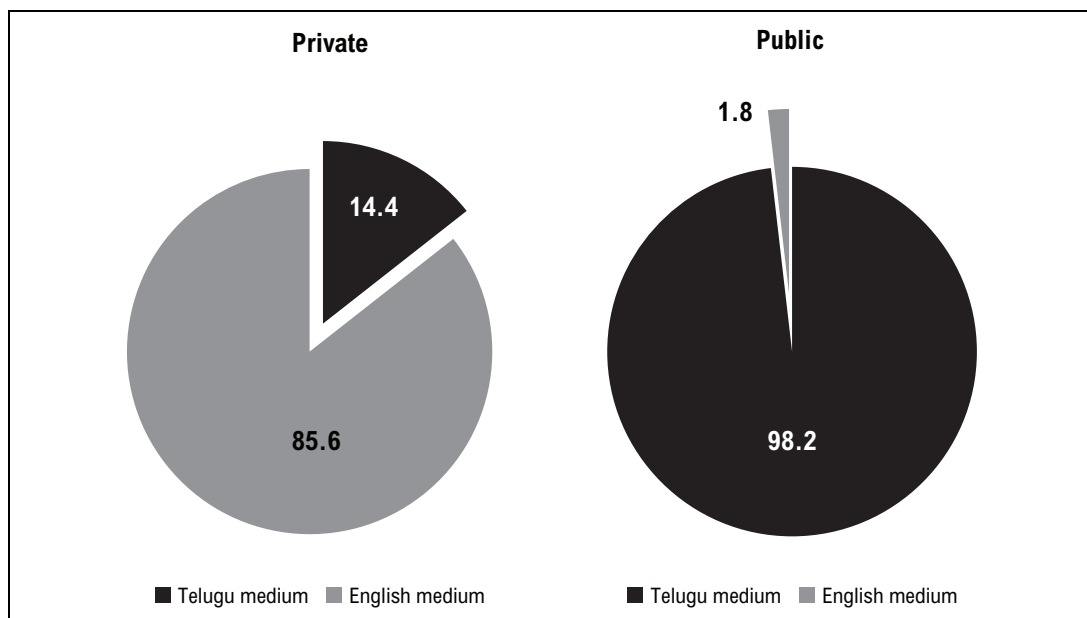
Even those parents who enrol their children in government schools display their helplessness in not being able to afford to send their children to private schools, since they cannot afford the latter. Government schools continue to serve the ‘poorest of the poor’.

Balakrishna studies in an Ashram school and his father is a cowherd and his elder brother, aged 12, never attended school, since he helps his father tend to the animals. The mother explains that they choose the government hostel for their son because: “We are small people. Those who are well off put their children in private school; those who are like me will send them to government school.”

Parents have huge aspirations for their children and ‘English-medium’ instruction is a major reason why parents continue to choose private schools. Eighty-five per cent of the private schools in our sample are ‘English-medium schools’ (Figure 3). On the other hand, only 14 per cent of the government schools were English medium and all of these were located in urban areas.

Jagati’s mother chose an urban ‘English-medium’ private school for her daughter, since there is no English-medium teaching in government schools. “We talk in Telugu at home and outside ... But in degree and in all the studies, English is a must. At intermediate [level]² also, all are English medium only. So we prefer English medium.”

Figure 3. *Percentage of English- and Telugu-medium schools in sample, by private or government status*



4.2. Comparison of learning outcomes between children in government and private schools

Learning outcomes for children in government and private schools were measured by mathematics test scores. The mathematics test consisted of 21 items of number identification, addition, subtraction, multiplication, division and problems.

² 'Intermediate level' refers to senior secondary education in Andhra Pradesh, usually provided in institutions called junior colleges.

Figure 4. Comparison of average mathematics test scores between children at government and private schools %

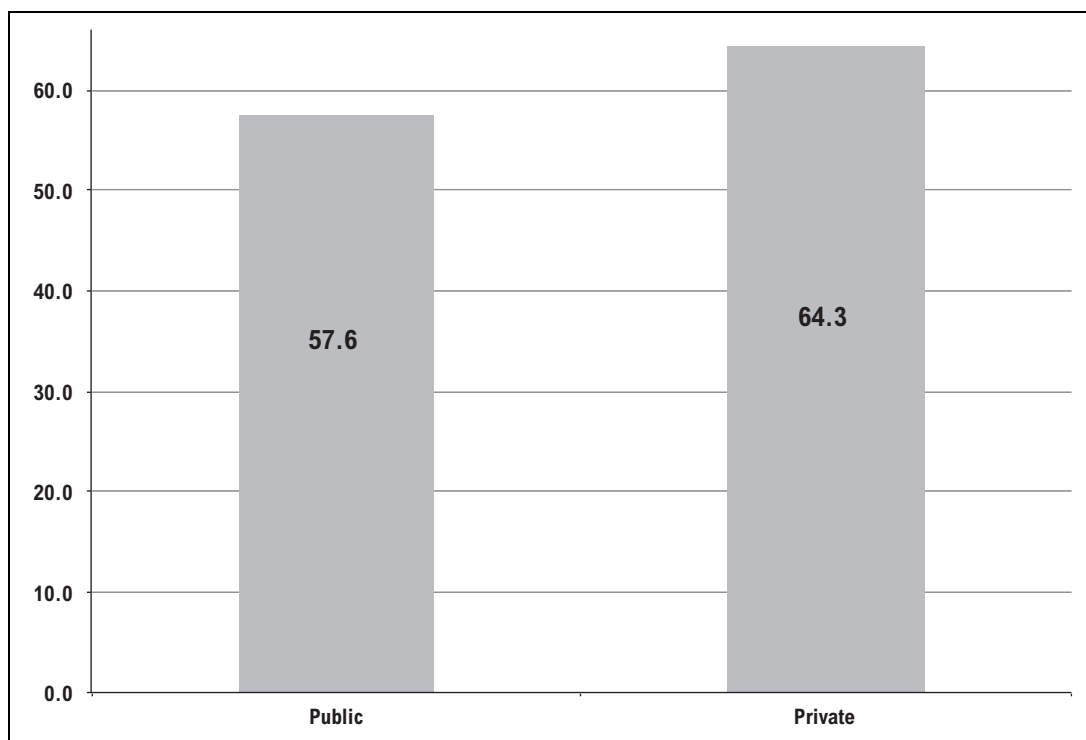
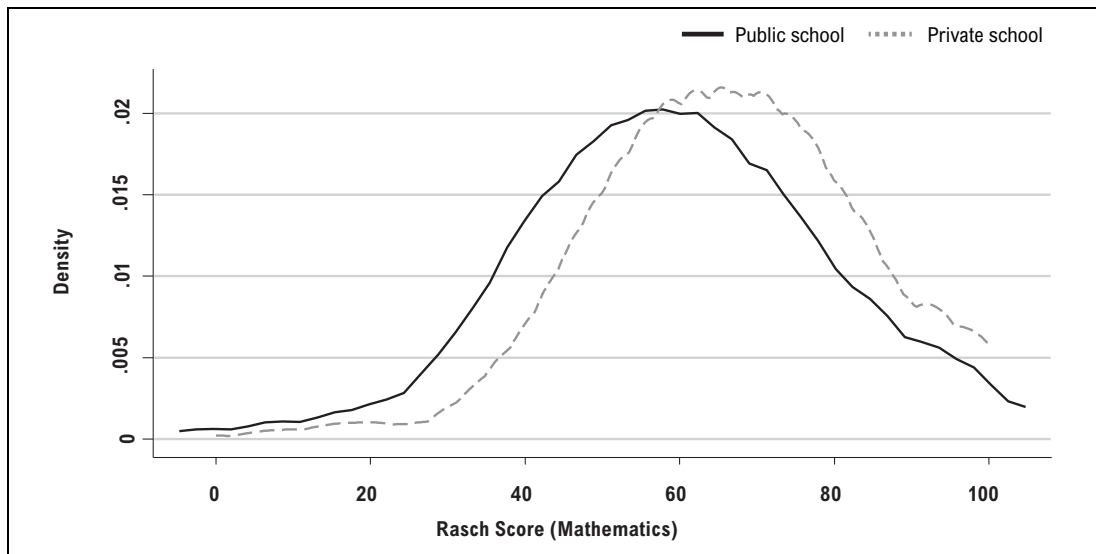


Figure 4 shows that, overall, students in private schools have 6.7 per cent higher average scores in mathematics than students in government schools. A t-test to compare the mean test scores confirms that this difference is statistically significant (at 1 per cent level). The above comparison between the mean test scores, strongly suggests that children going to private schools have a significantly higher learning outcome in mathematics than children who go to government schools. However, with a view to analyse and evaluate their performance in a more elaborate way, we compare the distribution of test scores between children attending government and private schools. Figure 5 juxtaposes the two kernel density functions of maths scores in private and government schools. We notice that not only the mean, but the whole distribution of test scores in private schools is to the right-hand side of the distribution pertaining to government schools. Thus, there is strong evidence from these data that students in private schools are achieving better results, at least in terms of mathematics, than the students in government schools. We recognise that this difference in performance could be due to quality of school inputs or could be due to differences in intakes between government and private schools. In this paper, we try to investigate if test score is affected by teaching quality.

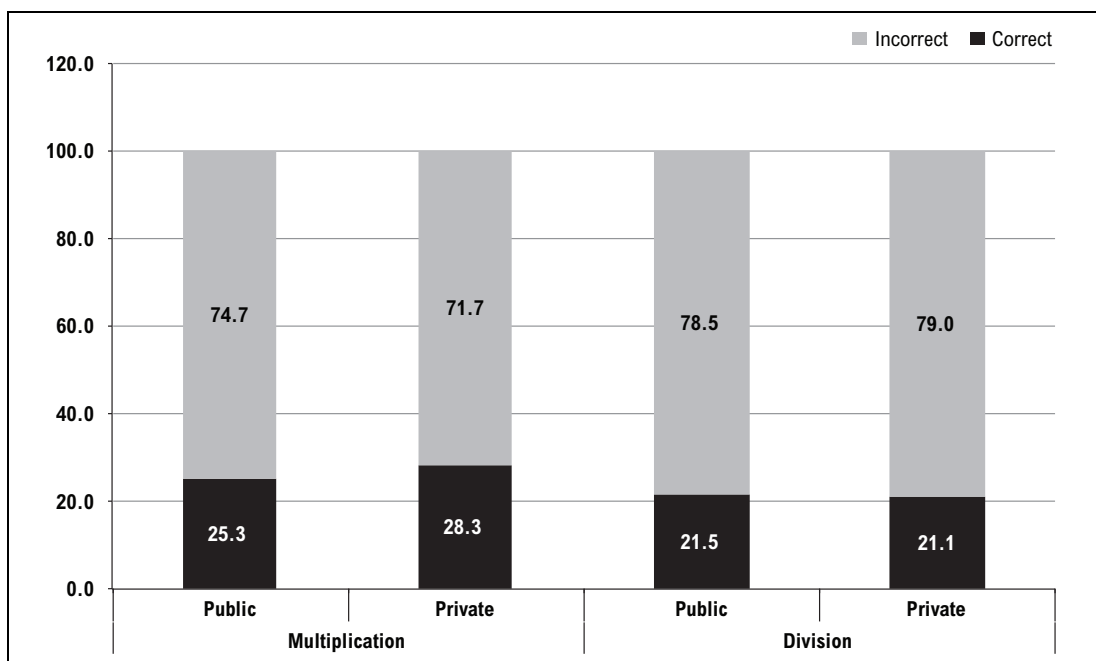
Figure 5. Kernel density estimates of students' mathematics scores by type of school



Source: Young Lives School Survey, Andhra Pradesh (2010–11)

Although private school children are, on average, doing better than government school children, the truth remains that children in both types of schools have clearly not mastered basic mathematical skills such as subtraction, multiplication and division. In private schools, at the age 8, 72 per cent of children could not solve a simple two-digit by one-digit multiplication problem, while 79 per cent could not divide (Figure 6), as against three-quarters of the children in government schools who could not multiply and 79 per cent who could not divide. Therefore it is evident that though achievement scores of students in private school are significantly better than those in government schools, there is still a lot left to be desired in terms of gaining mathematical conceptual knowledge in the schools.

Figure 6. What do the children actually know in mathematics?



Source: Young Lives School Survey, Andhra Pradesh (2010–11)

Since students in private schools are seen to perform comparatively better than those in government schools, supporting parental perception of private schools, we next examine teaching quality comprising teacher characteristics, content knowledge, attitudes and teaching practices in government and private schools. This is to enable us to determine the factors which support or create obstruction in children's learning outcomes.

4.3. Mathematics teachers' characteristics

In this section we will focus on teacher characteristics and see how they differ across government and private schools. As mentioned before, we concentrate only on mathematics teachers. The characteristics of the mathematics teachers in our sample are presented in Table 6. In government schools, teachers who taught mathematics comprised headteachers, regular teachers and 'vidya volunteers'. In private schools 80 per cent of the mathematics teachers were employed as contract teachers.

Table 6. *Mathematics teacher characteristics*

Teacher characteristics	Type of school		Total
	Government	Private	
Mean age	33	28.3	30.8
Gender distribution (%)			
Male	65.8	30.9	49.5
Female	34.2	69.1	50.5
Mean age by gender			
Age (male)	35.5	29.5	33.7
Age (female)	28.2	27.8	27.9
Teaching experience (years)	7.7	4.6	6.3
Qualifications and training			
Dip.Ed/B.Ed/M.Ed	82.3	57.2	71.2
Secondary /Higher secondary	13.1	12.0	12.6
Degree	4.0	24.5	13.2
Masters and above	0.5	6.3	3.1
In-service training during the last academic year (2009/10)	59.6	4.4	35.0
Maths specialisation	17.2	35.8	25.5
Obs.	198	159	357

Source: Young Lives, School survey (2010–11)

Experience and qualifications

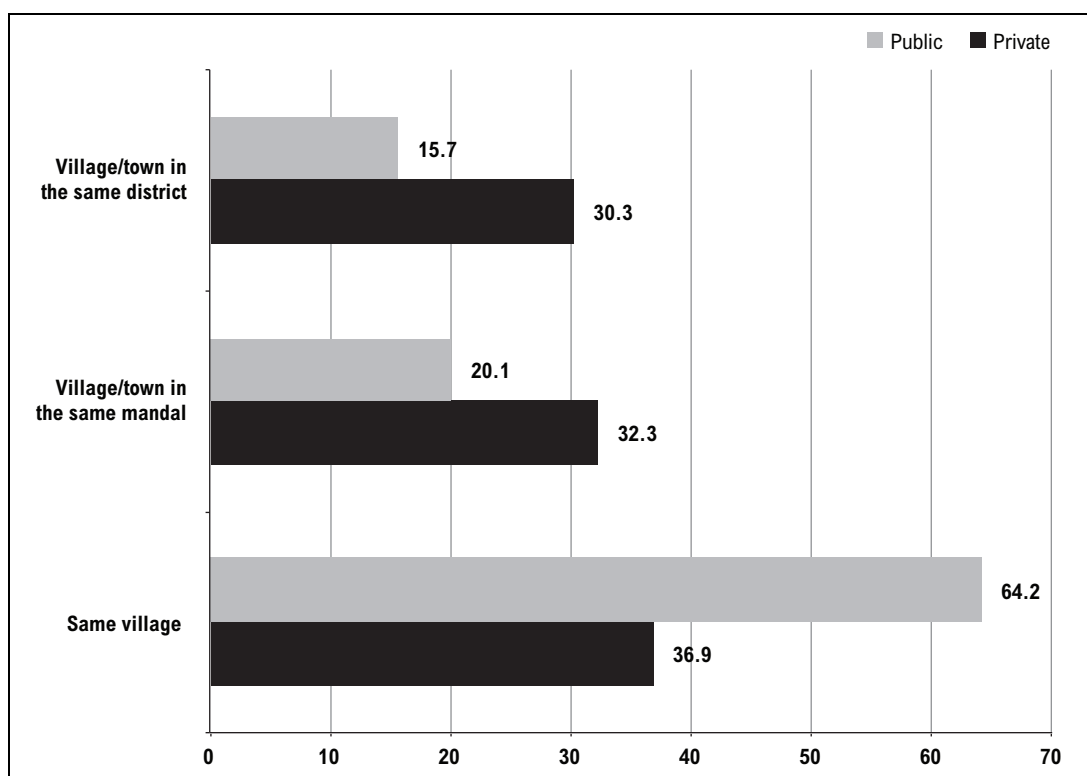
There are more than twice as many female mathematics teachers in private schools as in government schools, and more than twice as many female as male teachers in private schools. Teachers of both genders are found to be younger in private schools. In terms of teaching experience, teachers in government schools have on average three years' more experience than those in private schools. The average number of years of experience of teachers in government schools is 7.3, while in private schools it is 4.7. This is primarily because teachers in low-fee private schools are usually on short-term contracts and are under-paid, leading to large-scale attrition. This is not the case in government schools, where a large majority of teachers are permanently employed (other than the vidya volunteers, who are contractual), and are not willing to give up a permanent government job, which provides them with job security.

A meta-analysis conducted by Bali and Alvarez (2003) had found that teacher credentials had a statistically significant effect on students' test scores: a 10 per cent increase in the number of teachers with full credentials on a school staff increased mathematics test scores by over 1 point. While examining the teaching qualifications of mathematics teachers, we find that 82 per cent of teachers in government schools hold professional teaching qualifications (a Diploma, Bachelor or Master's degree in Education), whereas only 57 per cent of teachers in private school have these qualifications. In private schools, 30 per cent of teachers hold only general Bachelor or Master's degrees and 12 per cent have passed the secondary or higher secondary examination, but have no teaching qualification. On the other hand only 5 per cent of teachers in government schools hold only Bachelor or Master's degrees, while 13 per cent have only secondary or higher secondary certification, without any teacher qualification.

Place of residence and resulting physical and social distance of teachers

It can be argued that in India, if a teacher resides close to their school, or in the same village, this will influence the quality of their teaching positively. Conversely, teachers, who have to travel a long distance to school every day are likely to come late and this may hinder the quality of their teaching. At the same time, due to a lack of qualified persons in smaller habitations and in rural areas, teachers who travel from neighbouring habitations or nearby urban areas may be better qualified. However, since time spent on teaching and learning has been shown in one study to have the most consistently positive effect learning of all relevant factors (Walberg 1998), long-distance travel may be one of the factors affecting student learning outcomes, as it leads to the late arrival of teachers in a large number of government schools, which often caused by poor local transport facilities.

Figure 7. *Location of residence of teachers in relation to their schools*



From our data (Figure 7) we observe that 64 per cent of the teachers from private schools reside in the village their school is in, while only 36 per cent of the teachers in government schools live in the same location as the school. Thirty per cent of the government school teachers travelled from a village or town in the same district but outside the mandal, i.e. they have to travel long distances to school, while only 15 per cent of teachers in private schools had to do the same. This may well explain the high rate of absence of government school teachers. Eighty-five per cent of the education officials interviewed were of the view that teacher absenteeism was a major issue in government schools and attributed this to reasons such as lack of transport, long-distance travel and involvement in their personal activities. This is corroborated by studies such as the SchoolTells Survey which revealed that on any given day, 25 per cent of regular teachers were absent and another 22 per cent arrived late at school (Kingdon et al. 2008).³

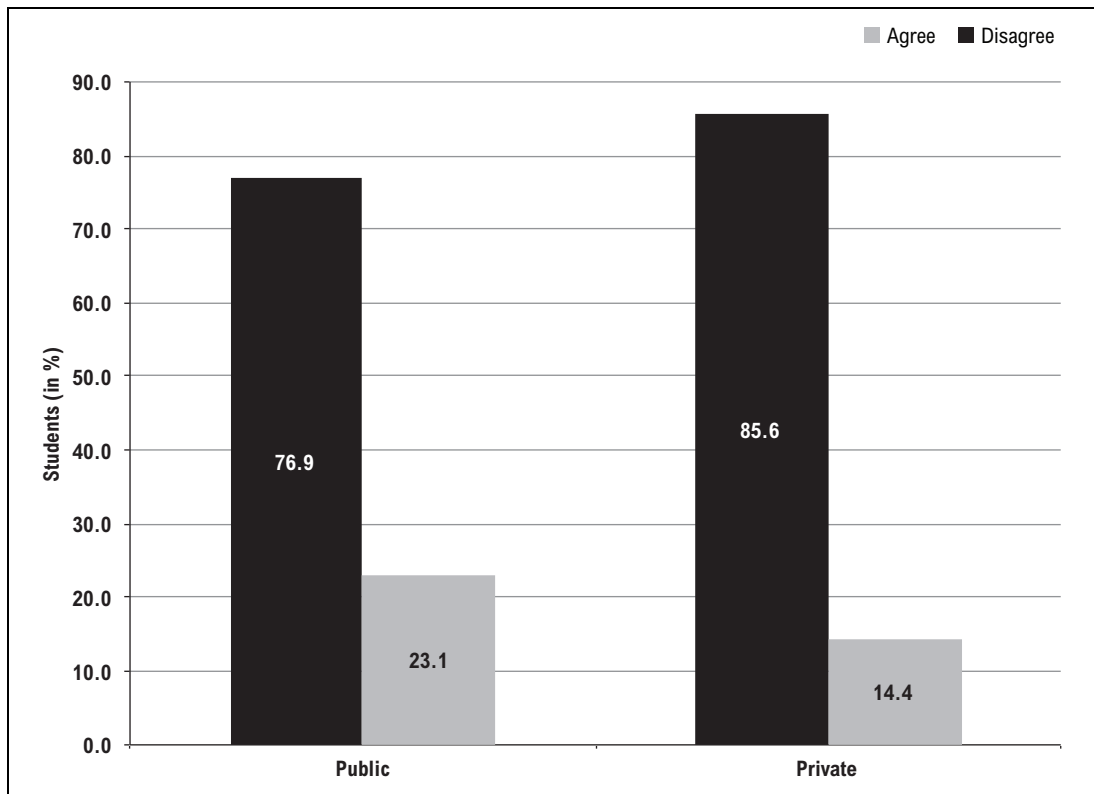
It is a well-established fact that teachers who understand the context of the child make better teachers, since they are able to contextualise and make teaching relevant. Teachers who exhibit a lack of understanding about the values of children and their parents sometimes perceive these children as less competent (Hauser-Cram et al., 2003: 813). Kingdon (2010) highlighted that gaping social distance was found to explain high teacher absence rates, since well-paid teachers felt it was 'beneath them' to teach poor children. Thus, even though teachers in government schools remain better qualified, the fact that a large number of do not belong to the same communities as the children, can have a negative impact on teaching and learning. This is particularly relevant to teachers who cannot understand and speak the mother tongue of migrant children from neighbouring states. One of the education officials interviewed from a district bordering another state, explained that "the newly appointed teachers do not know the language of the border state and it is taking a lot of time to get adjusted for both the teachers and the children, affecting the quality of education". Thus the social and physical distance between those teachers who live in neighbouring towns and teach in rural schools, is likely to cause a larger chasm between the teacher and the students.

Teachers' dispositions toward students

The interpersonal relationship between the teacher and the student is a very important dimension of teaching and learning. The teacher's attitude and disposition toward the children might affect children's learning outcomes. Studies have found similar amounts of variance in examination results explained by interpersonal teacher behaviour to those explained by other teacher behaviours (Goh 1994; Den Brok 2001). Teachers who are perceived as impartial are usually appreciated by students, since it makes them feel that the teacher cares about them. To capture the disposition and attitude of the teacher, we have captured students' perceptions of teacher behaviour through their responses to a teacher behaviour statement, such as 'My class teacher treats me fairly'. While 23 per cent of children in government schools disagreed with this statement, implying that the teacher was biased and treated them unfairly, only 14 per cent of private school students disagreed with it. A t-test shows the difference is significant at 1 per cent. Differential treatment by the teacher is known to have a significant impact on students' learning outcomes and biased behaviour of teachers is perceived to be greater by students in government school.

3 These results come from a sample of 125 public schools and 35 private schools in rural Uttar Pradesh.

Figure 8. *Students' perceptions of impartial teacher behaviour*



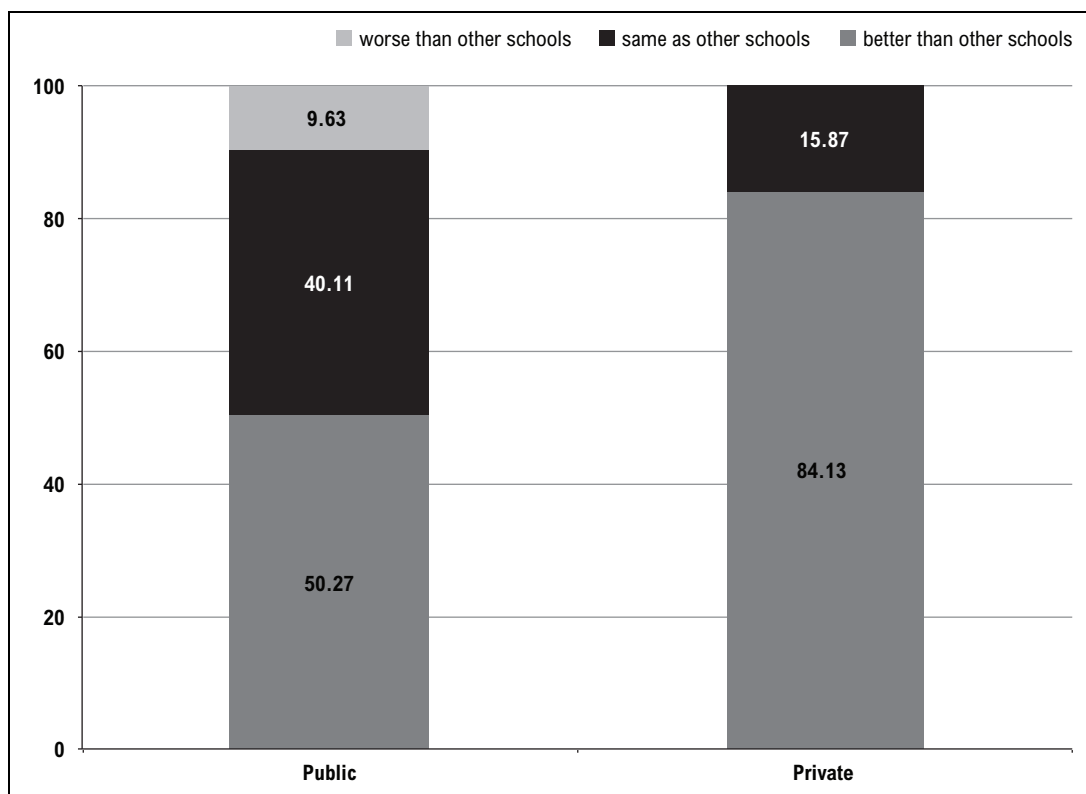
Teacher beliefs

Teacher beliefs are inextricably linked to their decision-making and therefore their professional practice (Pajares 1992). What a teacher feels about his/her own school will have an impact on the quality of their teaching, and will consequently affect children's learning outcomes. A positive attitude, enhanced by teachers' belief in the efficacy of their school, has always been observed as a key characteristic of good teaching. If teachers have negative opinions of their schools, and particularly if this is based on the student population, this can well lead to the well-known phenomenon of 'Pygmalion in the Classroom', a self-fulfilling prophecy in which students who are thought to be poor learners turn out not to learn well.

A rating scale was developed and administered to gather information about the opinion of mathematics teachers about their own schools. The scale contained three options:

- better than other schools in the mandal
- the same as other schools in the mandal
- worse than other schools in the mandal.

Figure 9. *Teachers' opinions of their schools (%)*



Source: Young Lives School Survey, Andhra Pradesh (2010–11)

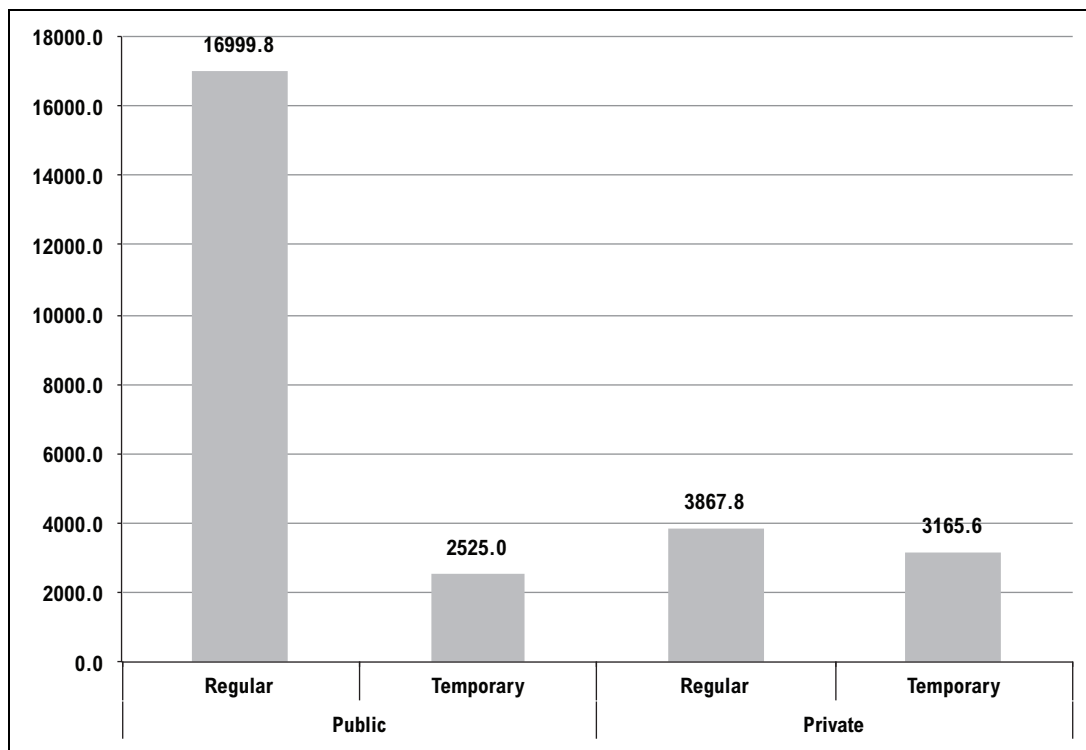
Eighty-four per cent of private school teachers were found to think that their schools were 'better than other schools in the mandal' while this proportion was only 50 per cent in government schools (Figure 9). Moreover, around 10 per cent of government school teachers have reported that their schools were worse than other schools in the same community, whereas no teacher in the private schools reported this. The opinion expressed by the teacher is known to have an impact on teacher performance and attitude towards teaching and learning. The analysis revealed that almost half the teachers working in government schools did not possess a positive opinion about their schools. This has major implications for self-efficacy, which affects behaviour by impacting goals, outcome expectations, affective states, and perceptions of socio-structural impediments and opportunities (Bandura 2000). Strong relationships have been demonstrated between student achievement and teachers' levels of 'efficacy' (Ashton and Webb 1986) and 'commitment' (Rosenholtz 1985). If the majority of teachers in government schools do not hold a positive attitude towards their own place of work, this will certainly affect the children they are teaching negatively. On the other hand, the fact that private school teachers feel a sense of pride in their school would undoubtedly have a positive impact on their teaching.

Salaries

Salaries that teachers draw can also be a factor that can cause demotivation and impact the quality of teaching. Private school teachers in low-fee schools, are generally contractual and do not receive permanent employment benefits as government teachers do. Thirty-two per cent of government school teachers are contractual (vidya volunteers) while around 80 per cent of private school teachers are employed on a contractual basis. Figure 10 shows the

average salary paid to regular and temporary teachers in government and private schools and it is amply clear that private school regular teachers are far less paid than those in government school.

Figure 10. *Salary of teachers in government and private schools (Rupees)*



The average monthly salary of a regular mathematics teacher in a government school is around Rs17,000 (US\$308) per month, which is nearly four times higher than in private schools, where it is only around Rs4,000 (US\$73). Temporary teachers in both types of school are paid around Rs3,000 (US\$54) on average. On the whole, government school teachers were found to be more experienced than private school teachers by three years. However, even when we compare teachers with more than nine years of experience in government and private schools, the salaries of government school teachers are five times higher than the salaries of private school teachers. If we assume that higher salary gives an incentive to the teachers to teach better, then government schools should perform far better than their counterparts in private schools, but the evidence is to the contrary. One explanation for this might be that the more highly paid government school teachers end up teaching the poorer and more socially disadvantaged children, who attend government school. This is based on the fact that 71 per cent of the children in our sample enrolled in government schools belonged to the bottom two wealth quartiles (see Table A1 in the Appendix) as against 26 per cent of the children attending private schools. The existing economic and social divide between the teachers and students, as evident in government schools, would therefore create a wider chasm and distance between the two. Therefore, government school regular teachers need to be made more accountable and performance-based incentives need to be adopted immediately.

Teachers' content knowledge

Rice (2003) focused on five 'teacher attributes': experience, degrees, certification, and pre-service coursework and test scores. She highlighted that 'teacher experience matters, particularly in the first few years of teaching, and that teacher certification seems to matter for high school mathematics, but there is little evidence of its relationship to student achievement in lower grades.' Rice concludes that 'more refined measures of what teachers know and can do (e.g. subject-specific credentials, special courses taken) are better predictors of teacher and student performance than are more conventional measures (e.g. highest degree earned) (Rice 2003: 50). Pedagogical Content Knowledge, a term introduced by Shulman (1986), refers to teachers' knowledge of students' thinking about a particular topic, the typical difficulties that students have, and ability to make mathematical ideas accessible to students. This generated a lot of research, which established that knowledge of content and students included the ability to anticipate student errors and to interpret incomplete student thinking. Hill et al. (2008) state that responding to students errors is a key aspect of 'the mathematical quality of instruction'. Hill et al. (2005) established that teachers' mathematical knowledge for teaching positively predicted student achievements in mathematics in both first and third grades.

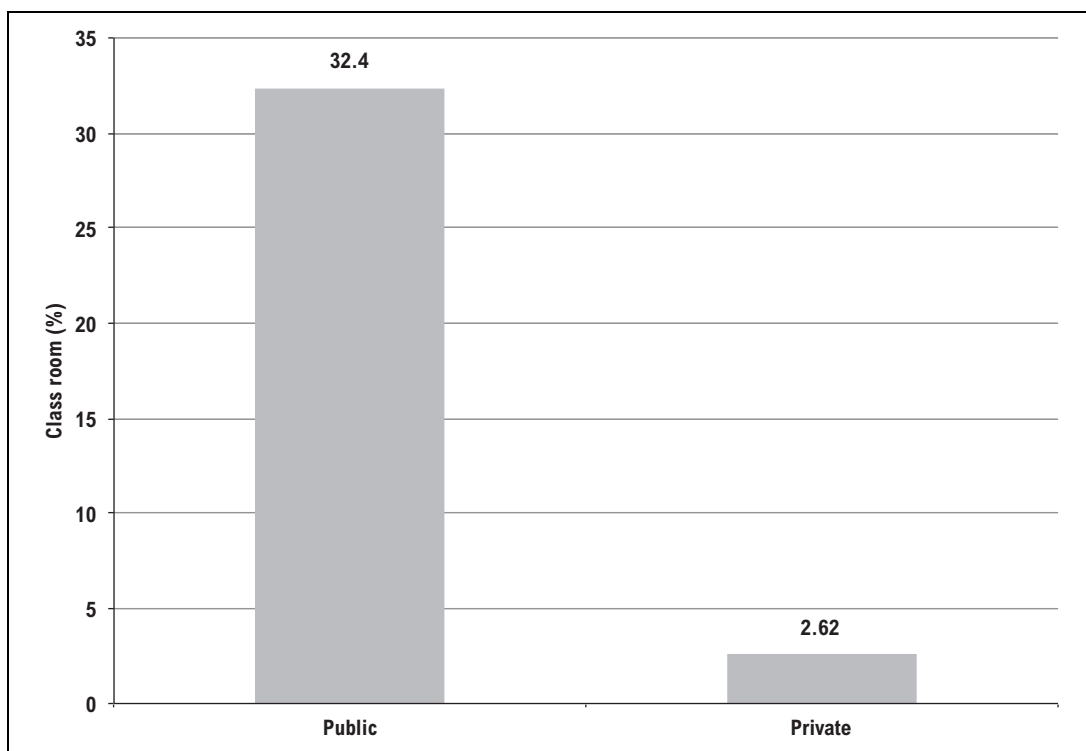
Therefore we measure mathematics teachers' content knowledge through a specially designed tool to test teachers' understanding of mathematical concepts and procedures, comprising tasks that assess the teachers' ability to respond to children's errors in mathematics. The data reveal that the average score obtained from the test is significantly higher (at 1 per cent) for government school teachers than for private school teachers. Thus teachers in government schools display higher content knowledge in mathematics, which may be connected with their higher levels of professional training.

4.4. Process of teaching

Classroom organisation

Some researchers advocate multi-grade classrooms, since they are 'more aligned with children's natural groupings and learning tendencies' (Ong et al. 2000: 206). In the relatively large body of research on the effects on achievement of grouping students with varying skill levels in different ways, evidence suggests that students learn more mathematics when they are in more homogeneous groups with a curriculum and materials geared to their needs (Loveless 2000; Loveless 1999; Slavin 1990). It is pertinent to point out that in India multi-grade classrooms exist purely as an administrative and logistical arrangement, rather than as a result of a decision based on ideology.

Figure 11. *Classes with multi-grade teaching in government and private schools (%)*



The analysis (presented in Figure 11) shows that 32 per cent of lessons in government schools were held by grouping classes together, while less than 3 per cent of the lessons in private schools were taught in multi-grade classrooms. There can be many reasons for combining grades, but in India the most frequent ones are a lack of sufficient teachers and the absence of teachers, thus leading to children being taught in classes with other children from different grades. Though multi-grade teaching may have its advantage in terms of providing 'vertical grouping', teachers need to be skilled in differentiating the curriculum and teaching and learning materials, in order to ensure there is no wastage of time for the learner, as the teacher moves from teaching one grade to another. Given that even within one grade there exists a range of learning needs and abilities, multi-grade classrooms pose a greater challenge than mono-grade classrooms. Most critically, multi-grade teaching coincides in practice with geography and poverty. Multi-grade teachers therefore contend with a generic pedagogical challenge for which they have not been trained – that of teaching a complete curriculum to students of varying ages at the same time. Thus a teacher may end up teaching students from Grades 3, 4 and 5 within the same class, which is very challenging if the teacher is not equipped with the requisite skills and would impact on the quality of instruction. Education officials interviewed expressed their concern regarding the teaching processes within government schools and complained that 'the system of lesson plans is not being maintained due to multi-grade teaching'.

Teaching methods

Table 7 is based on classroom observation conducted in 416 classrooms in government and private schools, and shows the activities observed during a period of 30 minutes. It was evident that teachers in both private and government schools used traditional methods of teacher-directed instruction; multi-grade teaching strategies, such as cooperative learning, were not observed in the classrooms visited. It is obvious from the data collected that

'lecturing' is still the predominant mode of teaching, with 54 per cent of teachers in government schools and 47 per cent of teachers in private schools following the 'chalk and talk' method of teaching. Small group work, which is one of the strategies that should be adopted to address varied learning needs, is known to take up much more class time than whole-class instruction or individual work, with respect to covering content. This was almost completely absent (less than 1 per cent) in both government and private schools. Most of the government schools (95 per cent) were observed to have used Telugu as the language of instruction, while 40 per cent of private schools used it. As already pointed out, 85 per cent of private schools in our sample claim to be 'English-medium schools'; however, only 57 per cent of the private school classrooms we visited were observed to be using English as the medium of instruction when we were there.

Table 7. *Most frequently used teaching method and language observed in mathematics lessons (%)*

	Government	Private	Total
Most frequent teaching method in mathematics lessons			
Introducing/summarising	0	0.51	0.24
Lecturing	53.85	47.18	50.72
Group call-and-response	4.07	6.15	5.05
Questioning individuals	6.79	10.77	8.65
Setting work/homework	28.96	29.23	29.09
Guiding groupwork	0.9	0	0.48
Talking/working with students	3.62	5.13	4.33
Discipline	0.45	0	0.24
Temporary absence	0.45	0	0.24
Most frequently used language of instruction			
Telugu	94.47	40.78	69.39
English	2.13	57.28	27.89
Urdu	0.85	1.94	1.36
Oriya	2.55	0	1.36

Source: Young Lives School Survey, Andhra Pradesh (2010–11)

Regular feedback through checking homework

Another factor that contributes to a good teaching and learning process is timely and regular feedback to students. The school effectiveness literature highlights the importance of frequent homework, student assessment and feedback (Fuller and Clarke 1994; Heneveld and Craig 1996). At a more complex level, the literature emphasises the timing and precision of feedback to learners on work undertaken and the transition from evaluation and feedback to the rectification of mistakes and misunderstandings, which is thought to improve learning (Creemers 1994). Therefore examining whether children's books were regularly marked by government and private school teachers was another way of assessing teachers' classroom practices.

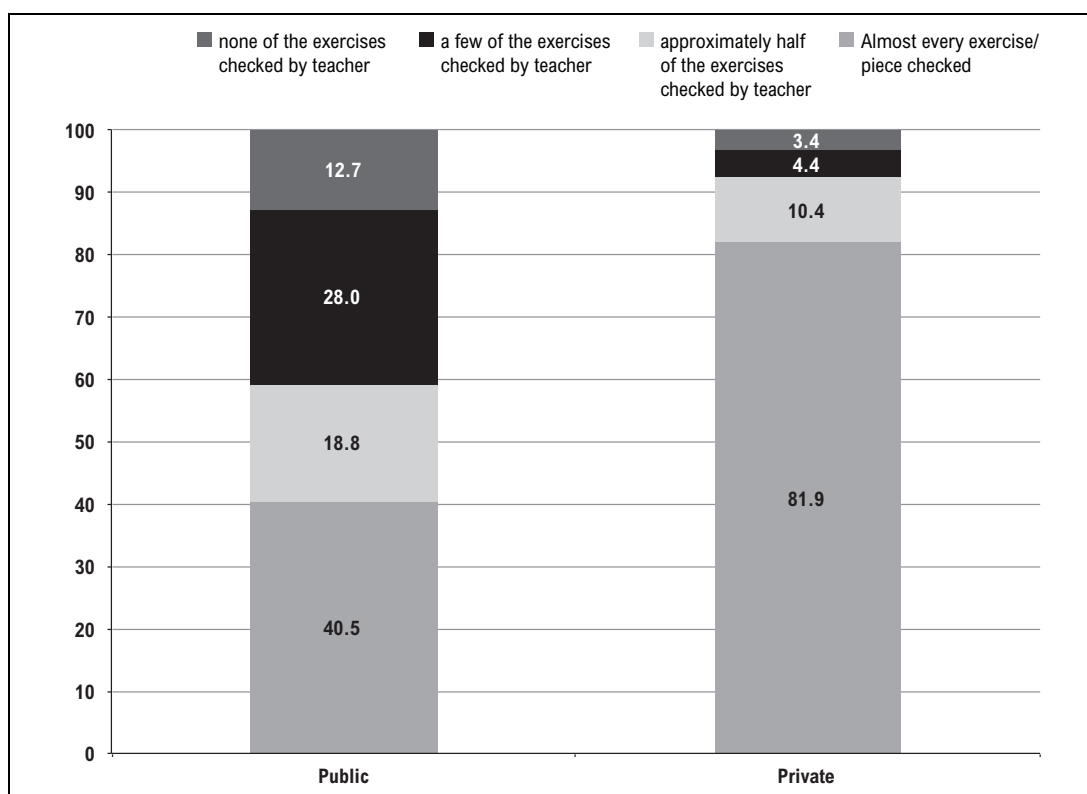
The field surveyors engaged in data collection physically checked the students' books in order to determine how many teachers were regularly providing feedback to students, by marking their books. Although, classroom observations indicated that almost equal numbers

of teachers in government and private schools were observed to be setting homework (Table 7), it is clear from Figure 12, that 82 per cent of teachers in private schools were found to have regularly corrected almost every exercise given to children as against only 40 per cent of teachers in government schools. If 60 per cent of teachers in government schools are not correcting all the work of the children, there is obviously a big lacuna that exists in terms of providing children with feedback that they need to enhance learning.

Supraja's mother complains:

"Nobody bothers in the government school ... they are not at all bothered whether a child has done homework or not. They do not motivate the child to study well in the government schools, whereas the private school teachers are scrupulously particular about all these things. In private schools, they give us progress report and conduct tests regularly."

Figure 12. *Percentage of books that have been marked by the teacher*



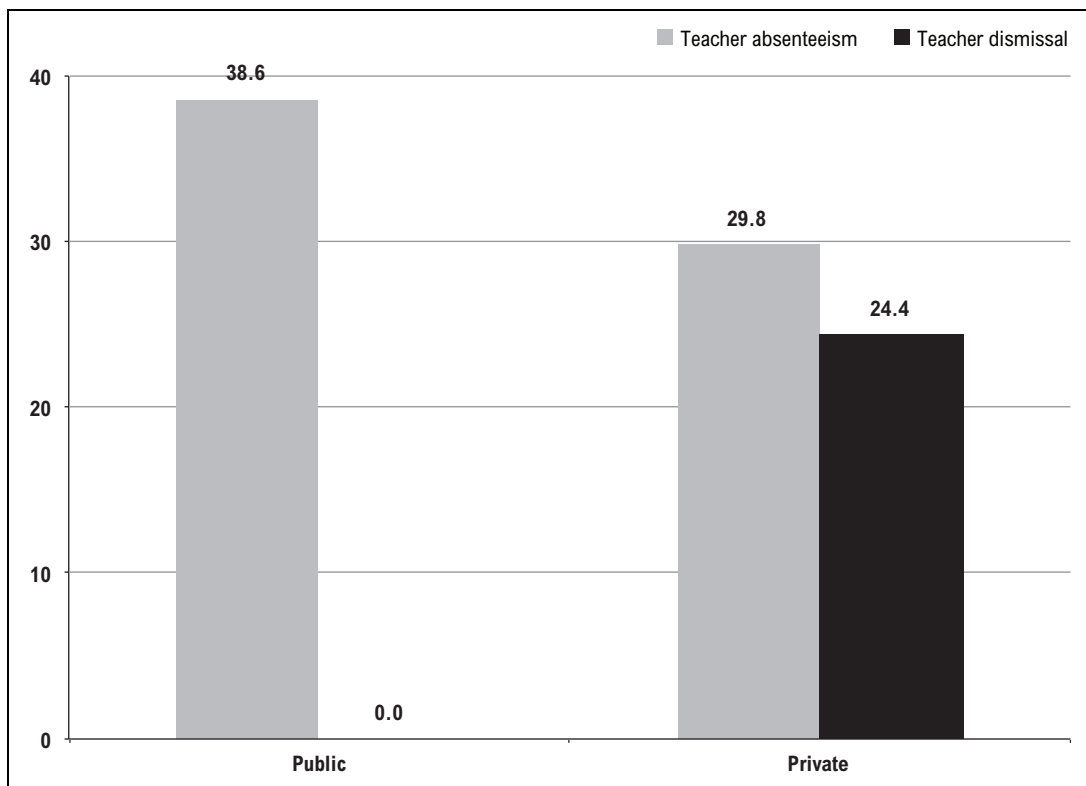
Source: Young Lives School Survey, Andhra Pradesh, 2010–11

School management: supervision and monitoring of teachers

The Oxfam Education Report points out that it is the 'inadequacies of public education systems' that have driven many poor households into private systems (Watkins 2000: 207). Sen (2001) found a high incidence of teacher absenteeism in his research carried out in government schools in poor villages in West Bengal, India. Drèze and Saran (1993) noted that in Uttar Pradesh, since the salary of a teacher in a government school was not related to his work performance, and his appointment was technically a 'permanent' one, he had little incentive to take his job seriously: 'In fact he rarely took the trouble of turning up at all' (Drèze and Saran 1993: 36). Our study collected information regarding teacher absenteeism from

children by asking them to say whether their teachers came to school. Absenteeism was found to be higher in government schools by around 10 per cent (Figure 13) when compared to private schools.

Figure 13. *Teacher absenteeism and dismissal (%)*



Source: Young Lives School Survey, Andhra Pradesh (2010–11)

Interestingly, when we checked how many teachers had been dismissed by the headteacher and the reasons for the same, it was striking to find that *no* headteacher reported a *single* teacher dismissal in government schools. This was corroborated by the education officials we interviewed, who unanimously complained that they were not in a position to take any action against teachers in the low-performing schools, in view of the service conditions. By contrast, 24 per cent of private school headteachers reported having made dismissals (Figure 13) based largely on poor-quality teaching (50 per cent), followed by absence without a proper reason (31 per cent). It has been mentioned earlier that government schools have 68 per cent permanent/regular teachers, whereas, private schools have 80 per cent teachers on contract (see sub-section 4.3.5). Unfortunately, teachers in government schools are less accountable, due to the permanent nature of their employment, furthered by the fact that no punitive action is associated with non-performance because of poor appraisal and supervisory mechanisms. From the interviews with headteachers we also have data regarding the frequency of sudden classroom inspections conducted by the headteacher. Only 12 per cent of headteachers in government schools reported that they conducted such inspections. On the other hand, 22 per cent of private school headteachers said they conducted sudden inspections. Therefore it is clear that the government school system really does not have a culture of holding teachers to account and many of them continue to go without due reprimand, owing to the lack of a robust appraisal and monitoring system.

Kavya Sri has three sisters and a younger brother. She is currently studying in a government hostel. She used to study in a private school and believes that private schools are better since she attended school daily and did not miss school due to her father paying money for school fees. She complains that:

“The government school teachers teach us for some time and then go sit silently without teaching us ... They tell us to sit and write; once we finish writing they tell us to write again ... if we write everything twice we will not have copy books, we don't have money!”

Teaching quality ultimately boils down to what the ‘teacher actually does in the class’ and it is apparent from the qualitative interviews that, often, even if the government school teacher is present, s/he does not bother to teach. There is lack of supervision and close monitoring and ‘permanently employed’ government school teachers do not feel any accountability towards the students and parents, unlike private school teachers, who are closely watched by the management and dismissed if any poor performance is observed.

4.5. Bi-variate analysis of test scores and teacher characteristics

In Table 8 we present the average score of children for a set of teacher characteristics which we have already discussed as relevant factors to determine children’s learning outcomes in mathematics (significance levels calculated by t-tests). Looking at the teachers’ gender and the corresponding score of the children, it can be seen that the students of male teachers have significantly higher scores than the students of female teachers. The table also shows that teachers’ years of experience have a non-monotonic relationship with children’s scores. At first, the average score of children increases as their teachers gain experience, then it falls when their teachers have between four and eight years’ experience and increases again when the teachers have more than nine years’ experience. Learning outcomes also vary between groups of children whose teachers have different qualifications. Children with qualified teachers (those with a diploma or degree) score significantly better than children whose teachers do not have these qualifications. Moreover, children taught by professionally qualified teachers who specialised in mathematics have better outcomes than those taught by teachers who did not specialise in the subject. Scores for children whose teachers have got BAs or MAs are significantly higher than those of children whose teachers were not educated above secondary level.

Table 8. *Teachers' characteristics and children's learning outcomes (bivariate analysis)*

Teachers' characteristics	Mean score	Diff from ref. group
Teacher's Gender		
Male	61.3	
Female	58	-3.3***
Experience		
0–1 years (Ref)	60.4	
2–3 years	60.9	0.52
4–8 years	55.3	-5.1
9 years and a	63.2	2.8*
Professional qualification (teacher training)		
No teaching qualification (NTT) (Ref)	52.3	
NTT/B.Ed/M.Ed	62.3	10.05***
Specialisation during teacher training		
Math specialisation (Ref)	66.19	
NTT/B.Ed/M.Ed with no specialisation	62.53	-3.66**
Other subject specialisation	58.97	-7.22***
General education		
Secondary/Higher secondary (Ref)	53.7	
Degree (BA)	61.5	7.8***
Masters and above (MA and above)	62.7	8.9***
Teacher's Content knowledge		
0–60 (Ref)	54.7	
Above 60–70	61.1	6.4***
Above 70–80	59.8	5.1***
Above 80–100	64.7	10.0***
Place of residence		
Living in the same village	59.4	0.9
Living in village/town in the same mandal	62.5	4.0**
Living in village/town in the same district (Ref)	58.4	
Teacher's attitude towards students: (My teacher treats me fairly)		
Agree (Ref)	62.7	
Disagree	49	13.7***
Teacher's perception of school		
Better than other schools in the mandal	60.2	3
Same as other schools in the mandal	59.7	2.5
Worse than other schools in the mandal (Ref)	57.2	
Regular feedback through checking homework		
Almost all the exercises corrected (Ref)	64.2	4.8**
Approximately half of the exercises	59.4	7.6***
A few of exercises	56.6	4.2*
None of the exercises	60	
Salary		
Quartile 1 (lowest)	53.4	8.2***
Quartile 2	62.1	-0.4
Quartile 3	63.1	-1.4
Quartile 4 (Ref)	61.7	
Type of employment		
Regular	61.9	3.9***
Temporary (Ref)	58	
Absenteeism		
Children did not report (Ref)	64.5	
Children reported absenteeism of teacher	35.5	6.7***

Note: * p<0.1, ** p<0.05, *** p<0.01 in t-test for significant difference from reference category

Table 8 also presents our examination of the link between teachers' content knowledge, which is measured by a test, and children's learning outcomes. This relationship is not monotonic either. Children taught by teachers from the same village or same mandal score better than those taught by teachers from another mandal or locality. Children who think that their teachers treat them fairly, i.e. impartially, score significantly higher than the children who do not agree with the statement: 'My teacher treats me fairly'. Teachers' attitudes towards their schools have an effect on children's learning outcomes and children taught by those teachers who believe that their schools are better or as good as the other schools in the community have higher scores than those who believe that their schools are worse than other schools. However, these differences are not significant statistically. By examining the teaching and learning processes and children's learning outcomes, we find that children whose teachers have checked almost all their exercises have significantly higher scores than those children with half, few or none of their exercises checked by their teachers. . It can be observed that the lowest salary quartile has significantly lower scores than the highest salary quartile, while there is no significant difference between quartile four and quartile two and three teachers' salaries and children's learning outcomes. Children who have reported absenteeism in their teachers have significantly lower scores (at 1 per cent) than those who do not think that their teacher is often absent.

4.6. Multivariate analysis

So far in our paper we have mainly looked at bivariate relationships between students' test scores in mathematics and various factors that may affect them. However, in a bivariate framework, we do not control for other factors which may confound any relationship. Therefore, we carry out multivariate analysis where we want to estimate the partial effect of each of the teacher characteristic, controlling for the effects of household- and child-specific characteristics on test scores.

We adopt a multivariate regression framework at the child level where we regress students' scores in mathematics on various factors that can affect them. Among the teacher-specific factors, we include all the characteristics of teachers that we discussed earlier in our bi-variate analysis. To control for household-level factors we include caste and wealth index of the household. In addition to these variables, some child-specific variables are included, like age, gender, grade in which the child is currently enrolled, language used by the child during the test and education level of the mother. In various studies it has been found that maternal education has a more significant impact on child education than paternal education. Also, there is a high correlation between maternal and paternal education levels, so we include only mother's years of education in the equation to control for parental education. Moreover, we also control for school quality in terms of physical infrastructure and facilities available within school, by including a school quality index variable. A dummy variable indicating whether the school is located in a rural or urban area and a dummy variable for an English-medium school are also included. We also control for school size, which is determined by the number of children attending the school. Some class-specific characteristics like number of children in the class (class size) and whether the class is grouped with another class (or other classes) have been included in the regression. There is another important dummy variable we include, which captures whether the school is private or government. One can argue that in addition to all these control variables, there may be some child-specific unobserved heterogeneity which could bias the estimated coefficients. For instance, if children who are more intelligent are sent to private schools, then our model will tend to overestimate the coefficient of the private school dummy. In fact, in the presence of such an

endogeneity problem, the other estimates may also become biased and inconsistent. To tackle such a problem, we estimate a second model, where we include an additional control variable capturing the mathematics scores of the students from the past. Thus, our specification becomes to some extent dynamic in nature. This type of specification is also known in the literature as a 'value-added' specification (Todd and Wolpin 2003, 2007). One can safely assume that these past test scores of the children reflect their ability to perform well in a mathematics test, and to a large extent they control for child-specific unobserved factors that may contaminate our estimation. We get this past mathematics score of the children from the Round 3 survey, which was conducted in 2009–10, while the dependent variable is from the school survey data, which was collected in 2010–11. These two models do not control for the bias that may arise due to mandal or sub-district-level unobserved heterogeneity, which may be correlated with both our dependent variable and some of the independent variables. In order to control for these mandal-level fixed effects, we include mandal or sentinel site dummies in the value-added specifications.

Table 9 contains the results of these three regressions. The first column gives the results where the past test score is not included. We see that controlling for other factors, the average score of children going to private schools is significantly higher (at 1 per cent) than those who go to government school, and the difference is 16 percentage points. The number of years of experience teachers have had do not have any significant impact on children's performance. Overall teachers' professional training (which includes Dip.Ed, B.Ed and M.Ed qualifications) has a significant effect (at 1 per cent) on children's test scores, controlling for the general education of teachers and other characteristics. Further we investigate whether the effect of this training is significantly different for each level of education for teachers. To do so we have included interaction terms of training with a Bachelor's degree and with a Master's and above (with secondary/higher secondary with training as the reference category). The coefficients of interaction terms reveal that it is only the teachers who have passed higher secondary school exams for whom professional training makes a difference to students' learning outcomes. However, trained teachers do not have any more significant positive effect on children's scores than those with only BA or MA degrees.

Surprisingly, having a teacher with who specialised in mathematics has no significant effect on a student's test score, which is rather counter-intuitive. Rowan et al. (2002) also found that students (Grades 1–6) of teachers with advanced degrees in mathematics did worse than those taught by teachers who did not specialise in mathematics. This may be because these children were in primary school; therefore, controlling for other factors, subject specialisation was not needed as such to improve teachers' ability to teach subjects such as mathematics. Teacher's test scores have a positive impact on children's test scores but it is not statistically significant. Teachers who live in the same village or a village or town in the same mandal have a greater impact on children's mathematics scores than teachers who come from another village or town outside the mandal but in the same district. Children for whom every exercise/piece of whose homework has been checked by the teacher have significantly higher scores than those none of whose work has been checked. Teachers' attitude towards children in the classroom has an impact on children's learning outcomes. Children who do not think that their teachers treat them fairly have significantly lower scores (at 1 per cent) than those who do not perceive their teachers in this way. Teacher absenteeism, as captured by children's reports, significantly lowers (at 1 per cent) children's scores.

Column 2 presents the results of our second model (value-added specification), which has an additional control for past test scores. As we see from the result, it is significantly and positively correlated with the current test score. As we have already explained, we may consider this model to be an improvement on the previous one since it controls for relevant child-level unobserved factors through the lagged score and yields more reliable estimates. Comparing the results from these two models we observe that the direction of impacts remains the same, and most of the variables which were significant earlier are found to be significant in this model too. However, we observe that though the coefficient of teacher absenteeism is negative, it is not significant in this specification. The coefficient of the private school dummy has become smaller in magnitude (from 16 per cent in column 1 to 11 per cent in column 2) but significant at 1 per cent. However, we see that the teacher's perceptions of their schools has become significant at the 1 per cent level. The most important observation from this regression is that children in private schools have higher test scores. It also shows that teacher credentials, place of residence, tendency to check homework and attitude towards children have significant effects on children's performance in mathematics tests, after controlling for other factors.

Table 9. *Effect of teacher characteristics on children's mathematics scores*

VARIABLES	(1) OLS	(2) OLS	(3) OLS-FE
Type of school			
Private school	16.08*** (0.000)	11.19*** (0.000)	11.41*** (0.000)
Teacher characteristics			
Gender (Female=1, Male=0)	-0.59 (0.715)	0.08 (0.953)	-0.76 (0.564)
Experience (years)	-0.20 (0.340)	-0.08 (0.618)	-0.08 (0.620)
Training (Dip.Ed/B.Ed/M.Ed) (training=1, no training=0)	8.30*** (0.007)	4.74* (0.069)	2.28 (0.405)
Education (ref. Secondary and higher secondary)			
Bachelor's degree	2.65 (0.392)	1.84 (0.479)	2.18 (0.355)
Master's (MA) and above	2.18 (0.660)	1.61 (0.740)	-1.02 (0.850)
Graduation × training	-3.57 (0.392)	-0.88 (0.804)	-0.04 (0.992)
Master's and above (MA) × training	-2.72 (0.643)	0.32 (0.955)	3.90 (0.546)
Specialisation (ref. no specialisation)			
Other subject specialisation dummy	-1.87 (0.489)	-1.87 (0.429)	-0.02 (0.992)
Maths specialisation dummy	-2.36 (0.467)	-0.71 (0.794)	-1.71 (0.510)
Score (for content knowledge)	0.08 (0.116)	0.04 (0.324)	0.02 (0.656)
Place of residence (ref. Outside mandal in same district)			
Same village	6.94*** (0.003)	4.66** (0.017)	2.85 (0.158)
Same mandal	6.63*** (0.001)	4.20** (0.022)	4.06** (0.027)

VARIABLES	(1) OLS	(2) OLS	(3) OLS-FE
Homework correction (ref. None of the work has been marked)			
Almost all the exercises/homework	4.69 (0.111)	3.49* (0.088)	4.35** (0.026)
Approximately half of the exercises	0.71 (0.815)	1.21 (0.561)	1.33 (0.511)
A few of the exercises	0.78 (0.785)	0.81 (0.688)	1.01 (0.624)
Attitude towards students			
'My teacher treats me fairly' (disagree=1, agree=0)	-7.00*** (0.000)	-4.48*** (0.002)	-5.00*** (0.001)
Perception of schools			
Better than other schools in the community	-1.20 (0.796)	9.43*** (0.000)	6.57*** (0.008)
Same as other schools in the community	1.13 (0.809)	11.35*** (0.000)	8.57*** (0.001)
Salary	0.00 (0.153)	0.00 (0.136)	0.00 (0.488)
Regular teacher	1.83 (0.403)	1.23 (0.511)	2.49 (0.183)
Absenteeism: 'My class teacher often does not come to school'	-4.42*** (0.001)	-1.18 (0.325)	-1.02 (0.397)
Round 3 maths score		0.65*** (0.000)	0.65*** (0.000)
Constant	10.58 (0.495)	-162.96*** (0.000)	-159.27*** (0.000)
Observations	746	726	726
R-squared	0.386	0.542	0.577
Site Fixed Effects	No	No	Yes

Notes: Robust p values in brackets. Standard errors are clustered at the school level.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Child-, household-, class- and school-specific characteristics have been controlled but not reported.

Results of mandal fixed effects (FE) regressions reported in column 3 of Table 9 reveal that private school, teachers place of residence, regular checking of homework by the teachers (every exercise/piece dummy) and teachers' attitude towards children and school still have significant effects on children's mathematics scores, after controlling for previous achievement scores as well as mandal-level heterogeneity (Table 9, column 3). The coefficient of teacher training variable for teachers who have passed secondary and higher secondary school exams is positive in this specification but it has become insignificant. Thus, our multivariate regression analysis suggests that teachers have a direct effect on variations in test score across government and private schools. Even after controlling for the previous achievement of the child, along with other child-specific, household and school characteristics, private school children tend to outperform their government counterparts in terms of mathematic test scores.

Table 10. *Summary statistics*

Variable	Obs.	Mean	Std. Dev.	Min	Max
Main variables					
Maths score (dependent variable)	860	60.0	20.2	0	100
Private school	862	0.4	0.5	0	1
Teachers' characteristics					
Gender					
Male	862	0.6	0.5	0	1
Female	862	0.4	0.5	0	1
Experience (in years)					
Dip.Ed/B.Ed/M.Ed	862	6.6	6.8	0	30
Secondary/Higher secondary	862	0.8	0.4	0	1
Degree	862	0.2	0.4	0	1
Master's and above	862	0.6	0.5	0	1
No specialisation	862	0.2	0.4	0	1
Other subject specialisation dummy	862	0.4	0.5	0	1
Math specialisation dummy	862	0.3	0.4	0	1
Score					
Same village	844	70.8	16.4	0	100
Village/town in same mandal	862	0.5	0.5	0	1
Village/town in same district	862	0.3	0.5	0	1
Almost all the exercises	862	0.3	0.4	0	1
Approximately half of the exercises	787	0.6	0.5	0	1
A few of the exercises	787	0.2	0.4	0	1
None of the work has been marked	787	0.2	0.4	0	1
My teachers treats me fairly (Disagree=1, Agree=0)	862	0.1	0.3	0	1
School better than other schools in the community	861	0.2	0.4	0	1
Same as other schools in the community	862	0.7	0.5	0	1
Worse than other schools in the community	862	0.3	0.5	0	1
Monthly salary	862	0.0	0.2	0	1
Regular teacher	862	8557.2	8624.9	600	39506
Temporary teacher	862	0.5	0.5	0	1
My teacher often does not come to school (Agree=1, disagree=0)	862	0.5	0.5	0	1
Control variables					
Household characteristics					
Wealth Index	862	0.5	0.17	0.01	0.89
Pupil characteristics					
SC/ST dummy	862	0.3	0.5	0	1
BC dummy	862	0.5	0.5	0	1
OC dummy	862	0.2	0.4	0	1
Child's age	862	8.8	0.4	8	10
Present class	862	3.6	1.1	0	6
Language used by children in maths test					
Telugu	862	0.9	0.3	0	1
English	862	0.1	0.3	0	1
Other (Urdu/Oriya)	862	0.0	0.1	0	1
Child's gender (Female=2, Male=1)	862	1.5	0.5	1	2
Maternal education (yrs. of education)	862	3.0	4.0	0	14
Round 3 maths score	842	300.5	14.3	263.8	340.8
School characteristics					
School quality index	862	-0.5	2.1	-1.8	16.8
School size	862	176.8	186.7	3	1,255
Does the school offer English-medium teaching?	844	0.3	0.5	0	1
Location (urban=1, rural=0)	862	0.2	0.4	0	1
Class characteristics					
Class size (total enrolment in the class)	862	23.0	13.0	2	68
Multigrade class	862	0.8	0.4	0	1
Non-multigrade class	862	0.2	0.4	0	1

5. Discussion and recommendations

As India is poised to meet MDG 2, universal primary education, one of the key aspects of guaranteeing quality education will hinge on ensuring that teachers are able to teach effectively and address each student's learning needs. This paper has highlighted the critical effect of teacher characteristics on student learning outcomes across government and low-fee private schools, which have so far not been stressed in earlier studies, and draws attention to the policy implications of these empirical findings. A refined understanding of how teacher attributes affect their performance across these different teaching contexts can be helpful in determining the range of potentially effective policy options.

5.1. Teacher recruitment and training

An important finding of the analysis is that teachers with only secondary or higher secondary education have students with poor outcomes, as compared to teachers with training qualifications or degrees. In our sample 45 per cent of the children (particularly in rural government schools) are first-generation learners (Table A1 in Appendix A) and need effective teachers to meet the challenges that their socio-economic situation creates in terms of no support after school. In the light of our findings, it is critical that teachers with only secondary and higher secondary education should not be recruited into the education system, particularly in remote and disadvantaged locations such as tribal areas. A government education official interviewed during the Young Lives school survey in a tribal belt remarked:

“[I]n this place, there are few qualified teachers (minimum of Bachelor of Education) and a very large proportion educated up to Grade 10 and many of such teachers are not even aware of the importance of education. Qualified teachers alone should be recruited.”

Particular importance must therefore be placed on the creation of an effective cadre of teachers in government and private schools, capable of serving the poorest children residing in most disadvantaged locations. Very significant for policymakers in the light of the implementation of the RTE Act, is the fact that our analysis did not find any significant difference between the effectiveness of teachers with professional teaching qualifications (Dip.Ed/B.Ed/M.Ed) and teachers with *only* general education qualifications such as Bachelors' or Masters' degrees. At a time when India faces a large shortfall in the teachers required to meet the pupil–teacher ratio norm mandated under RTE Act, and the current policy is to recruit only professionally trained teachers, this is extremely important to note. While we are not in any way suggesting that teachers should not be adequately trained or that schools must have only professionally trained teachers, we would at the same time like to draw attention to the dismal results of the recent Central Teacher Eligibility Test (TET), introduced in 2011 for the selection of professionally qualified teachers as regular teachers in government schools. In spite of having gained a teacher qualification such as a Dip.Ed or a B.Ed, out of a total of 785,227 qualified teachers who took the test, only 55,422, or a miniscule 7 per cent, managed to pass. While critics of the TET claim that the reason for this is that the test is not aligned to the pre-service curriculum, we feel that there is scope to critically examine the curriculum and the delivery of pre-service training courses across the

country. This is corroborated by studies that have highlighted, for example, that B.Ed programmes are too theoretical, teach using only lectures, are not long enough and that no professional development is available for the faculty members (Yadav 2011).

It is time India examined and revised the existing teacher pre-service training programmes to ensure that the curricula and teaching processes prepare future teachers to meet children's diverse needs in the classroom in light of universal enrolment. Furthermore, it might be prudent for policymakers to consider recruiting graduate teachers, selected from the top twenty per cent of graduates, and explore options for providing them with intensive and contextually appropriate in-service induction training and on-going mentoring. It is important that innovative strategies for meeting the current demand for teachers be adopted using ICT as well as credit-based accumulative courses that could have a large component of on-the-job mentoring. Both pre-service and in-service training programmes require a paradigm shift, in order to prepare teachers to engage all children with relevant and stimulating opportunities to learn, keeping in view local conditions and the aspirations of parents, including teaching through English.

5.2. Teacher deployment and rationalisation⁴

The finding that students had better scores if the teachers were from the same community has implications for teacher recruitment policy. As RTE is being implemented across states such as Andhra Pradesh, it is critical for teacher rationalisation (i.e. deployment to the schools that need them most) to take place to meet the pupil-teacher ratio norm and, if possible, for teachers to be posted in schools closer to their homes. Teachers should ideally live close to the school, to help control teacher absenteeism and to reduce time spent by teachers travelling long distances (which could instead be used to support the learning of their students).

5.3. Teaching practices

Since the analysis captures the fact that those students whose books had been checked by the teacher had significantly higher scores, it is useful to analyse this further. Descriptive analysis suggests that more than half of the students in private schools had had every exercise or piece of homework checked by their teacher. On the other hand only a miniscule 15 per cent of government school children had had their books checked by their teacher. Rosenshine (1986) pointed out the importance of feedback in his 'explicit teaching model', now regarded as the basis of good pedagogy, which advocated short presentations that are alternated with questions. Following the presentation, the teacher organises tutorial exercises, until all the students have been assessed and given feedback' (p. 65). Both 'guided practice' and 'independent practice' must be supported with feedback from the teacher. This seems to be conspicuously absent in government schools. Though teachers in private schools are paid considerably less than those in government schools, a majority of them regularly checked the homework of children. The regression analysis suggests that these factors have an impact on children's learning outcomes.

Though not statistically significant, it is important to note that teacher's content knowledge and general education affect children's learning outcomes. The effect size of teacher's score

4 Teacher rationalisation is the deployment of teachers to achieve a more equitable distribution of teachers across different schools and districts, particularly the most remote.

is 0.04 per cent in value-added specification and it drops to 0.02 per cent after incorporating site fixed effect. This finding is quite similar to the finding of Choi and Ahn (2004) who used meta analytic technique using 16 studies and found the average estimated correlation between teachers' subject knowledge and students' learning outcomes was only 0.06. Furthermore, the mathematical and pedagogical purposes behind particular classroom practices are as important as the practices themselves in determining effectiveness (Askew et al. 1997), and these must become a key focus of in-service and pre-service training courses. Teachers in government schools have better teaching qualifications as well as subject knowledge, but this has not translated into better student outcomes for a variety of reasons, highlighted above. It is useful to reiterate that good-quality teaching depends not only on content knowledge, but also on pedagogical knowledge. Pedagogical knowledge is a combination of instructional knowledge, content knowledge, knowledge about student's learning styles and current understanding, and knowledge about curriculum adaptation and differentiation. Teachers' beliefs, and their attitudes towards students, school and teaching and learning, interact with their content knowledge to shape the way they are able to transmit mathematics to learners. This was explained by Medley (1979) who proposed that: 'it is what the teacher *does* rather than what a teacher *is* that matters' (p. 13). To teach mathematics effectively teachers need to organise the lesson skilfully so that students are both supported and challenged to participate actively in the learning process. Only then will students learn to appreciate and engage with mathematics as a creative and stimulating learning activity. Teachers who had specialised in mathematics had no significant effect on students' test score at the primary level. Knowing how to teach mathematics well to students with differing abilities seems to be much more important than possessing a strong background in mathematics (Ball et al. 2001).

Finally, it is *practice* in the classroom that remains the major factor influencing learning outcomes. Our analysis highlights that teachers in government schools had on an average three years' more experience than those in private schools and exhibited better mathematical content knowledge than them (based on test scores), and that 26 per cent more of them had professional qualifications – yet the average mathematics score of children in private schools was higher by 6.7 percentage points. It would also appear, given the higher number of qualified teachers in government schools, that teacher training and job experience do not necessarily translate into the kinds of teacher knowledge, attitudes and skill that in fact matter most. The presence of multi-grade classrooms in government schools (32 per cent of the total), which require much more careful planning and attention to increased diversity of learning needs adds further to the pedagogical challenge of teaching. Koehler and Grouws (1992) proposed that teacher behaviour was influenced by the teacher's knowledge (of the content to be taught, how learners learn/understand it and the methods to teach it), in addition to teacher's attitude and beliefs about teaching and mathematics. Teachers' behaviour, such as being impartial and fair to all students, sets the tone of the classroom and helps in promoting equity. The fact that 23 per cent of the children in government schools perceived their teachers to be biased as against 14 per cent in private schools, directly affects learning outcomes for children. Teacher attitudes, such as beliefs about their school, further impact practice, since they affects their motivation and sense of pride in the work they do and thereby have an effect on students' learning outcomes. The fact that only 50 per cent of government schools teachers thought highly of their schools, as against 80 per cent of private school teachers, is an indicator of the lack of motivation that exists among government school teachers and a symptom of the prevailing climate in a large number of government schools. This is something that needs to be tackled urgently, since attitudes and

beliefs impact teacher behaviour and have a significant influence on student outcomes. It is apparent that teachers in government schools do not translate their content knowledge into teaching practices that positively impact learning.

5.4. Education system management

It is clear that private schools have a higher accountability towards parents, who are making huge sacrifices to pay the school fees. Private schools are also able to dismiss teachers who are not performing properly and a close watch is kept over classroom transactions. It is pertinent to mention the observation of one of the district education officer regarding government schools: ‘... mainly the teachers of primary school are absent from work. This is due to insufficient monitoring of primary schools.’ One of the government education officers interviewed opined that:

“MEOs should not do administrative work. They should only monitor schools and test the students’ performance and they should report the teachers who are irregular [in their attendance].”

This is corroborated by parents’ comments. Balasubramanyam’s mother, who works on her farm and did not have the opportunity to attend school, prefers to send her son to a private school in Grade 5 since she believes that: “in government schools, teaching one day ... they take ten days’ break ... they don’t take any care at all ... but in private schools we pay and they take much care in everything.”

Kavya Sri’s mother, who never attended school, is from the Scheduled Tribes and has four daughters. She complains that in the government village school:

“One teacher comes, he stays for an hour, then he says he has to apply for something [do some administrative work] and he goes off ... [then he] comes and signs [takes the attendance register] and when the bus comes, he leaves ... the other two or three teachers will be there, they will teach. They will appoint one elder student to take care of the children and they will not let the children come out. They [the children] go to school but they don’t know how to read or write even a word. We see their slates and they don’t write anything at all.”

Pointing out the difference between government and private schools she adds:

“We can see the education and tell the difference ... For private schools, we pay money, we can question them if children come home early or if they don’t study well ... if they don’t teach properly, we won’t send the children to their school ... but in government [schools] the teachers come and teach for the sake of their salaries – they just come and go daily.”

It is indeed a pity that better-paid and professionally qualified government school teachers, with higher content knowledge, should produce students with significantly lower mathematics scores. Lack of supervision and accountability seems to be one factor contributing to teachers’ lack of motivation and under-performance in the government school system, and a robust and transparent teacher management system based on performance-based incentives seems to be one way to tackle the current situation.

5.5. Quality education – unrealised

Our results strongly indicate that, overall, private school enrolment is associated with higher achievement in mathematics. This corresponds to earlier studies conducted in Andhra

Pradesh and elsewhere in the country (Govinda and Varghese 1993; Bashir 1997, Kingdon 2006; Tooley and Dixon 2003; Muralidharan and Kremer 2006). Our multivariate regression analysis suggests that, in terms of the mathematics test score, students in private school perform significantly better than those in government schools, even after controlling for all other factors, including the past test score. It shows that the being in a private school rather than a government school results in a mathematics score 11 percentage points higher, controlling for lagged score. The teacher characteristics which come out as significant determinants of children's learning outcomes are teaching credentials, their place of residence, classroom practice such as giving feedback to students, and their attitudes towards children and schools. However, at the same time much of the descriptive analysis reveals that, like the government schools, the quality of private schools, though better than that of government schools, is not satisfactory either. As indicated by children's mathematics test scores, a miniscule 25 per cent of the 8-year-old children in government schools and 28 per cent of children in private schools could solve the multiplication problems and only 21 per cent across both government schools and private schools could answer the division problems correctly.

Keeping this fact in mind, it would be a fallacy to propose that low-fee private unregulated schools, which are serving poor people, are a panacea for ensuring equitable quality education for all children, since the quality of education in these schools is also suspect. One should not fail to recognise that there is a tremendous financial burden on the poor families who aspire for their wards to get a 'better education' and choose private schools. Undoubtedly, government schools are not measuring up to the task of serving the learning needs of the poorest and most disadvantaged families, particularly with regard to teaching quality, but there is no quality assurance across small private schools either.

The mother of Supraja, who has attended three private schools and currently studies in Grade 5 explains that they currently pays Rs15,000 (US\$276) annually for her daughter and she fears that the fees may increase to Rs20,000 (US\$369) next year. She shares that:

"It is not [that] we have that amount ... we have to raise that money somehow and pay her school fees and later on try to clear the incurred loans. ... This is very burdensome. We will not have any savings as we spend everything on education. Strictly speaking, even people of our status cannot afford these schools. Now we have to send our child to even lower rung [private] schools ... the difference in the fees between [the] two types of schools ranges from 5,000 to 10,000 [rupees] and the quality of education offered is very different. There is a lot of disparity."

It is important to also note that our analysis does not highlight the diversity that exists in teaching quality within each of the two categories of private and government schools. No two government or private schools are the same. This is particularly so for private schools, both in terms of fees charged and the quality of services provided. Parents can pay fees of as little as Rs300 annually in some schools and as much as Rs20,000 annually in others. The financial burden that poor families face as a result of sending their wards to these low-fee private schools in rural areas and urban slums, is a matter of great concern and needs to become a policy concern. Also the fact that more boys and children from financially better-off families are being enrolled in private schools raises the issue of rising inequity in education.

Interestingly, the interviews conducted with district education officials of Rajeev Vidya Mission (as Sarva Shiksha Abhiyan is called in Andhra Pradesh) in the sample districts, and the mandal education officers of the selected sentinel sites, revealed that 50 per cent of them believed that half the teachers in the government schools 'were not discharging their duties

properly'. However, at the same time, the officials were very wary of private schools and one urban official commented:

"The private institutions are demanding huge amounts as donations and tuition fees, but surely neglecting the quality of teaching and learning as well. There is no scope for the student to think innovatively and no opportunity [for the student] to exhibit his/her creativity. This itself speaks about the private institutions, but in order to induce belief in government schools among the people, *a multifaceted revolution has to come* [our italics]."

Thus even the government education officials, though dissatisfied with how teaching is being conducted in private schools, are aware of the challenges currently facing government schools. They would really like the education department to think of innovative ways to gain the community's respect for the schools

The mother of Shankar, who is currently enrolled in Grade 4 in an English-medium private school, is dismayed with both the government and private school provision. She says:

"In municipal school, the teaching imparted is below par. The teachers are indifferent to the plight of the students as they are paid good salaries from the Government, so they are secure and do not bother about anything. They do not pay individual attention to the students. The classes are not held regularly and the lessons are not taught properly. They do not teach the whole lesson but they just skim through it and they also do not give the answers to most of the questions and leave the children in a quandary. If the children have any doubts the teachers do not clarify that. The teaching is haphazard and there are no explanations. However, [in the past] private school teaching was good. The teachers used to ask each and every student individually whether they were able to follow the lessons properly. But nowadays the trend has changed, even in private schools. Even here they have become quite callous and the teaching is not at all effective. They are blatantly letting the children mug up the subject matter [learn it by rote]. The students are learning blindly without any insight into the subject."

Thus quality is suspect in private schools serving poor people from rural and urban areas, which are undoubtedly being run primarily as 'business ventures' marketing themselves with 'English-medium' teaching. Poor parents make huge financial sacrifices to pay the fees in these schools, often ending up in debt. One deputy inspector of school commented:

"The bias of the parents towards private schooling is not healthy, and most of the private schooling fails to maintain teaching standards and creates a 'pressure cooker' atmosphere which ultimately hinders the personality of students. A strong motivation to achieve successful results is good but the process to reach it is hampering the ultimate goal, that is, the mental and physical growth of the student."

It is time that provision for regulating quality standards in low-fee private as well as government schools was developed.

5.6. Government schools serve the poorest children

One important thing to remember is that government schools are still the only option available for a large majority of economically marginalised children, and they still continue to enrol the lion's share of the elementary school child population. Over 70 per cent of the students in our sample who were enrolled in government schools belonged to households from the bottom two quartiles (see Table A1 in the Appendix). If India really intends to ensure

that all children should have access to quality education, we cannot give up on the government school system and only promote private schools. This will go against the very vein of the spirit of *education for all*, as clearly outlined by the Unni Krishnan judgement (*Unni Krishnan, J.P. v. State of Andhra Pradesh* 1993) 'Imparting of education has never been treated as a trade or business in this country since time immemorial ... The Unni Krishnan Decision does not imply that private schools cannot exist but states that they should not "commercialize education" and impart education with the motivation to profit from it' (para 164, S.C. 2244). Instead it is time for the Government to ensure that the large-scale investment being made in providing free and compulsory education to the poorest and most disadvantaged children bring forth the results that are desired. Progress in access to elementary education in India must be seen in relation to access to education as a whole and to the impact of education on outcomes, including equality (Little 2010).

It is important to consider the reform that educational management in the government sector requires, since teachers alone cannot be blamed for the current situation. There is an immediate need to ensure that ensuring the required pupil–teacher ratio at primary level should not translate into single-teacher primary schools, as numbers in government schools dwindle. Furthermore, both government and private schools must be given *autonomy* and be made *accountable* for ensuring the learning of every child. Results given by ASER (2010) as well as the Programme for International Student Assessment (PISA) (OECD 2009) amply highlight the fact that children are not learning at the correct level for their grade. Government school teachers with permanent jobs cannot take their job for granted, arrive late for work or not correct the books of the children they are entrusted to teach. The no-detention policy in government schools,⁵ leading to automatic promotion to the next grade, is in many cases turning into a 'no learning situation'. This does not mean that grade detention should be advocated, but at present, given the current condition of government schools with the poor accountability towards children's learning outcomes that exists, children can continue in school until Grade 9 and then be 'pushed out', when they are tested. This is exemplified by the fact that 12.4 per cent of the Young Lives Older Cohort children aged 15 to 16 years have already left school (Galab et al. 2011). The no-detention policy should not be used as an excuse for not assessing students, since what is critical is to provide each child with an individualised learning support system based on his/her needs. Continuous comprehensive evaluation needs to be interpreted and carried out in the right spirit.

School-based management, building on the current provisions of School Development Plans under the RTE Act, 2010, needs to become a vehicle for ensuring every child's learning and emotional needs are catered to by involving the local community. It is time the government school system buried some of the old practices that have been counter-productive. It is time for a new vision and new pathways to be established and celebrated. Leadership development must be undertaken as a matter of urgency. The supervisory cadre of Sarva Shiksha Abhiyan, mainly consisting of Block and Cluster Resource Persons and District Education Officers, must be strengthened through adequate financial and human resource provision at the Block and cluster level, and similar capacity building must also take place at District Institutes of Educational Training (DIETs), the State Council of Educational Research and Training (SCERTs) and the State Institutes of Educational Management and Training (SIEMAT).

5 Grade detention means not allowing children to move on to the next grade in the next school year. A no-detention policy has recently been introduced, which allows them to move on regardless of their marks.

Since parents are largely opting for private schools, due to the label of 'English-medium' attached to them, it is necessary for the government school system to also live up to parents' aspirations. To enable this, there is a need to train primary teachers to improve their proficiency in English through vacation training programmes or other short-term courses. The Andhra Pradesh Government, taking note of declining enrolment in the state schools (particularly in urban areas) in the wake of increasing demand for English-medium schools, has introduced English as a medium in all its schools from Grade 1 since 2011. However, getting current teachers trained to teach in English remains a challenge.

Focus group discussions with Young Lives children in Round 3 revealed that children felt the English medium was good and useful for all children, particularly for children belonging to households below the poverty line. The children expressed their concern that "there is lot of need to improve the teaching quality of teachers to attain standards like all other competitors in the field of education."

6. Conclusion

The question is, why are teachers in government schools, who are better trained, better qualified, equipped with better content knowledge, and better paid than private school teachers, not producing better learning outcomes for children? Verwimp (1999) reiterated that the quality of a school and the quality of teaching of the individual teacher is higher in schools that are able (and willing) to make more efficient use of the available time of their teachers and their pupils. This paper has not focused on issues related to time spent on task, the use of teaching aids, or other aspects of methodology, which may be an important area of analysis in the future. It is clear from our analysis that teachers with only secondary education perform very poorly. However, it is also very important to consider very carefully the fact that teachers with B.Ed or M.Ed qualifications do not produce significantly better student outcomes than teachers with general degrees such as BAs or MAs, after controlling for other factors. This finding has immense implications for policy formulation regarding teacher recruitment and pre-service teacher training as well as for the development of regulatory frameworks for both the government and private sectors, in the light of the RTE Act, 2009. There is a need to shift focus from credentials, such as degrees, to an examination of the content and process adopted by pre-service training courses, with a view to enhancing teachers' competencies in effective instructional strategies, so that students get the instruction they deserve. Moreover, it is crucial to examine what teaching practices are adopted in the classroom.

Private school teachers on the other hand are less qualified and experienced, paid much less, do not have permanent jobs, have lower content knowledge in maths, but are displaying certain teaching behaviours that are leading to better learning outcomes, for example, providing children with regular feedback by correcting their homework regularly, displaying more impartial behaviour towards students and showing more belief in the efficacy of their schools. The fact that many private school teachers belong to the same community as their students and live near their schools also translates into better learning outcomes, since there is less social and physical distance between the teachers and the learners, which is important for the teaching and learning process.

Our paper highlights that it is what the teacher 'believes and does' in the classroom that has the most impact on children's outcomes. This might be an opportune moment for

policymakers to align the TET with the teacher pre-service curriculum and evaluate prospective teachers for both content knowledge and pedagogical skills, as well as other teacher attributes such as attitudes towards disadvantaged students. Teacher training programmes will need to be remodelled to increase teacher capacity significantly and to ensure that all children, especially the more disadvantaged, are provided with effective teachers. Professional teaching standards need to be introduced so that teacher training institutes across the country are able to ensure that teachers have the requisite knowledge and skills to meet diverse needs in the classroom. Teachers' beliefs and attitudes will also need to be given critical attention. There are currently debates within countries where performance-based pay is being considered about whether this will lead to teachers of better-off children getting better pay. To counter this, it may be opportune for India to consider a robust appraisal system, linked to incentives for teachers working with socially disadvantaged students who make progress in both academic and non-academic domains. This may sound radical, but is it not time that teachers in both government and private schools feel more morally and professionally accountable for every child they are responsible for teaching? Also quality standards for teacher professional development and curriculum formulation need to be introduced to ensure teachers have adequate content knowledge and pedagogical skills to serve the most marginalised children. Furthermore, the curriculum itself needs to be examined and reformed so that it is relevant and accessible for all students.

Considering that, under the RTE Act, 25 per cent of private school places are to be reserved for the economically weaker sections of society, which might lead to a further scramble to get admission in to private schools, it is critical to ensure that the poorest children are not denied their right to a good education. Private schools may be considered better than government schools, but *'better'* should not be perceived as *'good'*. Benchmarks and standards need to be developed and implemented for quality assurance in both government and private schools. Furthermore, since the most disadvantaged children continue to enrol in government schools, it is critical that they are not 'short-changed' particularly since the largest investment by State and central Government is being made to support these schools.

Parents have huge aspirations and are making tremendous sacrifices in order to enable their children to have a better life than their own. It is imperative that the education system be reformed itself forthwith to meet this demand, by investing in and training an effective teaching force and by introducing a monitoring mechanism to hold it to account. Not only will this help India to meet its keep the promises it made at the dawn of the millennium, but it will also enable poor families to realise their dreams. Supraja's mother echoes the aspirations of millions of poor parents:

“People are not worried about their economic background or financial position ... they are only bothered about their children's education. They are prepared to give up anything for the sake of their children's education. They want to give their children whatever they missed in their childhood and they want their children to attain that position which they failed to get.”

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Appendix

Table A1. *Descriptive statistics for children in government and private schools (%)*

	Government	Private	Total
Wealth quartile			
Poorest	36.3	10.8	27.3
Poor	34.7	15.4	27.8
Rich	22.7	33.0	26.3
Richest	6.3	40.9	18.6
Mother's level of education			
Illiterate	67.5	36.0	56.3
Primary	18.7	18.3	18.6
Secondary	13.7	38.2	22.4
Higher secondary and above	0.2	7.5	2.8
Father's level of education			
Illiterate	44.2	19.0	35.3
Primary	25.4	16.3	22.2
Secondary	25.4	38.2	29.9
Higher secondary and above	5.0	26.5	12.7
First-generation learner			
In rural schools	44.9	20.3	38.4
In urban schools	16.7	6.7	8.7

Teaching Quality Counts: How Student Outcomes Relate to Quality of Teaching in Private and Public Schools in India

This mixed-methods paper investigates whether the ‘private school premium’, as manifested in student learning outcomes, is the result of better-quality teaching in private schools. Using school-, community- and household-level data from the Young Lives longitudinal study in the state of Andhra Pradesh in India, this paper makes a detailed comparison of 227 government and private schools attended by the children in the sample. We use detailed information on school-based components and information from classroom observation, as well as household- and individual-level information and qualitative interviews, for our analysis.

We look at the effect of teaching quality on children’s test scores, controlling for lagged test scores of children and for several household-, child-, class- and school-level characteristics. The results from our regression analysis suggest that children in private schools have a significantly higher (at 1 per cent) mathematics score than children in government schools. A key finding is that specific teacher characteristics and practices have emerged as important factors in determining children’s learning outcomes. While standard characteristics of teachers like experience, gender, content knowledge and subject specialisation do not have any significant influence on children’s learning outcome, teaching practices such as regularity in checking homework and factors such as the proximity of the teacher’s residence to the school and teachers’ attitude towards the children, as well as teachers’ perceptions of their schools, have emerged as important determinants of students’ test scores. In short, it is what the teacher ‘believes and does’ in the classroom that has the maximum impact on children’s learning outcomes.

Another key finding of our analysis is that the students of teachers with professional qualifications have significantly higher outcomes (at 10 per cent in value-added specification) than children taught by teachers with only senior secondary education. Students of teachers with Bachelors or Masters degrees in Education do not have significantly better outcomes than those taught by teachers with general degrees, after controlling for other factors. This has significant implications for policy formulation regarding teacher recruitment and pre-service teacher training, as well as the development of regulatory frameworks for both the public and private education sectors, in light of the Right to Education Act, 2009. There is a need to shift from a focus on pure credentials, such as education-related qualifications, to an examination of the content and process adopted by pre-service training courses, with a view to enhancing teachers’ competencies in effective instructional strategies, so that students get the instruction they deserve. Setting standards for teaching and learning, to create appropriate benchmarks for both government and private schools, is the need of the hour and should be addressed as a matter of urgency.



About Young Lives

Young Lives is an international study of childhood poverty, involving 12,000 children in 4 countries over 15 years. It is led by a team in the Department of International Development at the University of Oxford in association with research and policy partners in the 4 study countries: Ethiopia, India, Peru and Vietnam.

Through researching different aspects of children’s lives, we seek to improve policies and programmes for children.

Young Lives Partners

Young Lives is coordinated by a small team based at the University of Oxford, led by Professor Jo Boyden.

- *Ethiopian Development Research Institute, Ethiopia*
- *Centre for Economic and Social Sciences, Andhra Pradesh, India*
- *Sri Padmavathi Mahila Visvavidyalayam (Women’s University), Andhra Pradesh, India*
- *Grupo de Análisis para el Desarrollo (Group for the Analysis of Development), Peru*
- *Instituto de Investigación Nutricional (Institute for Nutrition Research), Peru*
- *Center for Analysis and Forecasting, Vietnamese Academy of Social Sciences, Vietnam*
- *General Statistics Office, Vietnam*
- *Child and Youth Studies Group (CREET), The Open University, UK*
- *Oxford Department of International Development (ODID), University of Oxford, UK*
- *Save the Children*

Contact:

Young Lives

Oxford Department of International Development (ODID), University of Oxford, Queen Elizabeth House, 3 Mansfield Road, Oxford OX1 3TB, UK
Tel: +44 (0)1865 281751
Email: younglives@younglives.org.uk
Website: www.younglives.org.uk