The nature of parental involvement and its impact on learning outcomes in Sitapur district, India.

Mansi Middha

University College London
Institute of Education

September 2022

A dissertation

Submitted for
Masters of Arts in Educational Planning, Economics and International Development

Table of Contents

List of Tables and figures

Abbreviations:

ASER	Annual Status of Education Report
EPF	Education production Function
FLN	Foundational Literacy and Numeracy
GPS	Government Primary School
LMIC	Low-and middle-income countries
NEP	New Education Policy
OBC	Other Backward Classes
PI	Parental involvement
RTE	Right to Education
SC	Scheduled Caste
ST	Scheduled Tribe

Abstract

Policy and practice in education are focused on improving the learning outcomes of students in alignment with global and national goals. Family characteristics including parental involvement in children's education are an important factor in determining the learning of students. Thereby, parental involvement is gaining attention as one of the cost-effective ways of improving students' learning outcomes in Low and Middle-income countries.

Using a sample of children with low math and reading levels, this study investigates the nature of parental involvement and its association with learning outcomes in Sitapur district in India. Utilising quantitative methods including descriptive statistics, OLS regression and adjusted predictions this study finds that while financial inputs and school-based inputs of parents are limited in the given context, many parents/families are directly involved with their children's education at home. The OLS regression model, which is based on the Education Production function, finds that except the financial input of sending the child to tuition PI has a statistically significant but weak influence on the learning outcomes. Findings also suggest that while parental involvement (except tuitions) is helpful, it is not sufficient in equalising the achievement gap between different caste groups.

However, the time children spend studying after school is strongly associated with learning outcomes. This suggests that whilst finding ways of improving the effectiveness of parental involvement, policymakers, parents, and community programs can focus on ensuring conducive environments for the after-school learning of children.

Acknowledgements

I would like to express my sincerest regards to my dissertation supervisor, Dr Ben Alcott, whose support has helped shape not just this dissertation but the entire EPEID masters' experience. His patience, empathy, guidance, and reassurance kept me afloat through the entire writing process. Additionally, I would like to express my gratitude to Professor Caine Rolleston, the program leader for designing this brilliant program and for his relentless support, and Dr Will Brehm, my personal tutor for his guidance and suggestions. I am also grateful for the diverse group of friends I made through the EPEID course, for their support and friendship.

This dissertation is inspired by the work of the research team at the REAL centre at the University of Cambridge and ASER, India. I would particularly like to thank Laura Cashman and Mansi Nanda from the University of Cambridge and Purnima Ramanujam from ASER, India for being generous with their time, support, guidance and suggestions on the data.

This work would have been impossible without the financial support from the Commonwealth Scholarship Commission and the University College London's funding team through the Commonwealth Shared Scholarship.

I would like to thank my family for their unwavering support and patience, especially my mother and my partner Rahul, who stood by me through every challenge along this journey. Last but not least, I thank my grandparents who started their lives as refugees of the India-Pakistan partition in 1947, their resilient and hard-working foundations have led me here.

Chapter 1: Introduction

Access to primary schooling in India has significantly improved in the past decades with enrolment staying above 96% since 2010 (ASER, 2018). This achievement is in alignment with the Millennium Development Goals and the Right to Education Act (RTE, 2009) of the Indian government. The RTE guarantees free and compulsory education to every child in the age group 6-14. This helped students from low-income families and especially girls to access primary education. However, access alone does not ensure the development of the skills (Pritchett, 2013; Pritchett & Beatty, 2012). The quality of educational access remains a grave matter of concern with only 55% of children in India being able to read at the age of 10 as per the World Bank's learning poverty report (World Bank, 2019). Annual Status of Education Report (ASER) which is a nationally representative household survey of students' learning outcomes shows that only 50.3% of students in Grade 5 are able to read a Grade 2 text and only 27.8% of Grade 5 students are able to solve division questions (ASER, 2018). Accordingly, the focus of the Indian government, much like that of the global educational initiatives such as the Sustainable Development Goal 4 (Beeharry, 2021) has shifted from mere 'educational access' to improving the quality of primary education in recent years, focusing specifically on foundational literacy and numeracy skills (NEP, 2020).

1.1 FLN Skills and Human Capital:

Foundational Literacy and Numeracy skills are broadly understood as the foundational skills students develop in primary grades. This study uses the ASER instruments' measures of verbal reading and arithmetic abilities of the children in primary grades as an indicator of foundational literacy and numeracy. The ASER instrument records learning up to grade 2 reading skills and up to grade 4 numeracy skills. The literacy skills are levelled as "reading a letter (letter sounds), reading a word, reading a paragraph, and reading a short story,". Numeracy skills are levelled as "single digit number recognition, double-digit number recognition, subtraction with borrowing and division". In the data used for this study,

the literacy and numeracy tests are based on the child's ability to read in the local official language, Hindi.

The World Bank defines human capital as "the knowledge, skills, and health that people invest in and accumulate throughout their lives, enabling them to realize their potential as productive members of society." Education is crucial for the development of human capital both for its economic as well as social returns including better health, lower fertility and investing in the human capital of future generations. However, children in developing countries may have weak academic skills, thus severing the link between education and economic growth (Glewwe et al., 2020; Hanushek & Woessmann, 2008; World Bank, 2018). Research in the past decades suggests that schooling attainment is not the same as the development of skills. This is globally highlighted in the "learning crisis" report by the World Bank showing that 53% of children in LMIC are unable to read by age 10. This crisis has been further exacerbated owing to the 'learning loss' during the COVID-19 pandemic school closure (World Bank, 2021).

Furthermore, the economic growth of LMICs is found to be strongly associated with the cognitive skills of the population, while only weak associations can be made with the years of schooling (Hanushek & Woessmann, 2008; World Bank, 2018). Literacy skills are also associated with productivity beyond just academic achievement including higher agricultural productivity, increased parental involvement in their children's education and improved financial behaviour (Banerji et al., 2017; World Bank, 2018). While the FLN skills may not be the only skills necessary for individual well-being or for human capital development, they are essential to put students on a higher trajectory for learning higher-order skills and reduce the dropout rates (Angrist et al., 2022; Evans & Hares, 2021). Increasingly, the measurement of FLN is being used as a measure of Human capital in LMIC,

leading both policy and practice to focus on FLN skills. It is also one of the metrics against which LMICs can hold themselves accountable to national and global educational goals.

Accordingly, the New Education Policy (NEP, 2020), educational interventions and contemporary research are focused on improving students' FLN skills. The NEP has prioritised FLN thereby initiating a national mission 'National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN) Bharat' to fill teacher vacancies, redesign teacher education, undergo curricular reforms and technological interventions to achieve the goal of universal foundational literacy and numeracy by 2025 (NEP, 2020). School-based programs such as the NIPUN Bharat program, Read India etc have been implemented by governments and non-governmental educational organizations (NGOs) like Pratham with the purpose of developing FLN skills in primary school students. The focus of these programs ranges from teacher training to introducing cost-effective pedagogies to improve foundational learning skills. Children's learning in school is a function of child, family and school characteristics and while government policies may not be able to directly address the child and family characteristics, they are able to directly influence school and teacher characteristics (Glewwe, 2013). However, the NEP highlights the potential of involving parents through parent-teacher meetings, progress report cards, involving parents in the planning of technology-based solutions and volunteering initiatives to foster improvements in school governance, student attendance and learning outcomes (NEP, 2020).

1.2 Parental involvement (PI) and FLN

Parental involvement in education has recently started receiving attention through research, policy and program as a potential area of intervention for improving students' learning outcomes in LMICs (Banerji et al., 2017; Cashman et al., 2021; Islam, 2017). Improving PI in education can prove to be a cost-effective strategy for improving the

educational outcomes of students (Islam, 2017; Sanchez, 2011). While the broader literature on PI shows that it is an important input in student's cognitive and non-cognitive outcomes there are inconsistencies in the empirical research within this field (Avvisati et al., 2011; Boonk et al., 2018; Fan & Chen, 2001; Horvat et al., 2003).

Studies in developed contexts show that while some aspects of PI are helpful in increasing the learning outcomes of students, other aspects may have no effect or even negative association with learning outcomes. In the context of South-Asia, Banerji et al., (2017) find that programs that increase mothers' level of literacy and enhance mothers' knowledge and exposure to children's education at home have a small but statistically significant positive impact on learning outcomes. Islam, (2017) finds that increasing the number of parent-teacher interactions in school significantly improves students' test scores as well as behavioural outcomes. Interventions that focused on providing information on the learning outcomes of students to parents had a positive effect on test scores in Pakistan, but a similar intervention in India did not lead to any significant improvements in academic outcomes showing that providing information alone may not be sufficient in improving outcomes (Banerjee et al., 2010; Islam, 2017).

The overall empirical evidence on the associations between PI and learning outcomes however remains limited. Funding in education needs to be diverted towards those characteristics that have a high impact on student learning and away from those that have little or no impact (Glewwe, 2013). While the idea of funding programs that increase PI may be intuitively appealing for improving students' learning, not all aspects of PI may lead to the desired educational results. Accordingly, this study explores the nature of PI in a rural, low-income context in India and its effect on learning outcomes.

Much of the research on the associations between learning outcomes and family background in developed and developing countries shows that family characteristics such as socioeconomic status, parental education and rural and urban geography have a large impact on students' learning outcomes (Alcott & Rose, 2015; Horvat et al., 2003). Parental characteristics such as education, socioeconomic and employment status can also largely determine PI in children's education both at home and in school (Avvisati et al., 2011; Cashman et al., 2021; Horvat et al., 2003). Improving PI is one of the potential ways to improve students' learning outcomes (Goodall, 2017). Studies done in high-income contexts show that specific aspects of PI such as "reading at home, holding high expectations for students' academic achievement, communication between parents and children regarding school and parental support for learning" have more impact on students' learning than other forms of involvement such as helping with homework and monitoring child's activities such as watching TV which may have limited or even negative associations with student's learning (Boonk et al., 2018; Fan & Chen, 2001). However, there is limited research to show the effect of specific aspects of PI in socio-economically disadvantaged contexts in LMIC where children may be first-generation learners (Banerji et al., 2017).

1.3 Significance of the study

The aim of this study is to identify the nature of PI in rural low-income contexts and disentangle the effect of different aspects of PI on learning. It focuses on the associations of specific aspects of PI to identify those that have the strongest association with students' learning outcomes. Since there is an increasing focus on PI as a potential method of improving learning outcomes, having a nuanced understanding of PI in low-income contexts will help design targeted PI programs and policies to improve student's learning outcomes (Islam, 2017; Sanchez, 2011). This study attempts to fill the gap in the PI literature in a low-

income and low-literate rural context by determining the association of different aspects of PI with the learning outcomes of students.

In India, the educational outcomes are likely to vary by the 'caste' of the student (Sabates et al., 2020). Caste is a social categorization of people into endogamous groups. Although caste discrimination is illegal by law, it continues to be practised (Deshpande, 2005a). Caste groups are typically represented as Scheduled caste (SC), scheduled tribes (ST), other backward classes (OBC) and General caste. SC and ST castes are the historically marginalised groups who continue to be socially, economically and culturally deprived despite affirmative action policies by the Indian government (Chauhan, 2008; Lastrapes & Rajaram, 2016). There are a plethora of studies examining caste in India, and some empirical research on PI. Caste is often used as a control variable in examining learning outcomes or the extent of parental involvement (Cashman et al., 2021; Sanchez, 2011). However, to my knowledge, no research examines the heterogenous effects of PI on different caste groups and its influence on learning outcomes. Accordingly, this study focuses on the differential effect of PI on different caste groups.

This study uses a rich dataset from the REAL "Accountability at the grassroots project, in India" to study the influence of different aspects of **PI** on the reading and math outcomes of students which are measured using the ASER tool. The dataset has a sample size of 24,000 children studying in grades 2, 3 and 4 of Government Primary Schools (GPS) in the Sitapur district of Uttar Pradesh (UP). It includes several variables indicating PI, household and parental characteristics including parental behaviour and activities at home that are associated with learning, as well as child, teacher and school characteristics in a rural, low-income context, thus making it suitable for this analysis.

1.4 Research Questions

This study focuses on the following questions:

Research Question (RQ) 1: What is the nature of Parental Involvement (PI) in the Sitapur district of UP?

Research Question 2: How does PI differ by caste, gender and education of the mother?

Research Question 3: What aspects of PI show the strongest associations with student learning outcomes?

Based on the findings of RQ3 this study will use the 3 variables with the strongest associations to answer **Research Question 4:** Can high levels of parental involvement offset the caste disadvantage for SC, ST and OBC categories?

Guided by the conceptual framework of the education production function (EPF) this study finds that some parental inputs significantly influence learning outcomes while others have no significant influence on either reading or math levels. The overall parental involvement through financial inputs and school-based inputs is low. A substantial number of parents engage in educational activities at home and communicate about school with their children, however, this only results in a marginal improvement in learning outcomes. Amongst the variables on PI, the ones that seem to have a significant effect on learning in both reading and math outcomes are ‘children taking tuition’, ‘someone helping the child at home with studies’ and ‘parents asking the child to read books other than textbooks. Of these variables, taking tuition leads to a substantial improvement in learning outcomes, while direct home-based PI leads to small improvements. However, the EPF model shows that there are large benefits to children regularly studying after school hours. This indicates that creating a positive home or community atmosphere which is conducive to children’s learning may be most beneficial in improving outcomes.

Chapter 2: Literature review

2.1 Economic Framework: Education production function

The economics of education is primarily concerned with the resources (inputs) and the returns to education (outputs or learning outcomes) (Avvisati et al., 2011). One important framework to determine the associations of various educational inputs to the learning outcomes is the **Education production function** (EPF). The EPF breaks down the several inputs that contribute to educational outcomes such as the household level inputs, school quality, child characteristics and parental or family involvement. Human capital research in the past decades has identified educational achievement or skills rather than 'years of schooling as being responsible for human capital development (Hanushek & Woessmann, 2008; Pritchett, 2013). While school enrolment, attendance and graduation rates have been traditionally used as a measure of human capital, the use of learning outcomes as a measure of human capital is relatively recent (Chudgar et al., 2012; Chudgar & Shafiq, 2010).

The impact of parental involvement on educational outcomes can be studied through the EPF. It determines the associations of different educational inputs on the learning outcomes. The inputs in an EPF include observable characteristics that determine student learning and are generally distinguished as the child, school and household characteristics (Glewwe et al., 2020).

The **EPF** equation is typically represented as:

$$A = a(\mathrm{S}, \mathbf{Q}, \mathbf{C}, \mathbf{H}, \mathbf{I}) \qquad [3.1]$$

Wherein **A** represents the Academic achievement or skills; **S** is the years of schooling, **Q** represents quality of schooling which includes the school and teacher level characteristics;

C includes the child-level characteristics that influence learning such as age, gender, and prior achievement **H**: includes all household-level characteristics such as parental education, socioeconomic status that affect learning and **I** are the inputs associated with household and children that are directed towards student learning, for example, student attendance, parental involvement and availability of learning materials (Glewwe et al., 2020). Parental involvement variables used in this study are a subset of 'I'. Although some studies using the EPF use the reduced form of the equation which represents the Inputs as a function of the other characteristics such as the cost of education, quality of education, parental education and Socio-Economic Status (Chudgar et al., 2012) this study uses the direct form of the EPF demonstrating the direct associations of the PI variables with learning.

This direct form function can be expanded as:

$$A = \beta_0 + \beta_s S + \beta_{q1} Q1 + \beta_{q2} Q2 \ldots\ldots + \beta_{c1} C1 + \beta_{c2} C2 + \cdots \ldots \beta_{h1} H1 + \beta_{h2} H2 \ldots\ldots + \beta_{i1} I1 + \beta_{i2} I2 + \cdots + \mu_a \quad [3.2]$$

Wherein Q1, Q2 and so on represent the different factors associated with the school quality, C1, C2 and so on represent different child characteristics such as gender and age, H1, H2 and so on represent the various household characteristics, I1, I2 and so on represent the characteristics on parental involvement. For instance, this study includes 10 characteristics associated with parental involvement so they would be represented as I1, I2…I10 in the given equation. It is also important to note that parental involvement variables only represent a subset of all household and child inputs. The β coefficients represent the association of the respective variable with the learning outcomes.

There is a range of studies analysing school-level inputs such as class size, private schooling, teacher effectiveness and parental characteristics such as household literacy levels,

socioeconomic status (SES) and child gender and their effect on student learning outcomes (Alcott & Rose, 2015, 2017; Datta & Kingdon, 2021; Duflo et al., 2015; Glewwe et al., 2020; Glewwe & Kremer, 2006; Muralidharan et al., 2017). However, the empirical evidence from the policy perspective focusing on home and family characteristics such as the different aspects of parental involvement as inputs for student learning outcomes is limited (Banerji et al., 2017; Chudgar & Shafiq, 2010; Islam, 2017; Kumar & Choudhury, 2021; Sanchez, 2011). This study uses the EPF to estimate the associations of different aspects of PI to the learning outcomes of children in a low-income, rural context in India. This would be helpful to inform educational policy and programs about specific parental activities or inputs that have the strongest associations with learning outcomes in low-income contexts.

2.2 Parental involvement: Overview

Parental involvement is an important and beneficial element of education (Barton et al., 2021; Goodall & Montgomery, 2014; Hornby & Blackwell, 2018; Islam, 2017; Sanchez, 2011). With the increasing focus on improving educational performance in LMIC, educational policies, programs, and research are focusing on PI as one of the potential ways of improving learning (Banerji et al., 2017; Cashman et al., 2021; Islam, 2017; Sanchez, 2011). Seminal studies on PI echo the proverbial notion that it takes a village to raise a child, indicating that children's education is both influenced by and is a shared responsibility of parents, school and community (Epstein, 2010; Goodall & Montgomery, 2014; Sabates et al., 2020). However, this study focuses only on the nature of parental or family involvement (which are used interchangeably), and its association with learning.

Parental involvement is multifaceted, and definitions of PI are subject to interpretation, contextual nuances, and the nature of the research (sociological, economic, or psychological). While some definitions of PI, include the motivation for better educational

outcomes for the child (Avvisati et al., 2011), others emphasize the importance of PI in influencing the "overall actions" of a child beyond just educational achievement (Goodall & Montgomery, 2014; S. won Kim, 2018). PI has further been described as a wide range of parental behaviours and practices at home and in the school community that are related to education. This includes parental aspirations, communication with children about these aspirations, communication about school-related activities, education-related rules at home, participation in school activities and communication with teachers about their children (Boonk et al., 2018; Epstein, 2010; Fan & Chen, 2001).

This study uses Avvisati et al.'s (2011) definition of PI which describes PI as the "**direct effort by the parents to increase educational outcomes of their children**." This definition represents an economic perspective as it is analogous to **parental time or resources as an input in the EPF**. This includes the activities and efforts by parents when children are of the schooling age, to improve students' learning or overall educational outcomes. This definition can also be adjusted for contextual interpretations and nuances as the nature of PI is likely to vary across contexts.

PI has further broadly been distinguished as home and school-based involvement (Chudgar et al., 2012). Home-based involvement refers to the activities and communication concerning schooling that parents engage in to support children's learning at home. These include reading to the child, communication about the school, and helping with educational activities such as homework or directly teaching (Chudgar et al., 2012; Epstein, 2010; Hoover-Dempsey et al., 2005). This could also include motivation and support parents provide to learners (Chudgar et al., 2012; Goodall & Montgomery, 2014; Padhi et al., 2020). School-based involvement includes communication with the teacher about the child,

attending school events or volunteering at school (Epstein, 2010; Goodall & Montgomery, 2014; Hoover-Dempsey et al., 2005; Kabay, S RISEProgramme, 2022).

2.3 Conceptual frameworks used for studying Parental Involvement:

The three most influential guiding frameworks in the study of parental involvement are the Hoover-Dempsey & Sandler framework, Epstein framework and Goodall Parent involvement-engagement continuum (Fan & Chen, 2001; Goodall, 2017; Goodall & Montgomery, 2014). These models have originated in high-income contexts, the Epstein and the Hoover Dempsey & Sandler model originated from the USA and the Goodall Continuum comes from the UK. While these models follow different approaches, they have some overlapping elements including the parents' home and school-based involvement types. All three models suggest that PI is influenced by school and can impact children's educational outcomes.

The **Hoover Dempsey and Sandler framework** focuses on the psychological processes behind parental involvement, the choice of specific involvement types and the mechanisms through which parental involvement has an influence on learning outcomes. It focuses on PI through a five-step model starting with parental motivation for involvement to the final stage of students' learning outcomes. The intermediate levels include the channels or mechanisms through which parents get involved, children's perceptions of these mechanisms, and the development of children's attributes that lead to learning (Goodall & Montgomery, 2014; Hoover-Dempsey et al., 2005). While the framework is theoretically useful, the elements of this framework may be difficult to measure empirically (Fan & Chen, 2001). Therefore, this model is not appropriate for an empirical study measuring the impact of parental involvement on learning outcomes.

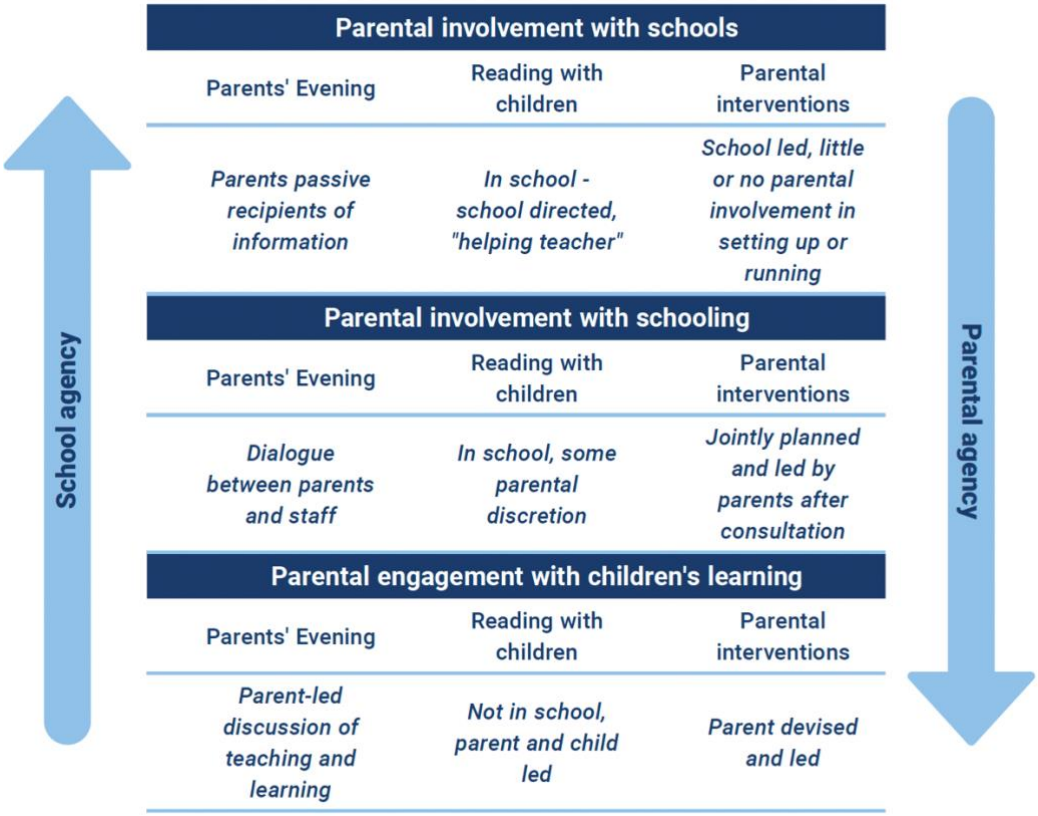
Epstein's model defines six types of activities undertaken by Parents which helps improve school effectiveness. This includes parenting, communicating, volunteering, learning at home, decision making and collaborating with the community. This model is focused on the involvement of parents from the perspective of the school and how schools can support parents to be better involved in their children's education (Epstein, 2010; Fan & Chen, 2001). Being highly school centric, this model is not appropriate for this study as the Parent-school partnerships are relatively new in India as compared to developed contexts and researchers generally define PI as the support parents provide at home to support children's learning (Padhi et al., 2020). Furthermore, in the context of Sitapur, the participation of parents in school is low as suggested by the initial analysis of the REAL dataset (UKFIET, 2022) and some of these involvement types including volunteering and parents' participation in decision-making in the school are unlikely to exist in government schools in rural locations.

The Goodall model is conceptualised as a continuum and distinguishes parental involvement from engagement both lying at different ends of the continuum. It differentiates between 'parental involvement' and 'parental engagement' from a perspective of a shift in agency between the school and the parent. She conceptualises 'parental involvement' as parents' activities and interactions with the school where the school has higher agency and 'parental engagement' as the activities that are independently led by parents to improve student learning. The Goodall model presents a more holistic view of parental involvement by representing home and school characteristics as a continuum. While this model can be adjusted for the given context, PI categories such as reading in class, and volunteering in school come from a more developed context and may be irrelevant for the context of this

study. Moreover, it is difficult to align the PI variables available in the REAL dataset to the categories defined in the Goodall model.

This study uses the terms PI at home and school rather than differentiating between 'parental involvement' and 'engagement'.

Figure 1: Goodall Continuum: from involvement to engagement.



Source: *(Barton et al., 2021)*

2.4 Nature and barriers to parental involvement in rural India

The lack of learning support at home is considered one of the reasons for the poor learning outcomes in India (ASER, 2018). While this is largely attributed to parents' lack of education, this study tries to delve deeper into the nature of parental involvement in rural India. Ideas and frameworks of PI in developed contexts largely focus on parent-school

partnerships. In LMIC contexts, the ways in which parents engage are more home-centric and include emotional support to the children, providing tuition, and verifying homework completion (S. won Kim, 2018).

PI especially in the Indian context can be largely dependent on the community in which parents live (Cashman et al., 2021; Chudgar et al., 2012; Chudgar & Shafiq, 2010; Sanchez, 2011). Most decisions about children's education are taken at the family (which extends beyond the parents) or community level. While parents are generally thought of as the ones responsible for children, they are not the only ones involved in their children's education (Sanchez, 2011). In the context of rural UP, children may receive help from other family members such as siblings and other relatives (Cashman et al., 2021). Although families are involved in all decision-making around the child's education, PI does not occur in a vacuum and family characteristics matter for educational outcomes as well as for PI. Parents do not randomly select their level of involvement and it is dependent on various factors such as their socio-economic status, educational background and ethnicity (Aturupane et al., 2013; Avvisati et al., 2011; Banerji et al., 2017; Boonk et al., 2018; Cashman et al., 2021). Wealth, parental education, gender, and age of the child are some of the most critical factors impacting parental involvement in developing and developed countries. Additionally, in the given context, family and community characteristics such as wealth, literacy levels, caste, religion, and cultural and geographical characteristics are crucial determinants of educational outcomes as well as **PI** (Alcott & Rose, 2015; Banerji et al., 2017; Cashman et al., 2021; Sanchez, 2011).

In LMIC where the quality of education is low, additional efforts may be required from the family to support children's learning. However, parents face several barriers in being involved with their children's education. Poverty, lack of education and the difference

in the social capital of the parents and teachers are some of the common barriers faced by parents in developed and developing contexts (Cashman et al., 2021; Padhi et al., 2020; S. won Kim, 2018). However, in developing contexts additional challenges exist for parents including limited access to good quality schools, poor public resources, poor school infrastructure, low-quality teaching, the geographical isolation of rural areas, and limited economic opportunities. These challenges are more acutely faced by low-income families in developing countries (S. won Kim, 2018).

2.4.1 Structural barriers

Parents' capacity to support children at home and school is influenced by structural factors such as "caste, unemployment and poverty". Low-caste families may expect children to contribute to the household rather than going to school (Impact Initiative, 2020; Sanchez, 2011). This may be one of the reasons for high rates of absenteeism from school. Ben Amor et al. (2020) find that the sex and caste of the child are the strongest determinants of absenteeism whereas illness or familial duties are identified as the main reason for absenteeism. Families in high-income contexts directly or indirectly influence the child's learning through reading stories or visiting libraries, museums, and parks with children. However, these aspects of PI are likely to be absent in rural areas of LMIC because of the absence of public resources and parents' leisure time (S. won Kim, 2018).

2.4.2 Financial barriers

Families with a low Socioeconomic status could be considered as having higher motivation to participate in the education of their children to overcome other disadvantages. However, empirical research on SES and PI shows that low SES families are less involved than high SES families (Cashman et al., 2021). Parents living in poverty may have competing demands for their time and may be unable to devote their time and resources to children's

learning. Economic resources help parents buy educational materials for their children and influence the learning environment at home. High SES families may also be more involved in school activities since they are economically stable and have the time to participate in educational activities with children. Contrastingly, low SES families have less time to dedicate to their children because of the urgency of the livelihood activities (Padhi et al., 2020). Attending school meetings sometimes may have severe economic consequences such as losing their daily wage (Padhi et al., 2020). Due to the lower PI, low SES families are not able to close the gap in the learning of the child, but rather widen the integrational gaps in learning outcomes (Li et al., 2020).

2.4.3 Lack of educational experiences and illiteracy

Parents from low literacy backgrounds may find it hard to participate in formal schooling experience if they have not experienced the same (Padhi et al., 2020). The increasing demand for English-medium education in low-income contexts adds yet another barrier to parent participation in low-literate contexts (Islam, 2017; Padhi et al., 2020). While this does not represent their lack of interest, it shows that they may require support and guidance to engage in discussions regarding school and support students with academics, for instance, by providing examples from their daily life or acknowledging children's work (Chudgar et al., 2012; Padhi et al., 2020). An RCT testing a maternal literacy and parental home-participation program in rural India finds that both increasing maternal literacy and supporting mothers to participate in the child's education can have a positive effect on students' learning outcomes (Banerji et al., 2017). Similar findings from other low-income countries are reported in (Chudgar et al., 2012).

2.4.4 Accountability of schools towards parents

In developing countries, parent-school relationships are often characterised by an imbalance of power (S. won Kim, 2018). When there is a large gap in the social capital of parents and teachers given the difference in their education and socioeconomic status, parents may find it difficult to participate in schools (Goodall, 2017). In India, government schools are often less accountable to parents and children and are rather accountable to authorities (Gruijters et al., 2020). This usually leads to circumstances where teachers are engaged in administrative work rather than actually teaching in the classroom (The Wire, 2018).

Furthermore, teachers and parents have poor opinions of each other which may hinder school-parent partnerships (Impact Initiative, 2020). Differences in caste, religion and teachers not living in the same community as the parents may further increase the gap between parents and teachers. In government schools, teachers often travel for work to villages, and they may not be as integrated with the local community (Fagernäs & Pelkonen, 2012). Furthermore, the government-mandated School Management Committees (SMC), where parents are representatives along with schools and local authority personnel, are ineffective in their functioning. As such the school-family relationships remain poor which is likely to negatively affect children's learning (Impact Initiative, 2020).

2.4 Aspects of Parental Involvement and learning outcomes

Conceptual frameworks of educational outcomes and empirical studies show that home, school and community factors have a role in students' learning outcomes (Chudgar et al., 2012). While there are numerous empirical studies analysing school characteristics and student learning outcomes in LMIC, those that focus on family characteristics and learning outcomes are limited. Moreover, empirical studies that disentangle the association of different aspects of parental involvement with the learning outcomes of students are even more sparse (Chudgar & Shafiq, 2010).

Analysis of PI studies in developed and developing contexts show an overall positive correlation between PI and student learning outcomes (Barton et al., 2021; Boonk et al., 2018; Chudgar & Shafiq, 2010; Islam, 2017). However, different aspects of PI have different associations with students' learning outcomes and some aspects may show no association or even negative association with academic achievement (Avvisati et al., 2011; Boonk et al., 2018; Fan & Chen, 2001). Communication between parents and children at home, material inputs, discussing school activities, holding high expectations of their children and motivating children are some of the factors that have the strongest relationship with students' learning outcomes. On the other hand, helping with homework and monitoring children's activities are found to be negatively associated with achievement (Boonk et al., 2018; Fan & Chen, 2001; Goodall, 2017; Sandeep Kumar Jaiswal & Rashmi Choudhuri, 2017). The nature and impact of different aspects of PI on learning outcomes may further vary based on their family background. Studies based in the US show that African American children benefit more from school-based involvement of parents whereas Euro-American children benefit more from home-based involvement of parents (Boonk et al., 2018). All activities involving parents may not necessarily improve students' test scores, while some may be beneficial for test scores, others are likely to affect behaviour, and the associations of yet others may remain unclear (Epstein, 2010). Despite these variations, there is an overall positive correlation between parental involvement and students' learning outcomes (Boonk et al., 2018; Sanchez, 2011).

Most empirical evidence and frameworks focusing on specific aspects of parental involvement are based in developed contexts and may not hold true in LMIC (S. won Kim, 2018). Sparse as it may be, evidence from PI interventions in LMIC shows some similar and contrasting patterns. A Randomised Control Trial (RCT) in rural India focused on improving

mothers' literacy and participation in their children's education through monitoring child's learning at home increased outcomes of students in both math and reading. However, the study found that there is no significant effect of the time that mothers spent helping children with their homework on learning outcomes (Banerji et al., 2017). This is consistent with the empirical research on homework and learning outcomes in developed countries.

An RCT intervention based in France which increased the number of parent-teacher meetings that focused on getting parents better involved found that the program helped improve the behavioural aspects and reduced truancy but had no effect on the test scores of children. While it improved the overall parental participation in school and home beyond the duration of the program, there was no effect of the program on the literacy and numeracy outcomes (Avvisati et al., 2014). A similar intervention in Bangladesh however found that face-to-face interaction of parents with teachers can substantially improve the learning outcomes of students. The intervention found that the involvement of parents through parent-teacher meetings improved the test scores by 0.3-0.4 standard deviations. The intervention improved the test scores of the students as well as their attitudes and confidence in their academic abilities (Islam, 2017). This shows that while increased parent-teacher meetings improve the behavioural outcomes of students, their effect on learning outcomes is different for developing and developed contexts.

Another intervention providing parents with information on students' progress increased the test score of children by 0.11 SD in Pakistan (Andrabi et al., 2017) by increasing parental knowledge of student performance. It also helped parents make better educational choices for their children. However, similar interventions in other low income including Kenya and India did not lead to substantial improvement in learning outcomes (Islam, 2017). In India, projects involving only information dissemination for parents did not

significantly improve educational outcomes showing that providing information alone may be insufficient if parents have limited capacity to engage with their child's education (Banerjee et al., 2010).

While the idea of parental involvement is intuitively appealing in its relation to student learning outcomes, there are inconsistencies within empirical research about the different aspects of PI. This makes PI one of the areas within education where the economic principles of "more is better" don't necessarily apply with regard to learning outcomes. However, evidence on the role of PI in improving the non-cognitive and behavioural outcomes of children is limited in LMIC. Hence interventions associated with increasing PI must be targeted accordingly for maximising outcomes. Through a study of the literature, this study finds that the effect of parental involvement on learning outcomes may be highly influenced by context, and results may vary even within low-income countries. The study of specific aspects of PI is important for LMIC because it is one of the potential ways in which educational policy and programs can be influenced to improve learning outcomes in a cost-effective manner and improve school capacity in resource-constrained environments. It may also help educators be better equipped to encourage parents to participate in activities that are important for improving learning outcomes (Islam, 2017; S. won Kim, 2018).

2.6 Alignment of Parental Involvement variables with the literature.

Based on the economic framework of the EPF, this study chooses PI variables that are representative of parents' time or financial inputs. The dataset includes two variables representative of parents' **financial inputs** including i) Sending the child to tuition and ii) Books other than textbooks in the household. There are several variables based on parental **time inputs** including those associated with **educational inputs at home** i.e. iii) Check the child's books/textbooks, iv) Read\Tell stories to children v) Someone helps the child with

studies; **communication about schooling and educational expectations i.e. i)** Ask the child what they did in school every day ii) Tell the child to study hard iii) Ask the child to read other than textbooks; and **school-based inputs** i) Knows teacher ii) Visited school this session.

While the variables available in the dataset do not emulate the discussed PI frameworks which are largely based in the context of developed countries, the variables selected for this study are inspired by and overlap with other empirical studies on parental involvement done in India, specifically Banerji et al., (2017), Cashman et al., (2021), Sanchez, (2011) and Chudgar et al., (2012). The overlap in the PI variables between this study and the other empirical studies done in India is shown in Table 1.

Table 1: Overlap with PI variables used in empirical studies in India

PI variables used in this study	PI variables from other studies in India
Financial inputs	
i) Sending the child to tuition ii) Presence of Books other than textbooks in the household.	Chudgar et al., (2012) include i) academic skill acquisition through monetary support ii) provision of non-school books and reading materials. Sanchez, (2011) includes financial investment in the child's schooling
Educational inputs at home	
iii) Check the child's books/textbooks iv) Read\Tell stories to children	Banerji et al., (2017) includes i) Mother helps the child with homework. ii) Mother has looked at the child's notebook recently.

v) Someone helps the child with studies	Cashman et al., (2021) includes i) Check the child's books/textbooks, ii) Read\Tell stories to children and iii) Someone helps the child with studies Chudgar et al., (2012) includes academic skill acquisition through teaching directly. Sanchez, (2011) includes helping the child in his or her study
Communication about school	
vi) Ask the child what they did in school every day vii) Tell the child to study hard. viii) Ask the child to read other than textbooks	Banerji et al., (2017) includes the frequency with which the mother talks to the child and others about children's education.
School-based inputs	
ix) Knows at least 1 teacher x) Visited school this session.	Banerji et al., (2017) includes school visits. Cashman et al., (2021) includes i) Knows at least 1 teacher ii) Visited school this session. Chudgar et al., (2012) includes awareness of teacher performance. Sanchez, (2011) includes: i) Visiting the school for a meeting, ii) when presence is needed for the child's work, and iii) at the teacher's request for discussion about the child's behaviour or study

Financial inputs: Household expenditure on children is a determinant of their learning outcomes (Kumar & Choudhury, 2021). The financial investment of parents in children's education represents parental tastes in education and how families may value education when there are competing demands in low-income households (Banerji et al., 2017). Parental investment depends on the parents' preferences for the child, quality of education, budget constraints that parents face and parental beliefs about these investments (Attanasio et al., 2020). In low-income contexts, while parents may be interested in investing in education, they simply may not have the means to do so. Hence these variables also present a proxy for wealth, since relatively wealthier families often send their children to tuition to improve test scores (Kumar & Choudhury, 2021).

Investing in tuition is common in South Asian countries, even among low-income families and rural areas (Alcott & Rose, 2015; ASER, 2018, 2021, p. 2; Dongre & Tewary, 2015). Private tuition is preferred by parents because of the individual attention tuition teachers pay to students (Padhi et al., 2020) and the ease of communicating with the tuition teacher as compared to the schoolteacher, whom parents may see as an authoritative figure (Sanchez, 2011). While tuition teachers may often not be as qualified as schoolteachers, tuition is seen as a way of improving learning outcomes in low-income contexts (Atherton & Kingdon, 2010; Tooley et al., 2007). Dongre & Tewary, (2015) also suggest that tuition may be improving learning outcomes because children spend more time studying as compared to their peers. Investing in tuition can therefore be considered an important aspect of PI. However, it is not sufficient to close the achievement gap for children from low and high-income backgrounds (Alcott & Rose, 2015).

Educational inputs at home may be particularly low in households with less literate adults (Chudgar et al., 2012). Less literate or illiterate parents may find it difficult to

understand the needs of their children and seldom know what to expect because of the lack of an educational experience. They may thus lack the confidence to effectively participate in the child's educational experience (Chudgar et al., 2012; Islam, 2017; Padhi et al., 2020). An intervention focused on increasing mothers' participation in education at home found that it led to improvement in learning outcomes (Banerji et al., 2017). Another intervention found that parents believed that they had fulfilled their responsibility by sending children to school and tuition and did not need to be involved beyond that. Parents may also lack the time, resources, and self-efficacy to be involved (Padhi et al., 2020).

Communication about schooling is found to have strong associations with learning outcomes in high-income contexts (Avvisati et al., 2011; Boonk et al., 2018; Fan & Chen, 2001). While limited empirical evidence exists in LMIC on parent-child communication, in India, parents are known to have high educational aspirations because they see education as a way out of poverty. This is reflected in the high enrolments and parents seeking early educational opportunities for children (Padhi et al., 2020).

School-based inputs by parents receive immense attention in the studies and frameworks of PI in developed contexts. However, in India, the overall involvement of parents in school is likely to be low, especially in government schools because of the low accountability of the teachers and schools toward parents. Initial analysis of the REAL data revealed that 92% of the parents reported meeting teachers as a waste of time while 43% reported that teachers did not do enough to support the learning of students. On the other hand, one-third of the teachers hold the opinion that parents do not support children's learning (Impact Initiative, 2020). There are further misalignments in the expectations of parents and teachers. While parents tend to transfer the onus of learning on teachers, teachers

expect parents to participate more in the learning of the child (Impact Initiative, 2020; Sabates et al., 2020). Parents view teachers as being authoritative (Sanchez, 2011) and schools may be rooted in middle-class values making it difficult for parents from low SES, SC&ST caste groups and low literacy to participate in schools (Lareau, 2000). While parental participation in schools is low, the Islam, (2017) study finds that increasing parental participation through parent-teacher meetings increases the learning outcomes.

2.7 Conclusion and Research Questions

The nature of PI in LMIC differs from that in developed nations. Most literature and frameworks on PI are modelled on developed countries' contexts which may not be directly applicable in low-income contexts (won Kim 2018). While poverty and low education of parents are some common challenges for high and low-income countries, parents in low-income countries face additional barriers to involvement, given the low quality and accountability of schools towards parents and limited public resources at their disposal. While parents hold high expectations of their children as they see education as a way out of poverty, they may be limited in their capacity to engage with children's education.

Overall, the research that disentangles the effect of different aspects of PI in LMIC is limited. Moreover, the influence of different aspects of PI on learning tends to differ even within low-income contexts. Programs including those on maternal literacy, providing support to mothers for monitoring children's learning at home, and increasing parent-teacher meetings have had a positive impact in LMIC (Banerji et al., 2017; Islam, 2017; Padhi et al., 2020). However, providing information about the learning of the child shows mixed results in LMICs. While these are helpful indicators of PI and its association with learning outcomes in LMIC, much remains yet to be explored. It is therefore crucial to examine the relationship between specific aspects of PI and the learning outcomes of students in low-income contexts.

Accordingly, this study focuses on the nature of PI, its variations for different sub-groups and the associations of different aspects of PI with learning outcomes.

Chapter 3: Methodology

3.1 Data

This study uses data from the "Accountability at the grassroots" project which is led by India's leading educational NGO, Pratham and the University of Cambridge's Research for Equitable Access and Learning (REAL) Centre. The program was implemented as a Randomised Control Trial (RCT) to study the effect of Pratham's community and school partnership program on learning outcomes as compared to having only a community program or having no program at all (Sabates et al., 2020). However, I have access only to the baseline data, while the midline and the end-line data are unavailable for analysis. This study uses the baseline data from the project, which was collected in 2018, as a cross-sectional dataset. The scope of this study remains exploratory rather than indicative of the impact of the program.

The data includes information from the household, child, school, teacher, classroom, village, and stakeholder levels. For this analysis, I merged separate datasets including the school, teacher, household and child-level information, based on the conceptual framework of the EPF. While the Classroom and Headteacher level characteristics are also important determinants of school quality within the EPF, for this analysis this study assumes the classroom level characteristics to be represented within the school and teacher level information available, for example the presence of an electricity connection is used as a proxy for school's infrastructural characteristics. Headteachers' data is available only for 391 Headteachers, from within a sample of 853 schools. While merging the Headteacher data

with the other datasets the observations are halved because data is not matched for schools where Headteacher information is unavailable. Hence, this study does not use the headteacher data as it substantially reduces the sample size. Identifying the reasons behind this missing data is beyond the scope of this research. The available variables used are modelled on the inputs of the EPF as described in Glewwe et al (2020).

3.2 Sampling

The data for this study comes from the "Accountability at the grassroots" project which was implemented in the Sitapur district in UP which is the most populous and one of the most economically deprived states in India (Niti Aayog, 2021). As per the ASER 2018 Report, 41.2% of students in Grade 3-5 can read a grade 2 level text and 32.5% can do a subtraction question in Sitapur. The literacy outcomes in Sitapur are similar to the State level and the numeracy outcomes are lower than the average State-level outcomes. However, the dataset represents the low-achieving students in Sitapur. The program was implemented in 400 villages that were randomly selected for the project if they had at least two GPS as per the government's official 'District Information on School Education' data (Cashman et al., 2021; Sabates et al., 2020).

All GPS in the sampled villages were included in the study. 20 students from each class 2, 3, and 4 of these schools were randomly selected to be a part of the study, except in classes where there were 20 or fewer than 20 students in the given class. In such cases, all students were selected to be part of the study. In classrooms with more than 20 students, randomisation was maintained. For randomisation, the field staff chose a random number between 1 and the number of children in the classroom. The child with the chosen serial number was included in the sample, after which every fifth child was chosen until there was a sample of 20 in every classroom. Furthermore, to eliminate selection bias because of irregular

attendance of students, if the selected students on the register were absent from school, they were tracked down and tested at home. Among the 20 children selected from each classroom, the first 10 who were below the grade 2 story level were included in the final sample. This is because the project focuses on improving the learning outcomes of children in the district, so they focus on those who are not at the expected grade 2 reading level (Cashman et al., 2021; Sabates et al., 2020).

3.2.1 Sample characteristics

Household data was collected for 96.5% of the sampled children, where some children belonged to the same household. Broadly the characteristics that are deterministic of educational outcomes and PI are caste, gender, mother's education, and wealth. This study analyses the PI based on caste, gender, and the mother's education but does not analyse PI based on wealth because there are no clear indicators of wealth in the dataset. The data includes information from 853 schools in the district. The sample consists of 53% girls and 47% boys. Nine percent of the sample belongs to the General caste, 47% to SC and ST categories and 41% to the OBC category. Sixty-eight percent of the students' mothers have never been enrolled in school, 17% have up to 5 years of education and 14% have more the 5 years of education.

Table 2: Sample characteristics

	Total (N = 20060)
Caste	
General	1832 (9%)
SC_ST	9379 (47%)
OBC	8299 (41%)

Dont_know	550 (3%)
Sex of the Child	
Boy	9443 (47%)
Girl	10617 (53%)
Mother's education	
Never enrolled	13724 (68%)
Upto 5 years	3493 (17%)
More than 5 years	2709 (13%)

3.3 Missing data and data cleaning

The dataset originally consisted of 23,970 observations of children studying in Grades 2, 3, and 4 in GPSs in Sitapur. For this analysis, child, household, school and teacher datasets were merged using the household, village and school ID. On merging household data with the school and teacher data some unmatched observations were deleted. Some variables of interest have some missing information, after deleting the observations with missing values, the sample size obtained is 20,060. The variable with the most missing values is mothers' education. A few other variables that have missing values are the child's attendance on the day of the survey, child's age, and caste. While the obtained sample has a sufficiently large sample size to obtain statistically significant results, questions on parental involvement have some "No response" or "Don't know" responses along with the typical "Yes" and "No" responses. Observations with "don't know" or "No response" are not deleted from the dataset, however, they are not presented in the analysis.

For caste, the SC and ST categories were combined to obtain statistically significant results and because can be considered similar from a perspective of social and economic disadvantage and the reservations provided by the government through affirmative action policies (Deshpande, 2005a). Some observations where the caste is unknown or inapplicable are not deleted, but they are not discussed in the findings. Mother's education is categorised

as having no education, up to 5 years or more than 5 years to obtain statistically significant results.

3.4 Variables

This study uses the economic framework of the EPF to identify the aspects of PI that are most strongly associated with learning. The EPF measures academic achievement as a function of the Years of schooling (S), School Quality which includes school and teacher characteristics (Q), Child characteristics (C), Household characteristics (H) and Parental and child's educational inputs (I).

$$A = a(S, Q, C, H, I) \quad [3.1]$$

The explanatory variables for this study are the Parental involvement variables that are a subset of the parental and child inputs (I). While this study includes 10 PI variables from that dataset that are indicative of monetary inputs and parental time inputs, it is likely that there could be several unobserved factors that contribute to the educational outcomes of the child (Aturupane et al., 2013).

3.4.1 Outcome variable

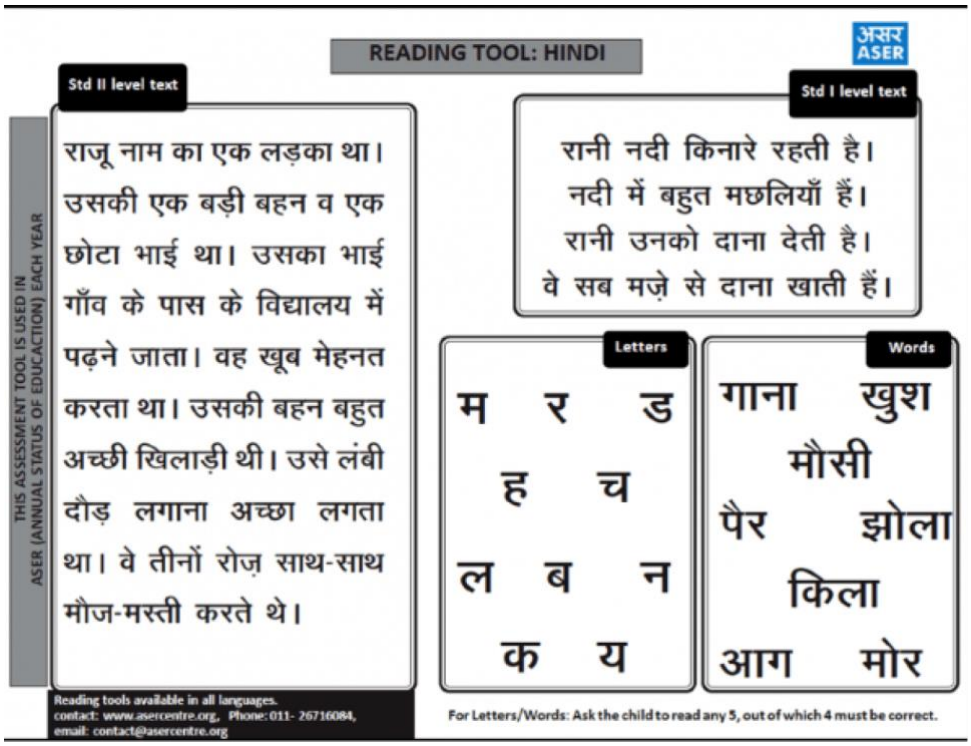
Consistent with the **EPF**, this study uses literacy and numeracy skills levels as the outcome variables. These are measured using the ASER reading and math assessment tool for grades 2, 3 and 4 of GPS in the Sitapur district. The ASER tool measures reading and arithmetic abilities through simple oral assessment tasks across all grade levels.

The reading tool (see figure 1) includes four levels, the first measures students' ability to read letters, the second level involves reading common words, the third level includes reading a small paragraph (grade 1 level) and the fourth level involves reading a story (grade 2 level). The math tool (see figure 2) includes similar levels where the first level is

identifying a single-digit number, the second level is identifying a double-digit number, the third level is solving a two-digit subtraction question with borrowing and the fourth and most difficult task involves solving a three-digit by one-digit division which is taught in Grade 3 or 4. In the given dataset few students are at the division level for Math so the levels 'division' and 'subtraction' are combined to obtain statistically significant results. If the student is unable to read letters, they are marked as "Beginners" for reading. Likewise, if the student is unable to identify single digit numbers, they are marked as "Beginners" for Math. While the nationwide ASER assessments are conducted as a household survey, the REAL project tested the students in schools as the study focuses on the learning levels of students in government schools (Sabates et al., 2020). Although the learning levels cannot be considered continuous in the same way as test scores, they do represent basic skills in increasing order of difficulty. For the sake of simplicity, this study interprets the levels as continuous for reporting outcomes.

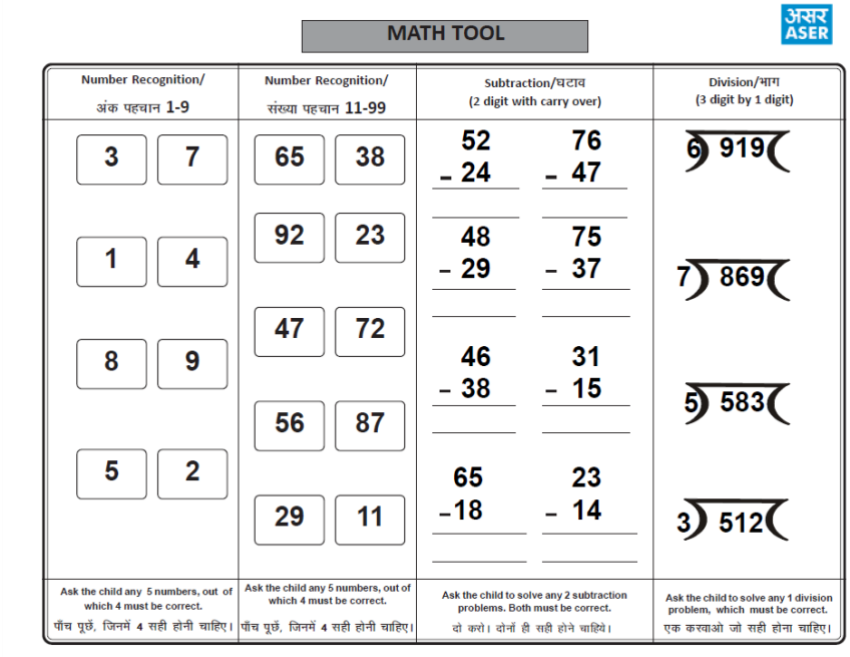
A critique of the ASER reading and math tools is that they do not measure the language comprehension or writing abilities of the students (Cresswell et al., 2015). However, these simple tools may have high explanatory power (World Bank, 2018) and are simple to conduct through a quick verbal assessment. The results are easy to communicate, thus demystify learning for parents, especially those parents who may not know what to expect from a child in terms of learning (ASER, 2018; Banerji, 2021). The reliability of this tool has been tested through other studies (Johnson & Parrado, 2021; Vagh, 2009).

Figure 2: ASER literacy tool



Source: (ASER, 2018)

Figure 3: ASER Math tool



Source: (ASER, 2018)

Table 3: Students' outcomes based on caste and gender and mothers' education level

	ASER Reading level				ASER Math level			
	Beginner	Letter	Word	Para	Beginner	1-9	11-99	Subtraction Or division
Caste								
General	28%	47%	11%	14%	12%	63%	20%	5%
SC_ST	40%	46%	8%	6%	16%	69%	13%	2%
OBC	34%	48%	9%	8%	13%	69%	16%	3%
Sex								
Boy	36%	46%	10%	9%	12%	65%	19%	4%
Girl	36%	48%	8%	7%	15%	71%	12%	2%
Mothers' education								
Never enrolled	39%	46%	8%	7%	15%	69%	14%	2%
Upto 5 years	35%	48%	9%	9%	14%	67%	16%	3%
More than 5 years	25%	48%	13%	14%	10%	64%	22%	5%
Total	36%	47%	9%	8%	14%	68%	15%	3%

3.4.2 Independent variables:

i) Explanatory variables: I: Parental involvement

Parents' educational decisions in India are shifting from merely sending their children to school to providing good quality education. In rural low-income households, parents may see children's education as a pathway out of poverty (Kumar & Choudhury, 2021).

Accordingly, this study attempts to find the associations of parents' involvement in their children's education and the learning outcomes of the children.

The dataset includes several variables that indicate the involvement of parents in children's education. For compatibility with the EPF, this study is particularly interested in the specific monetary or time inputs parents provide for improving students' learning outcomes. Some of the PI variables may not necessarily represent parental involvement but 'family involvement'. Given the nature of families in the rural low-income context of UP, this could mean that the child receives help from a sibling or another relative at home. Hence this study uses 'parental involvement' and 'family involvement' interchangeably.

As discussed in the literature, this study distinguishes PI as home and school-based inputs. Based on the nature of previous empirical studies and the variables available in the dataset the home-based inputs are further categorised as i) Financial inputs, ii) Educational inputs at home, iii) Communication about school and educational expectations and iv) School-based inputs. All PI variables are recorded as dichotomous with 'Yes' = 1 and 'No'=0 responses.

Table 4: Parent involvement inputs

Home-based inputs	
Financial inputs	
i)	Child goes to tuition currently
ii)	Books other than textbooks at home
Educational inputs at home	
iii)	Check the child's textbook
iv)	Read/tell stories to the child

v)	Anyone helps the sample child in studies.
Communication about education	
vi)	Ask the child what they did in school every day.
vii)	Tell the child to study hard
viii)	Ask the child to read other than textbooks.
School-based inputs	
ix)	Know the child's teachers' name?
x)	Visited the school this session?

ii) Control variables

The choice of the control variables used in the Ordinary least Square (OLS) regression model is based on the EPF.

The **Years of schooling** the child has attained is represented as **S** in the EPF. In the given study the students are sampled from grades 2, 3 and 4. The child's class will be introduced in the model as a dummy variable. The base category is Grade 2 and outcomes of Grade 3 and 4 would be reflected in comparison to Grade 2. More years of schooling would normally be expected to reflect higher learning outcomes.

School and teacher characteristics are represented as **Q** in the EPF and includes all observable school and teacher characteristics that may influence the learning of students. Evidence suggests that overall school infrastructure including classroom conditions, the presence of toilets, electricity, and other physical facilities such as laboratories and libraries improves students' learning (Cuesta et al., 2016). In rural low-income contexts, the availability of separate girls' toilets, drinking water and school meals may also determine children's attendance in schools (Afridi, 2011; H. Kim & Rhee, 2019; Kumar & Choudhury,

2021). This study uses **separate girls' toilets** and the school having an **electricity connection** as a measure of the infrastructure quality.

Evidence on teachers' characteristics and learning finds that students having female teachers is advantageous for language learning but has no effect on their math learning (Chudgar & Sankar, 2008). While some studies find that teacher resume characteristics including years of experience and educational qualifications have little or no bearing on educational outcomes (Aslam & Kingdon, 2011) others suggest that it has a positive impact on learning (Aturupane et al., 2013; Singh & Sarkar, 2015). This study uses the **teachers' gender, educational qualification,** and **years of experience** as teachers' characteristics controls.

C**hild characteristics (C)** included in this model are **age, sex** and observed **attendance in school** because they are important determinants of the learning (Alcott & Rose, 2015). Older children are likely to have higher learning outcomes than younger children as intellectual abilities increase with age (Aturupane et al., 2013). The learning outcomes differ based on gender and it can also represent the innate abilities, for instance girls may be better readers than boys and boys may be better at math (Aturupane et al., 2013). The initial analysis of the REAL project shows that girls from the ST category who have less educated mothers tend to perform worse than any other subgroup within the data, so it becomes important to control for those characteristics. Empirical studies in the Indian context have found the learning outcomes of girls to be lower than that of boys, especially in Math (Alcott & Rose, 2015; Kumar & Choudhury, 2021). Children's attendance in school can be an important measure of determining learning outcomes (Kumar & Choudhury, 2021), it can also act as a proxy for other unobserved household and child characteristics such as the child's health and household circumstances that influence learning. The understanding that

longer absences from schools can cause ‘learning losses’ is clearer than ever in the wake of the Covid-19 pandemic (Alban Conto et al., 2021). However, a limitation of this measure is that the attendance recorded in the data is the attendance of the child on the day of the survey and may not represent the attendance patterns over time.

Household characteristics (H) including the socioeconomic status of the family, parental education and family structure such as caste and family size are important determinants of learning outcomes as well as **PI** (Alcott & Rose, 2015; Banerji et al., 2017; Cashman et al., 2021; Chudgar et al., 2012; Chudgar & Shafiq, 2010). Children from disadvantaged groups including SC & ST children have lower educational outcomes as compared to General category students (Kumar & Choudhury, 2021). While empirical studies that use learning outcomes or parental involvement as the outcome variables, control for caste, there are no studies focusing on caste as their main explanatory variable for learning outcomes or parental involvement. Mukherjee, (2015) finds that caste and gender identities can also influence children’s and parents’ educational aspirations. Typically, there are 4 caste groups or reservation categories i.e., i) SC, ii) ST iii) Other backward classes and iv) General castes. This study combines the SC and ST so the 3 caste categories for reporting findings in this study are i) SC and ST, ii) OBC and iii) General.

Parental education particularly mothers’ education can greatly influence the learning outcomes of children in both developed and developing contexts (Jeong et al., 2017; Kumar & Choudhury, 2021). Accordingly, this study controls for the mother’s level of education. Mother’s education is categorised as, ‘never enrolled’, ‘up to 5 years of education’, and ‘more than 5 years’. Household assets or ‘wealth’ of the household are significantly associated with learning outcomes (Alcott & Rose, 2015; Kumar & Choudhury, 2021). In

India, household asset ownership is often used as a measure of family wealth in the absence of income data (Cashman et al., 2021; Lastrapes & Rajaram, 2016). The type of house in which the family resides is commonly used as a measure of SES and is categorised as 'Kutcha', 'Semi-pucca' and 'Pucca' houses. The Kutcha house represents the lowest quality which is generally either a temporary or a mud house. The semi-pucca house is an intermediate quality house, it could also be used to represent a partially constructed house. The Pucca house is a house that is constructed with high-quality materials such as brick and mortar. In addition to the type of house, this study uses the presence of an electricity connection as a measure of household wealth. This is because having electricity may potentially influence a child's education, for instance being able to study after it is dark. The wealth of the family is measured using 2 indicators i) the **type of house** in which the family resides and ii) having an **electricity connection**.

The household variables that are used as controls for in the EPF model are **caste, mother's level of education** and **wealth**.

In this model **Child inputs in Education (I)** include the time spent on learning after school, which is known to significantly impacts students' learning outcomes. Kumar & Choudhury, (2021) find that the time child spends learning has the potential to close the achievement gap between children in private and government schools. The dataset includes the questions: "In a week, how often does a child study after school?" The responses are recorded as "Never, Occasionally and Regularly". As with the PI variables, this variable also includes some 'Don't know responses that are not deleted from the dataset but are not presented in the findings. Furthermore, the time a child spends studying at home can be an important control because it may reflect unobserved characteristics such as the child's motivation for education and household circumstances.

3.5 Empirical strategy

The study uses quantitative methods including descriptive statistics, OLS regression and adjusted prediction which are used to analyse the nature of parental involvement and its association with reading and math learning outcomes and the results are produced using the Stata-17 software.

3.5.1 Descriptive statistics

Research Questions 1 and 2 use descriptive statistics to identify the nature of parental involvement in rural UP and its variation in the subcategories of caste, gender of the child and mother's education. This study uses a cross-tabulation to show the overall percentage participation of the parent in each of the PI variables and its variation in the subgroups of caste, gender of the child and mother's education level.

3.5.2 OLS model based on the Education Production Function

RQ 3: To identify the aspects of PI that show the strongest associations with learning outcomes, this study utilises an OLS model based on the EPF.

The EPF is represented as: A= a (S, Q, C, H, I) [3.1]

$$\boldsymbol{A} = \beta_0 + \beta_s(Grade) + \beta_{q1}(\ girlstoilet) + \beta_{q2}(\ electricity\ in\ school) + \beta_{q3}(teacher's\ gender) + \beta_{q4}(years\ of\ experience) + \beta_{q4}(teacher\ education) + \beta_{c1}(childsex) + \beta_{c2}(childage) + \beta_{c3}(observedattendance) + \beta_{h1}(caste) + \beta_{h2}(Motherseducation) + \beta_{h3}(housetype) + \beta_{h4}(electricity) + \beta_{pi1}\ (tuition) + \beta_{pi2}\ (buy\ books) + \beta_{pi3}\ (checknotebook) + \beta_{pi4}\ (tellstories) + \beta_{pi5}(help\ withstudies) + \beta_{pi6}\ (askaboutschool) + \beta_{pi7}(studyhard) + \beta_{pi8}(readotherbooks) + +\beta_{pi9}(knowteacher) + \beta_{pi10}(visitschool) + \beta_i(childownstudy) + \mu_a \quad [3.3]$$

In this model reading and maths learning levels are the outcome variables indicating the educational achievement (**A**), **I** represents all the variables that show parental or child's inputs, **PI** is the variable of interest which in the given equation represents a subset of I, and the control variables are years of schooling (**S**), school (**Q**), home (**H**) and child (**C**) characteristics. Another variable included in this model is the amount of time the child spends studying at home, which also indicates a subset of **I** since it includes all the household and child inputs. While this model controls for several characteristics that are associated with learning in the given dataset, there are likely to be unobservable characteristics such as the household environment, motivation, and geographical characteristics that may influence the learning outcomes of students, which are represented through the error term μ_a. This study does not control for the geographical characteristics in this model because the sample represents only rural areas of the Sitapur district and children studying in government schools. Hence, it is assumed that there is likely to be limited regional variation since all the villages are in the same district. Studies using the EPF may also include variables related to the health of the child (Aturupane et al., 2013), however, in the given dataset there are no such health indicators.

The $\beta_{pi1} - \beta_{pi11}$ represent the coefficients for the PI variables. This helps disentangle the effect of different variables of PI in the model. The same model is replicated for reading and math outcomes. The PI variables will be considered to influence learning if any of the coefficients $\beta_{pi1} - \beta_{pi11}$ are statistically significant. While a positive β coefficient would be interpreted as improving learning outcomes, a negative coefficient would be interpreted as having a negative effect on the outcomes of children.

3.5.3 Adjusted Predictions based on OLS interactions

RQ4: To identify the heterogenous effects of specific PI aspects on learning outcomes for different caste groups this study uses an adjusted prediction model. While the OLS helps disentangle the effect of different aspects of PI on the learning outcomes the adjusted predictions help to make these results more tangible. The adjusted predictions help specify the independent variables and then find the results for that specific group. To identify the heterogeneous effects of PI on caste, the same OLS model [3.3] is used along with an interaction between the caste and the specific PI variable of interest. Using the 'margins' and 'marginsplot' commands in Stata, a graph is plotted showing these heterogeneous effects of parental involvement on different caste groups.

$$A = \beta_{pi0}(PI\ variable\ of\ interest\ X\ caste) + OLS\ model \quad [3.3] \qquad [3.4]$$

This study uses caste interactions only for those three PI variables that have the strongest associations with both Reading and Maths outcomes based on the findings of RQ3. The same model [3.4] is replicated with each of these variables.

3.6 Limitations

3.6.1 Data Limitations

While the reliability of the ASER tool has been tested and it is widely used in empirical studies, the skills measured using this tool are limited. The tool does not account for written or comprehension skills, however as per the World Bank, (2018) report even simple measures of skills such as being able to read simple sentences such as "parents love their children" can have high explanatory power. Additionally, the dataset does not include any measure of children's social-emotional or behavioural skills. Recent literature suggests that social-emotional skills are essential to the development of Human Capital (Evans &

Hares, 2021). Moreover, **PI** research in high-income contexts indicates that PI shows stronger associations with the behavioural and non-cognitive outcomes of children as compared to academic outcomes (Avvisati et al., 2014). This study only identifies the influence of PI on learning outcomes and cannot comment on the impact of PI on children's social-emotional capabilities, well-being and thus the overall development of human capital.

The dataset used for this study is based on a specific context of low-achieving students in one district and the results cannot be generalised to represent the region or the country. The nature of **PI** and its impact on students learning outcomes are particularly likely to vary in high-income urban contexts.

3.6.2 Model Limitations

The data utilised for this study is from a parent, community and school partnership intervention which was implemented as an RCT. However, since I only have access to the baseline data, it restricts the use of the dataset for sophisticated quantitative methods research such as RCT, Difference-in-Difference or Instrumental Variable to find the impact of the parent, community and school partnership intervention on the learning of children. Some indicators of the impact of the program are shared in UKFIET, (2022) blog post and which shows that parent and community intervention helps improve Parent involvement as well as learning outcomes of children. While propensity score matching could have been considered as the quantitative approach for this study, it would have been unlikely for parents to participate in all or none of the chosen PI activities. There are also concerns about the reduced sample size for propensity score matching. Hence, OLS regression was considered the most appropriate approach.

The OLS model controls for several home school and child characteristics that are expected to have an impact on the learning outcomes. Family characteristics such as SES, caste and mother's education are included in the model since they are associated both with parental involvement and the learning outcomes to prevent spurious effects. However, regression methods are insufficient in establishing a causal relationship between PI and learning outcomes, as regression does not account for unobservable characteristics such as family environment and the parent-child relationship. Moreover, if the omitted variables are endogenous to PI i.e., influence parental involvement, the coefficients obtained through OLS are likely to be biased.

While the EPF model includes several characteristics available that are likely to influence learning, there could be unobservable factors that influence learning which may undermine the strength of the model. However, including the variable 'How often does the child study after school' may act as a proxy for the family environment.

Chapter 4. Findings

4.1 Research Question 1 and 2

1. What is the nature of PI in the Sitapur district?

2. How does PI differ by caste, gender and education of the mother?

For RQ 1 and 2 descriptive statistics are used to identify the nature of PI, demonstrating the ways in which parents choose to get involved. Table 5 uses descriptive statistics to show the extent of PI in each of the chosen PI aspects. It also depicts the differential participation of parents in their child's education based on caste, sex of the child and the education level of the mother. This section discusses the findings of each category of

involvement as i.e., i) ‘Financial inputs’, ii) ‘Educational inputs at home’, iii) ‘communication about school’ and iv) school-based inputs’ to provide an overview of the nature of PI and for the simplicity of discussion. There is expected to be a difference in PI based on the caste, sex of the child and mothers’ education. SC&ST category students, girls and children with mothers who have no education are expected to have lower parental involvement as compared to the students belonging to the general category, boys and those with mothers who have more than 5 years of education.

Table 5: Descriptive statistics: PI based on caste, sex and mothers' education

	Caste				Sex		Mothers' education			
	General	SC&ST	OBC	Don't know	Boy	Girl	0	Upto 5	More than 5	**Total**
Financial inputs										
Child takes tuition currently?	16%	7%	9%	5%	10%	7%	7%	11%	16%	9%
Books other than textbooks at home	6%	5%	6%	4%	5%	5%	5%	7%	7%	5%
Educational activities at home										
Do you check child's book or notebook?	77%	64%	66%	70%	66%	66%	59%	78%	87%	66%
Read/tell stories to child?	25%	17%	17%	20%	18%	18%	14%	24%	31%	18%
Anyone helps the child in studies?	65%	54%	55%	60%	56%	56%	49%	65%	76%	56%
Communication about education										
Ask child what s/he did in school everyday?	81%	73%	75%	77%	75%	74%	72%	80%	85%	75%
Tell child to study hard?	93%	91%	92%	91%	92%	91%	90%	93%	95%	91%
Ask child to read other than textbooks?	42%	27%	32%	31%	31%	30%	27%	36%	39%	31%
School based involvement										
Know any child's teachers' name?										
Know at least 1	32%	23%	24%	31%	24%	24%	21%	28%	36%	24%
Visited the school this session?	40%	33%	34%	39%	35%	34%	31%	39%	45%	34%

Financial inputs by parents are represented by tuition and the presence of books other than textbooks at home. Table 5 shows that only 9% of the children attend tuition. This further varies by caste, gender, and mothers' education. While 16% of the students from the general category attend tuition, this number is lower for SC, ST (seven percent) and OBC (nine percent) categories. Ten percent of the boys and seven percent of girls in the sample attend tuition. Sixteen percent of children whose mothers have more than 5 years of education take tuition as compared to 11% of students whose mothers have less than 5 years of education and seven percent whose mothers have no education.

Few households (five percent) have books other than textbooks. This number is almost similar between different castes and the sex of the child. However, the presence of 'books other than textbooks' is slightly higher (seven percent) in households where mothers are educated. Overall, this number remains low across all subgroups showing that in the given context children may have very limited exposure to educational materials at home. Descriptive Statistics show that the financial inputs of parents in education are low.

Educational inputs at home include checking the child's notebook, telling stories to the child and helping the child with studies. Overall, 66% of parents report checking children's notebooks or books. While 77% of parents from the general category check children's books or notebooks there is not much difference between the SC&ST (64%) and OBC category parents (65%). Expectedly, more mothers with education check their child's notebooks as compared to mothers with no education. 87% of the mothers with over 5 years of education check the child's notebooks, 78% with up to 5 years of education and 59% with no education do the same. Only 18% of the parents' reported telling stories to children. Twenty-five percent of general category parents tell stories to their children and 17% of SC&ST and OBC parents do the same. Storytelling also increases with the mother's

educational level. Fourteen percent of mothers with no education tell stories, whereas 24% with up to 5 years of education and 31% with more than 5 years of education do.

Overall, more than half (56%) the households report children having someone who helps them with their studies at home. Children could be helped by their parents, siblings, or other relatives. Sixty-five percent of parents from the general category report someone helping children with their studies, whereas 54% of both SC&ST and OBC households report helping children with their studies. In households where mothers have more than 5 years of education, 76% of students receive help in studies, whereas 65% of children with mothers up to 5 years of education and 49% whose mothers have no education receive help at home. For all three PI variables on providing education inputs at home, there is no difference in involvement based on the gender of the child.

Communication about school: Most parents (75%) ask their children what they did in school. This number is high (above 72%) for all students regardless of caste, gender or mother's education. Similarly, 91% of parents report telling the sample child to study hard in school, this is similar for all categories of parents varying only between 90-95%. High parental communication could be indicative of parental concern or educational expectations. Fewer (30%) parents ask their children to read other than textbooks. 40% of parents belonging to the general category, 32% in the OBC and 27% in the SC/ST category ask their children to read other than textbooks. This variable expectedly also shows some variation in based on the mother's education. 39% of households who have mothers with more than 5 years of education and 36% of households with mothers up to 5 years of education ask children to read books other than textbooks, 27% households with no education of the mother

do the same. This is an interesting finding given that only 5% of households have access to books other than textbooks.

Overall parents' **school-based inputs** are low, only 24% of parents reported knowing at least one teacher's name and 33% visited the school during the 2018 academic session. The involvement in school differs by 7-8 percentage points based on the caste of the parents. Thirty-two percent of general category parents know the name of at least one teacher and 40% visited the school during the academic session. Both the school involvement variables are similar for the SC&ST and OBC categories wherein 23% (SC&ST) -24 %(OBC) know the name of at least one teacher and 33%-34% visited the school during the academic session. School-based inputs are similar for both boys and girls. However, this variable shows considerable differences based on the mothers' education categories. Households with educated mothers are more likely to be involved in school. Thirty-six percent of the households where mothers have more than 5 years of education know a teacher's name and 45% have visited the school during the academic session. Twenty-eight percent of households where mothers have up to 5 years of education know at least one teacher's name and 39% have visited the school in the academic session. Whereas for households with no education of the mother only 21% know a teacher's name and 31% have visited the school during the academic session.

It is interesting to note that there is either no difference or less than 1 percentage point difference for all the PI variables for boys and girls in the given dataset, except for the financial inputs wherein more boys than girls have access to tuition. The reason for this is likely to be higher educational spending by parents on the education of boys than girls due to the prevalent patriarchal norms (Azam & Kingdon, 2013). This is also evident in the Alcott &

Rose, (2015) study that finds that more boys are much more likely than girls to attend private schools when families have limited resources.

4.2 Research Question 3

What aspects of parental involvement appear to be most strongly associated with student learning outcomes?

The main aim of this study is to disentangle the effect of different aspects of parental involvement on learning outcomes. For this purpose, the OLS regression model was used to find the associations of different aspects of PI with learning outcomes. Table 6 shows the OLS regression estimates for the reading and maths outcomes which are based on the EPF.

Table 6: OLS model estimates of reading and maths levels

VARIABLES	Reading aserreading	Maths asermath
Child takes tuition currently.	0.22***	0.13***
	(0.02)	(0.02)
Books other than textbooks at home	0.00	-0.03
	(0.03)	(0.02)
Do you check child's book or notebook?	0.00	0.01
	(0.01)	(0.01)
Read/tell stories to sample child?	-0.00	-0.01
	(0.02)	(0.01)
Anyone help sample child in studies?	0.08***	0.04***
	(0.01)	(0.01)
Ask child what s/he did in school every day?	0.03**	0.00
	(0.01)	(0.01)
You tell sample child to study hard in school?	0.01	0.01
	(0.02)	(0.02)
Ask child to read other than textbooks?	0.04***	0.04***

	(0.01)	(0.01)
Know any child's teachers' names? (Reference category= Does not know even 1)		
Know at least 1	0.04***	0.01
	(0.01)	(0.01)
Visited the school this session?	-0.00	-0.00
	(0.01)	(0.01)
Class in which the child is enrolled (Reference category= Grade 2)		
Grade 3	0.18***	0.13***
	(0.02)	(0.01)
Grade 4	0.37***	0.23***
	(0.02)	(0.01)
Presence of a separate girls' toilet in school	0.02	0.01
	(0.01)	(0.01)
Electricity in school	0.08***	0.05***
	(0.01)	(0.01)
Teachers' sex: Female	0.03**	0.03***
	(0.01)	(0.01)
Teachers' educational qualification (Reference category= Secondary)		
Bachelors	0.18***	0.04
	(0.05)	(0.04)
Teachers' educational qualification: Masters or PhD	0.17***	0.03
	(0.05)	(0.04)
Teachers' years of experience	0.00	-0.00
	(0.00)	(0.00)
Child age in years	0.06***	0.05***
	(0.01)	(0.00)
Child's Sex (Reference category= Boy) Girl	-0.05***	-0.13***
	(0.01)	(0.01)
The child is present in school on the day of the survey	0.10***	0.07***
	(0.01)	(0.01)
Caste (SC/ST)	-0.18***	-0.10***
	(0.02)	(0.02)

Caste (OBC)	-0.08***	-0.04**
	(0.02)	(0.02)
Caste (Other/Don't know)	0.01	0.01
	(0.04)	(0.03)
Mothers' education (Upto 5 years)	0.03*	0.01
	(0.02)	(0.01)
Mothers' education (More than 5 years of education)	0.20***	0.11***
	(0.02)	(0.01)
Type of house (Semi-pucca)	0.05***	0.05***
	(0.01)	(0.01)
Type of house (Pucca)	0.02	0.02*
	(0.01)	(0.01)
Household has electricity connection	0.05***	0.04***
	(0.01)	(0.01)
In a week, how often does the child study after school? (Reference category: Never)		
Occasionally	0.17***	0.11***
	(0.02)	(0.01)
Regularly	0.37***	0.23***
	(0.02)	(0.01)
Constant	0.69***	1.33***
	(0.08)	(0.06)
Observations	20,060	20,060
R-squared	0.13	0.12

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The R-squared for this model shows that the model explains 13% of the variation in reading levels and 12% of the maths levels of students. This means that there are other factors determining the learning outcomes that are not included in this model.

4.2.1 Parental involvement and learning outcomes

Financial Inputs: The regression estimates show that tuition improves the reading levels of students by 0.22 levels and maths outcomes by 0.13 levels. This is statistically significant at the 99% confidence interval. However, having books other than textbooks at home does not lead to any improvements in the learning outcomes either for literacy or maths.

Educational inputs at home: There are three variables depicting parental inputs at home i.e. checking the child's books or notebooks, reading or telling stories to the child and a family member helping the child with studies. Amongst these, only 'helping a child with studies' leads to improvements in both reading and math levels. While most parents report checking the child's notebook and textbooks this does not lead to any significant changes in the learning outcomes. Helping the child with studies leads to a 0.08 level improvement in the reading level of the child and a 0.04 level improvement in the math levels. Both these are significant at the 99% confidence interval.

Communication about school: Findings from RQ 1 and 2 show that in the given context, a majority of parents communicate with their children about school. Amongst the given variables representing parent-child communication about the school, parents asking the child what they did in school every day has a small but significant influence on the reading levels (0.03 levels increase) but not on the math levels. Telling the child to study hard in school does not significantly influence the learning outcomes for either reading or math. Asking the child to read other than the textbooks have a significant influence on both the reading and maths levels, increasing both the reading and the math levels by 0.04.

While parents' **school-based inputs** are limited**,** parents knowing the teacher shows a positive association with the reading levels indicating that knowing the teacher increases the reading levels by 0.04 levels. This is significant at the 99% confidence interval. However, it

does not have any significant influence on the math level of the student. Visiting the school shows no significant association with learning outcomes.

Consistent with the literature some aspects of parental involvement are associated with the learning outcomes of children while others are not. Amongst the 10 PI variables, the only ones that influence students' learning outcomes in both math and reading are the **child taking tuition**, **someone helping the child with studies at home** and **asking the child to read other than textbooks.**

4.2.2 Control variables

School, Family and Child characteristics and their association with the learning outcomes.

S represents the years of schooling in the EPF. The given dataset represents students from Grades 2, 3 and 4 which is recorded as a dummy variable in the dataset. Since the assessment for learning is the same across all grade levels it is a good representation of the increase in the learning levels based on an extra year of schooling. Grade 3 students have 0.18 reading levels higher than grade 2, and those in grade 4 have learning levels 0.37 levels higher than the Grade 2 students. Similarly, for math grade 3 students perform 0.13 levels higher than Grade 2 and grade 4 students perform 0.23 levels higher than Grade 2 students. All coefficients are statistically significant at 99% confidence intervals.

Q: School quality is represented through the variables, separate girls' toilet, electricity connection in the school, teacher's gender, teachers' education qualifications and teachers' years of experience. The presence of a separate girls' toilet shows no significant relationship with learning outcomes, however, the presence of an electricity connection in school is significantly associated with the learning outcomes in both reading and math. Having an electricity connection increases the reading outcomes by 0.08 levels and the math

outcomes by 0.04 levels. Teachers' gender is significantly associated with both math and reading outcomes. Having a female teacher increases both the math and the reading outcomes by 0.03 levels. Teachers' educational levels are significantly associated with reading but not with math outcomes. Having a bachelor's degree as compared to secondary education increases the reading level of the students by 0.18 levels and having a master's or higher degree increases the reading levels by 0.17 as compared to those teachers who have only secondary education. However, teachers' education has no association with the math outcomes. This shows that while having a college-educated teacher leads to better reading outcomes than ones who only have secondary education qualifications, the effect of a Masters or other higher qualification does not improve learning any more than the Bachelor qualification does. Teachers' years of experience show no association with either reading or math levels.

Child characteristics (C): As anticipated, the child's age is consistent with their performance in both numeracy and literacy. The older the child the better they are likely to perform academically. For every year the child is older the reading levels are levels 0.06 levels higher, and the math levels are 0.05 levels higher. In the given context gender plays an important role in determining outcomes, especially for math. Girls' performance in both literacy and math is lower than boys. In literacy girls perform 0.05 levels lower than the boys and in math they perform 0.13 levels lower than the boys. Furthermore, child's attendance in school on the day of the survey indicates a higher achievement in both math and literacy. Children who are present in school on the day of the survey perform 0.1 levels higher in reading and 0.07 levels higher in math. All the factors related to child characteristics are significant at 99% confidence intervals.

H: Household characteristics: The household characteristics this study controls for are caste and mothers' education, the type of house in which the family resides and having an electricity connection, with the latter two being measures of the SES of the family. Caste is significantly associated with the learning levels of students. Those belonging to the SC/ST category perform 0.18 levels lower on the literacy levels and 0.1 level lower on the numeracy levels as compared to the general category students. Similarly, those belonging to the OBC category perform 0.08 levels lower in reading and 0.04 levels lower in math as compared to the general category students. While many of the mothers in the given dataset have never enrolled in school, some have education levels between grades 1-5, and yet fewer have secondary or higher education. For mothers who have had less than five years of education the children perform 0.03 levels higher on reading levels, but this has no significant effect on their math learning levels. Children whose mothers have had more than primary education perform 0.2 levels higher on the reading levels and 0.11 levels higher on the math levels. This shows that the secondary or higher education of a mother can significantly alter children's academic achievement. This finding corroborates the literature on mothers' education and academic achievement (Chudgar & Shafiq, 2010).

For SES measures, the children living in semi-pucca houses perform 0.05 levels higher in both reading and math as compared to those living in Kutcha houses. It is however surprising that there is no significant difference in the reading levels for those living in kutcha houses to those living in Pucca houses whereas Math levels are only 0.02 levels higher which is significant at the 90% confidence intervals. Having an electricity connection in the house increases the Reading levels of the students by 0.05 levels and Maths outcome by 0.04 levels, which is significant at the 99% confidence intervals.

I: Inputs by children the variable in the dataset that represents the inputs by the children is the time during a week that students spend studying after school hours which like parental involvement is a subset of **I.** For students who study occasionally after school, the learning levels are 0.17 levels higher for reading and 0.11 levels higher for Math than those who never study after school. For the students who study regularly after school, the learning levels for reading are 0.37 levels higher and 0.23 levels higher for math, as compared those who never study after school. This finding indicates that studying after school hours has a strong association with students learning outcomes, corroborating the findings in (Kumar & Choudhury, 2021) which finds that studying regularly can overcome the achievement gap between private and government school students.

4.3 Research Question 4

Can high levels of parental involvement offset the caste disadvantage for SC, ST and OBC categories?

There is a significant disadvantage in both reading and math levels based on the caste of the child, especially for the SC&ST category students. While caste disadvantage cannot be thought of in linear terms such as wealth or mothers' education, typically SC&ST categories are considered the most socially, culturally and economically disadvantaged groups, the OBC category is typically more privileged than the SC&ST category but less advantaged than the general category. Although not analogous to race, caste disadvantage is often also compared to racial disadvantage in the United States (Deshpande, 2005b). This study uses the adjusted prediction model to answer whether high levels of parental involvement can offset the caste disadvantage for students by finding the heterogenous effects of specific aspects of PI on learning outcomes for different caste groups.

RQ 3 finds that only 3 PI variables that have a significant influence on both reading and math outcomes are selected to answer this question. These three variables are i) the child takes tuition currently, ii) someone at home helps the child with their studies and iii) Parents ask the child to read other than textbooks. These variables also represent a balance between the three different aspects of home-based PI discussed i.e. financial input in education, educational inputs at home and communication about school. The graphs presented i.e. figures 4, 5 and 6 can be used to interpret whether high levels of involvement in these 3 aspects can overcome the caste disadvantage.

4.3.1 Effects of tuitions for different caste groups

Heterogenous effects of tuitions on the caste of the child find that taking tuitions has a statistically significant impact on all caste sub-groups since the confidence intervals do not overlap for any of the caste groups (see Figure 4). For all the caste categories, the students who take tuition perform approximately 0.2 levels higher than those who don't in both reading and math levels. It is also apparent from the graph that, taking tuition may offset the caste disadvantage for SC&ST and OBC categories, i.e., children from these categories who take tuition perform better in both reading and math than those in the general category who do not take tuition. However, sending the child to tuition is not an equitable aspect of PI, because it is unlikely for those households to afford tuitions who are likely to benefit the most from it (Alcott & Rose, 2015, 2017).

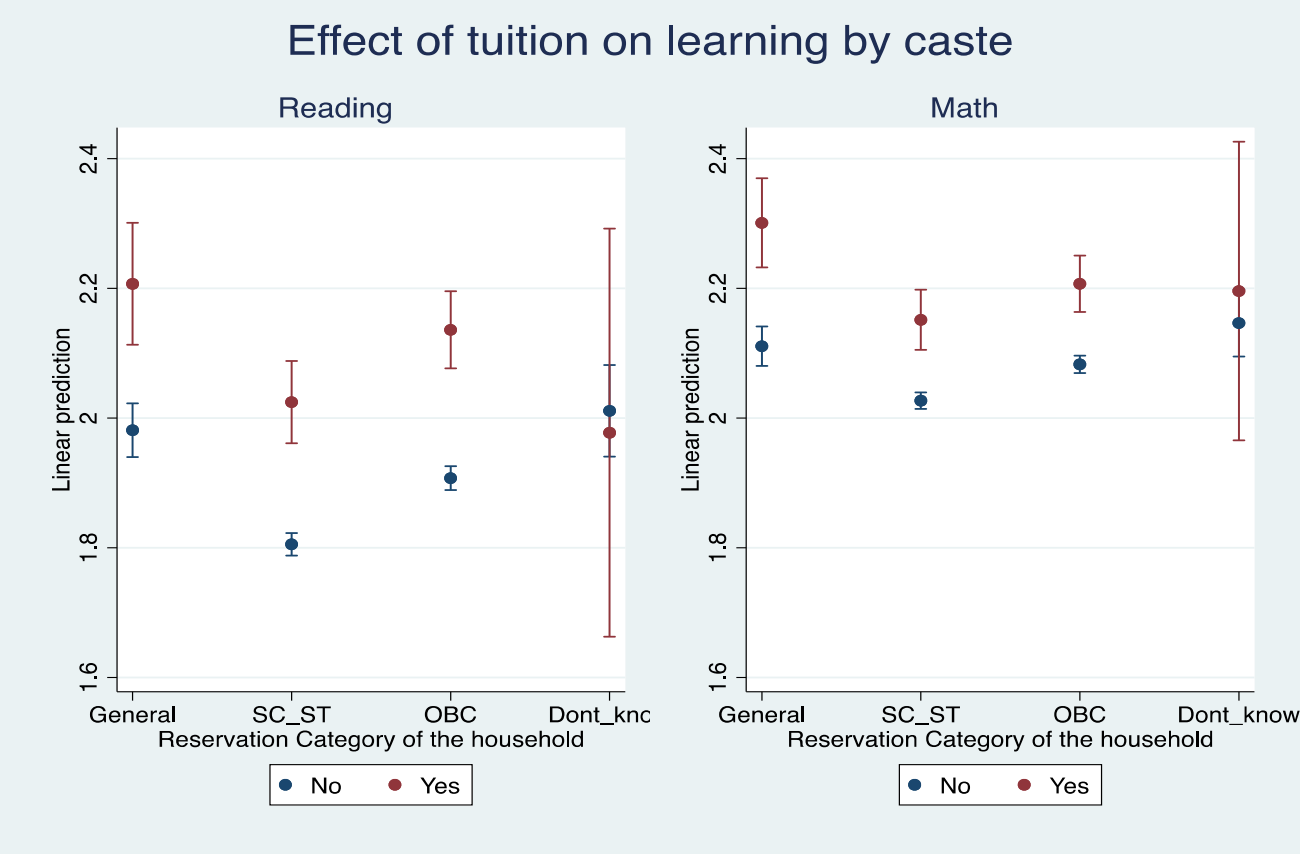


Figure 4: Differential effect of tuition on learning by caste

4.3.2 Effects of 'receiving help at home' for different caste groups

Receiving help at home significantly improves reading outcomes for SC&ST OBC groups, but not for general category students since there is an overlap in the confidence intervals (see figure 5). For math outcomes receiving help at home only significantly influences SC&ST category students. While OBC and General category children who receive help perform slightly better than those who don't, this difference is not statistically significant at the 95% confidence intervals level. The graph shows that while helping the child with studies may not offset the caste disadvantage, it leads to statistically significant improvements in both reading and math levels for SC&ST children and reading for OBC children. Clearly, helping students with studies is more beneficial for the SC&ST and OBC category students than it is for the general category students.

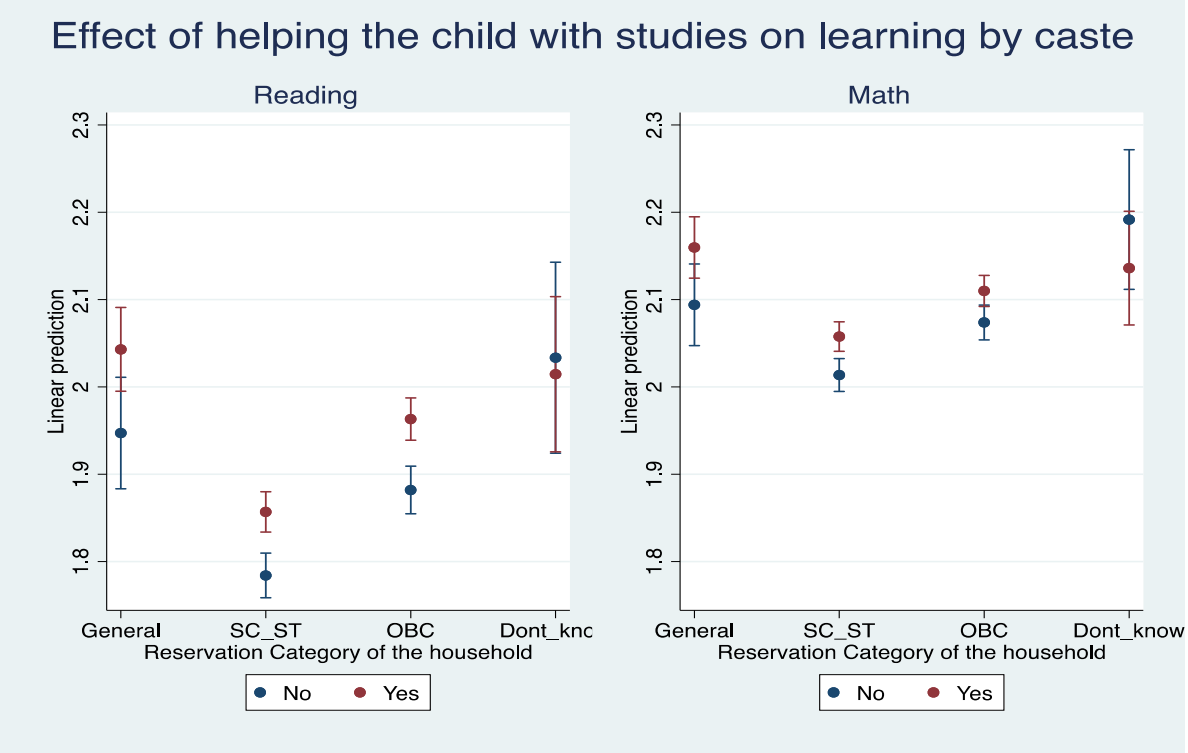


Figure 5: Differential effect 'helping the child with studies' on learning by caste

4.3.3 Effects of 'asking child to read other than textbooks' for different caste groups

Parents asking children to read other than textbooks can be considered a proxy for high expectations of parents. Asking the child to read other than textbooks only seem to have a statistically significant impact on students in the OBC category both for reading and math. The overlapping of the confidence intervals shows that for the other caste subgroups while children who are asked to read other than textbooks perform marginally better than others, this is not significant at the 95% confidence intervals. Research from high-income contexts shows that having high expectations of students has the strongest influence on learning outcomes, however, in the context of this study it is not sufficient for balancing the caste disadvantage for the most disadvantaged groups.

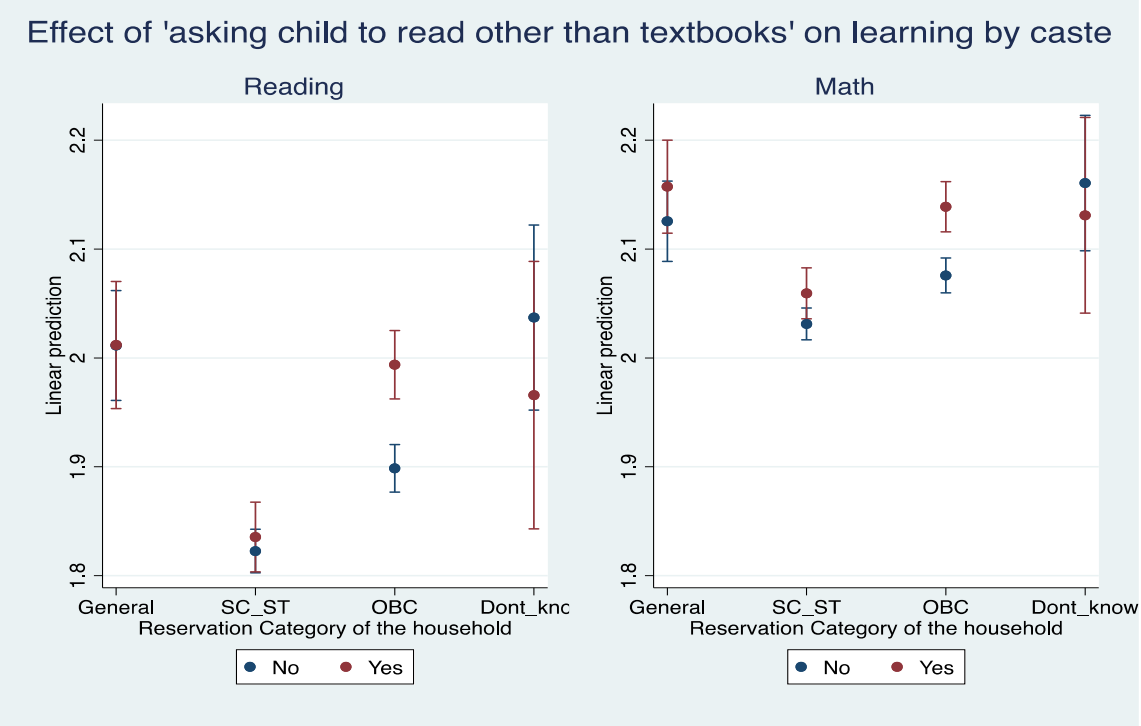


Figure 6: Differential effect 'asking the child to read other than textbooks' on learning by caste

Chapter 5: Discussion and conclusion

5.1 Theory

Parental involvement in LMIC is gaining attention as it can be one of the potential cost-effective ways for enhancing the learning outcomes of students. However, there is a dearth of empirical research on the topic in low-income contexts. The main aim of this research was to identify the nature of PI in rural UP and identify the aspects of PI that show the strongest associations with learning outcomes. Existing literature on PI's effect on student achievement is mostly based in developed contexts and has shown that while parental involvement leads to improvement in learning outcomes, not all aspects of PI may be significant in influencing students' learning. This study tries to disentangle the influence of different aspects of parental involvement on the learning outcomes in the context of rural UP and identify the heterogenous effects of PI for different caste groups.

Firstly, this study finds that the financial inputs and school-based inputs by parents, in Sitapur, are limited, whereas the direct involvement of parents at home through educational inputs or communication about school is comparatively higher. The limited financial inputs by parents in their children's education was anticipated because the data represents a low-income, rural context where households may have competing demands for resources. As established through former analysis of the data, this study shows that parents' school-based inputs were also low, as many parents do not see value in interacting with teachers. Secondly, an important insight of this study is that while PI differs by caste and mother's education, there is no difference in PI based on the gender of the child. The only exception to this is taking tuition, wherein more boys than girls take tuition. This is consistent with the preferential educational spending of parents on boys. General category households and those with high education of mothers are more likely to be involved than SC&ST and OBC households and those with no education of mothers respectively. Therefore, it becomes important for policy and practice to focus on these low achieving sub-groups, to close the achievement gap.

Thirdly, while a substantial number of parents are directly involved in their children's education at home, this has little, if any bearing on their learning outcomes. Sending children to tuition indicates parents' financial inputs, which though sparse, can significantly improve learning. It can also help offset the caste disadvantage for SC, ST and OBC students as compared to the general category. However, this is neither a practical nor equitable solution for low learning outcomes. Helping the child with studies at home shows a small but significant positive effect on both reading and math learning outcomes. Although it is insufficient to overcome the caste disadvantage, helping children with studies has a statistically significant impact on the disadvantaged caste groups. SC&ST and OBC groups

benefit more from receiving help at home than General category students. A majority of parents communicate with their children about school, including asking them about their school day and asking them to study hard, while a limited number of parents ask children to read other than textbooks. 'Asking the child to read other than textbooks' is indicative of high parental expectation and improves both reading and math levels. However, the heterogeneous effects of caste show that 'asking the child to read other than textbooks' only leads to significant improvement for the OBC category and may not be sufficient in balancing the caste disadvantage for SC&ST category students.

These findings provide insights into the nature of PI in rural areas of the Sitapur district in, UP, showing the extent of financial and time inputs and their bearing on learning outcomes. Variables on direct PI at home show that while parents choose to get involved it may not be the most effective way of improving learning outcomes. This is consistent with the literature in showing that parents may need guidance to support their child's learning in low-SES and low-literacy contexts (Banerji et al., 2017; Padhi et al., 2020).

5.2 Methodology

From the perspective of the EPF, this model can be considered as the value-added model, i.e., indicative of the value added by the different aspects of parental involvement. The findings suggest that while some aspects may add value to learning outcomes, other aspects do not seem to add any substantial value to children's learning outcomes. The limitation of this study however remains that, while some aspects of PI do not increase academic outcomes, they may still be beneficial for the overall wellbeing of the child. This study does not account for the associations PI may have with the non-cognitive, behavioural outcomes or emotional well-being of students. Research in developed contexts has shown that PI has more influence on the non-cognitive and behavioural outcomes of students than on

learning outcomes. In LMIC, social-emotional or other non-cognitive measures of the students are limited. Since this study uses a secondary dataset, it is beyond the scope of this study to find the associations of PI with non-cognitive and socio-emotional outcomes. Hence, this study cannot estimate the effect of 'PI' on the overall well-being of the child. Future research on PI can focus on the association between PI and non-cognitive outcomes of the students.

Furthermore, existing frameworks of PI are based on high-income contexts and may not be suitable for explaining the nature of PI in low-income contexts. While the conceptual literature is helpful to understand the mechanisms of PI in low-income contexts, there is a need for developing frameworks to understand involvement types in low-income contexts. This will help reduce the inconsistencies and provide more structure for analysing the parent or family involvement in low-income countries.

5.3 Policy and Practice

The factor in the education production model that has the maximum effect on learning outcomes is the time that child spends studying after school. This is an important finding because while direct parental inputs do not seem to have a large impact on the learning outcomes, child's inputs do. To help improve learning outcomes parents, family and the community can enable an environment that is conducive to children spending time studying after-school. Policy and programs can ensure the provision of comfortable community spaces to provide an environment that is suitable for studying after school. This becomes even more necessary in the context of rural, low-income areas such as the Sitapur district where only 36% of the household have an electricity connection which may hinder learning at home. The Kumar & Choudhury, (2021) study also finds that the achievement gap between private and

government school children can be reduced through regularly attending school and spending time studying at home.

While the overall associations of parental involvement with learning outcomes are positive, these associations are weak, with the exception of investing in tuition. However, tuition can increase the existing inequities in achievement between the rich and the poor and as such it cannot be considered a solution for the low learning outcomes. Policy and practice can work towards supporting parents to be involved more effectively and help design programs for after-school learning of children, such as through remedial classes or volunteer-led community learning spaces. The (Kumar & Choudhury, 2021) study also recommends that in contexts where parents may have limited capacity to help their children, after-school remedial programs can be beneficial, especially for the most disadvantaged students.

References

Afridi, F. (2011). The Impact of School Meals on School Participation: Evidence from Rural India. *The Journal of Development Studies*, *47*(11), 1636–1656. https://doi.org/10.1080/00220388.2010.514330

Alban Conto, C., Akseer, S., Dreesen, T., Kamei, A., Mizunoya, S., & Rigole, A. (2021). Potential effects of COVID-19 school closures on foundational skills and Country responses for mitigating learning loss. *International Journal of Educational Development*, *87*, 102434. https://doi.org/10.1016/j.ijedudev.2021.102434

Alcott, B., & Rose, P. (2015). Schools and learning in rural India and Pakistan: Who goes where, and how much are they learning? *Prospects*, *45*(3), 345–363.

Alcott, B., & Rose, P. (2017). Learning in India's primary schools: How do disparities widen across the grades? *International Journal of Educational Development*, *56*, 42–51. https://doi.org/10.1016/j.ijedudev.2017.05.002

Andrabi, T., Das, J., & Khwaja, A. I. (2017). Report cards: The impact of providing school and child test scores on educational markets. *American Economic Review*, *107*(6), 1535–1563.

Angrist, N., Bergman, P., & Matsheng, M. (2022). Experimental evidence on learning using low-tech when school is out. *Nature Human Behaviour*, *6*(7), 941–950.

ASER. (2018). *ASER 2018 Report*. http://img.asercentre.org/docs/ASER%202018/Release%20Material/aserreport2018.pdf

ASER. (2021). *ASER 2021 Report*. http://img.asercentre.org/docs/aser2021forweb.pdf

Aslam, M., & Kingdon, G. (2011). What can teachers do to raise pupil achievement? *Economics of Education Review*, *30*(3), 559–574. https://doi.org/10.1016/j.econedurev.2011.01.001

Atherton, P., & Kingdon, G. (2010). *The relative effectiveness and costs of contract and regular teachers in India*.

Attanasio, O., Meghir, C., & Nix, E. (2020). Human capital development and parental investment in India. *The Review of Economic Studies*, *87*(6), 2511–2541.

Aturupane, H., Glewwe, P., & Wisniewski, S. (2013). The impact of school quality, socioeconomic factors, and child health on students' academic performance: Evidence from Sri Lankan primary schools. *Education Economics*, *21*(1), 2–37. https://doi.org/10.1080/09645292.2010.511852

Avvisati, F., Besbas, B., & Guyon, N. (2011). Parental Involvement in School: A Literature Review: *Revue d'économie Politique*, *Vol. 120*(5), 759–778. https://doi.org/10.3917/redp.205.0759

Avvisati, F., Gurgand, M., Guyon, N., & Maurin, E. (2014). Getting Parents Involved: A Field Experiment in Deprived Schools. *The Review of Economic Studies*, *81*(1), 57–83. https://doi.org/10.1093/restud/rdt027

Azam, M., & Kingdon, G. G. (2013). Are Girls the Fairer Sex in India? Revisiting Intra-Household Allocation of Education Expenditure. *World Development*, *42*, 143–164. https://doi.org/10.1016/j.worlddev.2012.09.003

Banerjee, A. V., Banerji, R., Duflo, E., Glennerster, R., & Khemani, S. (2010). Pitfalls of Participatory Programs: Evidence from a Randomized Evaluation in Education in India. *ECONOMIC POLICY*, 31.

Banerji, R. (2021). Learning for All: Lessons from ASER and Pratham in India on the Role of Citizens and Communities in Improving Children's Learning. In *Powering a Learning Society During an Age of Disruption* (pp. 181–194). Springer, Singapore.

Banerji, R., Berry, J., & Shotland, M. (2017). The Impact of Maternal Literacy and Participation Programs: Evidence from a Randomized Evaluation in India. *American*

Economic Journal: Applied Economics, *9*(4), 303–337. https://doi.org/10.1257/app.20150390

Barton, A., Ershadi, M., & Winthrop, R. (2021). *UNDERSTANDING THE CONNECTION BETWEEN FAMILY- SCHOOL ENGAGEMENT AND EDUCATION SYSTEM TRANSFORMATION*. 38.

Beeharry, G. (2021). The pathway to progress on SDG 4 requires the global education architecture to focus on foundational learning and to hold ourselves accountable for achieving it. *International Journal of Educational Development*, *82*, 102375.

Boonk, L., Gijselaers, H. J. M., Ritzen, H., & Brand-Gruwel, S. (2018). A review of the relationship between parental involvement indicators and academic achievement. *Educational Research Review*, *24*, 10–30. https://doi.org/10.1016/j.edurev.2018.02.001

Cashman, L., Sabates, R., & Alcott, B. (2021). Parental involvement in low-achieving children's learning: The role of household wealth in rural India. *International Journal of Educational Research*, *105*, 101701. https://doi.org/10.1016/j.ijer.2020.101701

Chauhan, C. P. S. (2008). Education and caste in India. *Asia Pacific Journal of Education*, *28*(3), 217–234. https://doi.org/10.1080/02188790802267332

Chudgar, A., Miller, K., & Kothari, B. (2012). Relationship between household literacy and educational engagement: Analysis of data from Rajkot district, India. *International Review of Education*, *58*(1), 73–89.

Chudgar, A., & Sankar, V. (2008). The relationship between teacher gender and student achievement: Evidence from five Indian states. *Compare: A Journal of Comparative and International Education*, *38*(5), 627–642. https://doi.org/10.1080/03057920802351465

Chudgar, A., & Shafiq, M. N. (2010). Family, community, and educational outcomes in South Asia. *Prospects*, *40*(4), 517–534.

Cresswell, J., Schwantner, U., & Waters, C. (2015). *A review of international large-scale assessments in education: Assessing component skills and collecting contextual data*.

Cuesta, A., Glewwe, P., & Krause, B. (2016). School infrastructure and educational outcomes: A literature review, with special reference to Latin America. *Economia*, *17*(1), 95–130.

Datta, S., & Kingdon, G. G. (2021). *Class size and learning: Has India spent too much on reducing class size?*

Deshpande, A. (2005a). *Affirmative action in India and the United States*.

Deshpande, A. (2005b). *Affirmative action in India and the United States*.

Dongre, A. A., & Tewary, V. (2015). Impact of private tutoring on learning levels: Evidence from India. *Available at SSRN 2401475*.

Duflo, E., Berry, J., Mukerji, S., & Shotland, M. (2015). *A wide angle view of learning*.

Epstein, J. L. (2010). School/Family/Community Partnerships: Caring for the Children We Share. *Phi Delta Kappan*, *92*(3), 81–96. https://doi.org/10.1177/003172171009200326

Evans, D. K., & Hares, S. (2021). *Should Governments and Donors Prioritize Investments in Foundational Literacy and Numeracy?* Center for Global Development.

Fagernäs, S., & Pelkonen, P. (2012). Preferences and skills of Indian public sector teachers. *IZA Journal of Labor & Development*, *1*(1), 1–31.

Fan, X., & Chen, M. (2001). Parental Involvement and Students' Academic Achievement: A Meta-Analysis. *Educational Psychology Review*, *13*(1), 1–22. https://doi.org/10.1023/A:1009048817385

Glewwe, P. (2013). *Education Policy in Developing Countries*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226078854.001.0001

Glewwe, P., & Kremer, M. (2006). Schools, teachers, and education outcomes in developing countries. *Handbook of the Economics of Education*, *2*, 945–1017.

Glewwe, P., Lambert, S., & Chen, Q. (2020). Education production functions: Updated evidence from developing countries. In *The Economics of Education* (pp. 183–215). Elsevier. https://doi.org/10.1016/B978-0-12-815391-8.00015-X

Goodall, J. (2017). *Narrowing the achievement gap: Parental engagement with children's learning*. Routledge.

Goodall, J., & Montgomery, C. (2014). Parental involvement to parental engagement: A continuum. *Educational Review*, *66*(4), 399–410. https://doi.org/10.1080/00131911.2013.781576

Gruijters, R., Alcott, B., & Rose, P. (2020). *The effect of private schooling on learning outcomes in South Asia and East Africa: A within-family approach*.

Hanushek, E. A., & Woessmann, L. (2008). The Role of Cognitive Skills in Economic Development. *Journal of Economic Literature*, *46*(3), 607–668. https://doi.org/10.1257/jel.46.3.607

Hoover-Dempsey, K. V., Walker, J. M. T., Sandler, H. M., Whetsel, D., Green, C. L., Wilkins, A. S., & Closson, K. (2005). Why Do Parents Become Involved? Research Findings and Implications. *The Elementary School Journal*, *106*(2), 105–130. https://doi.org/10.1086/499194

Hornby, G., & Blackwell, I. (2018). Barriers to parental involvement in education: An update. *Educational Review*, *70*(1), 109–119.

Horvat, E. M., Weininger, E. B., & Lareau, A. (2003). From Social Ties to Social Capital: Class Differences in the Relations Between Schools and Parent Networks. *American*

Educational Research Journal, *40*(2), 319–351. https://doi.org/10.3102/00028312040002319

Impact Initiative. (2020). *ESRC-FCDO Research for Policy and Practice: Education Accountability Relationships Between Schools, Communities, and Government in India*.

Islam, A. (2017). *Parental Involvement in Education: Evidence from Field Experiments in Developing Countries*. 53.

Jeong, J., McCoy, D. C., & Fink, G. (2017). Pathways between paternal and maternal education, caregivers' support for learning, and early child development in 44 low- and middle-income countries. *Early Childhood Research Quarterly*, *41*, 136–148.

Johnson, D., & Parrado, A. (2021). Assessing the assessments: Taking stock of learning outcomes data in India. *International Journal of Educational Development*, *84*, 102409.

Kabay, S RISEProgramme (Director). (2022, June 24). *RISE Annual Conference 2022—Day 2*. https://www.youtube.com/watch?v=fr45M9Pa-QY

Kim, H., & Rhee, D.-E. (2019). Toilets for education: Evidence from Kenya's primary school-level data. *International Journal of Educational Development*, *70*, 102090.

Kumar, D., & Choudhury, P. K. (2021). Do private schools really produce more learning than public schools in India? Accounting for student's school absenteeism and the time spent on homework. *International Journal of Educational Development*, *83*, 102395. https://doi.org/10.1016/j.ijedudev.2021.102395

Lareau, A. (2000). *Home advantage: Social class and parental intervention in elementary education*. Rowman & Littlefield Publishers.

Lastrapes, W. D., & Rajaram, R. (2016). Gender, caste and poverty in India: Evidence from the national family health survey. *Eurasian Economic Review*, *6*(2), 153–171.

Li, X., Yang, H., Wang, H., & Jia, J. (2020). Family socioeconomic status and home-based parental involvement: A mediation analysis of parental attitudes and expectations. *Children and Youth Services Review*, *116*, 105111.

Muralidharan, K., Das, J., Holla, A., & Mohpal, A. (2017). The fiscal cost of weak governance: Evidence from teacher absence in India. *Journal of Public Economics*, *145*, 116–135. https://doi.org/10.1016/j.jpubeco.2016.11.005

NEP. (2020). *National Education Policy 2020 Ministry of Human Resource Development Government of India*. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

Niti Aayog. (2021). *National Multidimensional Poverty Index Baseline Report Based on NFHS-4 (2015-16)*. https://www.niti.gov.in/sites/default/files/2021-11/National_MPI_India-11242021.pdf

Padhi, D. R., Jhunja, R., & Joshi, A. (2020). Enabling adults with less education to support their child's education through hyperlocal educational videos. *32nd Australian Conference on Human-Computer Interaction*, 210–219. https://doi.org/10.1145/3441000.3441060

Pritchett, L. (2013). *The rebirth of education: Schooling ain't learning*. CGD Books.

Pritchett, L., & Beatty, A. (2012). The negative consequences of overambitious curricula in developing countries. *Center for Global Development Working Paper*, *293*.

Sabates, R., Bhattacharjea, S., & Wadhwa, W. (2020). *Accountability from the Grassroots: Children's foundational reading and arithmetic in Sitapur District, Uttar Predesh. REAL Centre, University of Cambridge. 10.5281/zenodo.3648334*. 10.5281/zenodo.3648334

Sanchez, A. J. (2011). *Family engagement in education in Uttar Pradesh, India: Factors associated with the involvement of families in their children's education*. University of Minnesota.

Sandeep Kumar Jaiswal & Rashmi Choudhuri. (2017). A Review of the Relationship between Parental Involvement and Students' Academic Performance. *International Journal of Indian Psychology*, *4*(3). https://doi.org/10.25215/0403.052

Singh, R., & Sarkar, S. (2015). Does teaching quality matter? Students learning outcome related to teaching quality in public and private primary schools in India. *International Journal of Educational Development*, *41*, 153–163. https://doi.org/10.1016/j.ijedudev.2015.02.009

The Wire. (2018). *Administrative Duties Are Stealing Valuable Time from Government School Teachers*. https://thewire.in/education/non-teaching-duties-government-school-teachers-india

Tooley, J., Dixon, P., & Gomathi, S. V. (2007). Private schools and the millennium development goal of universal primary education: A census and comparative survey in Hyderabad, India. *Oxford Review of Education*, *33*(5), 539–560. https://doi.org/10.1080/03054980701425664

UKFIET. (2022, July 18). Involving the community in raising children's foundational learning outcomes: Evidence from India. *The Education and Development Forum (UKFIET)*. https://www.ukfiet.org/2022/involving-the-community-in-raising-childrens-foundational-learning-outcomes-evidence-from-india/

Vagh, S. B. (2009). *Validating the ASER Testing Tools: Comparisons with Reading Fluency Measures and the Read India Measures*.

won Kim, S. (2018). Parental involvement in developing countries: A meta-synthesis of qualitative research. *International Journal of Educational Development*, *60*, 149–156.

World Bank. (2018). *World Development Report 2018: Learning to Realize Education's Promise. Washington, DC: World Bank. Doi:10.1596/978-1-4648-1096-1. License: Creative Commons Attribution CC BY 3.0 IGO*. https://www.worldbank.org/en/publication/wdr2018

World Bank. (2019). *World Bank India: Learning poverty brief*. https://thedocs.worldbank.org/en/doc/386361571223575213-0090022019/original/SASSACININDLPBRIEF.pdf

World Bank. (2021). *World Bank: Pandemic Threatens to Drive Unprecedented Number of Children into Learning Poverty*. World Bank. https://www.worldbank.org/en/news/press-release/2021/10/29/world-bank-pandemic-threatens-to-drive-unprecedented-number-of-children-into-learning-poverty

Appendix A

Table A1: Hoover Dempsey and Sandler Model of parental involvement

Level 1	The first level focuses on parental beliefs of what parents think they could do, what they should do and the invitations they receive from the school and the child to become involved.
Level 2	The second stage of this model focuses on the parents that choose to get involved and focuses on the time and ways in which parents choose to stimulate learning and their feelings about the invitations they receive towards the involvement.
Level 3	The third level pays attention to the ways in which the parents get involved, how they model learning, reinforce what the children have learnt, and they also teach directly to the students.
Level 4	The fourth level compares the parents' activities to the developmental stage of the child and institutional understandings of parental engagement.
Level 5	At the fifth level, the model considers the pupil outcomes because of involvement.

Source: (Goodall, 2017).

Table A2: Epstein's model of parental involvement

Parenting	Helping all families establish supportive home environments for children
Communicating	Establishing two-way exchanges about school programs and children's progress
Volunteering	Recruiting and organizing parent help at school, home, or other locations.
Learning at home	Providing information and ideas to families about how to help students with homework and other curriculum-related materials
Decision-making	Having parents from all backgrounds serve as representatives and leaders on school committees.
Collaborating with the community	Identifying and integrating resources and services from the community to strengthen school programs.

(Epstein, 2010).

Table A3: Table of descriptive statistics

Variables	Description	Obs	Mean	Std. Dev.
	Parental Involvement (I)			
ch tuition	Sample child takes tuition currently 0=No 1= Yes	20060	0.13	2.08
paresp 5	Do you think it is parents' responsibility to buy book/textbooks? 0=No, 1=Yes	20060	0.41	0.49
check bk	Do you check child's book or not? 0=No, 1=Yes	20060	0.68	0.48
tell story	Read/tell stories to child. 0=No, 1= Yes	20060	0.19	0.4
study help	Anyone help sample child in studies. 0=No, 1=Yes	20060	0.56	0.5
sampch percpq8	Ask child what s/he did in school? 0=No, 1=Yes	20060	0.78	0.45
sampch percpq9	You tell sample child to study hard in school? 0=No, 1=Yes	20060	0.94	0.29
sampch percpq10	Ask child to read other than textbooks? 0=No, 1=Yes	20060	0.35	0.52
know teacher	Know any child's teachers' name? 0=Does not know even 1, 1=Knows at least 1	20060	0.35	0.58
visit school	Visited the school this session? 0=No, 1=Yes	20060	0.37	0.51
	Years of Schooling (S)			
childclass	Class of the Child, 2=Grade 2, 3=Grade 3, 4=Grade 4			
	Child Characteristics (C)	20060	2.97	0.82
childage	Child Age	20060	8.06	1.22
childsex	Sex of the Child 1=boy 2=girl	20060	1.53	0.5

att obs day1	Child Observed attendance on the day of the survey	20060	0.48	0.5
	Child Inputs (I)			
ch ownstudy	In a week, how often does the child study after school? 0=Never 1=Occasionally 2=Regularly	20060	1.24	0.71
	Household Chracteristics (H)			
caste	Reservation Category of the house. 1=General, 2=SC/ST, 3=OBC 4=Don't know	20060	2.38	0.69
mothedu	Mothers' education level. 0=Never enrolled 1=Primary 2=Secondary or higher	20060	0.46	0.75
hh type	Type of house. 1=Kutcha, 2=Semi Pucca 3=Pucca	20060	2.04	0.82
hh elec1	Electricity connection in house. 0=No, 1 =Yes	20060	0.36	0.48
	School and teacher characteristics (Q)			
girls toilet	Separate girls' toilet available. 0=No, 1 =Yes	20060	0.79	0.41
Elec	Electricity connection in school 0=No, 1=Yes	20060	0.25	0.44
teacher edqual	Teachers' Education Qualification. 1=Secondary 2= Bachelors 3=Masters or higher 4=Other	20060	2.42	0.54
Years exp	Teachers' years of experience.	20060	6.85	6.71
Teacher sex	Sex of the teacher. 1=Male 2=Female	20060	1.5	0.5

Appendix B: Blogpost

The nature of Parental involvement and its impact on learning outcomes in Sitapur district, India

The global and national goals of education in India have shifted focus from schooling to learning in recent decades. This is a result of the increasing empirical research showing that while children have access to school, learning remains trails far behind the expected grade levels. Annual Status of Education Report (ASER) which is a nationally representative household survey of students' learning outcomes shows that only 50.3% of students in Grade 5 are able to read a Grade 2 text and only 27.8% of Grade 5 students are able to solve division questions (ASER, 2018). The New education policy (NEP, 2020) focuses on raising outcomes, and stakeholders such as governments, NGOs and educators are seeking ways of improving the learning outcomes of children, particularly those in primary schools.

The lack of learning support at home is considered one of the reasons for the poor learning outcomes in India (ASER, 2018). Thereby, programs, policies and research on parental involvement are gaining popularity as a potential means of improving students' learning outcomes. However, there is a dearth of empirical research on parents' involvement and its influence on learning outcomes in low-income contexts. This makes it crucial to focus on the nature of Parental involvement and its association with learning. Research in high-income countries shows that different aspects of Parental Involvement have different associations with students' learning outcomes and some aspects may show no association or even negative association with academic achievement (Avvisati et al., 2011; Boonk et al., 2018; Fan & Chen, 2001). Accordingly, this study explores the nature of parental involvement and its different aspects in a rural, low-income context in India. It further disentangles the association of some important aspects of parental involvement with learning outcomes.

Using quantitative methods, this study finds that the financial inputs of parents and school-based involvement are limited in the given context. Nonetheless, a substantial number of parents provide educational inputs at home, including helping the child with studies at home and checking their notebooks or textbooks. A majority of parents also communicate with their children about school, including asking them what they did in school every day and asking them to study hard. This shows parents' willingness to support their children's education and the high expectations that parents have from their children's education. Moreover, while parental involvement differs by caste and the education of the mother there seems to be no difference in parents' involvement based on the gender of the child. For all the variables on involvement, with the exception of sending child to tuition, parents are equally involved in the education of both girls and boys. This is consistent with the preferential educational spending of parents on boys. The most contrasting differences are in the involvement of those households where mothers have no education as compared to households where mothers have more than 5 years of education.

While studying the associations between the different aspects of parent involvement and learning outcomes, this study finds that after controlling for the mother's education, caste, household indicators of wealth and school quality characteristics, only a few aspects of parental involvement have significant associations with the reading and math learning outcomes of the child. These include i) sending the child to tuition, ii) helping the child with studies and iii) asking the child to read other than textbooks. The research is consistent with studies in high-income contexts finding that not all aspects of parental involvement significantly influence children's learning. Furthermore, the study finds that while sending the child to tuition helps overcome the caste disadvantage in the learning outcomes, other forms of parental involvement at home cannot overcome this achievement gap. While parental involvement at home including helping the child with studies and asking them to

read other than textbooks is helpful in increasing the learning levels, it is not sufficient to overcome the caste disadvantage. While sending the child to tuition substantially increases the learning outcomes, it is neither a practical nor equitable solution for increasing learning outcomes. A substantial number of parents are directly involved in their children's education at home, however, this has little, if any bearing on their learning outcomes. Other studies done in low-income and low-literacy contexts of parents also suggest that parents may need guidance to effectively support their children in their studies.

While parental involvement may not show strong associations with learning outcomes, children's learning inputs do. The study finds that the time the child spends studying at home after school is an important aspect which is found to be strongly associated with learning outcomes. Those children who regularly spend time studying after school perform 0.37 levels better in reading and 0.23 levels better in math as compared to those students who do not spend any time studying at home.

This suggests that parents, communities, educational programs and policies must ensure spaces and environment that are conducive to the after-school learning of the child. In areas where parents may have limited capacity to effectively influence the education of their children, the government's after-school remedial learning programs can make a large difference in the learning outcomes of students and help close the achievement gap between those belonging to SC&ST castes and with no mother's education as compared to those with General castes and high education of the mother. Furthermore, given the insight that parents are highly involved at home, policies and programs can continue to focus on ways to increase the effectiveness of parental involvement in low-income contexts.

Appendix C: Research Proposal

Title

The nature of Parental involvement and its impact on learning outcomes in Sitapur district, India

Background

Access to primary schooling in India has significantly improved in the past decades with enrolment staying above 96% since 2010 (ASER, 2018). However, the quality of educational access remains a grave matter of concern with only 55% of children in India being able to read at the age of 10 as per the World Bank's learning poverty report (World Bank, 2019). Annual Status of Education Report (ASER) which is a nationally representative household survey of students' learning outcomes shows that only 50.3% of students in Grade 5 are able to read a Grade 2 text and only 27.8% of Grade 5 students are able to solve division questions (ASER, 2018). Accordingly, the focus of the Indian government, much like that of the global educational initiatives such as the Sustainable Development Goal 4 (Beeharry, 2021) has shifted from mere 'educational access' to improving the quality of primary education in recent years, focusing specifically on foundational literacy and numeracy skills (NEP, 2020).

The lack of learning support at home is considered one of the reasons for the poor learning outcomes in India (ASER, 2018). Thereby, parental involvement in education has recently started receiving attention through research, policy and program as a potential area of intervention for improving students' learning outcomes in LMICs (Banerji et al., 2017; Cashman et al., 2021; Islam, 2017). Accordingly, this study explores the nature of Parental involvement in a rural, low-income context in India and its effect on learning outcomes.

Review of the literature

Parental involvement is an important and beneficial element of education (Barton et al., 2021; Goodall & Montgomery, 2014; Hornby & Blackwell, 2018; Islam, 2017; Sanchez, 2011). With the increasing focus on improving educational performance in LMIC, educational policies, programs, and research are focusing on PI as one of the potential ways of improving learning (Banerji et al., 2017; Cashman et al., 2021; Islam, 2017; Sanchez, 2011). PI has further broadly been distinguished as home and school-based involvement (Chudgar et al., 2012). Home-based involvement refers to the activities and communication concerning schooling that parents engage in to support children's learning at home. These include reading to the child, communication about the school, and helping with educational activities such as homework or directly teaching (Chudgar et al., 2012; Epstein, 2010; Hoover-Dempsey et al., 2005). This could also include motivation and support parents provide to learners (Chudgar et al., 2012; Goodall & Montgomery, 2014; Padhi et al., 2020). School-based involvement includes communication with the teacher about the child, attending school events or volunteering at school (Epstein, 2010; Goodall & Montgomery, 2014; Hoover-Dempsey et al., 2005; Kabay, S RISEProgramme, 2022).

The nature of PI in LMIC differs from that in developed nations. Most literature and frameworks on PI are modelled on developed countries' contexts which may not be directly applicable in low-income contexts (won Kim 2018). While poverty and low education of parents are some common challenges for high and low-income countries, parents in low-income countries face additional barriers to involvement, given the low quality and accountability of schools towards parents and limited public resources at their disposal. While parents hold high expectations of their children as they see education as a way out of poverty, they may be limited in their capacity to engage with children's education.

In LMIC where the quality of education is low, additional efforts may be required from the family to support children's learning. However, parents face several barriers in being involved with their children's education. These include i) **Structural barriers** Parents' capacity to support children at home and school is influenced by structural factors such as "caste, unemployment and poverty". ii)**Financial barriers** Families with a low Socioeconomic status could be thought of as having higher motivation to participate in the education of their children to overcome other disadvantages. However, empirical research on SES and PI shows that low SES families are less involved than high SES families (Cashman et al., 2021). Parents living in poverty may have competing demands for their time and may be unable to devote their time and resources to children's learning. iii) **Lack of educational experiences and illiteracy**: Parents from low literacy backgrounds may find it hard to participate in formal schooling experience if they have not experienced the same (Padhi et al., 2020). The increasing demand for English-medium education in low-income contexts adds yet another barrier to parent participation in low-literate contexts (Islam, 2017; Padhi et al., 2020). While this does not represent their lack of interest, it shows that they may require support and guidance to engage in discussions regarding school and support students with academics. iv) **Accountability of schools towards parents** In developing countries, parent-school relationships are often characterised by an imbalance of power (S. won Kim, 2018). When there is a large gap in the social capital of parents and teachers given the difference in their education and socioeconomic status, parents may find it difficult to participate in school (Goodall, 2017). In India, government schools are often less accountable to parents and children and are rather accountable to authorities (Gruijters et al., 2020).

Overall, the research that disentangles the effect of different aspects of PI in LMIC is limited. Moreover, the influence of different aspects of PI on learning tends to differ even within low-income contexts. Programs including those on maternal literacy, providing

support to mothers for monitoring children's learning at home, and increasing parent-teacher meetings have had a positive impact in LMIC (Banerji et al., 2017; Islam, 2017; Padhi et al., 2020). However, providing information about the learning of the child has shown mixed results in LMICs. While these are helpful indicators, much remains yet to be explored on the nature of PI and the correlation between specific aspects of PI and student achievement in LMIC. It is therefore crucial to examine the relationship between specific aspects of PI and the learning outcomes of students in a low-income context.

Research questions

Most empirical evidence and frameworks focusing on specific aspects of parental involvement are based in developed contexts and may not hold true in LMIC (S. won Kim, 2018). Moreover, the aspects of parental involvement are associated with learning may differ by context. There is a dearth of conceptual and empirical literature in LMIC contexts focusing on Parental Involvement in education in low-income contexts. Moreover, these effects may vary for the subgroups of people such as that for different caste groups.

Accordingly, this study focuses on the following questions:

Research Question (RQ) 1: What is the nature of Parental Involvement (PI) in the Sitapur district of UP?

Research Question 2: How does PI differ by caste, gender and education of the mother?

Research Question 3: What aspects of PI show the strongest associations with student learning outcomes?

Based on the findings of RQ3 this study will use the 3 variables with the strongest associations to answer **Research Question 4:** Can high levels of parental involvement offset the caste disadvantage for SC, ST and OBC categories?

Research Methodology

Conceptual Framework: Education production function

The framework this study is uses to identify the association of Parental involvement with learning outcomes is the **Education production function** (EPF). The EPF breaks down the several inputs that contribute to educational outcomes such as the household level inputs, school quality, child characteristics and parental or family involvement.

Studies based on the EPF typically analyse school-level inputs such as class size, private schooling, teacher effectiveness and parental characteristics such as household literacy levels, socioeconomic status (SES) and child gender and their effect on student learning outcomes (Alcott & Rose, 2015, 2017; Datta & Kingdon, 2021; Duflo et al., 2015; Glewwe et al., 2020; Glewwe & Kremer, 2006; Muralidharan et al., 2017). However, the empirical evidence from the policy perspective focusing on home and family characteristics such as the different aspects of parental involvement as inputs for student learning outcomes is limited.

This study focuses on the impact of parental involvement on educational outcomes can be studied through the EPF. It determines the associations of different educational inputs on the learning outcomes. The inputs in an EPF include observable characteristics that determine student learning and are generally distinguished as the child, school and household characteristics (Glewwe et al., 2020).

Research method

I use secondary research data from REAL, "Accountability at the grassroots in India" which is a project implemented in 400 villages of Sitapur district in UP, India. The project focuses on working with the most-disadvantaged primary school learners in poor households.

The project supports school actors to work with their communities to develop an understanding of children's learning levels and facilitate action both inside and outside the classroom.

The purpose of my research is to find the aspects of parental involvement that have the most effect on children's learning outcomes and the heterogeneous effects of parental involvement on different caste groups. The research methods to be used in this study are quantitative methods, including descriptive statistics, OLS regression and adjusted predictions based on OLS interactions. The main aim of this study is to disentangle the effect of different aspects of parental involvement on learning outcomes. For this purpose, the OLS regression model will be used to find the associations of different aspects of PI with learning outcomes.

It is beneficial to use quantitative methods because the study includes a large sample size with information about several households, schools and child characteristics making it suitable for this analysis. However, since I only have access to cross-sectional data which restricts the use of the dataset for sophisticated quantitative methods research such as RCT, Difference-in-Difference or Instrumental Variable to find the impact of the parent, community and school partnership intervention on the learning of children. While propensity score matching could have been considered as the quantitative approach for this study, it would have been unlikely for parents to participate in all or none of the chosen Parental involvement activities. There are also concerns about the reduced sample size for propensity score matching. Hence, OLS regression was considered the most appropriate approach.

Bibliography

Sources appropriate for the proposed research are listed as follows.

Alcott, B., & Rose, P. (2015). Schools and learning in rural India and Pakistan: Who goes where, and how much are they learning? *Prospects*, *45*(3), 345–363.

Alcott, B., & Rose, P. (2017). Learning in India's primary schools: How do disparities widen across the grades? *International Journal of Educational Development*, *56*, 42–51. https://doi.org/10.1016/j.ijedudev.2017.05.002

ASER. (2018). *ASER 2018 Report.* http://img.asercentre.org/docs/ASER%202018/Release%20Material/aserreport2018.pdf

Aturupane, H., Glewwe, P., & Wisniewski, S. (2013). The impact of school quality, socioeconomic factors, and child health on students' academic performance: Evidence from Sri Lankan primary schools. *Education Economics*, *21*(1), 2–37. https://doi.org/10.1080/09645292.2010.511852

Avvisati, F., Besbas, B., & Guyon, N. (2011). Parental Involvement in School: A Literature Review: *Revue d'économie Politique*, *Vol. 120*(5), 759–778. https://doi.org/10.3917/redp.205.0759

Avvisati, F., Gurgand, M., Guyon, N., & Maurin, E. (2014). Getting Parents Involved: A Field Experiment in Deprived Schools. *The Review of Economic Studies*, *81*(1), 57–83. https://doi.org/10.1093/restud/rdt027

Banerji, R., Berry, J., & Shotland, M. (2017). The Impact of Maternal Literacy and Participation Programs: Evidence from a Randomized Evaluation in India. *American Economic Journal: Applied Economics*, *9*(4), 303–337. https://doi.org/10.1257/app.20150390

Beeharry, G. (2021). The pathway to progress on SDG 4 requires the global education architecture to focus on foundational learning and to hold ourselves accountable for achieving it. *International Journal of Educational Development*, *82*, 102375.

Boonk, L., Gijselaers, H. J. M., Ritzen, H., & Brand-Gruwel, S. (2018). A review of the relationship between parental involvement indicators and academic achievement. *Educational Research Review*, *24*, 10–30. https://doi.org/10.1016/j.edurev.2018.02.001

Cashman, L., Sabates, R., & Alcott, B. (2021). Parental involvement in low-achieving children's learning: The role of household wealth in rural India. *International Journal of Educational Research*, *105*, 101701. https://doi.org/10.1016/j.ijer.2020.101701

Chudgar, A., Miller, K., & Kothari, B. (2012). Relationship between household literacy and educational engagement: Analysis of data from Rajkot district, India. *International Review of Education*, *58*(1), 73–89.

Datta, S., & Kingdon, G. G. (2021). *Class size and learning: Has India spent too much on reducing class size?*

Duflo, E., Berry, J., Mukerji, S., & Shotland, M. (2015). *A wide angle view of learning*.

Epstein, J. L. (2010). School/Family/Community Partnerships: Caring for the Children We Share. *Phi Delta Kappan*, *92*(3), 81–96. https://doi.org/10.1177/003172171009200326

Fan, X., & Chen, M. (2001). Parental Involvement and Students' Academic Achievement: A Meta-Analysis. *Educational Psychology Review*, *13*(1), 1–22. https://doi.org/10.1023/A:1009048817385

Glewwe, P., & Kremer, M. (2006). Schools, teachers, and education outcomes in developing countries. *Handbook of the Economics of Education*, *2*, 945–1017.

Glewwe, P., Lambert, S., & Chen, Q. (2020). Education production functions: Updated evidence from developing countries. In *The Economics of Education* (pp. 183–215). Elsevier. https://doi.org/10.1016/B978-0-12-815391-8.00015-X

Goodall, J., & Montgomery, C. (2014). Parental involvement to parental engagement: A continuum. *Educational Review*, *66*(4), 399–410. https://doi.org/10.1080/00131911.2013.781576

Hoover-Dempsey, K. V., Walker, J. M. T., Sandler, H. M., Whetsel, D., Green, C. L., Wilkins, A. S., & Closson, K. (2005). Why Do Parents Become Involved? Research Findings and Implications. *The Elementary School Journal*, *106*(2), 105–130. https://doi.org/10.1086/499194

Islam, A. (2017). *Parental Involvement in Education: Evidence from Field Experiments in Developing Countries*. 53.

Muralidharan, K., Das, J., Holla, A., & Mohpal, A. (2017). The fiscal cost of weak governance: Evidence from teacher absence in India. *Journal of Public Economics*, *145*, 116–135. https://doi.org/10.1016/j.jpubeco.2016.11.005

Sanchez, A. J. (2011). *Family engagement in education in Uttar Pradesh, India: Factors associated with the involvement of families in their children's educatio*n. University of Minnesota.

won Kim, S. (2018). Parental involvement in developing countries: A meta-synthesis of qualitative research. *International Journal of Educational Development*, *60*, 149–156.

World Bank. (2019). *World Bank India: Learning poverty brief*. https://thedocs.worldbank.org/en/doc/386361571223575213-0090022019/original/SASSACININDLPBRIEF.pdf