International Journal of Educational Research Open 3 (2022) 100198

Contents lists available at ScienceDirect

International Journal of Educational Research Open

journal homepage: www.elsevier.com/locate/ijedro

Understanding the accuracy of teachers' perceptions about low achieving learners in primary schools in rural India: An empirical analysis of alignments and misalignments

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ARTICLE INFO

Keywords:
Teachers
Perceptions
Foundational Literacy
School Accountability
India

ABSTRACT

Teachers' perceptions of their students' academic skills are crucial in enabling teaching at the appropriate level and shaping learning processes. We examine how accurate are teachers' perceptions for low achieving students using data collected from around 1,800 primary school teachers across 848 schools in rural India. We find that around 40% of teachers inaccurately perceive that the low performing students in their classroom had already acquired foundational literacy, when they have not. Female teachers, para-teachers, and teachers with lower work burden are more likely to have accurate perceptions of low performing students. Our study highlights the need to work with teachers to ensure more realistic perceptions in order for pedagogical approaches like teaching at the right level to reach its intended impact.

1. Introduction

Over the past two decades, many low and lower-middle-income countries have made significant improvements in educational access for children (Global Education Monitoring, 2017). Nonetheless, several challenges remain with respect to education quality, which has led to persistence of low performance among school-going children (World Bank, 2018). For instance, global estimates suggest that six out of ten children enrolled in primary school fail to acquire basic numeracy and literacy (UNESCO Institute for Statistics, 2017). In Central and Southern Asia, around 81 percent of children finish primary school without attaining minimum reading/arithmetic proficiency (UNESCO Institute for Statistics, 2017). It is well established that teaching quality plays a central role in determining and improving the quality of educational outcomes (Hanushek, 2011; Hanushek & Woessman, 2011), and it is considered one of the most important factors influencing student achievement (Darling-Hammond, 2000; Hanushek et al., 2016). Research on teacher effectiveness and teaching quality has emphasised the role of teacher beliefs in influencing their pedagogical practices. Teacher beliefs include, but are not limited to, epistemological practices, self-efficacy, and an understanding of children's learning abilities. While these beliefs can be formed during teachers' own education and training, they are also influenced by pre-existing cultural beliefs about gender, and, in the case of India, caste (Brinkmann, 2015; Clarke, 2003; De and Malik, 2021).

In this paper, we focus on teachers' perceptions related to their students' learning levels. These perceptions are vital to the teaching process and can affect student learning through many channels. First, these perceptions affect teachers' decision-making regarding pedagogy and instructional practice. Recent recommendations to improve children's learning in low and lower-middle-income countries have emphasised teaching children at the right level (Banerjee et al., 2016; Banerjee et al., 2007). This approach requires an accurate assessment of children's learning levels and then grouping them based on "ability", rather than by age or school grade. To implement this effectively, teachers need to correctly identify children's progress in learning. Second, teachers' perceptions influence their expectations of students' performance, which has shown to have a strong self-fulfilling prophecy effect (Brophy & Good, 1970; Namrata, 2011; Stipek, 2012; Riley and Ungerleider, 2012). For instance, if a teacher underestimates a student's

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https://doi.org/10.1016/j.ijedro.2022.100198
Received 2 June 2022; Accepted 12 August 2022
Available online 18 August 2022

performance, they may also form low expectations of the student's future performance, which in turn might reduce the student's confidence levels, leading to a cycle of declining performance. This is consistent with evidence suggesting that teacher feedback is one of the key factors that shapes students' learning via student's efforts and their own goal setting (Hattie, 2008).

Given the importance of teachers' perceptions in shaping students' learning outcomes, numerous studies in the Global North have empirically examined the extent of the relationship between teachers' perceptions of children's abilities and their actual learning levels (Hoge & Coladarci, 1989; Südkamp et al., 2012; Urhahne & Wijnia, 2021). These studies have explored various factors affecting the accuracy of teachers' judgement including their inherent characteristics, (teacher knowledge and skills, beliefs and attitudes, years of experience); those of the students (prior knowledge, motivation, intelligence and socio-economic background); and the nature of the test (subject-specific or not). Overall, these studies have shown that teachers' judgments are far from perfect with accuracy varying depending on some student characteristics – for instance, some studies have found that teachers are less accurate about low performing students than they are about those who are high achievers (Begeny et al., 2008; Begeny et al., 2011). A bulk of these studies, however, are largely based on data from high income countries, where teachers have more resources to assess and identify children's academic abilities. In many countries in the Global South, teachers may not have access to such resources, and they rely on classroom experience and interactions with pupils to form perceptions about their academic abilities. This raises an important question: how closely do teachers' perceptions match the actual levels of academic skills acquired by the students in a global south context?

This paper aims to address this important question by focusing on the case of primary school pupils in rural India who have not yet acquired foundational literacy skills. In particular, we address the following two research questions: (1) How accurate are teacher perceptions of low performing students (or students who have not yet acquired foundational literacy)?, and (2) to what extent are personal, educational and professional characteristics of teachers associated with accuracy in their perceptions?

Evidence related to the accuracy of teachers' perceptions and students' actual foundational skills is particularly important in a context like India, where teachers are subject to a system that imposes curricular expectations that transcend children's learning levels (Pritchett & Beatty, 2015). For example, in Rajasthan, which is one of the low-performing states for children's foundational learning outcomes, the curriculum expects children to be able to read a paragraph by the time they reach Grade 2 of primary school. However, evidence has shown that less than 40 percent of pupils in Grade 3 in Rajasthan can read simple two-syllable words (Bhattacharjea, Wadhwa, & Banerji, 2011). Therefore, only a relatively small proportion of children's learning is consistent with curricular expectations, which in turn makes it likely that the teacher will focus only on them during instruction. For many children who are in school but not learning, it is imperative that teachers adjust and adapt their instruction to meet the needs of these learners. This requires a clear understanding of children's skills, particularly their foundational literacy skills, which we use for empirical exploration in this paper.

We acknowledge that focusing on low performing students excludes the possibility of exploring teacher's perceptions in a more comprehensive way. For instance, focusing on low performing students means that we are only able to examine whether teachers can accurately perceive these students to be low performing. Our analysis cannot help comment on whether teachers can distinguish student's performance across the whole ability distribution. Yet, as the proportion of low achieving students in the location of the research is relatively high, the study only collected information on low performing students. Hence, we can only focus on the extent of teacher's accuracy for low performing students. For equity reasons, focusing on children being able to achieve foundational literacy skills and read fluently is important as these skills enable children to master other competencies. Another reason to focus our analysis on the low performing students is that past research has found that teacher misalignment is highest among these children (Begeny et al., 2011; Ready and Wright, 2011).

2. Theoretical framework

We base our analysis on the framework discussed in De and Malik (2021). Their study explores the connection between social distance, teacher beliefs, teacher practice, and student learning, specifically in the contexts of India and Pakistan (summarized in Fig. 1). The framework suggests several inputs that go into teacher effort, which include: (i) knowledge of curricular content; (ii) career incentives (rewards and sanctions determined by the system); and (iii) teachers' beliefs and perceptions. In this paper, we examine teachers' perception of children's learning, measured by the extent to which they relate to actual learning.[1] For our empirical analysis, we quantify the extent of this accuracy using pupils in grades 2, 3 and 4 of primary schools in a rural district of the most populous state in India. One key characteristic of these children is that none of them can read a grade 2 story, hence most of them have not mastered foundational literacy skills even after spending at least two, if not more years of attending school.

We also investigate key factors which are associated with the extent of the accuracy of teachers' perceptions. Here, De and Malik's (2021) framework identifies three potential factors that shape teachers' beliefs and perceptions:

1) Education and pre-service professional training shape teachers' perspectives of how students learn; how good they themselves are at imparting knowledge; and the kind of students that are good learners.
2) Teachers imbibe the cultural values of the society in which they grew up, as well as to which they currently belong. The education they receive may, in some cases, modify or further reinforce some of those values.
3) In-service capacity building programs can help teachers acquire new knowledge for teaching, while also influencing their beliefs and perceptions.

By combining insights from the above theoretical framework with past studies on teaching quality in the Indian context, we operationalise the potential factors likely to be associated with the accuracy of teachers' perceptions. These include - standard resumé characteristics including teacher certification, training, and experience (Kingdon, 2006; Azam & Kingdon, 2015), the nature of their employment contract (Atherton & Kingdon, 2010; Muralidharan & Sundararaman, 2013; Goyal & Pandey, 2013), and teacher's age, gender, caste, religion and socio-economic status (Rawal & Kingdon, 2010). We also consider the role of geographical factors such as the location of the teacher's residence (whether or not it is in the same village as the student's) as this may also influence on the accuracy of their perceptions of student learning levels.

3. Methodology

In order to answer the proposed research questions, this paper estimates the accuracy of teachers' perceptions of students who have not achieved foundational learning, using the ASER tool (more below). We

[1] The literature in high income countries refers to this concept as 'teacher judgement accuracy' or 'judgement accuracy'. Although we analyse the accuracy, we mainly refer to it as 'teacher perceptions of children's learning' to situate it within the broader context of teacher perceptions of multiple aspects related to the child and his/her family.

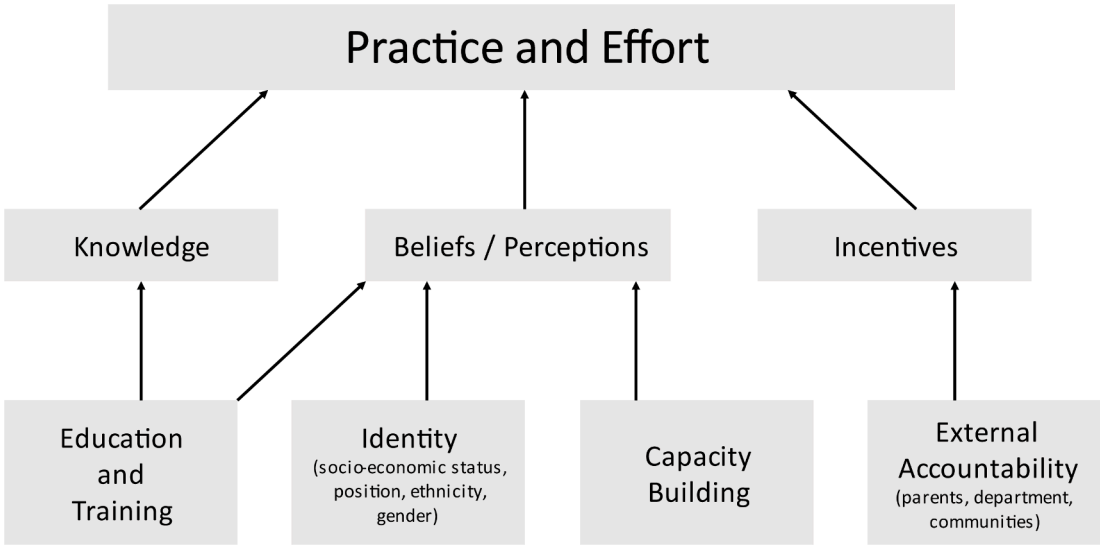

Fig. 1. Theoretical framework for the study.
Notes:
While the framework presents how teachers practice and efforts are related to various factors including beliefs, the focus of the paper is on perceptions of children's learning.
Source: De and Malik (2021)

begin with a descriptive analysis to assess the extent of the accuracy of teachers' perceptions. To do this, we measure the extent to which teachers accurately perceived that the selected children have not achieved foundational literacy. Furthermore, we examine whether there is variation in the accuracy of these teachers by grade of the students as well as by school. Following that, using least squares regression techniques, we explore which of the key teacher-level factors proposed from theoretical and empirical studies are associated with our measurement of the accuracy of teacher perceptions.

3.1. Sampling and survey instruments

We use data from a baseline survey which was conducted between October 2018 and January 2019, which is about the middle of the school year. The data is part of a project aimed at investigating the potential of school and community-based interventions to enhance children's learning outcomes in Sitapur district, in the northern state of Uttar Pradesh in India. A total of 400 villages were randomly selected from the universe of villages in Sitapur with at least two government primary schools. Then, all the government primary schools in each village in the sample were included, which yielded a total sample of 848 schools. From each of these schools, 30 children - 10 each from Grades 2, 3 and 4 - were selected to be part of the baseline survey.

The exact selection process for children was as follows: from each school's enrolment register, 20 children were randomly selected from each of the target grades. A foundational literacy and numeracy test - the ASER test - was then administered to each one (see Fig. 2 for an example of the ASER literacy tool). The first 10 students who were unable to read a story deemed appropriate for students in Grade 2, were selected as part of the final sample. The ASER test is a basic tool developed by Pratham Education Foundation to measure foundational literacy skills. The reading assessment consists of four tasks of varying levels of difficulty: –reading alphabets/letters, reading commonly used two-syllable words, reading a four-line text (*paragraph* consisting of words typically found in Grade 1 textbooks in India), and the most advanced task reading a story (consisting of words typically found in Grade 2 textbooks in India). A child who is unable to read simple letters of the alphabet is categorised as a 'beginner'. If a child is only able to read simple letters but fails to read words is classified as "letter/alphabet". The highest level a child can be classified is Grade 2 text or '*story level*'. In addition to the ASER test, information was collected on each selected student's household, for which the main caregiver was asked about the child's prior schooling, learning activities in the home, and the caregiver's level of engagement/interaction with the school.

In each selected school, a detailed survey was administered to teachers who taught Hindi (the primary regional language of Sitapur, as well as the language of instruction in the government schools in our sample). The headteacher (or the senior-most teacher) in the school was asked: "*Which teacher teaches Hindi to Grade (2, 3, or 4) regularly?*". Based on the responses, a total of 1,844 teachers were part of a sample – they responded to questions relating to their socio-economic and demographic characteristics, as well as their teaching qualifications, previous teacher training experience, and professional development, among others.

3.2. Measuring the accuracy of teachers' perceptions

As per our ethical protocol, teachers were given information about the study, were explained about anonymity of their responses and their voluntary participation was requested. Each teacher in the sample was asked individually about the reading abilities of the ten selected children that s/he taught. Teachers were surveyed separately so that they feel comfortable sharing their responses. In some cases, however, other teachers were in the vicinity which may have affected this part of the study, particularly in terms of overestimating children's reading skills. The foundational learning levels of these children had been recorded previously, as indicated above, and not in the presence of the teacher. Each teacher was shown the text corresponding to the *story* in the ASER test shown in Fig. 2 and was asked: *"Can child (insert child name) read a story like this?"*. For each child, the teacher's potential response options were: *yes, no*, or *don't know/can't say*[2]. We matched teachers' responses with the children's test outcomes to measure the accuracy of teacher's responses. When collecting the data, teachers were not aware that their responses were going to be matched with children's abilities. Hence, it is

[2] Teachers reported not knowing the child's reading level in only 3.6% of the cases. For the purpose of our analysis, we recorded the 'don't know/can't say' response as 'no'.

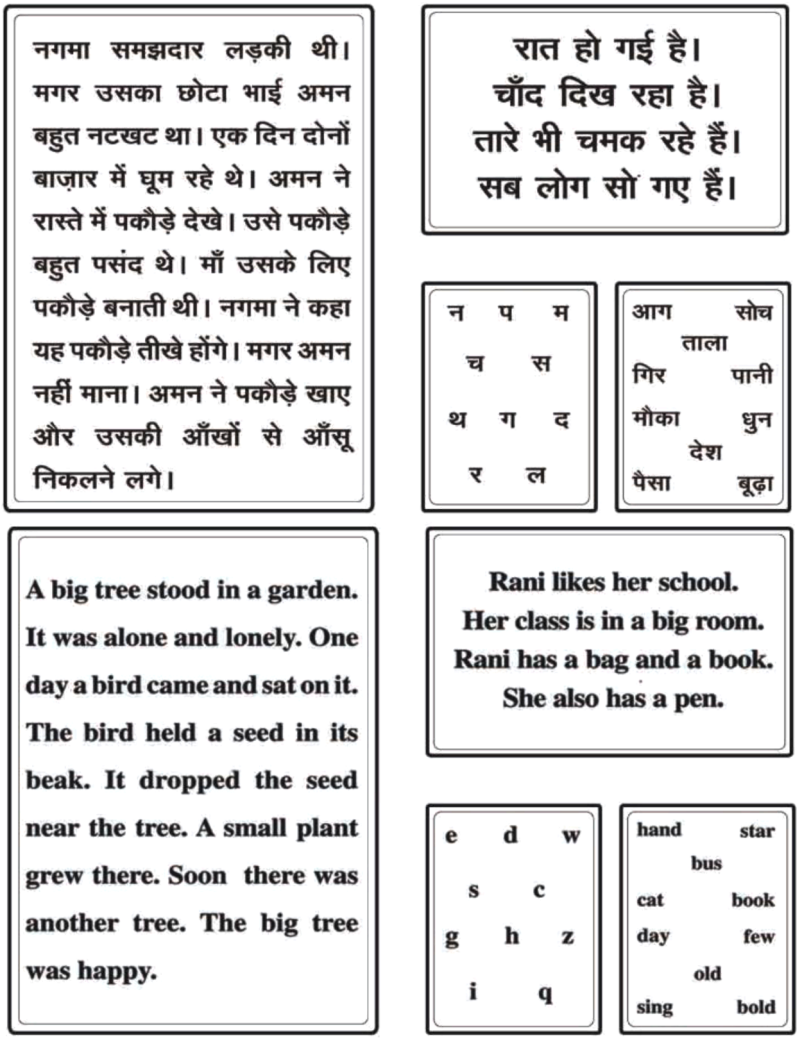

Fig. 2. ASER Reading Tool (Hindi and English versions).
Source: Tool developed by Pratham Educational Foundation.

likely that teachers could have again overestimated children's abilities. If teachers had known their responses were going to be matched, it is possible that teachers could have responded more conservatively or refused to answer at all. Therefore, it is possible that our measure of interest plausibly contains some degree of overestimation.

Note that by the selection process described previously, none of the children could read the *story* in the ASER test; and this part of the sampling process was withheld from the teachers. Research has shown that teachers in the public system are often scared to admitting that the children are not performing well (in this case not even the basic proficiency) and tend to overstate the childrens' achievements (Singh, 2020). While this is another potential bias in our research, our study deals with children as opposed to young learners and we asked questions to the teacher about general reading ability as opposed to questions which may be directly tied to material in the curriculum or textbook. We believe that our process of data collection reduces the potential for the teachers to get defensive about children not performing well. Also, very few teachers refused to participate in the study, which indicates their general willingness to respond to the survey. Of a total of 1,844 teachers, 1,823 (98.8 percent) agreed to participate in this part of the study and their responses were matched with 16,360[3] children's reading abilities. This is the final sample that has been used in our survey.

3.3. Sample description

Table 1 presents summary statistics associated with the study sample. Approximately 46% of the teachers are female and 72% are below the age of 40. Nearly one-fifth of the teachers are headteachers, meaning that they have the added responsibility of undertaking all the administrative work related to the school. On average, teachers in our sample

[3] We could not use the entire sample of about ~24,000 children for this study. This was because if a teacher was teaching multiple (sampled) grades within the same school, she was asked about the reading abilities of the children in the highest grade she taught. For example, if a teacher taught Hindi to Grades 2 and 4, s/he was questioned about the reading skills of only the fourth-graders. Furthermore, for 825 children, the teachers reported that they did not know them and thus were unable to report their foundational skills. For this reason, these children were also dropped from the analyses.

Table 1
Descriptive statistics for teachers (N=1,823)

Variable	Description	Proportion/ Average
Sociodemographic background characteristics		
Teacher sex	Female	45.5
Teacher age (young)	Less than 30 years	20.3
Religion	Hindu	93.6
Reservation category	General	34.7
	SC/ST	24.7
	OBC	40.2
	No information provided	0.4
Marital status	Ever married[#]	82.6
Teacher has school age children	If teacher has any child who is 6 years or older	49.4
Standard Resume Characteristics		
Educational qualification	Masters or above	42.6
Work experience	Avg. teaching experience in years	6.8
Designation	Headteacher[##]	21.3
	Regular teacher	50.7
	Para-teacher	28.0
Teacher's salary	Less than 10,000 IRS	10.1
	10,000 to 40,000 IRS	34.1
	Above 40,000 IRS	51.5
	Did not disclose the salary	4.3
Contextual Factors		
Workload	Avg. # of different classes taught by the teacher	3.2
Association with current school	Avg. no of years the teacher has spent with his/her current school	4.5
Classroom environment where the teacher teaches *Hindi* to the sample children	Single-grade	39.2
	Multi-grade	58.8
	No information provided	2.0
Highest sample grade to which the teacher regularly teaches *Hindi*	Grade 2	27.9
	Grade 3	26.5
	Grade 4	45.6
Has any child of the teacher ever studied in a government school?	Yes, has studied	25.5
Teacher's current living location	Same village as that of school	11.3
Posting teacher's choice	Whether the current posting was the teacher's choice	68.3

Source: ESRC Accountability Project Data Collection 2019. Notes:
[#] Includes legally separated or widowed.
[##] Includes those who are designated 'teachers in-charge' and 'on-deputation' headteachers.

have a little more than 6 years' teaching experience. A large majority (93%) are Hindus and married (82%).

In terms of the children in our sample, 53% percent are girls, and 73% live in the same village in which the school is situated (Table 2). Since our sample consists of primary, government school children in villages with at least two government schools, it is not surprising that most of them live in the same village as the school. In terms of their foundational reading scores, recall that our sample consists of children who are at most, at Grade 1 levels in reading, which means they are only able to read a simple *paragraph*. Table 2 shows that only 9.4% of children are able to read a *paragraph*, 9.5% can read words, while 47.6 percent are only able to recognise letters. Around 34% of the children in our sample were deemed *beginners*, i.e., unable to recognise letters. These results are somehow consistent with a nationally-representative survey (ASER, 2018) which found that 30.6% percent of fifth-graders in India were unable to read at Grade 1 levels, and in Uttar Pradesh, where our study is situated, this proportion was 33.3%.

3.4. Empirical Strategy

We conducted our quantitative analyses using teacher-level data. To obtain an indicator of teacher accuracy, we aggregated each teacher's responses for the 10 children and estimated the proportion of correctly identified proficiency levels. Using this variable as our outcome of interest, we employed ordinary least squares regression to estimate the association of the teacher sociodemographic, standard resume and contextual factors (shown in Table 1) with teacher accuracy.

Table 2
Descriptive statistics for children (N=16,360)

Variable	Description	Percentage
Child's gender	Girls	53.1
Child's grade	Grade 2	28.8
	Grade 3	26.8
	Grade 4	44.4
Child's reading level as per the ASER test	Beginner	33.5
	Letter	47.6
	Word	9.5
	Paragraph	9.4
Child's household type	*Kutcha*[#]	31.5
	Semi *pucca*[##]	31.6
	Pucca[###]	34.3
	No information provided	2.7
Child's reservation category	General	9.0
	SC / ST	48.0
	OBC	42.1
	No information provided	0.9
Does the child live in the same village as that of the school?	In the same village	72.6

Source: ESRC Accountability Project Data Collection 2019. Notes:
[#] Walls and roof are not made of cement or concrete
[##] Only the walls are made of cement or concrete while the roof is made of other inferior material
[###] Walls and roof are made of cement or concrete

It is possible that the classroom composition can influence teacher's perception and their accuracy. Therefore, we control for classroom composition using aggregate information that we have from all the children in the classroom taught by the teacher. We included the number of children enrolled in the sample grades, the percentage of overage children in the classroom, the percentage of girls in the classroom, the percentage of children in the classroom whose sex is same as the teacher's, the percentage of children of SC/ST castes in the classroom, the percentage of children in the classroom whose caste is same as the teachers, the percentage of children in the classroom living in kutcha households, and the percentage of children in the classroom who can read simple words in the ASER test.

In addition to classroom composition factors, we also consider school and village level variables in the model. Among the variables selected we have the availability of a separate register to record teachers' attendance, the availability of a school timetable, the presence of functional toilets for children and teachers, the availability of story-books for children to read, the provision of a mid-day meal[4], visits by cluster and block-level officials[5], occurrence of the last School Management Committee (SMC)[6] meeting and the availability of a tarred road

[4] Under the mid-day meal program, free, cooked lunches, are served to children studying in primary and upper primary grades in government and government-aided schools in India.
[5] Cluster Resource Centre (CRC) and Block Resource Centre (BRC) provide academic support to primary and upper primary schools and teachers on a regular basis. They are led by Cluster Resource Centre Coordinators and Block Resource Centre Coordinators respectively. Each CRC covers a small number of schools within easy reach. Multiple CRCs in an administrative block constitute a BRC.
[6] The Right to Education 2009 Act mandates the formation of a School Management Committee in every government-funded school. It mainly consists of parents and works to facilitate community involvement in children's learning.

to reach the school. Village-level characteristics include access to the village by a tarred road, electricity, post office, bank, computer centre or internet cafés, private clinic, primary health centre, and shop in the village. To control for time-invariant factors at the block level that might affect our outcome of interest, we include 15 variables to control for block fixed effects[7].

We first estimate the model to capture teacher level predictors from the teacher accuracy. Then, we include classroom, school and village controls and finally we add block fixed effects. All estimated standard errors are clustered at the block level. The sequential addition of control variables is required to analyse the stability in magnitude of the teacher level factors and whether the associations are meaningful or driven by other factors. Overall, we suggest that this empirical strategy enables us to get a perspective of the teacher level correlates that are associated with teacher perception accuracy.

4. Results and discussion

4.1. The extent of (in)accuracy of teachers' perceptions

On average, teachers were able to correctly identify the reading levels of about 55% of their students. Three out of every five teachers (60.8%) correctly identified the reading levels of at least half of their students. This implies that around 40% of teachers fared worse than someone who would have been guessing randomly (since the teachers were only asked whether or not their students could read the *story*, someone guessing randomly would be right 50% of the time).

We analyse whether this inaccuracy is driven by certain teachers. To assess this, we estimate the percentage of correct responses for each teacher separately (based on the 10 children they were asked to assess), and then plot a histogram of these percentages (Fig. 3). We observe some mixed patterns. While the inaccuracy of about 5% of teachers was extreme (correct for less than 10% of their students), around 15% were correct about almost all of their students (at least 90% accuracy). Overall, we find there is an almost uniform distribution of teachers spread across different levels of perceptive accuracy, with about 10% in each of the fourth to ninth deciles. One of the key findings is that there is a significant discrepancy between teacher perceptions and students' actual foundational reading outcomes measured by the ASER tool. Moreover, it appears that this is not concentrated among a few teachers, but is, in fact, a systemic issue, given the high degree of dissonance seen with so many teachers.

One could argue that teachers' assessments might be incorrect if the students were close to being able to read the *story* in the ASER test, but were unable to perform up to their capability on the day of the test (which may have happened for a variety of reasons). In that case, the extent of the disparities described above would be exaggerated. To explore this, we restricted our sample to children whose reading proficiency had been incorrectly assessed by their teacher. Fig. 4 shows that out of the 7,330 students that teachers incorrectly identified as being able to read a *story*, only 16% were able to read a *paragraph*. More than 70% of incorrectly identified students were either at the *beginner* level (unable to identify even letters/alphabets) or were only able to identify letters. These results suggest that there is a wide gap between students' actual foundational reading skills and teachers' perceptions of these.

To explore whether the extent of teachers' judgment accuracy varies across different schools, we aggregated the data to the school level, to obtain a measure for each one. The aim here is to test whether teachers with inaccurate perceptions of their students' learning were concentrated in certain schools. Fig. 5 shows the distribution of schools across different levels of accuracy. In around 12% of the 848 schools used for estimation purposes, teachers accurately judged less than 30% of their students' reading abilities. A significant proportion of schools also lie at the opposite end of the spectrum - in around 25% of all schools, teachers are correct about at least 70% of their students' foundational reading abilities. This demonstrates that the mismatch between perceptions and actual reading skills is unlikely to be localised to certain schools.

Accordingly, we explore which key factors are associated with the accuracy of teachers' perceptions. As mentioned previously, we have grouped these factors into three categories – (i) sociodemographic background characteristics, (ii) standard resume characteristics, and (iii) contextual factors.

4.2. The association between teachers' sociodemographic background characteristics and the (in)accuracy of their judgment

We began our empirical analysis by focusing on the teacher's gender. Previous studies in India have found a positive association between female teachers and students' literacy outcomes, as well as more effective interactions with students (Chudgar & Sankar, 2008; UNESCO, 2000). These findings are supported by the results of our study. Results in Table 3 (Column A) indicate that female teachers are 5 percentage points more likely to accurately judge children's reading skills (*p-value* $<$ 0.05) relative to male teachers. This result remains almost unchanged when we add classroom, school and village controls (Column B). Finally, the inclusion of block fixed effects reduces this association to 4.3 percentage points and still remains statistically significant at 5% level (Column C). This adds to previous evidence pointing towards better performance by female teachers over their male counterparts.

Following our theoretical framework depicted in Fig. 1, we included age, religion, caste and marital status as potential factors which could shape a teacher's identity and thus have a bearing on his/her perceptions. For instance, in rural Indian contexts, caste may also lead to prejudices that could undermine children's learning outcomes (Rawal & Kingdon, 2010). Following our empirical analyses, we found no statistically significant association between teachers' age, religion, caste or marital status and the accuracy of their judgement. For example, the accuracy of judgement of teachers belonging to SC/ST and OBC categories (lower castes) is not significantly different (statistically) than that of teachers from the highest (General) caste category in any of our models.

4.3. The association between teachers' educational and professional characteristics and the (in)accuracy of their judgement

Recent evidence on teaching quality has shown that standard resume characteristics such as teacher experience and qualifications are not significantly associated with children's learning (Azam & Kingdon, 2015; Singh & Sarkar, 2012). However, these aspects are often valued, and more educated and experienced teachers are perceived to be better teachers. The National Education Policy of India also states the importance of teacher education, and aspires that by 2030, the minimum qualification for teaching will be a 4-year, integrated B.Ed. degree (Ministry of Human Resource Development, 2020). Current government regulations in India for hiring teachers sets the qualification bar quite low, making it easy to pass[8]. Hence, it is possible to have a fair amount of

[7] In India, a district is further subdivided into community development blocks for planning and development, and each block is administered by a Block Development Officer. Our study sample was situated in 15 blocks of Sitapur district.

[8] In India, government regulations stipulate the minimum qualifications required to become a teacher. According to the National Council for Teacher Education (Determination of Minimum Qualifications for Recruitment of Teachers in Schools) Regulations, 2001, to be hired as a primary school teacher, an individual must have at least a Secondary School Certificate (SSC) or its equivalent and a diploma or certificate in basic teachers' training. This regulation is strictly implemented, and is supported by our data - almost all the teachers in our sample satisfy this selection criterion.

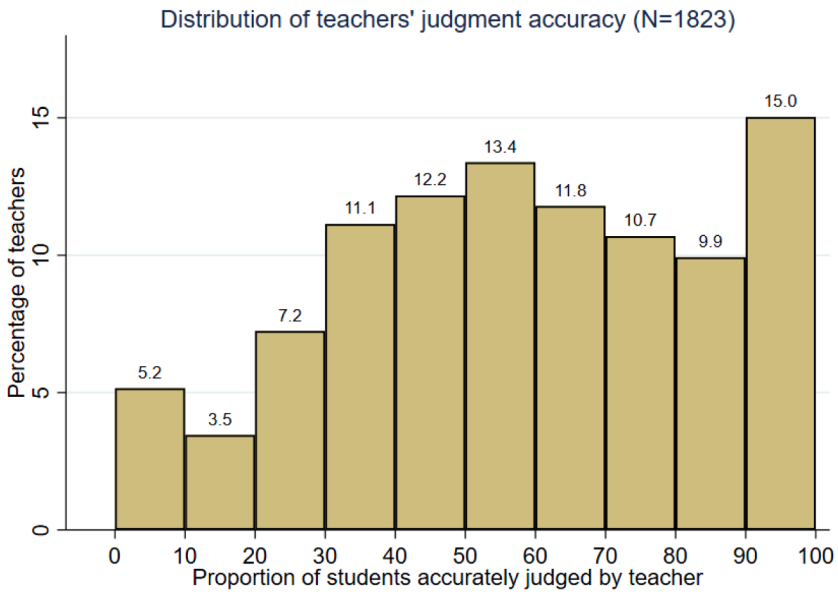

Fig. 3. Distribution of teachers' judgment accuracy.
Notes:
The figure shows the distribution of sample teachers' judgment accuracy. Teachers are not concentrated at one particular end of the distribution. For the fourth to ninth deciles, around 10% of teachers fall within each decile.

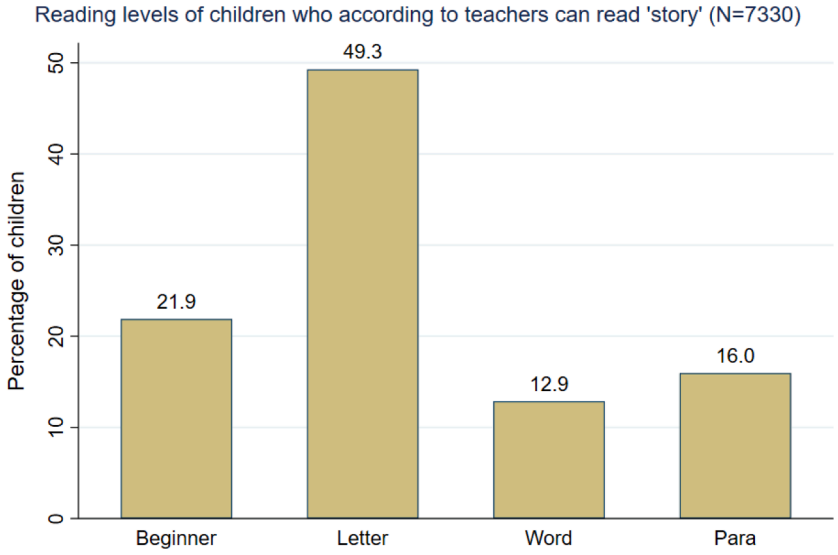

Fig. 4. Reading levels of children who, according to their teachers, can read a '*story*' (N=7,330).
Notes:
The figure shows the distribution of the reading levels of 7,330 children whom teachers incorrectly identified as *story* readers. Around 70% of children in this sample cannot read even words, providing strong evidence of the gap between teachers' perceptions and children's actual abilities.

variation in the qualifications of serving teachers, with the possibility of more 'educated' teachers being better at their jobs.

Results shown in Table 3 demonstrate that there are no differences in the accuracy of teachers according to whether they hold a Masters degree, the number of years of teaching experience or their salary. None of the coefficient estimated for these variables are statistically significant and this is consistent when adding controls and block fixed effects. These results are largely consistent with prior evidence on the insignificant impact of teacher qualifications on student achievements. For instance, a large-scale study conducted with second and fourth graders studying in government primary schools situated in five Indian states, found no significant association between teachers' educational qualifications and children's learning outcomes (Bhattacharjea, Wadhwa, & Banerji, 2011).

Yet, teachers' designations also have the potential to influence how they fulfil their responsibilities. For instance, being a headteacher brings with it additional administrative responsibilities which might take away time/energy that could have been spent in the classroom (or with students), leading to a lower likelihood of accurate judgments. With regard to para-teachers[9], while their appointment has been the subject of some debate, studies have demonstrated that the lower salaries they are offered have made them opt for additional jobs over and above teaching (Kingdon et al., 2008 as cited in Kingdon & Sipahimalani-Rao, 2010), which can affect their efforts in the classroom. A teacher's designation has the potential to affect his/her accountability as well. Two studies in India that focused on para-teachers in Uttar Pradesh have found lower absence rates among para-teachers than regular teachers (Kingdon & Banerji, 2009 as cited in Kingdon & Sipahimalani-Rao, 2010). Lower absence rates may mean increased interaction with children, and thus a better understanding of their true abilities.

Our sample includes three kinds of teachers: regular teachers, headteachers, and para-teachers. Regular teachers constitute a majority of our sample at 50.7%, followed by para teachers (28%) and headteachers (21.3%). Results shown in Table 3, Column A show that para-

[9] Para-teachers are contractual teachers often hired from the local communities. They have the same teaching responsibilities as that of regular teachers but do not have similar salaries and other employment benefits.

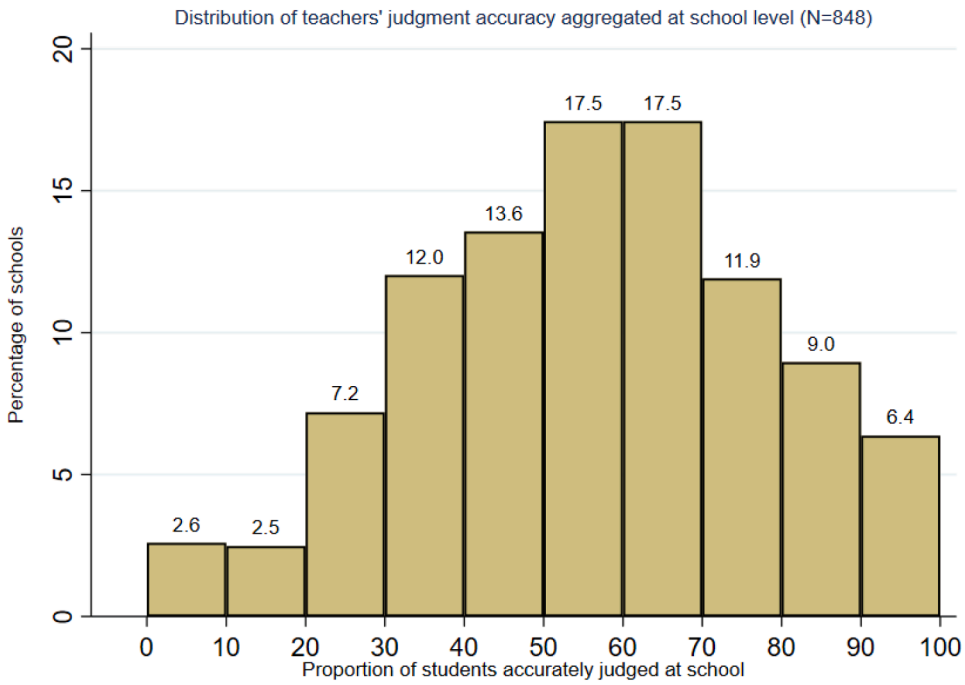

Fig. 5. Distribution of teachers' judgment accuracy aggregated at school level.
Notes:
The figure shows the distribution of judgment accuracy at the school level. The distribution looks like a bell curve with major portion of the sample in the middle, with fewer observations at the tails.

teachers are 8.3 percentage points more likely to be accurately judge students' learning levels, than regular teachers (*p-value* < 0.05). When adding controls for classroom, school and village characteristics as well as block fixed effects, this result holds and becomes a bit stronger (Columns B and C). Our findings complement those of Atherton and Kingdon (2010) who show that para-teachers are more effective in imparting learning as compared to regular teachers. Atherton and Kingdon (2010) further suggest that para-teachers put in greater effort than regular teachers due to the nature of their contracts, which need to be renewed on an annual basis. Given this uncertainty, they are liable to put in more effort, which could lead to a better understanding of their students.

4.4. The association between teachers' contextual factors and the (in) accuracy of their judgment

Teacher workload is a factor that could potentially affect the accuracy of teachers' judgments. Those who teach multiple grades are unlikely to allocate as much attention to each student, compared to teachers who teach single grades. This in turn implies that they would be less likely to know students' actual learning levels. Our findings suggest that teachers with a higher workload have a lower likelihood of knowing their students' actual learning levels (and this is consistent across all models which include controls and block fixed effects). With every additional grade taught, teachers are around 1.3 percentage points less likely to have realistic perceptions of their students' reading skills (*p-value* < 0.05).

In addition to the number of grades taught, what may also be important is how long has the teacher been in the current school and whether the teaching is in a multi-grade or single-grade classroom. In the state of Uttar Pradesh, in which this study is located, the proportion of all fourth-grade students in multi-grade environments was 60.4% and for second-grade it was 63.8%, respectively in 2018 (ASER 2018). Multi-grade classrooms tend to be larger and more diverse in terms of student learning levels, making it less likely that teachers teaching these classes would be familiar with children's learning levels. We do not find evidence that time in school or teaching in multi-grade classrooms is a statistically significant predictor of accuracy in perceptions.

Next, we examine how the grade that the teacher teaches affects their perceptions of children's reading abilities. We find that compared to second grade teachers, those teaching the third and fourth grades were 8.2 percentage points and 13.2 percentage points less likely to make accurate assessments of their students' reading abilities respectively (Table 3, Column A). This result holds even after controlling for classroom, school and village characteristics, although the magnitude declines substantially to 5.2 and 8.2 percentage points for third and fourth grade teachers relative to second grade teachers, respectively. This result may be attributed to teachers' overestimation of older children's abilities. Since students in higher grades have spent more years in school, the teacher is more likely to think that they could read the *story* in the ASER test. As discussed earlier, overall, the students in our sample have low reading abilities, and hence the teacher is more likely to be incorrect about students' reading proficiency in higher grades as they would expect them to be able to read the *story*, which in fact, most cannot.

Finally, we explore some additional contextual factors such as whether the teacher's own child attended government school, the geographic proximity of the teacher's residence to that of his/her/their students and whether the posting was that of the teacher's choice. None of these factors was statistically significant in our models (Table 3).

4.5. Robustness checks

It could be argued that reading the *story* in the ASER test is very similar to reading the *paragraph*, and hence children who could read this level, might be incorrectly perceived by teachers (who are not aware of the nuanced differences between *paragraph* and *story* levels) as being able to read the *story*. To address concerns that our results are driven by teachers who are unable to clearly differentiate between these two close levels of reading proficiency on the testing tool, we omitted children who were able to read paragraphs from the sample and re-estimated the results. The findings were largely consistent with the findings presented before. We found that 36.4% of teachers incorrectly perceived the reading levels of at least 50% of their students. This high proportion further validates the wide gap between teachers' judgments and children's actual reading abilities. Moreover, we observe that teachers' judgment accuracy follows a similar distribution pattern as that shown in Fig. 3, with around 10% of teachers in each decile for the fourth to

Table 3
Parameter estimate (*standard error*) for the accuracy of teachers' perceptions on low performing children foundational literacy abilities

Variables	Column A	Column B	Column C
Sociodemographic background characteristics			
Female teacher	5.064	4.948	4.271
	(1.871)*	(1.879)*	(1.909)*
Teacher age (less than 30)	0.271	0.412	0.793
	(2.212)	(2.014)	(2.157)
Teacher religion (Hindu)	4.937	4.255	4.168
	(2.167)*	(2.281)	(2.290)
Teacher's reservation category (Ref: General)			
SC/ST	2.879	1.062	0.394
	(2.164)	(2.960)	(3.013)
OBC	0.337	-0.270	-0.609
	(1.152)	(1.902)	(1.892)
Teacher ever married	0.184	-0.066	-0.134
	(1.733)	(1.544)	(1.534)
Standard resumé characteristics			
Teacher has Masters degree or above	0.647	0.864	0.847
	(1.500)	(1.519)	(1.547)
Total years of teaching experience	0.033	-0.004	-0.029
	(0.161)	(0.157)	(0.152)
Teacher's designation (Ref: Regular teacher)			
Headteacher	1.453	1.454	1.567
	(2.134)	(2.048)	(2.137)
Para-teacher	8.259	8.475	8.931
	(2.839)*	(2.669)**	(2.919)**
Teacher's salary (Ref: Less than 10,000 IRS)			
Between 10,000 and 40,000	4.480	4.839	4.915
	(3.629)	(3.269)	(3.215)
Above 40,000	6.138	7.902	8.388
	(3.718)	(3.619)*	(3.801)*
Contextual factors	6.138	7.902*	8.388*
	(3.718)	(3.619)	(3.801)
Workload (number of classes taught)	-1.277	-1.421	-1.241
	(0.516)*	(0.512)*	(0.565)*
Association with current school (years)	-0.147	-0.116	-0.101
	(0.233)	(0.207)	(0.199)
Teacher teaches in a multi-grade class	-1.448	-1.662	-1.467
	(1.997)	(1.962)	(1.791)
Grade taught (Ref: Std. 2)			
Grade 3	-8.243	-5.201	-5.194
	(1.927)**	(1.929)*	(1.873)*
Grade 4	-13.151	-8.154	-8.194
	(2.124)**	(1.914)**	(1.989)**
Teacher's own child has attended government school	-1.700	-1.953	-1.871
	(1.433)	(1.269)	(1.255)
Teacher lives in the same village as the school	-0.356	1.853	2.174
	(2.273)	(2.697)	(2.695)
Posting teacher's choice	-2.223	-1.851	-1.897
	(1.679)	(1.499)	(1.494)
Controls			
Classroom-related factors[#]	No	Yes	Yes
School facilities	No	Yes	Yes
Village facilities	No	Yes	Yes
Block fixed effects	No	No	Yes
Constant	54.817	53.283	53.234
	(4.719)**	(4.153)**	(4.500)**
Observations	1705	1705	1705

Source: ESRC Accountability Project Data Collection 2019. Notes: Asterisks (*, **) indicate statistical significance at 5 and 1% level, respectively.

[#] includes: number of children enrolled in the sample grades, percentage of overage children in the classroom, percentage of girls in the classroom, percentage of children in the classroom whose sex is same as the teacher's, percentage of SC/ST children in the classroom, percentage of children in the classroom whose caste is same as the teachers, percentage of children in the classroom living in kutcha households, and percentage of children in the classroom who can read simple words in the ASER test.

ninth deciles. In terms of predictive results, our estimates with this restricted sample continue to show that female teachers, para-teachers, those teaching fewer classes, and those teaching lower grades are more likely to correctly judge children's reading abilities relative to each of their counterparts. It is also worth noting that the more traditionally revered characteristics, such and teachers' educational level and work experience, did not predict differences in teachers' accuracy in assessing their students' reading skills.

5. Conclusion

This paper focused on teachers' perceptions of low performing children, in particular, whether their students have the literacy skills to be able to read a simple story. Our research is motivated by the hypothesis that these perceptions have a direct impact on teachers' classroom practices, particularly if teaching at the right level is the goal. For our analysis, we used data from 848 government primary schools situated in a rural Indian district and measured the proportion of students incorrectly perceived to be able to read a *story* (when according to the ASER test, these children were unable to do so). Our results suggest that 4 out of 10 teachers incorrectly assessed the foundational literacy levels of at least half of their students. With regard to the factors shaping this discrepancy, we find that female teachers, those with lower workloads, and para-teachers, are more likely to know their students better. However, teacher experience and educational qualifications are not associated with the likelihood of accurate assessments. Furthermore, teachers living in geographic proximity (same village) to their students did not show any edge over others, in terms of correctly predicting their reading proficiency. However, we found that the grade the teacher was teaching (and asked about) was relevant, where those teaching comparatively lower grades were more likely to accurately assess their students' reading skills. We propose that this could be due to teachers' preconceived notion that children in higher grades have better learning levels than those in lower grades. In other words, it is not that they know the younger children better but rather, that their perception that younger children have low learning levels, happens to be correct.

Our findings contribute to the literature on teacher effectiveness in multiple ways. First, while teacher beliefs and perceptions have recently been recognised as an important factor influencing teacher classroom practice, our study adds to this evidence by focusing on teachers' perception of children with low foundational skills. Most of the knowledge base about teachers' judgment accuracy comes from studies conducted in developed countries, whereas our results are derived from a very large sample of teachers and children based in rural Uttar Pradesh, a consistently lower-ranking state in foundational literacy achievements (ASER 2018). Although the importance of teachers' abilities to accurately assess their students is being increasingly recognised, measuring this can be daunting, especially in linguistically diverse countries such as India. The study demonstrates how an easy-to-use, and publicly available ASER assessment tool can be used to measure teachers' in/accuracies. The ASER tool has already been used successfully in several developing countries, to assess children's foundational learning outcomes[10].

Although our study fills an important gap in the literature on the accuracy of teachers' judgment in the Indian context, it is not without limitations. Firstly, it investigates the impact of only teacher-level factors on teachers' judgment accuracy. Many studies in the Indian context have highlighted that child characteristics such as gender, caste, economic status, etc. have a significant impact on teachers' perceptions (Brinkmann, 2015; Clarke, 2003;) and assessments (Hanna & Linden, 2009). As we were interested in exploring teacher-level factors, we conducted the analysis at teacher level, and as a result, we could only control for aggregated child-level characteristics. This strategy would

[10] http://www.asercentre.org/p/76.html (accessed on January 04, 2022)

reduce the potential omitted variable bias but not eliminate it completely. Therefore, our results cannot be interpreted as being causal but are rather associations that are suggestive of the observed relationship. Secondly, we were able to only focus on the accuracy of teachers for low performing pupils. Therefore, we are unable to establish if teachers are correct about perceptions of learning for high achieving pupils. The restriction on the sample makes it impossible for us to carry out this analysis and hence remains a limitation of our study.

Yet, our study has some important implications in the area of teacher training. Including curricula and programs that inform teachers about using assessments as a formative tool and making them aware of the implications of accuracy in relation to their students, could be a valuable addition to in-service and pre-service training. It is only through accurately assessing their students' actual learning levels, that instruction, interactions, and activities in the classroom can turn into meaningful learning. This is in line with the recognition that helping teachers teach at the level of the student is one of the key principles in ensuring all children learn (World Bank 2018), and various countries have developed initiatives to help teachers conduct better diagnostics on their students. In Singapore, for example, screening tests are used at the beginning of Grade 1, and those who are behind are provided additional support daily (OECD, 2011). In India, there is evidence that teachers require additional support in terms of suggestions on the use of diagnostic tools to strengthen teaching (Muralidharan & Sundararaman, 2010). New technologies such as computer-assisted learning are being implemented in schools in New Delhi and evidence in urban areas shows that well- designed, technology-aided programs could improve classroom instruction (Muralidharan et al., 2019). Although the evidence in using these is mixed, some positive results point to the potential of scaling up such interventions (Banerjee et al., 2007). The findings from our study highlight a critical need to first identify whether teachers have accurate perceptions of their students' learning levels, before assisting teachers with better identification and utilisation of data for children's learning outcomes.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

Funding for this project comes from the UK Economic and Social Research Council (ES/P005349/1) and from the Mars Wrigley Company Foundation. Research partners include the Pratham Education Foundation, the ASER Centre, and the REAL Centre at the Faculty of Education, University of Cambridge.

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