

Learning the Right Lessons: Measurement, Experimentation and the need to turn India's Right to Education Act upside down

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INTRODUCTION

India has almost achieved universal enrolment of children in primary schools. This is an important achievement, albeit one that has arrived too late for the many young men and women who missed out in recent decades. They are already of working age and have children themselves.

The government is now focusing its attention on retaining children and ensuring that they complete secondary schooling. This is fine and needed. However, getting children enrolled in school has turned out to be radically insufficient for the real task of providing children with the skills they need for their future lives as workers, citizens and parents. All the evidence shows that the bulk of India's basic education system is dismally failing in this task. With minor exceptions, the quality of learning varies from average to poor across all states, for both government and the vast majority of private schools. Even worse, this limited evidence, over time, finds effectively no progress in levels of quality since the mid-2000s. There is a huge risk that, despite schooling, another generation of Indian schoolchildren will enter the workforce and adult citizenship with grossly inadequate skills. This will be a drag on growth and a source of rising inequality. The few with high skills and access to capital will continue to benefit from growth, while the unskilled products of India's education system will face weak job prospects in an increasingly globalised world.

Can the quality problem be tackled? This depends on a proper diagnosis. There is little evidence that the issue lies with demand. Parents, including those who did not have schooling themselves, almost universally say they want their sons and daughters to complete schooling. The rapid growth in private schooling and tuition throughout India, including in poor rural areas, is a direct expression of this demand. But parents typically have little idea of what goes on in schools, and even less influence, in spite of the formal existence of parent committees for government schools and of payment of fees for most private schools.

There are sharply differing views on what the problem is on the supply side, and thus what the remedy should be. Some see this as an issue of inadequate 'inputs'- poor facilities, shortage of teachers, lack of teacher-training and so on. These are the cornerstones of the Right to Free and Compulsory Education Act (RTE) that came into force on April 1st, 2010². A different view sees the issue as a lack of incentives for teachers to put effort into genuine teaching. Within this view, some argue that further expansion of private schooling is *the* answer, whether through use of vouchers or other means. Others advocate sharper incentives for those teaching within government schools, for example, in the form of rewards for quality of learning outcomes, or

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² The Right of Children to Free and Compulsory Education Act or Right to Education Act (RTE), which was passed by the Indian parliament on 4 August 2009, describes the modalities of the provision of free and compulsory education for children between 6 and 14 in India under Article 21A of the Indian Constitution.

greater use of contract teachers (who are typically lower-paid and younger, but lack job security). Or, some argue, non-financial incentives could come from providing better information to parents, who could then put pressure on schools. Yet another view is that the fundamental issue is one of a misaligned pedagogy: that teachers are indeed teaching something, but not what children need; and meanwhile, teachers are required to keep pushing through a required curriculum, with the consequence that most children keep falling further behind and never really learn. These interpretations have hugely different implications for policy design.

It is, fortunately, possible to inform the debate with careful analysis. In the past few years, there has been a range of careful studies involving rigorous analysis and interpretations of what does and does not work in Indian schools. Many of these have been conducted in collaboration with leading international academics (including from the Massachusetts Institute of Technology, Harvard and Stanford, in collaboration with Indian Government and non-government institutions) and are being published in peer-reviewed journals. Some have been in NGO-run schools, but much has involved actual experiments within the government schooling system. For example, the book, “Poor Economics” by MIT economists Abhijit Banerjee and Esther Duflo devote a chapter to reviewing evidence from across the world on what works in education policy, from increasing the demand for schooling to improving student learning. This type of work is complemented by extensive analysis of patterns from large-scale, nationally representative surveys that actually measure quality of learning.

While much more is needed, these analyses have important implications. This paper consolidates recent rigorous evidence into an assessment of what we do and don’t know. It then suggests implications for the future of education design and experimentation over what does and does not work in India.

The studies we review find a mixed picture. There are several important examples of success in improving outcomes. Research involving children attending government schools in rural Bihar and Uttar Pradesh found that both the pedagogy and the teaching capacity are available to have a substantial impact on basic learning levels in both reading and maths. This is found for unpaid volunteers working outside the school (in both states), and in a summer learning camp with government teachers in Bihar. In rural Andhra Pradesh, innovations that provide incentives for government teachers linked to learning bear fruit in better outcomes, with both group-based and individual incentives for the teachers. Adding contract teachers also improves learning in AP, despite the fact that contract teachers were being paid a fifth of the salary of regular teachers (while teachers in private schools were paid even less). All these studies were based on comparisons with control groups (through randomised control trials - see the section below for discussion on design details).

However, what is *not* known is how to effect systemic change within state education systems. The large quantity of central government and state resources that has gone into the primary education sector across the country, notably under the Sarva Shiksha Abhiyan (SSA, the Education for All Movement), has apparently supported getting children into school. There have been some striking successes in increased enrolment, in Bihar for example. But these efforts have failed to achieve anywhere near satisfactory attendance or learning levels. In experimental studies in government schools in Bihar and Uttarakhand, attempts to introduce the same pedagogy within the school system in the regular school year had little or no impact in either state (in contrast to successes in Bihar outside the regular school context). It is unclear whether the incentive-based or contract teacher innovations in Andhra Pradesh could be replicated state-wide - on financial or political economy grounds. A study in Uttar Pradesh also explored whether village education committees, which are mandated under the SSA, could be mobilised to make a difference, but these had no impact; indeed, many VEC members did not even know that they had been appointed to the committee!

Nor is there any conclusive evidence that private schooling is a panacea. Both private schooling and tutoring is extensive. - with private schools accounting for a majority of enrolment in most urban areas, and about a quarter of rural children between the ages of 6 and 16. Over a fifth of children in both government and private schools receive private tutoring, so that in total, over 40 percent of all rural children have some form of private education, from school or tutors (with substantial variation across states). Children who attend private schools or receive extra tutoring do have better learning levels, but these are still way below desirable levels. Indeed, after controlling for household characteristics, the difference between children in private and government schools is small, except for English, that many private schools offer. By contrast, there is a large difference in the economic cost (as opposed to the cost paid by households): most private schools have much lower total costs, especially because of the much lower salaries that teachers receive.

These results have a major implication. There is an urgent need to foster a process of exploration and experimentation within the government and private schooling systems, with systematic monitoring and analysis of results in actual learning levels. Effecting systemic change is difficult. Within the government system, it requires alignment of reasonable commitment levels of government actors all the way down from the State education services through to district, block and cluster level administrative structures, and of course into the drivers of behaviour of teachers themselves. The evidence indicates that large effects can *potentially* be had with existing resources, and do not (necessarily) require radical shifts in inputs, the introduction of vouchers etc. This will, however, almost certainly involve providing the incentive, curriculum and information base for teachers to teach to the children's specific needs. This can involve various routes - adjusting the curriculum, streaming or organising of children, providing effective pedagogies to private schools and tutors, using volunteers or contract teachers and so on. These are all different ways of getting at the same problem, but just how to do this, on the scale of a state, in a politically supportable and administratively feasible way, is simply not known. The very lack of consensus implies that analysis and informed debate is of the utmost importance. And this can only be done if there is systematic measurement of inputs, incentives, processes and, fundamentally, of actual learning levels.

Is this approach in line with the RTE? Not as currently framed and generally interpreted. In particular, the RTE, rather than emphasising how schools should be made to deliver a certain minimum level of learning to every child, emphasises a standardised, input-oriented approach to both government and private schools, imposes government terms of service on private teachers and supports automatic advancement of children without allowing an independent measurement of learning at each grade. These features could damage experimentation, could render the low-cost private schooling movement financially unviable (even with the public transfers for the 25 percent quota for disadvantaged students) and stop systematic exploration and discovery of what does and does not work. Now just how the RTE will be implemented at the state level is unknown, and at least in the spirit of the Act there is attention to quality.³ That only underscores the importance of public debate now, both at the Centre and, even more importantly, in the states.

The remainder of the paper is organised as follows. We first briefly summarise the evidence on the quality of education and the divergent views on what to do about this. Then we provide a review of recent research on attempts to make a difference, and interpret the results. Finally, we discuss the implications for public action and how the RTE can be made to work better.

³ See Mehta (2012).

THE DISMAL QUALITY OF LEARNING IN INDIAN SCHOOLS

All the evidence shows the dismal quality of basic learning, in all states, in urban and rural areas, and in government and private schools

The evidence on the dismal quality of learning is overwhelming. It comes from multiple sources. These include the ASER reports (Annual Status of Education Reports) coordinated by Pratham/ASER Centre that have been conducted for rural areas every year from 2005 to 2011; they cover some 700,000 children and are statistically representative for almost all districts in India. Education Initiatives surveyed rural and urban schools in 2009, covering 160,000 children in 18 states in rural and urban areas. The nationally representative 2004-05 NCAER human development survey included both rural and urban areas. Himachal Pradesh and Tamil Nadu were included in the internationally comparable Programme for International Student Assessment (PISA) under the Organisation for Economic Cooperation and Development in 2009. And in-depth surveys were undertaken in specific states as part of research projects, including for Andhra Pradesh, Bihar, Orissa, Rajasthan, Uttarakhand and Uttar Pradesh.

These surveys used a variety of test instruments and different ways of testing, and yet the results are strikingly consistent. Both the ASER surveys and NCAER survey use a test instrument that Pratham/ASER Centre have developed and extensively piloted over many years, which allows a rapid categorisation of children into different reading, maths and comprehension levels. These tests are administered to children in a random selection of households in order to provide a statistically representative assessment of learning levels in the rural population. ASER tests all children in a household between the ages of 5 and 16. For the purposes of understanding the state of learning amongst children in the country, this household-based testing is greatly superior to school-based testing. It covers children in government and private schools (whether or not the latter are registered), and, of particular importance, children who are not in school on the day of testing (survey data finds that many enrolled children are not in attendance on the day of a school visit).

The ASER instrument is designed for a rapid assessment, so it is important to compare it with other testing instruments. The Bihar and Uttarakhand surveys (conducted by J-PAL South Asia⁴) did exactly this, comparing the ASER test instrument with two other tools - a 'fluency battery test' that was adapted for Hindi from an Early Grade Reading Assessment that is used in both the United States and many developing countries, and extensive written Hindi and maths tests also developed with some items from international tests (Vagh, 2010). These were administered to the same children, allowing comparison between the various test instruments. Analysis of the results found that *all* tests had desirable testing properties, provided consistent results across tests, and with different relative power in terms of discrimination across learning levels (the ASER tests, and even more the fluency battery, are relatively strong at basic levels of learning, while the written test was designed to also discriminate across higher reading and maths levels).

Amongst other surveys, the Education Initiative's research involved development of a sophisticated testing instrument that was administered in schools in standards 4, 6 and 8 in both urban and rural areas. Education Initiatives also developed the test instrument used for a different research study in Andhra Pradesh (APRest).

⁴ This is the Abdul Latif Jameel Poverty Action Lab in South Asia (based at the Institute for Financial Management and Research, IFMR), which is the regional branch of the Massachusetts Institute of Technology J-PAL.

These instruments were full-length tests, and included multiple choice and free response questions involving written answers and oral reading. PISA is an internationally designed test administered to 15-16 year olds who have had at least six years of formal schooling (since it seeks to assess the effects of schools). While the ASER survey and the older NCAER survey provide a good picture of learning levels in the overall population of children covered, the EI and PISA surveys are designed to assess the quality of learning of children actually in schools. A final example is a 2005 survey, analysed in Das and Zajonc (2000), which took items from the Trends in International Mathematics and Science Study (TIMSS) maths test and tested 6,000 children in public and private, urban and rural, secondary schools in Orissa and Rajasthan.

All surveys strongly indicate that learning levels are dismal across India.

What are some of the main findings?

First, while there is substantial variation across states, *none* of the states are performing anywhere near a satisfactory level. Table 1 provides some illustrative results from the 2011 ASER survey of rural children. Even in relatively better-performing states in terms of learning outcome, such as Himachal Pradesh and Kerala, the quality is severely inadequate for the bulk of students. Moreover, states known for their success in terms of economic growth, including Andhra Pradesh, Gujarat and Tamil Nadu, all have severely inadequate learning levels (and Gujarat and Tamil Nadu are worse than Bihar, for example, in terms of basic learning⁵). To the extent that growth in these fast-growing states required skills, this was likely due to the very small minority of workers who managed to get access to elite educational institutions such as the Indian Institutes of Technology.

Table 1. Indicators of learning deprivation in rural areas across Indian states in 2011

State	% of children in Standard V who <i>cannot</i> read a Standard II text	% of children in Standard V who <i>cannot</i> divide
India	52	72
Andhra Pradesh	40	62
Bihar	50	63
Gujarat	51	77
Himachal Pradesh	26	40
Kerala	26	67
Tamil Nadu	68	86

Source: ASER (2011)

Second, the variety of survey results indicates the depth, as well as the breadth, of the problem. ASER and other tests vividly show how far most children are below the learning levels expected of children in Standard 2. This finding also highlights the mismatch between curriculum (expected learning levels) and actual learning levels of children - an issue we return to later in the paper. Figure 1 illustrates dismal trends across the grades, with data from Andhra Pradesh.

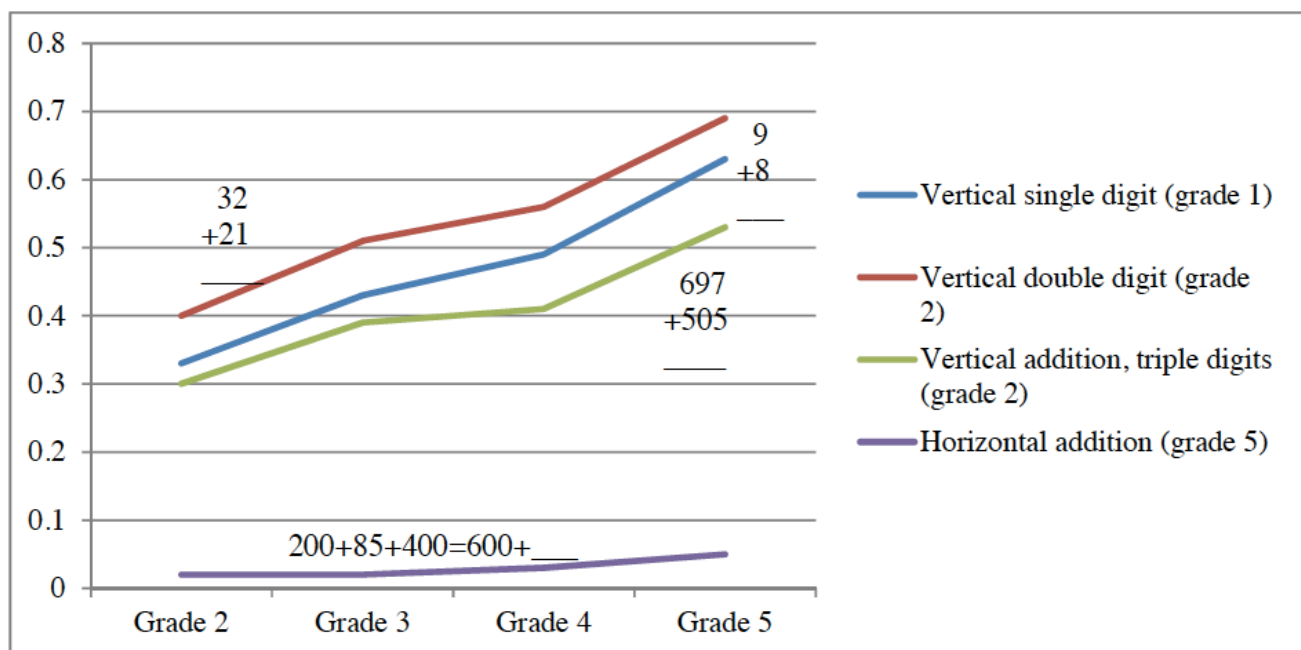
⁵A similar result was found in the NCERT survey of 2010, for class 5 students which shows that Uttar Pradesh is doing better than Gujarat, West Bengal, Jharkhand and Tripura. The survey tested over 1 lac class 5 students, across 31 states, in both rural and urban schools in language, mathematics and environmental studies.

The PISA results show how far India's children are ranked far below children in other countries. In international rankings, Himachal Pradesh and Tamil Nadu came last but one- only above Kyrgyzstan. As Pritchett (2012) has commented, the average child in these two states is at the level of the *worst* OECD or American students (those in the 5th percentile), and even worse for children in Hong Kong, Korea and Singapore (that might be considered aspirational levels for an emerging market country such as India). The *best* students in Himachal Pradesh and Tamil Nadu are 24 points (a quarter of a standard deviation) behind the *average* American 15 year old. The American education system is notorious for its weak quality when measured according to the standards of an advanced country. Furthermore, 58 percent of 15-year olds in school in Himachal Pradesh and 44 percent in Tamil Nadu cannot be distinguished from "not having learned any science at all" - ten times as many as those in USA. More than 80 percent in both states are below a level that, according to PISA, equips them with the "science competencies that will enable them to participate actively in life situations related to science and technology" (Pritchett, 2012). This is consistent with the earlier work of Das and Zajonc (2000) that found a mean test score of over *three* (OECD) standard deviations below the OECD mean for secondary school students in Orissa and Rajasthan. And all these results only apply to children in school - according to ASER (2011), 6 percent of 15-16 year old rural children were out of school in Tamil Nadu, and 2 percent in Himachal Pradesh.

Figure 1 illustrates the learning levels of school children at the primary grades indicating the proportion of children who can solve a grade-appropriate competency-based question in maths. The y-axis represents the percentage of children who got the particular competency (question) correct. For example, by Standard 2, the proportion of children who can do the double digit vertical addition correctly – which is an appropriate competency for 2nd graders – is just above 40 percent. Almost no children can make the quite simple conceptual adjustment needed to undertake horizontal addition even at Standard 5.

Figure 1: Learning profiles from Andhra Pradesh demonstrate that only a minority of children learn basic addition skills between grades 2 and 5

(Proportion of children at different learning levels)



Source: Pritchett and Beattie (2012) based on APREsT data provided by Karthik Muralidharan.

Third, urban schools are better than rural schools, but not substantially so. For example, Education Initiatives found that children in urban schools performed better at most language and maths levels, in terms of statistical significance, but the difference was only 'meaningful' in terms of educational levels for language in Standards 4 and 6. There were no 'meaningful' differences in language in Standard 8 or in maths for Standards 4, 6 or 8).

Fourth, any strategy on learning in India has to take private schooling into account. As noted above, there has been a significant increase in children receiving some form of private schooling, either through attendance in a private school or through private tutoring. While there are some elite, expensive private schools, the bulk of schools are low cost, have low fees and cater to middle groups in the urban and rural population. Some (e.g. Tooley and Dixon, 2005) have argued that the low-cost private schooling movement is central to any progress in education in India. It surely has a major role, but the survey results also show that while children in private schools or those receiving tutoring perform slightly better than children in government schools, the quality remains dismal. Moreover, in all the statistical analyses, a good part of the difference is attributable to their coming from wealthier homes with more educated parents (Chugdar and Quin, 2012, Desai et al, 2009, Mukerji and Wadhwa, 2012). The typical apparent gain is actually less than the differences across government schools in India's states.

Fifth, it might be asked how this awful overall quality can be consistent with India's apparent global success in producing high quality engineers and other talents. Some have left the country. The United States' Silicon Valley, one of the innovation capitals of the world, is buzzing with Indian names (Luce, 2012). But many, of course, remained in India, and helped power the economic dynamism of recent decades, in the iconic sectors of IT and pharma, and also in many other industries. There are two answers to this. There is the well-known story of the elite Indian Institutes of Technology (and a few other elite establishments). But this applied to only a tiny group of Indians. Then, there are the sheer numbers of Indians combined with high levels of learning inequality. Das and Zajonc (2000) found the inequality of learning in Orissa and Rajasthan to be only exceeded by South Africa from amongst countries with TIMMS data. This meant that both statements that follow were consistent with the data: "'for every ten top performers in the United States there are four in India' and 'for every ten low performers in the United States there are two hundred in India'" (Das and Zajonc, 2000, p.1).

BUT THERE IS NO CONSENSUS ON CAUSE AND TREATMENT

Policy design would be easier if there was agreement on the sources of the problem. When the issue is that children are not enrolling in school, the challenge is clear, at least at face value. And there has been great success in getting children, especially girls, enrolled, notably in the most lagging or disadvantaged states. A big part of this seemed to be an issue of having a supply of accessible schools: as far back as the late 1990s, the PROBE report of Northern Indian states found substantial demand for school amongst poor rural households (PROBE, 1997). Bihar's big push to get children into school, under the first administration of the Chief Minister Nitish Kumar, was in part driven by an enormous expansion and upgrading of schools, with about a three-fold rise in the number of teachers in government schools.

But on the question of what to do to improve children's learning, there are diverse and sometimes opposing views. We briefly outline some of the main views.

Household conditions and behavior: One of the major regularities in the international research on learning is the correlation between the socio-economic status of the home and learning outcomes. Children from homes that are wealthier and have better educated parents and siblings do better in school. This also appears to be true of India, based on the survey evidence. How much of this is causal is unclear. It could be that homes of 'better' socio-economic status live in better neighbourhoods, send their children to better schools, or parents put more pressure on teachers. Or the home environment may play a direct causal role in learning, via direct inputs to learning, placing lower demands for child 'labour', or instilling effort and aspirations in the children. This would take policy in the direction of expanding economic opportunity, engaging with parents, providing transfers linked to education, or compensatory action for the children from more education-poor homes.

School infrastructure and other inputs: A very popular diagnosis of why quality of education is poor or why children's learning is low focuses on lack of school inputs: it *seems* obvious that effective teaching and learning require reasonable pupil-teacher ratios, well-trained teachers, decent infrastructure (of classrooms, toilets etc.) and teaching materials (textbooks, exercise books, blackboards and so on). This is a major thrust of the newly passed Right to Education Law which mandates minimum input norms for both government and private schools. There is, however, surprisingly little evidence from international literature or from research in India to support this position: pupil-teacher ratios, infrastructure or measures of teachers' qualifications are typically unrelated to learning outcomes (See Hanushek, 2007, for a review of developed country evidence, and Kremer & Holla, 2009, for a review of evidence from developing countries). While there have been very few experiments that carefully analyse effects of increasing inputs in an Indian context, children who attend school with better infrastructure seem not to do better in terms of quality. It is desirable that school facilities are of decent quality and teachers don't face huge classes, but it is not obvious that this will solve the quality problem.

Midday meals: A very different argument concerns the importance of having midday meals in schools. This can make a difference in terms of incentivising children to actually go to school. There is indeed a large difference between enrolment and attendance in many schools: in one research project, it was found that the ratio of attendance to enrolment on the day of a surprise visit was only about a quarter of enrolled children in standards 2 and 4 in rural schools in Bihar, and less than 60 percent in Uttarakhand (Banerjee et al, 2011). (Moreover, these were schools that were offering midday meals). A different argument is that midday meals could potentially make a difference to concentration levels and thereby, impact learning of school-children; however, for most schools, the bulk of the school day takes place before lunch.

Incentives: There is growing interest, especially among economists, on the role of incentives in schooling. Arguments are made about the 'incentive properties' of private schooling: school managers are effectively selling a product (at least, for fee-paying private schools; the so-called 'government-aided' private schools are effectively run on the same terms as government schools). They need to convince parents that it is worth sending their children to their schools. Parents often say school quality is the reason they choose private schools over government schools, though English language teaching is at least as important a reason. Another argument is that teachers in private schools lack tenure, and so face stronger incentives than government teachers to actually turn up and teach. This has led some observers to argue for supporting a large-scale shift into private schooling by tolerating their growth, through vouchers or other means. (See, for example, Tooley and Dixon, 2005.)

Incentives are also seen as a major issue within government schools: It is well-known that there is both a major absenteeism problem in much of India, and that teachers who are at school are often not teaching. The PROBE

report (1999) found that in only 53% of government schools across 4 states was there any teaching activity going on. In half of the sample schools, there was no teaching activity at all during the investigator's visit. Kremer et al (2006) found in a survey of 3,700 primary schools across 20 states, that 25% teachers were absent from school on a given day. Among teachers found present in school, only about half were observed engaging in teaching activity in schools. A common interpretation is that teachers have low incentives to actually turn up and teach since they have security of tenure, receive few rewards for putting effort into teaching let alone improve learning, and are often required by officials or politicians to work on other matters.

This diagnosis leads to a range of policy recommendations. One alternative is to engage teachers on term contracts (whether or not these are considered regular teachers, albeit on lower pay), on the principle that they will be incentivised to teach or lose their job. Another is providing additional rewards to teachers if learning levels improve. Yet another involves creating a career path for teachers linked to performance in learning outcomes (Pritchett and Murgai, 2005). A different kind of measure concerns empowering parents: having Village Education Committees (typically required under the SSA, and now part of the RTE), on the principle that they will put pressure on heads and other teachers to turn up and teach.

Curriculum design: Yet another argument is that there is a failure of curriculum design. The RTE education stresses age grade learning and also specifies that the syllabus should be completed in a given time period. This assumes a linear progression from year to year with children mastering the content/curriculum of each year before moving up to the next grade level. The reality is quite different: there is a lot of evidence that the level of learning of most children is typically way below requirements of the curriculum. Yet teachers are required to complete the curriculum.

Systemic issues (a): administration. What happens in schools, both government and private, is influenced by the layers of administrative structures that lie above the school itself. This includes cluster and state level school administrators, inspectors of private schools, state level bureaucracies and, not least, the central government that provides funding with requirements (as in the SSA) and passes federal laws (as in the RTE). Systems can change if everything is aligned, from top to bottom, to achieve goals that are clearly articulated and leadership is in place.

Systemic issues (b): political economy. A complementary argument focuses on political economy issues. In India - as in many countries - teaching is a valued source of employment, and government teaching is especially valued since it pays substantially above alternative jobs (both private teaching and other private sector jobs) (Pritchett and Murgai, 2005). Teachers are also one of the largest groups of public employees and can become both an important area for patronage and a political force. There is evidence that this is salient in India: there are mutually reinforcing relations between teachers, politicians and officials, with both political influence and threats of incentives and disincentives being linked to patterns of absenteeism and placement in better and worse teaching positions, in the form of discretionary transfers (Béteille, 2009). Further, while teacher associations and unions have been able to exert influence to demand (and receive) better pay scales, job security and other benefits, this has not led to much progress on improving education quality (Kingdon, 2008).

Each of these major diagnoses suggests a different strategy or path as solution and therefore these interpretations have hugely different implications for policy design. **This is precisely why measurement and analysis and informed debate based on empirical evidence are of the utmost importance.**

RESULTS FROM THE RIGOROUS ANALYSIS OF ACTUAL EXPERIENCES

Fortunately, in the past few years, there has been a variety of careful studies and interpretations of what does and does not work. These include a number of randomised control trials (RCTs)⁶ of programmes that aim to address some of the problems discussed above, and point to solutions that work. This is by no means the only source of evidence of value, but has advantages in assessing causality for the specific innovation analysed. By contrast it is hard to design RCTs to test systemic issues. Sometimes this leads to discovery of small innovations that can have large gains; in other cases they provide insights into systemic or structural issues. There is a steep learning curve with every piece of research contributing to a larger body of evidence that could be used by practitioners and policymakers alike in designing programmes for effective learning outcomes. In this section, we review and present evidence that measures the impact of inputs in the schooling process, the impact of remedial learning measures and teacher level incentives on student learning outcomes, giving a brief overview of why certain measures have worked while others had no effect. The evidence we present is by no means exhaustive and conclusive. We focus especially on RCTs undertaken in India, with selected results from other relevant studies. These provide carefully researched, evidenced-based results. But this is still a partial account of what would be needed on the scale of a state, in a politically supportable and administratively feasible way. This can only be assessed with systematic measurement of inputs, incentives, processes and, fundamentally, of actual learning levels.

I. Increasing school inputs under the RTE provisions

There have been several initiatives in India and elsewhere to improve enrolment and improve learning by providing inputs such as additional teachers, free textbooks and reading material, uniforms, scholarships, schools meals etc. The large quantity of central government and state resources that has gone into the primary education sector across the country, notably under the Sarva Shiksha Abhiyan (SSA, the Education for All Movement), has apparently supported getting children into school. Increased enrolment has been striking, in Bihar for example. But these efforts have failed to achieve anywhere near satisfactory attendance or learning levels. The issue now, is not enrolment, but there is a strong case for new research on determinants of daily attendance, that is ill-understood. Mid-day meals has been considered effective in getting children into schools, but much more careful analysis is needed to determine if it has been successful in impacting attendance positively.

Inputs find considerable mention under the RTE framework for what schools should have. As noted above, it may seem commonsense to assume that in a country like India with low levels of inputs, any additional inputs provided in the form of teachers, text books, stationary and materials, school meals etc. will have a positive impact. However, the general consensus from research is that most inputs often don't have any impact. While we might find an increase in enrolment in some cases, this has *not* generally led to higher learning outcomes. This illustrates the gains from careful research. This is a process of learning, and evaluation teaches us which

⁶ Randomised Control Trials (RCTs) are a type of Impact Evaluation that uses random assignment to allocate resources, run programmes, or apply policies as part of the study design. The main purpose of an RCT is to determine whether a programme has an impact, and more specifically, to quantify *how large* that impact is. Impact evaluations measure programme effectiveness typically by comparing outcomes of those (individuals, communities, schools, etc.) who received the programmes against those who did not. There are many methods of doing this. But randomised evaluations are generally considered the most rigorous and, all else equal, produce the most accurate (i.e. unbiased) results. <http://www.povertyactionlab.org/methodology>

inputs could provide more returns on the investment. Thus, while much more is needed, we can draw some general lessons from the empirical evidence that is currently available.

What about teaching-learning materials such as reading materials, flipcharts and school uniforms?

There is mixed evidence on the impact of instructional inputs such as reading materials and flipcharts on children's learning outcomes. In rural India, an evaluation of specially designed, colourful reading and maths materials did not show an impact of these materials on children's learning outcomes, when used by school teachers, in the absence of any training and additional support to teachers (Banerjee et.al. 2011). These materials were specially designed as part of a larger evaluation of a learning enhancement programme, aimed at imparting basic skills to children who were behind their peers in achieving grade-appropriate competencies. A proportion of schools were randomly allocated to receive these reading materials, and the hypothesis was that teachers would be motivated to use these materials to enhance children's learning. However, only when materials were combined with appropriate training on how to use these materials to enhance learning, *and* teachers were provided with additional volunteer support, was there an impact on basic maths and reading skills for the children. Flipcharts used in Kenya too showed no impact on test scores (Glewwe, Kremer et al, 2004). In rural primary schools in Kenya, a group of randomly selected schools were given flipcharts while others were not (schools without flipcharts were used as comparison schools). There was no impact on test scores for schools using flipcharts vis-à-vis schools that were not given flipcharts.

However, inputs sometime have been found to have some impact. Providing free textbooks to a randomly selected group of primary and middle schools in Kenya increased the scores of the best students, that is, those with high pretest scores as compared to schools that did not receive the free textbooks (Glewwe et. al, 2009). However, there was almost no impact on test scores of the weaker students. From Andhra Pradesh, there are interesting results that suggest that investments in specific additional inputs may have an impact on learning; however, this impact disappears as soon as parents, in anticipation of the free inputs, substitute for their own investments into their child's education (Muralidharan et. al, 2010). This particular piece of research on material inputs comes from a series of experiments that involved a mix of input- and incentive-based policies for teachers and schools, designed to test different hypotheses. A group of schools in AP were provided block (cash) grants for inputs over two years. Results indicated that nearly half of the grant allocation was spent on child stationary (notebooks, chalks, slates) and close to another 40% was spent on classroom materials (such as charts and toys) and practice books for children. As a result of spending on classroom level inputs, student learning improved in the first year. However, these gains were insignificant in the second year of the experiment. Interestingly, at the same time, household spending on these specific school inputs fell significantly in the second year of the allocation, indicating that households were changing their spending in response to anticipated school spending in the second year. An interpretation is that schools spent money on material goods such as child stationary and practice books that parents are likely to buy for their children in the absence of school provision. This led to substitution, allowing households to reduce their own spending on the same.

This highlights that the type of inputs matters. For example, school uniforms that are usually paid for by parents of children going to rural Kenyan schools, when distributed for free, did lead to a significant reduction in absenteeism and improved test scores (Kremer et al, 2003). The premise behind evaluating the provision of

free school uniforms was that this would reduce part of the financial barrier to access to education. This was an experiment in which a proportion of students were randomly chosen by lottery to receive free uniforms and results were compared a year later with students who did not get the uniforms. The results showed that the provision of free uniforms reduced school absenteeism by 44% for the average student and by 62% for students who previously did not own a uniform (in the treatment group). There was a substantial impact in test scores (that improved by a significant 0.25 standard deviations).

Increasing supply of teachers, reducing class size:

Large class sizes, teacher absenteeism and heterogeneous classes are commonly cited as sources of low quality. Results from several studies done in other developing countries suggest that there is little or no impact on learning from reduced pupil-teacher ratios. This is particularly striking since, in contrast to developed countries, the starting point in poor countries is typically of high pupil-teacher ratios. An initial intuition would be that when inputs are low, marginal gains are high.

A series of experiments have systematically evaluated the effects of reducing class sizes by recruiting extra (contract) teachers in schools (Duflo et al., 2006), as well as by adding civil service teachers (Muralidharan, 2005; Banerjee et al., 2003).⁷ This model is especially important, given that state governments are increasingly hiring teachers on temporary contracts to meet the pressures from the large-scale expansion of primary education. Typically, contract teachers are younger and with less formal training than regular teachers, paid much less, and are more likely to be from the same village as the school in which they teach. There is a concern that contract teachers will not impact children's learning because of lower qualifications. We have reviewed studies that have systematically tested the impact on learning by reducing class sizes by hiring extra teachers, as well as a more focused approach whereby extra teachers are specifically assigned to lower performers within classes. We present two key pieces of evidence below that evaluate the impacts of extra contract teachers in government primary schools.

As part of a series of experiments from Andhra Pradesh (APRESt), a group of schools were provided with an additional teacher on contract (this cadre is similar to the Panchayat teachers in Bihar, and perform a similar role to the *balsakhi* in Vadodara or the intended role of volunteers in Uttarakhand – which will be discussed subsequently in this paper). In the APRESt intervention design, a group of 100 schools got an extra contract teacher who was assigned to a school (and not a particular grade or to a subset of students based on initial achievement). Overall, contract teachers (CT) were found to be more effective with students in CT schools significantly outperforming students in the comparison schools (0.13 standard deviations improvement in learning over two years for children with a contract teacher). In addition, the extra contract teacher was particularly beneficial for students in Std.1, although overall, all students across all grades taught by contract teachers gained from the programmes. Contract teachers were also significantly less likely to be absent from school than regular government school teachers. Thus, a key policy message from this study is to hire locally hired teachers on fixed term renewable contracts and have them focus on children who need help in early schooling years, adding to the critical mass of evidence supporting the effectiveness of this type of programme. It is a highly cost effective model, as contract teachers cost much less than regular teachers, and have large gains for children's learning improvement.

⁷ See also Urquiola and Verhoogen (2009) for the lack of impact of pupil-teacher ratios in Chilean schools.

The results from AP also find resonance in a study in rural Kenya where, in a randomly selected group of schools, children in grade 1 were split by ability and grouped as per initial achievement (based on a pre-test), while in a comparable cluster of schools, the students were divided into two groups within the class, with no predetermined criteria (Duflo et al, 2006). Both groups of schools got an extra teacher, either a government teacher or a contract teacher (the contract teacher was lower paid and did not have tenure). These schools were compared with each other, as well as with a control group of schools which had no extra teacher. The researchers were trying to disentangle the effects of reduction in class size on learning levels (and in part, the effects of dividing classes by ability). Results indicated that merely reducing class size by adding an extra teacher had no effect on the test scores of students. In fact, in the schools which had extra contract teachers, the regular (government) teachers showed even less effort in teaching, as observed through random visits to the school. (There is some evidence of similar responses in Indian studies). Only when a group of schools with extra government teachers (with reduced class size) were monitored by the school management committee members, did this lead to the teachers exerting more effort to teach; however the higher teaching activity did not substantially reduce the learning impact gap between contract and regular teachers.

Thus far the evidence has focused on inputs: a few studies find some impact in specific contexts, but there is no general support for the view that further investments in school level inputs will improve learning (however desirable it may be on other grounds). Yet, that is not the entire spectrum of the issue. Children are clearly lagging behind and need additional help. Some view additional inputs as the solution, while others argue that it is the curriculum that is at the base of the learning issue and thus needs to be addressed. The current debate brings pedagogy and teaching practices to the fore, with a growing body of research suggesting the need to employ remedial measures for children to cope with the curriculum, and teaching practices to be adapted to the child's level.

II. Specific pedagogy aligned with children's needs

The evidence available also raises the important issue of *curriculum design*. The RTE stresses age grade learning and also specifies that the syllabus should be completed in a given time period. This assumes a linear progression from year to year with children mastering the content/curriculum of each year before moving up to the next grade level. The reality is very different.

The problem of curriculum design

In our review of current patterns of achievement above, we have seen that most children in Indian schools have learning levels that are way below expectations of the curriculum or levels expected of them at their current grade level. Using data from studies in South Asia and Africa, Pritchett and Beatty (2012) analyse the risks of an 'overambitious curricula' and find that a majority of students spend years in schooling with very little progress in learning. Low level of learning is in part the result of the curriculum moving faster than the students are learning, creating a *growing gap* between student skills and instructional material. Pritchett and Beatty observe that "Of children lacking the ability to answer simple curricular-based questions going into a typical grade, only 1 in 8 children demonstrate that skill after an additional year of schooling. This means that seven out of eight children made no progress on a typical item after an entire year of schooling." (Pritchett and Beatty, 2012 p.7.). The consequences of the problem are illustrated with simulations illustrating the pernicious effects of such a *curricular gap* with actual learning levels. Even if children start at the same initial level of learning, a higher curricular gap can lead to worse cumulative learning achievement. They demonstrate that

the combined effect of lower initial skill levels with an inappropriately accelerated curriculum is much larger than the student arriving with the low skill level alone. A 'slower' curriculum, adapted to the learning levels of children, can paradoxically lead to substantially faster learning.

The problem of a curricular gap is consistent with the experimental results discussed above. Getting incentives right for teachers has to be embedded in a curricular approach that is aligned with a child's needs; otherwise, increased effort will have no effect. This also may explain the inefficacy of higher inputs in many studies - since increased teaching inputs will have no effect if the 'required' action in the classroom is inconsistent with what children need.

To explore whether textbooks aligned with the curriculum only matter for the best performing children, Glewwe and others conducted a randomised evaluation of providing free textbooks to government school children studying in grades 3-8 in rural Kenya (Glewwe et al, 2009). Providing textbooks increased the scores of the best students (those with high pre-test scores) but had little effect on other students – and almost no impact on test scores of the weaker students. Over the four years of the programme, it was found that the gap between textbook schools and comparison schools (who were not supplied free government textbooks) actually narrowed considerably over time. This is consistent with the hypothesis that textbooks help only strong students who can already read fluently and that textbooks are thus designed such that they are out of the reach of the understanding of the average child in class. Further, the general issues of high teacher and student absence rates and inability to keep pace with the curriculum only compounded the problem in this case. There was no evidence to suggest a positive impact on grade repetition, dropout and student absence rates.

In addition to thinking about children's abilities there is also the question of teachers' capabilities. Several studies provide estimates of teachers' capability to teach - which raises critical questions about the preparation and support to teachers for teaching (Atherton and Kingdon, 2010; Bhattacharjea, Banerji, Wadhwa 2011). In fact, a recent study finds that a large proportion of teachers have difficulties in doing simple traditional tasks like summarizing a basic text, explaining word meanings in simple language or laying out step by step how to do word problems even at Std 4 level (Bhattacharjea et. al, 2011).

The RTE mandates that there be no external Board examinations, automatic promotion and the completion (by the teacher) of the prescribed curriculum in each class, and thus leaves very little room for adjusting teaching to a very heterogeneous group of children. By contrast, the results cited above strongly suggest the need to go beyond inputs and to look more closely at classroom practices and class organisation to understand actual influences on learning. We discuss next a growing body of research from India that has evaluated key interventions that improve reading, including structured reading instruction and training teachers to teach at the child's level, and greater parental and community engagement to effect change in schools.

Evidence on teaching at the level of the child

Several large-scale interventions have been carried out in different parts of the world that focus on teaching children by ability rather than by grade. Impact evaluations of such programmes have systematically found significant effects on learning levels of children. There is evidence for an effective pedagogy that can work for children who need remedial help as well as higher levels, and can be imparted by both government teachers and volunteers - but that this is effective only if the pedagogy is aligned with the task at hand for teachers.

An evaluation of a remedial education programme that was undertaken in government schools in Vadodara and Mumbai in 2001 (Banerjee et al. 2005), found a substantial improvement in learning for low-performing students, who received remedial tutoring by a *balsakhi* (a community-based tutor) who was hired at a fraction of the cost of a government school teacher and placed in all schools during school hours to work with children who had fallen behind their peers in basic reading and maths. Typically, the *balsakhis* were female, with no formal teacher training, and were younger and less educated than government teachers. They usually belonged to the neighbourhood of the local primary school. They taught for two hours a day, and alternated between grades 3 and 4 in government schools. The class was split into two groups, with the lower performing (bottom twenty students) of the class assigned to the *balsakhi* and the remaining children with the regular teachers. Scores on the post-treatment test showed gains over both years for all the children in the bottom third in both language and maths, especially in higher maths competencies. The proportion of children in the bottom third of the class who passing basic competencies, increased by 8 percent. This was interpreted as being a result of the *balsakhi* tailoring instruction to suit the needs of the lower performing students and focusing on basic skills, (rather than the general reduction in class size that was responsible for the programmes gains).

As discussed above, merely reducing class size by hiring extra teachers does not have an impact, whereas, splitting a class by students' initial achievement on test, and assigning extra teachers to work with the children has found to be effective in improving learning outcomes measured through test scores. The extra teacher project in rural Kenyan primary schools, that was evaluated through an experimental design, assigned extra teachers on renewable contracts to classrooms that were split by ability (on initial achievement on test for grade 1 students – these were the “tracking schools”). These were compared to schools where students in grade 1 were grouped at random and not based on any test or criteria (“non-tracking schools”). This design allowed researchers to disentangle the effects of merely reducing class size from grouping class by ability and tracking students' learning outcomes through a focused approach (Duflo et al, 2006). As noted above, merely reducing class size by adding an extra teacher (in this case, the class size reduced from 82 to 44 students in a class) had no effect on the test scores of students for classes that were not streamed by initial achievement levels. By contrast, in classes where students had been grouped by ability test scores increased for all students, both for low and high performers. Substantial increases in test scores in tracking schools were observed both after 18 months, and a further year later. Low-performing students benefited more from instruction at a more appropriate level than they did from having high performing peers in the same class.

We have learnt above that it is indeed possible that lower paid, less trained and often less qualified teachers on renewable contracts can have positive impacts on children's learning within government schools. What about unpaid volunteers from the community? In 2005, J-PAL researchers evaluated a model that was being implemented by Pratham⁸ in rural Uttar Pradesh that recruited and trained village volunteers to teach basic reading and maths skills to those children lagging behind to ‘catch up’ with their peers once back in class (Banerjee et al, 2010). Three interventions were tried with the aim of improving learning outcomes for children and evaluated through randomised control trials. The first two interventions explored the influence of

⁸Pratham is a nationwide NGO has been implementing large-scale nationwide programmes that deliver basic reading and maths skills to rural and urban children. Pratham's programmes seek to partner with village communities and government school systems to bring about a significant improvement in basic learning levels across the country. Pratham's strength lies in participative organisational strategies combined with practical pedagogies that can be implemented at scale with existing teaching resources and volunteers.

information and community participation on improving the quality of education and around sharing information about low learning levels in the community through a participatory process through developing "village education report cards" on learning levels. The last intervention supplemented these discussions with an action component: unpaid village volunteers were recruited and trained to conduct after-school community-based reading camps that supplemented the usual primary school teaching.

Just providing information to parents and community members had no effect; village education committee members were not even aware of their appointment to the committees; as a result, the school system was left untouched. However, the volunteer programmes of supplemental teaching proved to be highly effective. In the community-based after-school reading camps, the average child who attended the reading programmes and who could decipher letters, but not words in the baseline, was 26 percentage points more likely to be able to read and understand a story than a comparable child in the control villages. Combined with the natural progress of children over the course of a year, these results implied that, after a year, all the children who could not read at all and attended the camp were able to decipher letters, and 35 percent of the children who could read letters and attended a camp were able to read and understand a short story.

“Though information to parents, including around the Village Education Committees, failed to have an impact on government schooling, the basic reading and maths pedagogy (‘Learning to Read’) developed by Pratham was effective when delivered by unpaid volunteers trained by Pratham workers in villages; volunteers taught children out of school hours.” (Banerjee et al. 2010)

Remedial education interventions in school along with volunteers from the community:

The major learning from these reading camps in UP led to a series of innovations to test whether the pedagogy could be embedded in the normal functioning of a government school during regular school days, so that more children could be reached, using existing teachers and supplemented by volunteers (Banerjee et al. 2011). This was Pratham’s flagship ‘Read India’ programme, which has reached 35 million children in over 350,000 villages in 19 states across India since 2007. Under this programme, Pratham extended its pedagogy to cover all primary school levels up to grade 5. A set of materials for use in school and training was developed. In the resulting pedagogy (CAMaL: Combined Activities for Maximised Learning), activities included focusing on a specific target group of children, articulating clear learning goals, using appropriate teaching-learning activities and materials and organising children into groups by ability level. Ongoing measurement of children's ability to read, write, comprehend and do basic arithmetic and solve problems was used to assess progress.

The basic programme in schools (in selected blocks of Bihar and Uttarakhand) included alternative combinations of three main elements: first training and monitoring of teachers to more effectively teach specially designed grade-level material during the normal school hours; second, supplemental teaching through volunteers working to help lagging behind children (this was similar to the Uttar Pradesh programme by the same NGO) and third, distribution of the teaching-learning materials and books to schools without extra training and support of teachers (for Bihar). A final treatment (for Bihar) involved a month-long summer learning camp, targeted to lagging children in grades 3-5, using specific learning materials. In Bihar, the volunteers worked after school hours, while in Uttarakhand, the volunteers worked inside the schools alongside teachers. Villages were randomly selected to receive one model or the other and the programme was evaluated over a period of 2 school years. The results confirm the effectiveness of the programme when implemented by volunteers in the communities (overall, learning levels increased by 0.11 standard deviation for an average of all tests). For this particular intervention group (only implemented in Bihar for volunteers in

the community), results significantly improved on all tests relative to the control group, including for the advanced competencies. Children benefited both at very low and higher levels of baseline competency.

The study also confirms, however, that mainstreaming the programmes through the regular school system, even with the explicit collaboration of the States' education departments, proved to be difficult. In both states of Bihar and Uttarakhand, the programmes which focused on training teachers for implementing the pedagogy during the school year, without adding volunteers to support government teachers, had only very small effects and gains were concentrated among kids who could read letters, or words/sentences; children at the bottom and children at the top did not benefit at all. Government teachers continued to teach in age-grade groupings using the usual textbook and curriculum. In Uttarakhand where the volunteers were embedded in the school system that had the responsibility to monitor them, the programme including teacher training, volunteers and materials had no effect whatsoever. Thus, bringing volunteers to the schools in Uttarakhand, which had been effective in other contexts, failed in this case, possibly because the volunteers in effect just substituted for teachers (who could then work less), or were directed to non-teaching activities.

These results are aligned with the earlier studies in Kenya by Duflo, Dupas and Kremer, referred to above, where they found an increase in teacher absence when an extra teacher was provided to the school, except when school committees were explicitly instructed to monitor the programmes. In the study of balsakhis in Vadodara and Mumbai, Pratham's staff exerted constant monitoring of the school, whereas in the Bihar and Uttarakhand study, it was largely the school's responsibility to ensure that the volunteers and teachers were present and did their work, with Pratham staff visiting less frequently.

Summer learning camps: A first interpretation of the weak in-school results could be that teachers do not exert effort, are not motivated to teach, or are too set in their ways to implement the innovative pedagogy. However, a very different result is found in the gains in learning amongst children who attended summer camps in Bihar. These were taught by the same teachers who also taught in the regular school year, supported by a volunteer in the classroom. The summer camp was aimed at children in grades 3, 4 and 5 who were not yet reading or doing arithmetic of grade 2 level. The classes took place in government school buildings. JPAL researchers conducted a randomised evaluation of this pilot 'summer learning camp' that was implemented by the Bihar government and Pratham teachers in government schools and were paid their salary for the extra month. The evaluation found significant learning gains in reading and maths, with significant persistence even after two school years. Overall, there was a significant, but modest, impact on overall reading levels in the villages with the camps. Virtually all the learning gains were found amongst children with low levels of initial learning, indicating that the pedagogy was well designed for this group. 14% of children moved up one level in reading on average, in the treatment villages relative to control. For those who actually attended, the gains were much larger (for example, a child gained 0.56 of a level, indicating that half the class moved up one level if they regularly attended summer camp). This impact was mainly driven by larger gains for the children who could only read letters at the baseline before the camp. As already emphasized, these learning gains occurred with existing government school teachers. Perhaps their work in the summer was much more effective because they too were freed from the grip of age-grade curriculum and could work in a focused manner with the kids left behind. During the school year, teachers are compelled to teach by grade and are busy completing curriculum as required by law.

An interpretation of the mixed results from the Read India evaluation throws up questions on how to integrate innovation within a government framework; it also highlights some important lessons: *Pedagogy and teaching effort tailored to the child can have significant impacts even with unpaid volunteers and low-paid teachers,*

provided this is the primary focus of their work. The failure of teachers to achieve results within the school year is consistent either with weak teacher motivation or an emphasis on delivering the curriculum rather than competencies.

III. School and teacher level incentives

A key lesson from the studies focusing on pedagogical innovations is that teaching behaviour seems to be an important channel through which learning happens for students. This raises the question of the incentives that teachers face when actually in the classroom. A number of studies have tested alternative interventions, providing incentives to schools or teachers, or using contract teachers, who may be incentivised to teach, since they could otherwise lose their job. These questions are systematically studied in a series of randomised evaluations in India under the Andhra Pradesh Randomised Evaluation Study (APRESt) and helps inform us better on what worked in a particular context (Muralidharan and Sundararaman, 2011). As discussed above, earlier studies found that the effort of government school teachers in India is a serious problem, as reflected in high rates of teacher absenteeism or being present but not teaching (PROBE, 1999, Muralidharan and Kremer, 2003).

The APRESt explored several interventions, with a mix of input- and incentive-based policies for teachers, hiring additional contract teachers, and material inputs, designed to test different hypotheses. It was carried out in five districts of Andhra Pradesh. Overall, the interventions with contract teachers were found to be *more* effective than the regular teacher, with students in extra contract schools significantly outperforming students in comparison schools. This is a highly cost effective model, as contract teachers cost much less than regular teachers, and have large gains for children's learning improvement. Testing the hypothesis that teachers do not know how to help students and thus feedback and better information can help them address specific needs of students, existing regular teachers in a selected set of schools were provided with detailed feedback on students and were subject to minimal, low stakes monitoring. Results indicated that teaching activity of the teachers in the feedback schools seemed to be higher relative to the comparison group with no feedback and monitoring. Teachers were found to be actively teaching, reading from textbooks, using the blackboard more and assigning more homework as compared to the comparison school teachers (a significant effect of 0.107 standard deviations higher teaching activity for treatment schools relative to comparison schools). However, while teaching activity improved under observation, this did not translate into any learning gains for children. The lack of impact on test scores of students despite enhanced teaching activity, suggests that teachers temporarily changed behaviour when observed, but did not actively use the feedback reports in their teaching or that their teaching activities were not suited to the children's needs.

Performance pay incentives for teachers:

The debate around performance-based pay to increase teacher output has received much attention. A common criticism of financial incentives is the reduction of intrinsic motivation, and the danger of the teacher teaching to the test in order to gain the desired learning outcomes for the child. In a key set of interventions that gave additional rewards to teachers, these rewards linked financial bonus as an incentive to teachers based on student improvements (APRESt: Muralidharan and Sundararaman, 2011). The hypotheses were that pay could incentivise performance on learning outcomes, or contract teachers could be as or more effective as regular teachers. The study explored whether teacher performance-pay can improve test scores, whether teachers change behaviour and whether there are negative consequences. In the randomised experiment design, there were two variants of the financial bonus: in one variant, individual teachers received bonus pay

based on average test score gains made by their students. In the other variant, all teachers in a school received the bonus based on average test score gains for the entire school (group incentive). In addition, in order to estimate long-term effects, half the schools in each of the treatment groups were randomly allocated to continue receiving the performance bonuses for a period of five years. The student test was designed to test conceptual knowledge that required a deeper understanding of basic concepts in order to reduce the problems of teaching to the test, and language and maths were chosen as the focus subjects. Further, the bonus was estimated as a function of the average improvement of all students in a class, to counter teachers being incentivised to focus only on students near some target (for example, the low-performing students).

There were three significant results of the experiment on teacher rewards: First, the bonus (incentive) schools did better for all major subgroups (individual and group incentives) and in all the grades (Std.1-5) relative to the comparison schools which did not receive a bonus. This was found in both maths and language and for all levels of question difficulty. These students performed better on conceptual (and not just mechanical) questions, and performed significantly better even on subjects for which there were no incentives (scoring 0.52 standard deviations and 0.30 standard deviations higher than students in comparison schools on tests in science and social studies). Second, individual incentive schools outperformed the group incentive schools on student outcomes at the end of the programme, though they were equally effective in the first year of the experiment. Third, students who had completed five years of primary schooling under the programme scored an overall 0.54 standard deviations higher in language and 0.35 standard deviations higher in maths as compared to the comparison schools. The impact of individual teacher incentives on performance and student learning was significant over the entire duration of the five year programmes. However, neither of these interventions reduced teacher absenteeism; instead, only increased teachers' efforts while at school, leading us to suppose that the main mechanism for the improved outcomes in incentive schools is teaching activity conditional on presence.

Figure 3 Combined impact of APRESt interventions

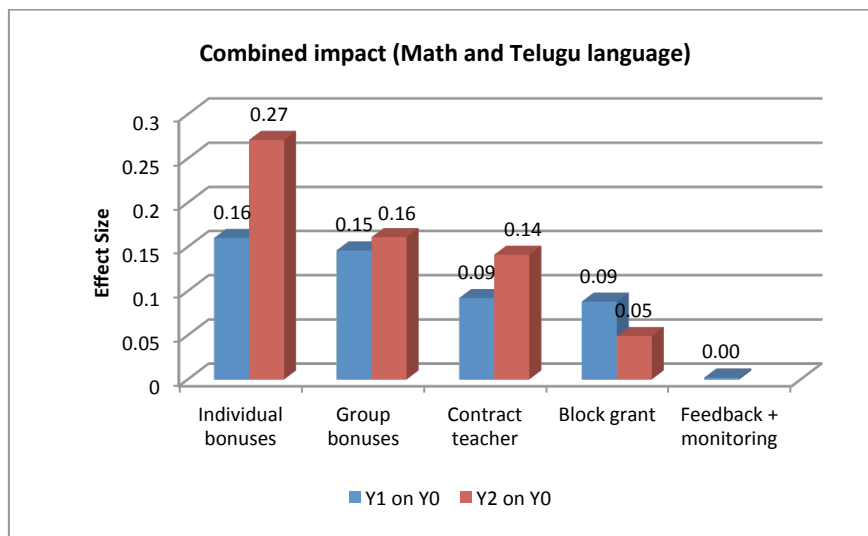


Figure 3:

In summary, comparison of all the interventions indicates that performance pay was twice as cost effective as an extra contract teacher, and a contract teacher is five times more cost effective than a regular teacher. This suggests that expanding a performance pay programmes would be 10 times more cost effective than a business as usual expansion of spending.

Source: Karthik Muralidharan, (presentation to Cabinet Secretariat, Government of India, 18 Jul, 2011), *Lessons from the Andhra Pradesh Randomised Evaluation Studies (APRESt)*

Figure 3 shows that among all the programmes tested under the umbrella of the APRESt study (contract teachers, grants to buy additional classroom stationary and materials, feedback and monitoring of teachers and

performance-pay incentives) – the individual and group bonuses that comprised the performance-pay incentives had the largest impact and were more cost effective relative to the gains on student outcomes.

Though it is clear that financial incentives for existing government school teachers, linked to actual outcomes in skills, led to substantial improvements, it is unclear if this was a pure incentive effect on effort, or a means of having teachers focus on actual learning outcomes. Further, although linking teachers' pay to attendance can increase student learning, instituting teacher incentives within the government school structure will require considerable push and negotiation with the administration, especially where teacher unions are strong and active.

GUARANTEEING THE RIGHT TO EDUCATION AND LEARNING FOR ALL

In the speech marking the introduction of the Right to Free and Compulsory Act into law, Prime Minister Manmohan Singh said:

"We are committed to ensuring that all children, irrespective of gender and social category, have access to education. An education that enables them to acquire the skills, knowledge, values and attitudes necessary to become responsible and active citizens of India."⁹

This is a superb aspiration. But it is not at all clear that it is consistent with current government policy or the provisions of the RTE itself. In this concluding section we summarise what the lessons from evidence imply for an approach to education policy, compare this with the RTE - as currently interpreted - and suggest a way forward.

So what does the review of evidence here imply about how to achieve the above aspiration? We have seen the following. There is a huge quality problem in rural and urban schools. There are high levels of inequality in learning, with only a small proportion able to acquire good learning. There is a steady shift from government to private schooling, supplemented by use of private tutors. The shift to private almost certainly affects all children of elites, but also extends to over half of urban children in urban areas, and about a quarter of rural children. Outside the very small number of elite schools, private schooling is associated with only slightly higher quality (at least in English), but at much lower economic cost. This is especially because the market wage for private teachers is way below salaries for regular government teachers.

Against this background, there have been a range of carefully conducted and assessed research studies and randomised controlled trials on a variety of efforts in India that are trying to improve learning outcomes. The above review of the current empirical literature on "what works" points to several promising directions.

(a) Experiments on learning innovations: substantial improvements in basic skills can *potentially* be had through alternative pedagogies with existing resources, whether with volunteers, existing teachers or contract teachers. These gains can come about in government schools as the system now works, but only rarely occur within the existing system, and only seem to work with strong monitoring and enforcing mechanisms to ensure effective implementation.

⁹Prime Minister's address to the nation on 1 April, 2010, downloaded 18 May 2012.
<http://www.pib.nic.in/newsite/erelease.aspx?relid=60001>

(b) Teacher incentives: small financial incentives to teachers have been seen to lead to improvements in learning quality, and *can* also make a difference within the government school system. These were not achieved with increases in inputs - indeed there is little, though mixed, evidence that changing inputs will have much of an effect at all on learning levels (both from the Indian and international evidence). Therefore while inputs may be needed in schools for other reasons, policies should not rely on inputs to guarantee learning;

(c) Teaching to a child's ability level: reorganisation of children by ability and aligning the pedagogy to teaching by ability level rather than grade level can lead to substantial gains, especially when the teaching-learning activities focus on developing basic skills rather than delivering content from textbooks.

The big question is how to change conditions in schools and classroom practices so that all children can learn effectively. Basic skills are fundamental building blocks for everything else, including conceptual ability, creativity and critical thinking. This implies urgently focusing on basic skills in the early schooling years across India. It is also critical to recognise that motivated teachers are integral to the effort and, that pedagogies have to be adapted to the needs of children. There is a need to acknowledge that there is a huge backlog of children, who are already in school and need remedial help. The evidence is that this *can* be done effectively with relatively straightforward basic training, at least in lower grades. There are potentially large learning gains to be reaped from setting realistic goals for teachers and children and from reorganising curricula and regrouping children by level rather than by grade to allow children to learn at a reasonable pace. These processes need to be initiated in both government or private schools, and be supported by supplemental learning support, and in some cases private tutoring and perhaps even parental involvement.

These directions for action flow from the results from careful experimentation of innovative ideas and systematic and independent empirical research and impact evaluation. However, an equally important result from the research is that teaching innovations often fail if they are just added on to the existing system of incentives, processes, pedagogies and curriculum requirements. How to change the overall government (and private) system to effect large improvements in learning is still unknown. This implies that it will be necessary to design a process of exploration and experimentation within the government and private schooling systems, with systematic monitoring and analysis of results in actual learning levels. Effecting systemic change is difficult, and is likely to require leadership from the top of State education systems, and experiments in pedagogical, administration and teacher incentives all the way down the government system. Outreach to the private system and exploration of learning successes and failures is also needed. This is an urgent need, given the breadth and depth of the learning deficit, if the current generation of students are not to miss out on the learning that they need and deserve.

How does the RTE relate to this approach? At first sight, its provisions appear to go in exactly the wrong direction. It is strongly input-focused, specifying norms for facilities, including infrastructure and pupil-teacher ratios, which will apply to both government and private schools. Children will automatically advance through the grades, whatever their ability, and board exams are prohibited - though teachers are supposed to continuously assess quality. Teachers are not allowed to tutor outside school. Private schools have to be recognised to be allowed to practice, and will be fined if they continue without recognition. They are given three years to meet the new norms. All private schools, with the exception of unaided minority schools, are required to reserve 25 percent of their places for children from weak disadvantaged backgrounds - with the cost reimbursed by the government at a rate based on the cost of government schooling or of actual private

tuition charged, whichever is lower. (This provision was challenged as unconstitutional, but the Supreme Court ruled that it was consistent with the constitution in a 2 to 1 ruling on April 12th, 2012.¹⁰)

Now, actual rules are being drafted at the level of states, so specific mechanisms for implementation could vary substantially. As Pratap Bhanu Mehta has commented, at present we still do not know how the RTE will be implemented in practice (Mehta, 2012). That, of course, is precisely why public debate is so important. Here are some issues that will be central to the success or failure of the RTE's implementation in relation to the quality issue.

Norms on infrastructure inputs and pupil-teacher ratios are desirable for the working conditions of teachers and the comfort of pupils, and it makes sense to implement these in government schools. However, as already noted, there is little or no evidence that these will have an impact on learning levels. It is thus crucial that the focus on inputs not divert attention from the measurement and tracking of actual learning, and discovery of what does make a difference.

Potentially much more problematic is the requirement that private schools satisfy the norms if they are to be recognised. Especially if this is linked to setting private teacher salaries at the level of government regular teachers, this could drastically affect the low-cost schooling movement - either through forcing productive schools to close or providing an incentive to bribe education inspectors (that, anecdotally, is already of significance.) RTE currently specifies that all teachers in private schools have to meet formal training requirements, but salary levels are (at least implicitly) to be determined by the States. As we have seen, learning outcomes are only moderately better than in government schools, but this is being achieved at much lower cost, to a significant extent because private schools are paying market salary levels, and often with teachers without the formal teacher qualifications specified in the Act.

A comparable consideration applies to terms of employment within government schools. A common diagnosis has been that teachers face weak incentives to actually teach. They are also paid way above the market wage for similar skills. Experiments with contract teachers, without security of tenure (and much lower pay), has led to better, not worse results in quality, owing to the stronger incentives they face. It may be possible to get similar results through shifting work and career incentives (financial or non-financial) incentives within the regular teaching service, but this is still to be explored. And the political economy of teachers will tend to resist this. Further, as we have found while reviewing the series of impact evaluations of Pratham programmes, Pratham-trained volunteers (who are unpaid) often can bring about large improvements in learning levels too. This is an area where *more*, not less flexibility and experimentation is required.

Profoundly missing from the RTE are mechanisms to get relevant information on learning performance of children, classes and schools. Up until now, student evaluations have focused almost exclusively on academic subjects, with an end-of-year, high stakes examinations (National Curriculum Framework, 2005). The RTE Act of 2009 mandated the introduction of a system of Continuous and Comprehensive Evaluation (CCE) to address endemic issues arising from traditional methods of evaluation and broaden the scope to include non-academic aspects to promote the holistic development of children. CCE is meant to allow for regular flow of information regarding student learning (collected by teachers) which enables tracking their progress and tailoring of lessons

¹⁰ See PRS (2012) for a discussion.

and teaching practices to student capabilities. Therefore, CCE establishes an intensive school-based evaluation system wherein external examinations, such as Boards exams are absent.

However, the move to CCE has been met with confusion due to the lack of guidelines on how to implement this effectively at the school level. In many states, the CCE activity is anchored in the current age-grade curriculum (the very element that is holding children back). In several states, the actual assessment activity has also been made cumbersome and complicated, thereby further reducing the possibility that each teacher will make an effort to understand where the child is at and what needs to be done to help him or her move forward. The teachers are not well trained to be able to use the assessments to map students' outcomes, both scholastic and non-scholastic. So while CCE in principle may have been a good thing, in practice it is likely to totally miss the boat, the effects of which will only be visible when students take the 9th class exams or competitive exams.

The RTE states clearly that the syllabus must be completed in a specified time and that children cannot be held back. At its core the RTE relies on inputs and age-grade organisation of children as the main organizing principle of school education in India. Equally problematic is the automatic advancement irrespective of learning level. The policy of no detention up to class 5 is already followed in government schools of some states (e.g. Haryana). As we have seen, there is a dramatic difference between the learning levels of most children and the current curriculum. In the traditional examination system, the end-of-year exams functioned as mechanisms to filter out low performers, who were detained in their current grade. Aligning pedagogies with the needs of children - and exploring alternative ways of doing this - has to be part of the solution. Some of this is about 'remedial' education, supplemental learning support or in fact "special training" (that is referred to in RTE). But the divergence between learning levels and the curriculum is so extensive that this goes way beyond the typical notion of remedial needs for limited numbers of children. It is about getting overall pedagogical alignment, regrouping of children, clear articulation of learning goals and all of this backed by support to teachers motivated teaching, for large proportions of the elementary school population. A no-detention policy could make learning worse, if it means no evaluation, and a rising gap between learning levels and curriculum requirements, especially for the weakest.

One of the more intriguing parts of the Act is the provision that 25% of places in private schools have to be allocated to children from 'weaker sections and disadvantaged groups' from scheduled castes, scheduled tribes, low-income and other disadvantaged or weaker groups. Again, much will depend on implementation. It could evolve into a voucher scheme for 'qualified' children or it could become embedded in local influence. In either case the effects on learning quality are not clear. We have seen that learning levels in private schools are slightly above those of government schools, but that some of the difference is explained by socio-economic background. There is not clear evidence from India on what effects would be for the targeted students who do gain access. There is some international evidence that access to private schooling via a voucher programme can improve schooling outcomes for students who gain (see Angrist et al, 2002, for example, for a programme involving secondary schooling in Colombia). But this may be context-specific, and the net effect on the whole schooling system is unclear, since effects on government schooling are ambiguous. And a further concern is over the vagueness of the criteria: categorisation of the needy is notoriously problematic in India, and subject to discretion, exclusions and patronage. This is a further area where what is needed more than anything is experimentation.

Is this, then, a time to be pessimistic or optimistic for the future of learning in India? This review suggests a decidedly mixed picture. The problem is huge; there can surely be no question on the need to put questions of learning *outcomes* at the centre of any education strategy. Indian households clearly want education. The RTE

is an important step, at least in symbolic terms. There is a lot of evidence on what does and does not work. Some of this evidence is encouraging: existing pedagogies can make a substantial difference to children with existing resources. But none of the evidence provides a clear pathway to a transformative solution. For that, the only coherent way forward is to encourage widespread exploration of alternatives, working within the government and private systems, and including private tutoring. And here the RTE has some major flaws - of omission and commission. However, actual implementation will depend primarily on the actual rules and practices at state level. This constitutes an immense opportunity for exploration and experimentation, but one that will depend, fundamentally, on putting measurement, assessment and public debate at the very centre of the process of discovery of what does and does not work. This could make the difference between providing India's children with "the skills, knowledge, values and attitudes necessary to become responsible and active citizens of India" and a profound failing in terms of what the country *could* offer to this generation, with deep consequences for poverty, inequality and the condition of Indian society and economy.

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