Information, Voice and Action: Can Communities Change Education Outcomes? Evidence from a Field Experiment in Pakistan

Salman Asim[¥], Dhushyanth Raju, Nazmul Chaudhury, Amina Riaz[*]

PRELIMINARY: NOT FOR CITATION

Abstract

Can governments improve functioning of school management committees by creating community engagement spaces to deliberate on education issues? The question falls within the broader decentralization literature where devolved service delivery in education is expected to result in better mapping of community identified needs (allocative efficiency), and improved resource-use (technical efficiency) at the school level. In a large-scale field experiment in rural Sindh, Pakistan, we pilot four interventions to strengthen linkages between the community, parents, local bodies (school committees) and head teachers. We use village-level randomization to estimate treatment effects on the availability and use of school-level resources. Treated schools are approximately twice as likely to have an additional teacher deployed post-treatment, as compared to schools in the control group. School infrastructure improvements are concentrated in the treatment group where community dialogue was sustained through text-messages, and new school committees were elected to act on community-identified needs. On the demand-side we find evidence of increase in enrollment, particularly in the early-grade intake of boys, concentrated in communities where dialogue was sustained through text-messages. Overall, we do not find any robust short-term gains in student test scores in the treatment group, for both English and Mathematics.

JEL Codes: D78, I21, I28, H75, O15
NEUDC program area and sub-area: Education (Education Delivery)

---

[*]We thank the Government of Sindh's Education and Literacy Department and the Reform Support Unit, in particular, Dr. Fazlullah Pechoho, Saba Mushtaq, Faisal Ahmed Uqaili, Dr. Hamzo Khan Tagar, Muhammad Nasim Qureshi and Sania Khursheed, for extensive collaboration and assistance; the World Bank's intervention design team, in particular Priyanka Pandey, Lorenza De Icaza and, Mariam Nusrat Adil; the Weitek Group for field implementation; Amar Fateen and Saindad Joyo for implementation support; RCons for school surveys; Ilagno Patchamutho, Rachid Benmessaoud, Amit Dar, Keiko Miwa, Umbreen Arif and Margo Hoftijzer for their encouragement and support for this project. Most importantly, we thank Robbie Dean, Cameron Friday, Ali Abbas, Zunaira Mughal, Amn Nasir and Tooba Akhtar for providing outstanding research assistance at various stages of the project. The authors thank Alaka Hola, Juliea M. Trias, Deon Filmer, Owen Ozier, Achim Schmillen and David Evans for helpful discussions and insightful comments. We thank discussant and participants at the 2016 RISE Annual Conference at the Blavatnik School of Government, University of Oxford. We gratefully acknowledge the financial support provided for this project by the Strategic Impact Evaluation Fund (SIEF), the Education Sector Development Program and the World Bank. The findings, interpretations and conclusions expressed in this paper are entirely those of the authors, and do not necessarily represent the views of the World Bank, its Executive Directors or the countries they represent.

¥ Corresponding author: Salman Asim, Economist, World Bank; email: sasim@worldbank.org;
Dhushyanth Raju, Senior Economist World Bank; Nazmul Chaudhury, Lead Economist and Adviser Strategy, Results and Risks, World Bank, and Amina Riaz, Consultant and Graduate student at University of Chicago.

1. Introduction

Poor governance and lack of school autonomy are commonly cited as barriers to improvements in student and teacher outcomes (World Bank, 2013). Community-based accountability initiatives have been shown to link parents and community members directly to decision-makers, thereby improving the mapping of preferences of those closest to service providers (Petrosino et al., 2012). This can be achieved through school-based management (SBM). SBM interventions primarily decentralize administrative and financial responsibilities, allocating authority to schools and local communities with the hope of increasing accountability of the education system and making education services more responsive to the needs of the community.

Education reforms related to decentralization have led to the emergence, and in some instances the revitalization of School Management Committees (SMCs). SMCs are a common mechanism used to promote community involvement in education as they bring together community members and school administrators (Barrera et al., 2009) on a shared platform to which authority is decentralized. It provides local communities with a 'voice' and decision-making responsibility (Patrinos and Fasih, 2009). In Sindh, SMCs receive annual grants from the Government to be spent on school improvement and on getting out-of-school children into school. SMCs are required to have frequent meetings between community members, parents and village influentials. Through this dialogue, the community's preferences influence the preparation of the School Improvement Plan (SIP) developed by the executive body members.

School-based management is likely to enhance school performance through improvements in *allocative and technical efficiency* (Bruns et al. 2011)[1]. Decentralization is expected to strengthen local participation in school decision-making by improving information flows and encouraging community members to partake in the school improvement process. Mansuri and Rao (2013) suggest that decentralization of political authority to local bodies improves the community's access to information, which in turn improves the quality of decisions made at the local level. The authors further contend that improved information flows lead to deliberative decision-making, whereby community members actively voice their opinions and concerns to improve local services. Further, Channa & Faguet (2012), in a systematic review of school-based decentralization reforms, note the positive impacts of such reforms on both allocative and technical efficiency, with stronger results for technical efficiency. However, critics of devolution and school-based management claim that there is little evidence of improvements in allocative efficiency as local bodies are hardly responsive to community-identified needs. Patrinos et al. (2009) suggest that decentralization does not necessarily transfer more power to community members because resulting political institutions (such as school committees) are often weak, which may lead to elites/administrators capturing these institutions.

School-based management and decentralization reforms may not lead directly to improved representation of community preferences in school-decision making, particularly in developing countries with weak institutional capacity; however, an emerging literature suggests that support mechanisms for building institutional capacity can improve the effectiveness of decentralization reform. A meta-analysis conducted by Asim et al. (WBRO, forthcoming) finds that the "collective

[1] *Allocative efficiency* relates to improved mapping of community preferences to inform decision-making at the school level. *Technical efficienc*y relates to governments producing larger amount of better quality services with the same level of inputs (Bruns et al. 2011).

demand" route of accountability for schools appears relatively promising in the context of South Asia. Comprehensive interventions combining different aspects of citizens' engagement have demonstrated moderate to strong positive effects on attendance, enrolment and learning.

Providing school grants does not improve school outcomes by itself. These grants may help finance school improvements in resource-constrained communities, but there is little evidence to suggest that providing grants to SMCs reliably results in the evolution of structures that promote collective action to improve education outcomes[2]. For example, in Indonesia, provision of school grants to SMCs for school improvements did not increase student test scores, even when the grants were coupled with capacity-building for SMC members (Pradhan et al., 2011). Similarly, the Government of Sindh contracted local NGOs to build capacity of SMCs under Sindh Education Sector Project (SERP-I). There was no improvement in school-level outcomes as the result of the project (World Bank, 2012).

Given the limitations of school grants in improving school outcomes on their own, mechanisms that promote linkages, create platforms for communities to engage and improve information flows may create conditions necessary for school grants to improve education outcomes. Facilitated meetings between school committees and respective village councils along with the provision of grants to school committees improved test scores improved by 0.17 standard deviations in Indonesia (Pradhan, et al. 2011), whereas a field experiment in Uganda suggested that the creation of a tool to monitor school performance had strong, positive impacts on student test scores (Barr et al., 2012). Such results show that carefully designed mechanisms for communities to operationalize school-based management policies may improve both community engagement and school outcomes.

In this study, we design a field experiment to study mechanisms that allow communities to come together and deliberate on education issues. We randomly assign villages to one of four treatment groups, or to a control group. In each treatment group, we experimentally vary how the dialogue takes place between community, SMCs and teachers while holding the information content the same. In addition, we vary the composition of SMCs by electing new council members in two of the treatment arms. The study takes place in rural Sindh, Pakistan, where in 2006, the government revitalized SMCs by giving them a nominal annual grant in the hope that the funding would encourage communities to play a stronger role in school improvement. Few stipulations are attached to these grants, in order to encourage the executive bodies (EBs) – to spend funds on improving school infrastructure, when necessary. However, there is little evidence to support the claim that these funds are properly utilized at the school level. Only a handful of community members know the role of an SMC[3], and even fewer are aware of the grants SMCs receive from the government to spend on school improvements.

Even if community members are aware of both the SMC and the grants, they might not know how best to engage with the SMC to ensure that their opinions on the utilization of funds form a part of the decision-making process. There is often an absence of platforms for dialogue between communities and schools. Political and administrative interference may also constrain effective

[2] A field experiment in Gambia demonstrates that grants alone without school-based management training did not impact student achievement or student/teacher attendance (Blimpo et al., 2011).

[3] As per household baseline data, only 7.7 percent of the community members (head of the household and spouse at the village-level) have heard about an SMC.

participation from taking root in feudal societies like rural Sindh at all levels of decision-making (Gazdar, 2000b).

In our first treatment arm called Info-Meet, we conduct a village-level meeting in randomly selected villages to promote dialogue between community members and the local SMC, so that community members may voice and discuss their preferences on how to tackle school-related issues. This traditional, facilitated village-level meeting consists of a dialogue between head teachers, teachers, community members and village influentials to create "linkages" between local stakeholders (Pradhan et al., 2011). The village-level meeting highlights the role parents and community members can assume to improve their local schools. Attendees receive information regarding their rights, and about the roles and responsibilities of SMC executive body (EB) members, together with EB members' names and phone numbers. This is expected to strengthen linkages and improve accountability of SMCs at the local level.

While linkages are expected to strengthen the flow of information between decision-makers and community stakeholders, there is mixed evidence on the effectiveness of traditional, facilitated village-level meetings on school outcomes[5]. Village-level meetings facilitated by a local NGO in Uttar Pradesh, India had no impact on community involvement, teacher effort or learning outcomes in schools (Banerjee et al., 2010). However, in a similar intervention in Karnataka, India, dramatized storytelling videos were played (Pandey et al., 2009) during community meetings, resulting in strong, positive impacts on similar outcomes. In the context of rural Sindh, village-level meetings and improved information flows may not be sufficient to bring about improvements in school outcomes. This is because a historical feudal power structure dominates local political life in the region, concentrating decision-making in the hands of feudal-elites, while clientelist politics systematically stifles the performance of local schools. In this feudal context, the norm is for community members to play a passive role in meeting where village influential are present. Information may improve the community's knowledge about its rights and roles. However, information flows may not be sufficient in creating conditions for community members to organize collectively to demand school improvements (Khemani et al. 2015; Lieberman et al., 2014).

To provide an alternative platform for community members to voice their preferences to SMCs, we introduce a virtual Community Dialogue Platform (CDP): an ICT interface that allows for two-way, anonymous communication between locals via SMS (text messages) on mobile phones. This is our second intervention arm and is referred to as SMS-Meet, since the CDP is introduced during a village-level meeting. Besides face-to-face deliberations during the village-level meeting, community members were also encouraged to voice their preferences by engaging in dialogue on school conditions virtually. They could do so by sending SMS (text messages) about the needs of their local schools to the CDP. The identities of all participants were kept anonymous to sidestep the feudal power structures prevalent in rural Sindh. This gave users confidence and allayed their fears of a backlash from feudal power holders. The messages received from individual community members were carefully tagged and categorized according to key ideas discussed in the messages.

By communicating on the CDP, community members were able to publically voice their preferences for school improvement. For example, while some community members thought that

[5] In a study in Indonesia, interventions that provided formal channels of parental participation, such as facilitated school meetings, were found to be effective in encouraging parents to be more actively engaged in school oversight (Cerdan-Infantes and Filmer, 2015).

it was more important to improve infrastructure and facilities at their local schools, others emphasized serious shortages of teachers in schools. This provided a clearer picture to the SMCs on what their schools required the most. Community-led dialogue was expected to provide actionable information to the SMC members, who could then individually or collectively attempt to address those problems in the school. Through this process, the CDP served as an important preference aggregation tool, allowing us to test for a relationship between key areas for improvement highlighted by the community in text messages sent to the CDP and any changes in school inputs made by the SMCs.[6] The design of the study, thus, allows us to evaluate the extent to which community-identified needs were addressed by the committee members—*improving allocative efficiency*.

We find that both the village-level meetings (Info-Meet) and the Community Dialogue Platform (SMS-Meet) were received well in remote villages, demonstrated by high participation rates[7]. However, the question is whether the motivation to participate in these village-level meetings translates into action at the school-level. We find positive impacts on school functionality: a lower proportion of schools were found closed in Info-Meet and SMS-Meet villages on an unannounced visit during the endline survey as compared to the schools in the control villages. In fact, the schools in these intervention groups are more likely to become, or remain functional as a result of the intervention. For example, we see that schools within the Info-Meet villages are 10 percentage points more likely to be found open during an unannounced visit as compared to schools in the control group.

In addition to improving preference mapping through improved linkages and platforms for voicing community preferences through village-level meetings or the CDP, a separate objective was to elicit and sustain meaningful participation of the community in the management of schools well after the intervention period. This could only be possible if the village-level meeting and the CDP were further integrated with local institutions. For this reason, we created two, separate treatment arms, Info-Meet-Support and SMS-Meet-Support. These intervention variants introduced democratic elections of SMCs and SMC capacity-building, which were intended to improve the composition of SMCs and to make them more responsive to the demands of the community for school improvement. In addition to the village-level meeting, democratic elections were conducted in the presence of a sub-district official (Taluka Education officer). Additionally, newly elected SMC members received trainings on how to successfully develop and implement School Improvement Plans (SIPs), and to engage with the community members. By instituting fair and democratic elections, we were able to address perverse incentives that might have existed previously from selection of *favored* community members by the school head teacher or the sub-district official.

Both the Info-Meet-Support and SMS-Meet-Support interventions intend to respond to problems related to misalignment of incentives between SMC members and the community, as well as weak accountability of SMCs. They do this by electing members to the SMC and imparting participatory training to perform their roles. Democratic elections and improved capacity of members of the SMCs' executive bodies can lead to increased political engagement within the local community and improve accountability of SMCs (Khemani et al. 2015, Olken 2010).

[6] *Figure 6A* illustrates the aggregated preferences from the CDP in the form of a world cloud.

[7] On average, participation rates were upwards of 60 percent of households sending at least one member to attend the meeting. The numbers are estimated from attendance sheets mapped against the village household census.

We analyze the added value of introducing SMC elections and training to both the village-level meeting and the CDP interventions. We find that SMS-Meet-Support added the most value in terms of increased activity of SMCs to improve local school infrastructure. For example, SMS-Meet-Support schools were 29.7 percent more likely to make infrastructure improvements compared to schools in the control group. Empowered SMCs are likely to have funded school improvements through a combination of SMC grants and funds raised locally. This is why we see improvements in classroom availability – a large infrastructure expenditure – requiring a larger investment than possible through SMC funds alone. Sustained dialogue through the CDP seems conducive to collective action at the village-level which could have brought about these improvements. Therefore, complementing of the CDP with elections and capacity-building of SMC EB members, enabled SMCs to improvise and respond to community-identified needs, when the resources provided by the government were inadequate.

Info-Meet-Support, however, created the weakest linkages between SMCs and community members, evidenced by small or statistically insignificant impacts on range of outcome measures. Compared to SMS-Meet and SMS-Meet-Support, the village-level meeting with additional election support and capacity-building did not produce similar changes in school infrastructure and school functionality. The presence of the TEO in Info-Meet-Support likely inhibited linkages and stifled dialogue in community-level meetings. The presence of the sub-district official seems to have undermined the credibility of the message for the lack of trust between communities in Sindh and the Government.

In Section 2, we illustrate the context of rural Sindh, Pakistan, detailing our rationale for selecting this region for the field experiment. We follow this background discussion by highlighting the motivation for the various treatment arms in Section 3, followed by a description of our interventions. In Section 4, we describe the evaluation design, including a discussion of the sampling framework. In Section 5, we describe the data collection strategy for the evaluation, and in Section 6, we provide descriptive statistics from our data. In Section 7, we discuss the estimation strategy used to evaluate the impacts of our interventions with a short discussion on school outcomes of interest. In Section 8, we present the results of our interventions on school outcomes. In Section 9, we discuss the mechanisms through which the interventions operated, based on insights gathered through coding qualitative responses in case study schools. Finally, we conclude in with a discussion on causal channels and the policy implications of the results.

2. Education in Sindh, Pakistan

In recent years, Pakistan's economy has grown considerably, with real GDP increasing at a rate of nearly 4 percent since 2009-10 (Pakistan Economic Survey 2014-15). Yet this growth has not been reflected in the country's expenditure on education, which has remained at less than 2 percent of GDP. Subsequently, Pakistan has failed to reach the Millennium Development Goal of achieving universal primary education by 2015. Nearly one-third of primary school-age children remain out of school (UNESCO, 2015). For children who do make it to school, 37.8 percent (UNDP HDR, 2015) drop out during primary school, while those who stay do not master basic numeracy and language skills (Andrabi et al., 2014). Low school functionality, lack of essential school infrastructure and high teacher absenteeism contribute to low levels of learning (Dundar et al., 2014). Moreover, large disparities exist in educational outcomes across the country's four

provinces, two territories and two special areas, as well as across rural and urban districts within each region.

Sindh province has a population of 42.4 million[8]. According to the Annual School Census (2014-15), there are 46,071 government schools in Sindh.[9] The province has one of the densest public schooling systems in the world, with approximately 1.08 schools per 1,000 inhabitants. However, while schools are plentiful in the region, they are often found to be closed or without teachers and students, especially in rural areas of the province. Nearly 15 percent of rural schools have either been closed for six months or more, have zero student enrollment or have no teacher assigned to them, according to the administrative census data.

Taking a closer look at functional schools[10] in rural Sindh reveals that 57 percent are one-teacher schools. In the case of such schools, high rates of teacher absence can lead to a school becoming non-functional. Consequently, the schools' functionality statuses are dynamic and can change from one school visit to the next.

Along with an endemic shortage of teachers, rural Sindh also has low student enrollment rates. According to the Pakistan Social and Living Standards Measurement Survey (PSLM 2014-2015), only 61 percent of all Sindhi children between the ages of 6-10 years are enrolled in school at the primary level. The net enrollment rate achieves a high of 73 percent in urban areas – compared to 77 percent in all of urban Pakistan. However, it drops to 52 percent in rural Sindh, compared to 63 percent in all of rural Pakistan.

Furthermore, functional schools in rural Sindh also demonstrate a lack of essential infrastructure. Asim (2013) finds that roughly, a quarter of these schools either do not have a building, or lack access to basic facilities such as a boundary walls, toilets, drinking water and electricity even when a school building exists. Schools without a building or adequate infrastructure are even more likely to be one-teacher schools with a probability of 0.75.

Students' learning levels correspond to inadequate inputs into public education in Sindh. According to the Annual Status of Education Report (ASER 2015), for English, only 24 percent of Grade 3 students can read words while only 19 percent of Grade 5 students can read full sentences. Learning outcomes are slightly better for Math: 32 percent of Grade 3 students can subtract, while 33 percent of Grade 5 students can perform division. For both subjects, boys outperform girls by 6 percentage points. These poor learning outcomes might also be influenced by the fact that on average, only 17 percent of the students' mothers and 44 percent of their fathers have attained at least primary schooling (ASER 2015).

In rural Sindh, these deficits are often linked to skewed power dynamics within villages, whereby economic and political life is dominated by large landlords, who control land, irrigation and credit (Gazdar, 2000b). A census that we conducted in 300 villages in the three study districts of Sanghar, Mirpurkhas and Matiari reaffirms these socioeconomic conditions. While villages are ethnically heterogeneous with an average of 18 castes coexisting in a village, wealth is concentrated in the

[8] The population of Sindh is roughly one quarter of Pakistan's total population.
[9] Out of 46,071 government schools in Sindh, there are 41,721 primary, 2,326 middle/elementary, 1,729 secondary and 295 higher secondary schools.
[10] Functional school refers to schools that were open with teachers and students registered at the time of the Annual School Census (ASC) – 2014-15.

hands of a few. 89 percent of rural households do not own any cultivable land. Most villagers involved in farming practices work on farms owned by others, indicating the presence of a feudal system in the region.

Furthermore, households across the three districts have low levels of educational attainment. Literacy levels of adults in the household are low as explained by the corresponding low levels of education. Men on average have 3.21 years of schooling, while women have 0.70 years of schooling[11]. Meanwhile, the majority of school-age children are out of school. On average, only 43 percent of children between ages 5 to 16 are enrolled in school. However, this masks large variations across villages, with the best-performing village having an enrollment rate for school-age children of 90 percent, compared to a mere 2 percent in the poorest performing village.

In *Figure 5*, we illustrate the village Seri and some typical characteristics of typical village in rural Sindh. Seri has a total of five schools. However, when we conducted an unannounced visit to the five schools, we found that only one school was open, having any teachers and students. This case highlights the issue of school functionality throughout the villages in our study. In the one school that was open in village Seri, two teachers were present, teaching a total of 123 students.[12]

FIGURE 5 about here

Parents have little choice in opting out of the weak public school system since private schools are virtually non-existent in rural Sindh. In terms of the market for education, Sindh contrasts with other provinces such as Punjab, which has a large market share of private schools. As of 2013, private, non-state education providers contributed to an overall 23 percent of all primary school enrollment in Punjab (Osorio et al., 2013). Since school choice is limited in rural Sindh to public schools leading to less competition amongst service providers, community engagement and parental involvement in school management is an important avenue for recourse. Increasing the voice of the beneficiaries is central to improving service delivery where schooling choice is limited (Le Grand, 1997).

In 2007-08, as part of the Sindh Education Sector Reform Program, supported by the World Bank, the Government of Sindh reactivated SMCs as a formal channel for local communities to engage with government schools. SMCs receive annual grants from the Government worth PKR 22,000 (approximately USD 200) to partake in school improvement activities. The SMC is given total control over its allocated funds and is fully empowered to withdraw these resources as and when needed to implement activities without seeking any authorization from line authorities. In 2008, the World Bank noted that there existed a large number of inactive SMCs and that the financing and capacity-building programs for those inactive SMCs had been discontinued (World Bank, 2012). However, as of June 2012, over 81.4 percent of the SMCs were active and receiving grants from the Government. Trainings for capacity-building of SMC executive body members in 5,025 schools were also conducted to encourage community-led school improvements. However, these

[11] Data on education and literacy is extracted from our baseline round surveys. Literacy test were conducted for the head of the household and his spouse. The head household member scored approximately 40 percent while the spouse only scored 31 percent, on average.

[12] *Figure 5* demonstrates a typical village where we conducted the intervention activities. Villages are divided into several settlements where household residences are located. Schools are located throughout the villages, either within settlements or on roads between settlements.

trainings and capacity building support did not result in any improvements at the school level (World Bank, 2012).

While many SMCs were reactivated and several others were trained, the Government of Sindh continued to be wary of underutilization, as well as misappropriation of grant-related funds outside of the scope of acceptable usage. In 2013, as the result of the evidence generated from the baseline surveys for this study, the Government of Sindh revamped the scope of the use of SMC grants, specifically requiring all SMCs in the province to submit Bank statements and members' composition details to be eligible to receive annual funds. The idea was to stop the accumulation of SMC funds in delinquent accounts and only provide grants to schools with active SMC members and functional accounts.

To support the Government of Sindh in finding a cost-effective solution in stimulating participation of communities in schools, we designed a multi-pronged experiment. Key novel elements of the interventions included: 1) clearly defined linkages of the proposed interventions to the existing institutional structure and to resources available to the communities through SMCs; 2) continuous interaction between communities, teachers and SMC members via the Community Dialogue Platform (CDP), also allowing for anonymity of participants to sidestep the feudal power structures prevalent in rural Sindh; 3) enabling of elected representatives of the communities to sit on these committees; 4) improving the effectiveness of parents and the community in undertaking tasks, roles and responsibilities that are already mandated under the SMC's charter, instead of introducing new tools to impact a direct change in learning outcomes; and 5) setting realistic, clear and achievable targets while developing a School Improvement Plan (SIP) to ensure better utilization of the grants provided by the Government of Sindh.

3. Community Engagement: Mechanisms, Fidelity and Costs

In this section, we motivate the design of four experimental mechanisms to strengthen linkages between communities and SMCs in rural Sindh. The implicit assumption underpinning decentralization of school management functions is that it contributes to: (i) improved flow of information to local bodies – *information*; (ii) the creation of spaces to deliberate and inform decision-making – *voice*; and (iii) building institutions such as regular elections of local bodies – *action* (Mansuri and Rao, 2013). In the context of rural Sindh, the baseline data revealed that none of the mechanisms expected to evolve organically as a result of revitalization of SMCs existed in 2011, more than five years after the revitalization of these committees.

3.1 Conceptual Framework and Theoretical Predictions

The relationship between the community and the SMC executive body is best described by the principal-agent framework. We treat the community members and parents of school-going children as *principals*, whose needs and preferences should ideally be represented in SMC decision-making, and the SMC executive body members as *agents*, who are responsible for the realization of community-identified needs for school improvement. In this simple framework, community-level agents use local networks and collective bargaining power to negotiate favorable access to inputs from politicians and bureaucracy, which in the case of Sindh province in Pakistan is the Education and Literacy Department of the Government of Sindh.

Khemani et al. (2015) suggest that in the presence of weak political institutions, agents can collude with patrons to maximize their own private interests. In the context of feudal Sindh, a lack of understanding of roles and responsibilities of SMCs among community members can result in weak or dysfunctional SMC bodies, patronized by sub-district officials and head teachers. In fact, the same patron-client relationships between teachers and the line ministry is likely to reproduce itself in school-based management at the local level if proper mechanisms are not in place to side-step clientelist power structures.

Furthermore, a lack of platforms for the community to deliberate results in an absence of a communal 'voice', further insulating SMC decision-makers from community-based sanctioning. Such sanctioning can reduce agency costs to the principal – the community members. There are also less obvious effects of this principal-agent problem. For example, a lack of coordination between the community and its representatives can lead to suboptimal outcomes, leading to lower overall welfare levels. Weak parental participation in their children's education might lead to lower child interest, imposing additional time and effort costs on teachers, dis-incentivizing teachers from putting in additional effort. This coordination failure could be resolved through greater parental participation and increased responsiveness of teachers to parental demand.

To address this principal-agent problem, we employ a 360-degree intervention design. We refer to it as such because the design targets not only the information asymmetry between the community and its representatives, but also provides them with a platform to deliberate and 'voice' their concerns to elected representatives. Specifically, the interventions first empower and inform the principals (community members) of their rights and roles, and subsequently, create sustained linkages between the principals and agents to increase accountability. Therefore, the community can use its 'voice' acquired through community engagement to act on newly acquired information, making its representatives more accountable and amenable to aligning school management decision-making with community identified needs. This increases the likelihood that local school-based management decisions will reflect the needs of the beneficiaries—parents and pupils.

Thus, we move away from the dysfunctional, top-down model of accountability, whereby, government education line departments are expected to impose costs on SMC executive body members and school teachers for poor performance, which only weakly elicits communities' participation in school decision-making. Further, we are careful about not interfering with existing power dynamics at the local level, which might generate unexpected, adverse impacts. Instead, we focus our attention on connecting local communities to schools, without inducing structural changes.

FIGURE 12 about here

First 180-degrees: Informing Principals and Providing Dialogue Platforms

First, we inform and empower community members about their rights and roles as stakeholders in their children's education. We expect that instruments such as village-level meetings, customized and effectively-packaged information about SMCs, as well as information on community members' rights, roles and responsibilities related to SMCs reduce information asymmetry between principals (communities) and agents (SMC representatives). This should increase the bargaining power of the community vis-à-vis SMC executive body members.

While the information campaign provides citizens an essential understanding of their role in school-based management and feeds a sense of ownership of the SMC within the community, we recognize that this is often insufficient to produce significant change in local decision-making. Information dissemination campaigns are often more effective at inducing individual-level action rather than influencing communities to organize as a collective to demand school improvements (Khemani et al., 2015; Lieberman et al, 2014). For example, an information campaign in India aimed at galvanizing community members to influence local SMCs led to no impacts on school resource allocation, but did influence private action to improve learning outcomes among children (Banerjee et al., 2010). Therefore, evidence suggests that information alone cannot address the collective action problem, and it is critical to also provide communities with a 'voice' to engage their representatives effectively (Olken et al., 2010).

To provide community members with this 'voice', we bring community members onboard two distinct dialogue platforms: a traditional village-level meeting with facilitated discussion between village influentials and parents, and an innovative SMS-based (text message) Community Dialogue Platform (CDP) that provides parents with school-related information while allowing them to exchange views and opinions about the condition of their children's school with the SMCs.

The village-level meetings bring communities together to a particular venue, where, after information about SMCs is shared, community members are invited to discuss issues pertaining to schools in their area. This exercise provides villagers with an opportunity to discuss educational problems and solutions, and to look for allies with whom they could generate community-level collective action. However, while village-level meetings have the benefit of allowing community members to discuss educational issues face-to-face, they might also make community members more restrained while sharing their views, especially if those views are critical of local elites.

This fear of village elites' reaction to negative feedback is eliminated through the anonymity provided by the CDP to community members. Thus, the CDP provides a safe space to bring parents, teachers and SMC executive body members together on a common platform, allowing them to team up in an attempt to improve learning outcomes at the local level. The CDP's two-way channel of communication provides information regarding SMC practices to community users, but more importantly, allows for broader, as well as a more intensive dialogue between SMCs and community stakeholders. The virtual dialogue generated through the CDP platform should amplify transparency effects. Details of the CDP are explained in Section 1.2.

Even with a communal voice that could be used through collective action to engage representatives, community members might find that local institutions are non-responsive to their preferences and/or the community's representatives lack the capacity to act on the community's identified needs. For example, the agenda of the executive body might be captured by members who have not been elected to their positions, and thus, do not represent the interests of the community. Or, even if they are the true representatives of the community, they might lack the ability and human capital to navigate the cumbersome requirements to contract local services and maintain financial books. The latter half of the intervention design deals with strengthening of linkages between the principals and the agents, as well as bolstering the capacity of the agents to undertake their responsibilities effectively.

Last 180-degrees: Sustaining Linkages between Principals and Agents through Election and Capacity-Building Support

The last 180-degrees of the design aims to achieve two objectives. Firstly, it attempts to formalize and legitimize the principal-agent interface in the form of a democratically elected SMC executive body, where the community can reduce agency costs and use sanctioning to align its representatives' incentives with its own. Secondly, it aims to preclude capacity constraints within the executive body that might cause inefficient mapping of the community's preferences by its representatives.

To achieve the first goal, we provide support to SMCs through fresh democratic elections of the SMC's executive body members. Improved representation of community members can lead to improved preference mapping of community demands in decision-making at the school level. To achieve the second objective, we provide participatory trainings for the newly elected members to enable them to act on community-identified demands. The capacity-building and election support components work in tandem: sustained and healthy political engagement coupled with enhanced capacity of newly elected decision-makers can be highly effective in aligning incentives between principals and agents, in this case, parents and SMC executive body members. Pradhan et al. (2014) demonstrate how democratically elected village-level councils had the largest impact on SMC action and school improvements. These impacts are attributed to the political power of the village-level council and its accountability to citizens due to collective action taken by parents and other community members.

Within our principal-agent problem, the community can use its expanded information base, stronger voice, improved linkages and representation on the SMC executive body to align the incentives of the agent (representative) with its own. By increasing their participation in the SMC, local community members can make SMC executive body members and teachers feel monitored, and therefore, increase the latter's accountability.

In schools with low access to resources, communities might not be able to use explicit, monetary incentives to reward the performance of executive body members. However, communities can still apply negative and positive social sanctioning to improve the effectiveness of service providers (Barr et al., 2012). Such a negative sanction could be the threat of removal from the SMC executive body during the next round of elections.

Lastly, to tackle the potential issue of low capacity of the SMC executive body, a training component is introduced to strengthen the capabilities of the executive body to lead the SMC. The training provides newly elected executive body members hands-on experience to develop and budget for an annual school plan, book-keeping and processes to procure services for school improvement. Executive body members are trained to responsibly manage the SMC funds and to display the plans and actual expenditures at a visible place in the school to increase public accountability.

Thus, combined, the two 180-degree design components produce a holistic 360-degree intervention design which reduces information asymmetry between the principal and the agent, gives the community a voice – generated through intensive community engagement – and strengthens the interface of the community and its representatives. This provides the community a

chance to realign the incentives structure of the SMC executive body to address the community's demands for improvements in educational outcomes at the local level.

3.2 Description of the Interventions

Village walk-throughs were conducted by field staff to announce the time and venue of a village-level meeting between all community stakeholders (parents, teachers, village leaders and SMC members). A unique jingle was developed and played using megaphones during these walk-throughs to specifically capture the attention of parents. Further, announcements regarding the meeting were made at local mosques. On average, participation rates[13] for village-level meetings ranged from 58 percent to 69 percent across the four variants. At the meeting, participants filled the attendance sheet and provided a mobile phone number which was in use by their respective households. Following this, they listened to a foundational audio clip that contained a 10-minute long dramatized story which highlighted the importance of education and introduced the SMC to the villagers. Key messages were reinforced by the field facilitator with the help of a flipchart.

Control Group: Villages in this group did not receive any of the interventions.

T1 – Info-Meet: The first variant used a unique audio clip which contained a 20-minute long discussion on the rights, roles and responsibilities of SMC members, highlighting specific actions community members could take to improve education outcomes in schools. A moderated discussion was then held amongst meeting participants around key ideas communicated in the foundation as well as the unique audio clips. At the end of the discussion, existing SMC EB members were introduced to the villagers. Lastly, a brochure was given to villagers that provided names and contact numbers of respective SMC EB members. While the first village meeting was conducted and facilitated by the village team, villagers were encouraged to independently organize and conduct a follow-up village meeting. *Figure 11* illustrates the workflow of this intervention variant.

T2 – SMS-Meet: During the village meeting, facilitators played a customized audio clip which introduced the innovative, SMS-based mechanism, formally titled the Community Dialogue Platform (CDP). This was followed by a hands-on demonstration of the CDP by field facilitators. Nominal airtime credit was provided free-of-cost to all participants so that their participation was not constrained by a lack of credit. Further, villagers were requested to vote for two, literate members of the community to serve as community volunteers, who were tasked with assisting mobile-illiterate members of the community with sending messages. These community volunteers were incentivized through the provision of additional, performance-based airtime credit. Over the following two weeks, the project team sent short, Tweet-like messages to participants. These messages reinforced key ideas related to SMCs that were discussed during the village meeting. In addition, participants received weekly messages that summarized feedback received from the community. Moreover, Interactive Voice Response (IVR) calls were made to villagers to garner their feedback about the CDP. *Figure 14* provides a description of the communication channels created by the CDP. *Figure 11* provides the work flow for this intervention. On average, 43 users

[13] The number of unique households present at village meetings as a fraction of total number of unique households in the village as given in project census data.

registered per village under T2 – SMS-Meet. Across T2 villages, there was an average registration rate of 65 percent.[14]

FIGURE 14 about here

T3 – Info-Meet-Support: Under T3, community members participated in fresh elections of the SMC EB. The Taluka Education Officer (TEO) presided over the elections of the EB to ensure compliance and to officially transfer responsibility for the functioning of the SMC to newly elected members. The TEO was also present during the village-level deliberation on school issues. Following this, freshly elected EB members were provided with hands-on training during three, structured meetings conducted over a three-week period. During these meetings, newly elected members also drafted a School Improvement Plan (SIP) with community input. The SIP was publically displayed with the purpose of increasing upward accountability (from community members to SMCs) to adhere to funding the improvements described in the SIP.

Implementation of T1 and the T1 subcomponent of T3 (Info-Meet) cost a total of USD 129,059, with USD 27,083 going into design costs and USD 101,976 serving as operational costs. Thus, implementing the Info-Meet component of T1 and T3 cost approximately USD 1,085 per village[15].

T4 – SMS-Meet-Support: This variant built on T2, and its elections and capacity-building elements were the same as T3. However, while the TEO presided over the election, he was not present during the demonstration of the CDP. Across T4 villages, there was an average registration rate of 61 percent. The overall average registration rate stood at 63 percent. This represented a high level of registration across the target population given estimates of mobile phone penetration rates reported for rural Sindh.[16] Further, attendance at EB trainings was high across districts as well as treatment arms (Info-Meet-Support and SMS-Meet-Support). Attendance at the three training sessions was never less than four out of five members in any of the villages across the three meetings. Details on village meeting and EB training session participation rates, as well as CDP registration rates are provided in *Table 2*.

TABLE 2 about here

The Intervention Design: Activating the Conceptual Framework in the Field

The information, voice and action components of the conceptual framework are generalizable across all four intervention variants. Each of the interventions starts with the provision of information and creating spaces to deliberate on school-related issues through collective "voice" of the community. We experimentally vary the way communities deliberate, for example, by varying the nature of the platforms provided, as in T1 (face to face village-meeting) versus T2 (ICT enabled community dialogue platform). In the cross-over design, we attempted to accelerate the creation of more responsive and effective executive bodies of SMCs by holding elections and

[14] The number of unique, registered contacts as a fraction of the number of unique households represented at village meetings.

[15] T1 Info-Meet and T3 Info-Meet-Support were implemented in a total of 119 villages. We look at the costs of the common elements of these two interventions in our cost effectiveness analysis.

[16] Project census data from 2012 indicates that on average, 74 percent of households at the village-level and 78 percent of households at the main settlement-level have access to a mobile phone.

providing capacity building support to new members, instead of waiting for the communities to do so themselves, as in T1 and T2 (no elections and capacity support) versus T3 and T4 (elections and capacity support).

4. Sample, Timeline, and Survey Content

4.1 Sampling Framework

This study took place in three districts of rural Sindh. Using the Pakistan Social and Living Standards Measurement (PSLM) survey we ranked all districts of Sindh by: i) education attainment of adults, and ii) primary school participation rates. To ensure the chosen districts are representative of diverse typology of rural Sindh, a large-, median- and small-sized district each was picked from available choices, in consultation with the Government of Sindh and by taking into account the safety of field teams.[18] Mitiari, Mirpurkhas and Sanghar were selected as the study districts, spanning rural areas of Sindh, Pakistan.

Sampling at the Village Level

The Annual School Census (2010-11) was used to set the sampling frame for villages and schools. The research team analyzed the distribution of talukas,[19] villages and schools across the three districts. To ensure that the sample was representative of the districts' school characteristics, we employed probability-proportional-to-size (PPS) sampling strategy, creating selection probabilities proportional to the number of students enrolled in primary schools per village.

550 schools were randomly drawn at this stage from 377 administratively-mapped villages from the school census. The village names and locations in the administrative data were unreliable and hence the school location in each of these villages were used to visit and map the village profile. 300 villages[20] were mapped in the village census exercise using a randomized ranking procedure.

Sampling at the School Level

Due to the relatively poor quality of the administrative data, we conducted a listing of all schools at the primary level in the 300 villages to update the sample. Our listing resulted in a mapping of 1,617 public primary schools and found 379 of these permanently closed[21]. Using village-level focus group questionnaires implemented as part of the village census exercise, we identified the

[18] Matiari was ranked the third smallest district, Mirpurkhas was ranked 12th, and Sanghar was ranked 18th. In terms of education indicators, Mirpurkhas had one of the lowest levels of education outcomes followed by district Matiari, while Sanghar was among the highest. They were deemed relatively safe by the Government for field teams to visit.
[19] The hierarchy of administrative units is as follows: federal, provincial, district, taluka, union council, village, and settlement.
[20] In order to select 300 villages from 377 (per our evaluation design), a village mapping firm identified and listed all schools in each village in the rank-order specified, until they hit the maximum sample of 300 villages. They were allowed to skip villages only when i) schools were not found in listed revenue villages due to noisy administrative data; or ii) field-teams were denied permission by local resident to enter the village. However, the number of such cases was negligible, with total replacements amounting to less than 20 villages.
[21] Permanently closed status refers to a school that has been closed for a year or more.

central settlement, or historic center of village political and economic life, and used this as a location for conducting village meeting in each treatment arm.

The school sampling strategy for the baseline covered public primary schools that were open on the day of the visit or closed for a period of less than one year prior to the day of visit. We sampled all such schools covering a total of 299 schools from 224 villages. In addition, we also covered 15 percent of schools (a total of 54 schools) in other settlements within the village. For villages that did not have any school in the central settlement, a maximum of three schools were surveyed from other settlements based on their total enrollment, adding another 132 schools from 63 villages. There were 9 villages that did not have either a functional or temporarily closed school in any of the village's settlements, so we included all schools (a total of 16 schools) even if they were closed for a period of more than one year. Four villages had to be dropped because no school was found during the village-level mapping of primary schools. Our final sample consisted of 501 schools across 296 villages.

At the time of data collection, the baseline field team faced political resistance and was denied entry in four of our sample villages. This reduced our final baseline sample to 292 villages. Afterwards, extensive quality checks were performed on the baseline data – five villages that did not meet the benchmark due to poor quality or incomplete surveys were dropped from the study. Overall, we concluded with a final sample of 287 villages.

To better reflect on the mechanisms through which the interventions effected outcomes, we also conducted comprehensive Case Studies in 40 schools that were selected using the Purposive Sampling Strategy. The sampling frame included schools that received treatment (i.e. Info-Meet/SMS-Meet/Info-Meet Support/SMS-Meet Support) and were covered in both baseline and endline surveys.

To fully capture the heterogeneity of treatment-induced changes in a wide spectrum of treatment villages, two groups of 20 schools each were drawn from the treatment groups. The first set of 20 schools was drawn using intermediate performance indicators[22]. Based on these indicators, we categorized schools as high, mixed, stagnant or low performing schools and then randomly selected two high, one mixed, one stagnant and one low performing school[23] from each of the four intervention bins in the sample.

The second set of 20 schools was drawn using outcome performance indicators, i.e. student achievement. These schools were purposively selected in the SMS campaign treatment block, as we measured strong impacts on intermediate indicators and found some evidence of improvements in test scores for these groups in the quantitative analysis. We therefore ranked treatment arms

[22] Performance indicators: a) change in student attendance to enrollment ratio, b) change in school infrastructure index, c) change in SMC executive body (EB) meetings, d) SMC funds utilized in the time period between the baseline and endline activity (yes or no indicator) and e) intervention knowledge of school Head Teacher respondent

[23] *High performing* schools show positive, significant change on at least three of the five performance indicators. *Low performing* schools show negative, significant change on at least three of the five performance indicators. To categorize *mixed* and *stagnant* performance, only three performance indicators have been taken into consideration: change in student attendance to enrollment ratio, change in school infrastructure index and change in SMC executive body (EB) meetings. Schools that show significant change, positive or negative, on 2 out of these 3, with the third indicator moving in the opposite direction (with significant change) have been categorized as *mixed.* Schools that show significant movement on only 1 (or none) of these indicators have been categorized as *stagnant*.

based on pooled test scores averaged at the school-level. Within SMS treatment arms we categorized schools as high achievement schools and moderate achievement schools[24], and then selected five schools from each of these categories and from each treatment arm.[25]

Survey Content

In both the baseline and endline, the school surveys collected detailed data on school-level variables such as enrollment, attendance, teacher on-task, facilities, infrastructure, SMCs, funding and expenditure. The field team collected teacher rosters to retrieve data on the total number of teachers on staff and teacher presence. The head teacher questionnaire collected information on the functionality of the SMCs. In addition, Learning Assessment Tests (LATs) were administered to randomly selected students and teachers.[26] [27]

Power Calculations

The primary outcome measures on which sample size was determined at the school level are the school's functionality, school's infrastructure, total registered teachers and total student enrollment. We find that our study is powered to detect effect sizes of 25-29 percent[28] for these outcomes. For student test scores, we conduct an ex-post power calculation using endline normalized Learning Assessment Test (LATs) data. We find that our study is able to detect effect sizes of 28-29 percent of changes in student test scores at the school level and 20-24 percent at the student level. This power calculation is based on cluster random assignment, with the school serving as the primary sampling unit or level of inference.

4.2 Timeline

We collected data over a four-year period, through one village census and school-mapping exercise, and two survey-based data collection exercises. The first data stream was a census of households and schools in the three districts (2011)[29]. The second was a baseline survey (2012) of communities, households, schools, teachers and students. The initial plan of action was to collect all baseline data in the first half of 2012. However, due to heavy rains in Sindh province, the data was collected in two rounds instead. These two rounds cover the time periods April 2012 to June 2012, and October 2012[30].

We conducted a comprehensive endline school survey from January 2015 to March 2015. The quantitative survey exercise included two phases: Phase A comprised surprise visits made to

[24] *High achievement* schools performed 1 deviation point above average test scores for the treatment arm and *Moderate achievement* schools performed within 1 deviation above average test scores.
[25] During the field implementation one school was replaced giving a final sample of 9 SMS-Meet schools (5 High and 4 Moderate achievement schools) and 11 SMS-Meet Support schools (5 High and 6 Moderate achievement schools). *Tables 24 and 25* show distributions for the case study sample and its characteristics.
[26] Student tests administered to teachers follow an SDI style knowledge assessment in which teachers were asked to mark a random student's completed exam.
[27] See *Appendix: Survey Content (page 78)* for a report on all survey content from baseline and endline data collection.
[28] Power calculations reflect significance levels of 0.05 and R^2 of 0.5. See *Tables 12-17*.
[29] We mapped 1719 schools and 181,061 households at the census round of data collection.
[30] The baseline survey also covered 6,506 households. Both the head of the household and his/her spouse were surveyed and LATs was conducted from 5281 children. We are currently working on a complementary paper that focuses on the demand side impact of treatments.

schools in January 2015. In Phase B, announced visits were made to all schools in the sampled villages between January 2015 and March 2015. We also conducted child-level testing in class gatherings during the same time period. Revisits to residual schools or schools where we faced data collection problems were made in October 2015. This was followed by the qualitative study conducted between September 2015 and November 2015.

5. Descriptive Statistics

Summary statistics presented in this section reflect findings from baseline data unless stated otherwise. For more details, please refer to the consolidated descriptive statistics provided in *Table 3*.

TABLE 3 about here

The total number of villages in the analysis sample is 284.[31] On average, there are approximately 6 government primary schools in every village as per our census data. On average, nearly half of the schools in each village, were found to be closed[32] in unannounced visits at the time of school mapping for village census. Compared to public primary schools, the number of private primary schools in the target area is low. Of the 284 villages in the sample, only an estimated 13 villages have private schools. This indicates that local communities do not have ample schooling options in rural areas of Sindh, and have no choice to exit the public schooling system for better quality of education of children. This is further verified through the baseline survey where we find that 84 percent of all sampled teachers reported sending their school-age children to public schools.

In our analysis, we took a closer look at the public school system examining a sample of 488[33] schools using the census data. A large percentage of schools were found to be closed during the census mapping: approximately one out of every five schools surveyed was found to be non-functional.[34] Recall that our sample includes schools in 9 villages that did not have any functional or temporarily closed schools.[35]

We also find evidence of low teacher registration rate in these schools. On average, only 2.3 teachers are registered per school. 44 percent of the schools in the sample were found to be one-teacher schools. Summary statistics also reveal a gap between teachers registered and present per school. The teacher absenteeism rate was 8% on unannounced visits to schools.

Of the present teachers**,** most have a relatively weak knowledge of their specific content areas. At

[31] The interventions were successfully implemented in 287 villages. However, after extensive data quality checks we had to drop the baseline data for another 2 villages (Sadrat and Khipro in Sanghar) and 1 village (Jhun Jani in Sanghar). For analysis purposes, we limit ourselves to schools common to both baseline and endline. Therefore, we are left with a sample of 488 schools from 284 villages. All summary statistics reported are for the 284 village sample only.
[32] Closed permanently or temporarily.
[33] 9 out of 488 schools were dropped because they were not found during the census round of survey leaving behind a sample of 479 schools.
[34] A school is considered to be 'functional' if it is open during an unannounced visit by the survey team and' non-functional' otherwise.
[35] So we cannot differentiate between permanently closed schools and temporarily closed schools in our entire sample. However, noting that these 9 villages compose only 2 percent of our total sample, census data confirms a high rate of non-functional schools and provides evidence of temporarily closed schools in the region.

endline, we tested teachers' command over the subject matter that they are expected to teach at school; we found that teachers' knowledge score on English was 73 percent on average while their Mathematics score was 82 percent on average. Since these tests were the same as the ones administered to students, the findings suggest that not all teachers have a strong command of the subject content they are teaching. There was also a large variation in these scores, with 10th percentile English and Math scores at 47 percent and 63 percent respectively. As most students come from uneducated households and often rely solely on classroom content, teacher knowledge is expected to have a strong impact on student learning; indeed we find that teacher scores are strongly correlated with student performance at 0.24 for English and 0.16 for Mathematics[36].

In terms of school infrastructure, this study focuses on four facilities that are essential for a safe, secure, and comfortable school environment for pupils. This includes a well-built boundary wall, functional access to drinking water, access to and availability of electricity and availability of functional toilets. Community members repeatedly mentioned the lack of these facilities in schools in the dialogue generated in both SMS-Meet and SMS-Meet-Support treatments. Aggregating these messages revealed a high preference at community level for improving these facilities (see *Figure 6A*). An infrastructure index, composed of these four components, has an average value of 1.40 out of a maximum of 4 for this sample, indicating inadequate facilities in schools.

The lack of infrastructure reflected strongly when we looked in detail at particular facilities: only 30 percent of schools had a boundary wall in satisfactory condition and 42 percent had functional toilets. Of these, a dismal 28 percent of schools had girls toilets available, which might also effect female teacher absenteeism. School hygiene in general was slightly more favorable, with 90% of the schools observed to be clean from the inside and 79% of schools not having a garbage pile or stagnant water standing outside their boundary wall[37].

Lack of electricity and drinking water are also likely affecting student attendance and learning in the region. Only 22 percent of schools had availability and access to electricity. This is crucial, since temperatures in the province can rise above 40 degrees Celsius (above 100 degrees Fahrenheit) between May and September, and access to electricity is needed to power fans and ensure that students are comfortable during the summer months. Coupled with the fact that on average, only 45 percent of all schools have functional access to drinking water, this makes attending school during the summer months difficult for students and teachers.

In order to create an environment conducive to learning, it is also important to have the physical capacity to hold classes. The schools in our sample have an average of 2.16 classrooms available. However, when enumerators observe classrooms that were actually used by teachers to hold lessons, this average drops. On average, only 1.61 classrooms are in use; schools are not fully utilizing available capacity.

Moreover, a large percentage of schools were found to be affected by the floods of 2011. On average, 66 percent of schools in sample villages reported being affected by the flooding in some way. Massive flooding in Sindh province turned many schools into shelters for displaced

[36] Because of strong correlation, we control for teacher content knowledge in our analysis of child learning outcomes.
[37] Questions on hygiene conditions inside and outside school include yes or no options based on the enumerator's discretion. We do not see any major fluctuation across treatment and control groups based on these measures. However, we recognize the limitation of our survey in providing detailed information on this front.

populations, adversely affecting the academic calendar of those schools. Furthermore, the flooding destroyed existing school infrastructure, such as boundary walls, classrooms and other facilities in several of the villages. The baseline activity was purposively delayed by almost a year after the census to capture the status of schools once conditions had normalized in 2012.

With regards to school size, the survey results show that on average, 63 students are enrolled in each school (from Katchi to Grade 5), yet a sizeable gender gap exists in enrolment, with 51 boys and 26 girls being enrolled on average. This can be explained by the disparity in the numbers of boys and girls who enter the school system each year; while there is an intake[38] of 21 boys into Katchi and Grade 1 on average, this number falls to a mere 11 for girls.

We also assessed student learning using specially designed Learning Assessments (LATs) for Math and English.[39] Unsurprisingly, students performed poorly on all subject areas. Students, on average, scored 46 percent on Math and 37 percent on English, with large variations – the standard deviations on Math and English scores are 26 percentage points and 24 percentage points, respectively. Interestingly, these scores are higher than the students' expected scores – the scores that students' perceived they would get on such an exam. On average, students expect to attain 31 percent on the Math test and 21 percent on the English test. Details on the composition of these tests are provided in *Table 21*.

6. Research Design

The evaluation follows a clustered randomized control trial (RCT) to construct a counterfactual in order to causally determine the impact of four community engagement and linkage mechanisms on improvements in school outcomes. We randomly assign villages to one of the four treatment bins or the control group, and we randomly selected households within each village to respond to baseline and endline questionnaires. The unit of randomization is the village and the school is the unit of inference. Since assignment to one of the four treatment bins or the control bin is independent of any confounders – observed or unobserved - selection bias is eliminated leading to an unbiased intention-to-treat (ITT) estimator[40]. Comparing the four treatment groups to the control group measures the impact of the interventions on school functionality, school infrastructure improvements, teacher characteristics and student achievement. These impact analyses provide insights into the channels in which the interventions operate, allowing us to test our conceptual framework.

By comparing outcomes in Info-Meet and SMS-Meet treatment groups with the control group, we can find the impact of facilitating different types of linkages between community members and the SMC. In addition, by comparing the outcomes between these two treatment arms, we can identify the differential impacts between the CDP and the village-level meetings with facilitated deliberation on school issues. By comparing the Info-meet-Support and SMS-Meet-Support

[38] School intake is defined as student enrollment in Katchi and Grade 1. Katchi is preprimary or ECE education.
[39] Scores reflect any Grade 3, Grade 4 or Grade 5 student who attempted at least one question on the Mathematics or English tests. There were 23 total questions on the Mathematics test and 24 total questions on the English test.
[40] We focus on the intention-to-treat estimator as treatment effects are subject to take-up rates (some treated units may register low or no participation in treatment) as well as contamination due to spill-overs (some control units may register effects of treatment in neighboring areas). In our analysis, we correct for the latter by dropping observations on schools which neighbor control settlements as robustness check (reference Table).

interventions to Info-Meet and SMS-Meet respectively, we can discuss the value added by institutional change and capacity-building. Lastly, we can test the impact of the presence of the Taluka Education Officer (TEO) on linkages between the SMC and the community members by comparing the results of Info-Meet-Support with the impacts of the other intervention arms.

6.1 Balance and Attrition

The treatment and control groups are balanced in terms of baseline statistics for covariates and outcome variables. Randomization was successful in creating representative samples within all four treatment groups and the control group. Balance checks conducted for this experiment are provided in *Table 1*. Further, to ensure that the treatment and control groups remained balanced even after potential attrition of the sample over the course of the project, an attrition analysis at the school-level was conducted. The results of this analysis are provided in *Table 18A*. We see that attrition of the sample in our study did not bias the balance of the outcome variables including test scores for tracked students.

6.2 Controls

We find that village size and school enrollment varies between villages after randomization. We control for both heterogeneities in village size and school enrollment in our impact estimates by clustering standard errors at the village level and controlling for baseline school size respectively. Furthermore, we control for the massive flooding that occurred in the province in 2011 by using an indicator for whether the school was impacted by a flood or not. Common shocks and district-wise idiosyncrasies and heterogeneity in district-level participation rates in meetings are controlled for by including district fixed effects in all regression models.

6.3 Sample for Analysis

We begin with a full sample of 488 schools in 284 villages in three districts of rural Sindh that were tracked at both baseline and endline. To measure the impacts of the interventions on school functionality, we limit our sample to the 479 schools which provide complete data for school functionality status during unannounced visits at both baseline and endline[41].

School functionality status affects the ability of our field team to capture complete data on school outcomes such as the proportion of teachers absent and student enrollment headcounts. For example, if a school was found closed during an announced visit at baseline but was opened during the announced visit at endline, our analysis for such schools lacks any baseline values for control variables. Furthermore, we find that school functionality is dynamic between announced and unannounced visits. This means that schools may be found closed during the unannounced visits even if they were open during the announced visit.[42]

We find that schools for which functionality status switches from closed to open during the intervention vary in other characteristics compared to schools that remain open. In order to avoid

[41] 9 schools from the baseline lacked any recorded data on school functionality for the unannounced visit and, therefore, were excluded from the sample.

[42] 84 percent of schools experienced no change in school functionality status, 16 percent of schools switched from closed to open, and 11 percent switched from open to closed at the time of the visit.

any bias in our impact estimates caused by schools that have recently opened[43], we limit our analysis sample for all school-level outcomes (except school functionality) to schools that were found open during the announced visits at both baseline and endline. Since switches in functionality are a major change, we do not know how representative the switcher schools are of the total sample and therefore, do not include them in the final sample.

6.4 ANCOVA Estimation

We recover a final analysis sample of 387 schools, referred to as the fully functional sample, for all outcomes other than school functionality status.

The RCT design allows us to employ an Analysis of Covariance model (ANCOVA) to improve the power of the study. We use the ANCOVA model since it allows us the benefit of a better-powered study, without having to incur the cost of multiple baseline surveys. As McKenzie (2012) suggests, a difference-in-differences estimator that yields equal power to the ANCOVA estimator would require twice the sample size; with our sample of 387 schools, we trade the precision of the estimator for the power and opt for ANCOVA, even though we report difference-in-differences results for all our regressions[45]. Although autocorrelation in education outcomes may affect the validity of our empirical design, we understand that the existing low levels of educational outcomes preclude this concern. We employ the ANCOVA estimation specification for all outcome variables with distinct baseline and endline values. The estimation specification for ANCOVA, for school *i* in village *v*.:

$$Y_{i,v,d,endline} = \beta T_v + f X_{i,v,d,baseline} + \ u_d + \varepsilon_{i,v,d} \qquad (1)$$

Where $Y_{i,v,d,endline}$ is an outcome variable at endline for school *i* in village *v* and district *d,* and T_v is the vector for village-level treatment indicators. $X_{i,v,d,baseline}$ is a vector of baseline school-level controls. Within this vector of baseline controls, the ANCOVA model holds the baseline outcome variable constant, in turn adding explanatory power and improving the precision of the impact estimate. u_d denotes district-level fixed effects. The standard errors are clustered at the village level (the unit of randomization)[46] .

6.5 Single Difference Estimation

We also present results from single difference estimation, whereby our dependent variable measures the any positive change in outcomes between the baseline and endline values. This dependent variable is agnostic to any negative changes in school outcomes, and carries values of zero if no change occurred between baseline and endline and one if a positive change did occur. We use this empirical strategy as results from the qualitative interviews suggest that treatment led

[43] We test for differences in means between schools that were open for several years and schools that were closed at the baseline but recently re-opened at the endline. We find significant difference in terms of enrollment, teacher presence, infrastructure and student performance.

[45] Compared to difference-in-differences (DID) estimation, ANCOVA has greater statistical power, particularly when autocorrelation in the outcome variable is low and a baseline is taken (McKenzie, 2012).

[46] As a robustness check of the ANCOVA specifications, we employ difference-in-difference (DID) estimations for all outcome variables used in ANCOVA. The magnitude of effect sizes remains largely similar between the ANCOVA and DID results. *Tables 6-8 and 19* include both ANCOVA and DID results by outcome category.

to either improvements in school-level outcomes, or no change in school outcomes. We therefore assume that declines in school outcomes, if they occurred, are outside the scope of our study and independent of treatment assignment. The differenced outcome variable(s) incorporate both the baseline and endline status of key school outcomes, measuring whether 1) school functionality improved, 2) the school received an additional teacher, and 3) the school improved classroom availability or classroom usage.

We employ a Single Difference specification in order to measure the impact of treatment on school improvements. The specification for Single Difference is presented as follows:

$$Y_{i,v,d} = \beta T_v + f X_{i,v,d} + \ u_d + \varepsilon_{i,v,d} \qquad (2)$$

Where $Y_{i,v,d}$ is an outcome variable for school *i* in village *v* and district *d,* and T_v is the vector for village-level treatment indicators. $X_{i,v,d}$ is a vector of school-level controls.

6.6 Impact on Intermediate Outcomes

We assert that to induce positive, final outcomes, a set of intermediate outcomes will be impacted by treatments. For final outcomes such as greater school functionality and higher average student test scores, the community must come together to demand better services at the school level. The next step for the community is to ensure that their collective voice is reflected in the decision making process at the school level. For this, the community must a) engage in collective action to exert pressure on SMC members and other relevant stakeholders (influentials, sub-district officials) to increase inputs received by the school; and b) to increase accountability of SMC executive body members in ensuring they comply with the decisions reached collectively by the community.

Thus, we expect improvements in school functionality and student test scores to come about through changes in intermediate outcomes. These include both the expected increase in inputs, such as a change in the number of teachers, or improvements in funding levels for infrastructure, as well as improvements in technical efficiency, whereby the same inputs are used more efficiently. For the latter, we assess the impact of the treatment on intermediate outcomes such as the attendance rate of teachers and the enrollment levels of students at schools.

The table below lists the key outcomes measures on which we expect to see an impact from the set of interventions implemented in the field experiment:

Impact On:	**Outcome Measure:**	**Empirical Approach:**
Teachers [see Table 4A]	Total number of teachers working at the school	ANCOVA
	School received an additional teacher	Single Difference
	Proportion of teachers absent	ANCOVA
	Total Number of Teachers Present	ANCOVA
Infrastructure [see Table 4B]	Number of classrooms available	ANCOVA
	Number of classrooms in use for lessons	ANCOVA
	School has an additional classroom available	Single Difference
	School has an additional classroom in use for lessons	Single Difference
	Infrastructure Improvement	Single Difference[49]
School Enrollment [see Table 4C]	Katchi to Grade 5 enrollment, disaggregated by sex	ANCOVA
	Katchi to Grade 1 enrollment, disaggregated by sex	ANCOVA
School functionality [see Table 4A]	School is open on an unannounced visit	ANCOVA
	Dynamic shifts in school functionality	Multinomial Logit[50]

7. Results

We present the results according to three categories: a) the extent to which community members engaged in collective action and influenced SMC executive bodies to implement improvements beyond their stated responsibilities, such as large-scale infrastructure improvements that required additional funding besides SMC grants and lobbying for an additional teacher; b)the extent to which interventions motivated the SMC executive bodies to comply with their responsibilities and duties to the communit which include improving school infrastructure, monitoring teacher and student attendance, and getting out-of-school students to enroll in school; and c) the systemic impacts on school functionality and student test scores, brought about by changes in intermediate outcomes.

[49] The Infrastructure Improvement Index (ranging from zero to four) accounts for four main functional components essential to a highly functional school: i) boundary wall, ii) electricity and electrical items, iii) drinking water and iv) toilets. Each component is represented through a dummy variable that takes a value of 1 to denote improvement in its condition at the endline as compared to the baseline. We sum these indicators to create an index that has values between 0 and 4, capturing the range of indicators where the school could have shown possible improvement and to identify schools that have shown improvement in multiple areas between baseline and endline.

[50] As a robustness check for school functionality results, we employ the Multinomial Logistic regression specification on a categorical variable for school functionality status to capture the two-way effect of changes in school functionality between baseline and endline. We construct an indicator of school functionality with values of -1, 0, and 1. A value of -1 indicates that the school was open in the baseline but closed at endline; a value of 0 indicates no change in status from the baseline to endline while a value of +1 indicates that the school was closed in the baseline but open at endline. We report the marginal effects of the treatment on the propensity of schools in each treatment bin to experience a change in functionality status compared to control schools. The results are largely consistent with the results from the ANCOVA model, and are available to review in *Table 5*.

7.1 Did treatment induce collective action through strengthened linkages?

Teachers

We begin by demonstrating evidence that community members collectively demanded that SMCs and school decision-makers lobby for additional teachers in treatment villages. Using the sample of 387 fully functional schools, we find that schools in nearly all treatment groups, with the exception of Info-Meet-Support, are more likely to have received an additional teacher between baseline and endline. Schools in the SMS-Meet treatment had the strongest impact, suggesting some form of collective action at the community level to get more teachers for the school in treatment communities. On average, schools in SMS-Meet were 13 percent more likely to receive an additional teacher compared to schools in the control group. ANCOVA estimates confirm that SMS-Meet schools experienced gains in the average number of teachers staffed in schools robust to baseline controls. See *Tables 4A* for details of the treatment effect on teacher outcomes.

TABLE 4A about here

Infrastructure

While all treatment bins showed improvement in classroom construction,[51] SMS-Meet-Support schools showed the most improvement, with schools in this bin being 13 percent more likely to have another classroom available compared to control schools. The result is significant at the 5 percent level. This suggests that newly elected executive bodies in the SMCs had strong incentives to fulfill their electoral mandate, particularly when the demand for additional classrooms was reinforced by community members through the CDP channel.

For utilization of an additional classroom for lesson, Info-Meet and SMS-Meet-Support register positive and significant results. On average, Info-Meet schools were 15 percent more likely to have an additional classroom in use compared to the control group. The improvement in the Info-Meet bin suggests that SMCs in these schools have prioritized repairs to the existing classroom infrastructure. We see that SMS-Meet-Support schools are approximately 17 percent more successful in utilizing an additional classroom for lessons compared to control schools.

These results also hold out for the SMS-Meet-Support treatment bin in the single-difference estimations. The last three columns of *Table 7* shows that schools that received the SMS-Meet-Support treatment implemented infrastructure improvements; the single difference coefficient is positive and significant for classroom availability, classroom usage as well as for the infrastructure index which encompasses electricity usage, boundary wall condition, toilet functionality and access to clean water. The levels of improvement in the index are higher in the intervention school sample, but SMS-Meet-Support remains the only statistically significant intervention, even when controlling for flood and school size at the baseline. Therefore, schools in SMS-Meet-Support were most capable of overcoming the barrier to financing infrastructure improvements that were the most commonly cited issues on the CDP. See *Table 4B* for treatment effects on the infrastructure index.

[51] The qualitative component of the study reinforces this finding, indicating that schools in many treatment arms are spending money on repair and maintaining school infrastructure.

TABLE 4B about here.

7.2 Did treatment influence SMCs to comply with their responsibilities and duties?

Teachers

Though SMCs have an important responsibility to ensure teacher presence in the schools of rural Sindh, we find that teacher attendance does not improve alongside growth in the number of total registered teachers. We find no systematic effects of treatment on total teachers present, inferring that the interventions did not improve the SMC's ability to comply with this mandated responsibility. Teacher absenteeism is a problem deeply entrenched in the public education system in Sindh. According to our analysis, there appears to be a higher proportion of teachers absent in all treatment bins compared to control with statistically significant results for Info-Meet and SMS-Meet schools, even when controlling for baseline levels of teacher absenteeism.

The literature discusses why treatments related to community engagement might not necessarily work in reducing teacher absenteeism. The community might lack any formal authority to reward or punish teachers, hence has little control over teachers (Kremer and Vermeesh, 2005). Moreover, in cases where the head teacher is responsible for monitoring teacher presence, there is a possibility of 'cheating', bending rules or favoring some specific teachers (Kremer and Chen, 2001). Furthermore, our community engagement and capacity-building interventions did not embed formal systems for continual monitoring of teacher and student attendance, but rather relied on collective action and linkages as the pathway to improve the functioning of the SMCs.

It is also possible that having additional teachers received in the school reduced the burden on any one teacher, making the others delinquent. Evidence from an experimental evaluation of teacher incentives programs in Kenya reveals that hiring of additional teachers increased teacher absenteeism rates (Duflo et al. 2015). In order to investigate, we run a sensitivity analysis of the proportion of teachers absent on all one-teacher schools at endline, effectively removing all schools that gained an additional teacher between baseline and endline. *Table 9 (collate tables)* shows that there are indistinguishable impacts on teacher absence for all treatment effects, signifying that the results of increased teacher absence are driven by schools that received an additional teacher over the course of the study. This provides evidence that receiving an additional teacher may dis-incentivize regular teacher attendance.

Student Enrollment

The interventions seem successful in influencing SMCs to get out-of-school children into school. We find that boys' enrollment in Katchi to G5 increased by an average of 21 percent in the SMS-Meet schools compared to schools in the control group, with the results significant at the 5 percent level. Robustness checks confirm this increase in enrollment; difference in difference analysis suggests that schools in the SMS-Meet intervention, on average, experienced an increase of 22 percent with results significant at the 10 percent level. Furthermore, we find that SMS-Meet-Support schools, on average, experienced a 20 percent increase in boys' early grade intake (Katchi to G1) compared to control schools after controlling for baseline enrollment rates; the results are weakly significant at the 10 percent level. This indicates lower primary dropout rates. The higher enrollment for boys also influences the coefficients on the overall class size for both boys and

girls.[52] We are not reporting combined enrollment results, but it can be made available upon request. See *Tables 4C* for treatment effects on student enrollment for Katchi to Grade 5, and Katchi to Grade 1, respectively.

TABLE 4C about here

7.3 Did treatment impact longer-term outcomes such as school functionality and student achievement?

School Functionality

Improvements in intermediate outcomes such as more teachers in schools, and functioning classrooms appear to have resulted in a positive change in school functionality for most intervention groups. Schools in all treatment bins except for Info-Meet-Support were more likely to be found open compared to schools in the control group (*Table 4A*). Info-Meet schools were 10 percentage points more likely to be found open on an unannounced visit compared to control schools.

These results are further bolstered by the multinomial logit estimates. The marginal likelihood of schools in the Info-Meet intervention of switching from open to closed status is statistically less likely, compared to schools in the control group. As an additional robustness check, we computed the transitional probabilities of switching school functionality status. They are consistent with results from the multinomial logistic regressions; we see that all treatments except Info-Meet-Support are more likely to switch from closed to open compared to the control.

TABLE 5 about here

Student Test Scores

We investigate student test scores to estimate if the interventions have helped improve learning outcomes. We build our analysis at two levels: i) student level where the same child is tracked in school and tested at both baseline and endline, and ii) the school level where all student test scores of grades 3 to 5 (irrespective of tracking status) are averaged at the school level. We are limited by our sample count at the student-level analysis because not all students could be successfully tracked from the baseline to endline. This was either because the student was absent on the day of the visit at the endline, or had dropped out of school. Further, we limit our sample to only tracked children in grades 3, 4 and 5 who attempted at least one subject question.[53]

We only find that students in the SMS-Meet-Support treatment experienced an increase in normalized Mathematics scores, on average, compared to control students by a margin of 0.3 standard deviations. Mixed results on learning outcomes exist in previous literature: a community-

[52] Student attendance rates are unaffected by treatment. This finding aligns to the results on teacher attendance. Recall that the interventions did not include any activity to improve regular school monitoring, but relied on improved community engagement and linkages to SMCs. Table can be provided upon request.

[53] We do not find any evidence of differential attrition of tracked students across treatment groups. Details can be provided upon request.

based information campaign in India increased the share of grade 3 and 4 children in Uttar Pradesh who could do divisions by 60 percent, yet children in other states/grades did not show any significant improvements (Pandey, Goyal and Sundararaman, 2008 and 2011). Further, in Pakistan, *report cards* with school and child test scores increased mean test scores in treatment villages in the province of Punjab by 0.11 standard deviations (Andrabi, Das and Khwaja, 2013). However, other similar information-based interventions did not prove to be effective in India or Nepal (Banerjee, 2010a; Chaudhury and Parajuli, 2010b). As in these studies, however, the results are only significant for mathematics scores but not very robust. In our school-level analysis, we fine no significant results for any treatment bin in either subject.

TABLE 4C about here

7.4 Threats to internal validity

Using geospatial analysis (GIS), we find that 5 percent of intervention villages are located 1-2 kilometers from the nearest control village.[54] This proximity may endanger the validity of the impact estimates if contamination of treatment occurred in control schools and villages. The assumption that no contamination occurred is referred to as the Stable Unit Treatment Value Assumption (SUTVA) (Wooldridge 2012). This requires that the treatment of one unit should be unaffected by the assignment of treatment to other units. The relatively close distances between control and treatment schools heighten the probability of contamination, a direct violation of the SUTVA assumption.

In order to test that contamination did not occur, we dropped all treatment schools in villages located at least 1 kilometer from control schools, and we conducted the analysis on this limited sample to identify any significant changes in the size of coefficients and standard errors. We find that the results remain consistent in magnitude compared to our earlier results, suggesting that contamination has not biased the impact estimates reported within the full sample and fully functional sample of schools.[55]

8. Mechanisms

The qualitative study gives an insight into how the intervention mechanisms influenced collective action on the part of community members and strengthened linkages between SMCs and the communities. We report the main findings from the qualitative study on how the mechanisms influenced changes in intermediate outcomes such as improvements to teachers, enrollment and infrastructure.

Teachers

The case studies reveal that the number of teachers registered in a school is not only dependent upon the Government's policy for teacher assignment but also on the efforts made by the

[54] The mean distance between a treatment school and the nearest control school is 7.41km; the median 5.83km, and the standard deviation 12.67km.

[55] *Tables 20A, 20B and 20C report results with restricted sample dropping treatment school less than 1 km from controls.*

community and the school staff towards securing more teachers for their school.[56] Although the Government's policy for number of teachers appointed to a school depends on student enrollment, the implementation of such policy is limited due to lack of teaching and planning resources. In the absence of such policy implementation, many schools have succeeded in securing more teachers through the efforts made by the SMC executive body members, village influentials and the Head Teacher, after personally approaching government officials and submitting requests.

Another factor that plays an important role in determining the number of teachers in a school and teacher tenure is the location of residence of the teachers. The main cause for decreases in number of teachers registered and teacher transfers is due to teachers not living near the settlement or school. Transfers can be ordered by the Government, but in most cases they are on a voluntary basis, where the teachers transfer out to another school because they are not local residents of the community. In such cases, only a few schools with active community participation are able to find replacements for teachers.

Student Enrollment

Student enrollment is highly dependent on the number of teachers registered in a school and teachers' attendance rates, yet other factors include SMC involvement in improving enrollment, the level of awareness about education among the community members, migration due to flooding, lack of employment opportunities and presence of other schools in the vicinity (especially new private schools as they are considered better in terms of quality of education and school facilities).[57] Dropout rates also affect a school's net enrollment and is often motivated by socioeconomic factors, such as migration amongst the agricultural labor class and the opportunity cost of going to school. Furthermore, girls tend to drop out of school as they get older; most of the drop out is most prevalent in upper grades from Grade 3 to Grade 5.

Infrastructure and use of SMC fund

Our qualitative analysis on infrastructure reveals details on infrastructure that have not been captured in the quantitative surveys.[58] The discussions held for the qualitative analysis identify buying or repairing of furniture, building new rooms in order to accommodate more students, boundary wall repairs and installation of water motors, water tanks or hand pumps as the most recurrent expenses. Furthermore, the discussions also uncover that in regions susceptible to heavy rainfalls and floods, the schools' expenses also include leveling the school grounds. In some cases, this is a heavy expense using up to three years' worth of accumulated SMC grants.

We also find that schools are not only using SMC funds for these improvements but are also raising/securing external funds. The sources of this external funding include villagers' contributions, NGO donations and MPA/MNA[59] special funds. This funding is either secured through efforts of the village leader or the SMC's executive body.

External funding is often needed to make large purchases due to limited SMC funds and, in some cases, due to inaccessibility of the SMC funds. The issues faced by schools with reference to

[56] *Table 9A* provides more details on teachers from the qualitative study.
[57] *Table 9C* provides more details on student enrollment from the qualitative study.
[58] Refer to *Tables 9B* and *9C* for details from the qualitative study.
[59] Refer to the Member of Provincial Assembly of Sindh and Member of National Assembly of Pakistan

availability and accessibility of the fund are varied: firstly, in 2014 all schools were required to close their respective Parent-Teacher Association (PTA) account and open an SMC account. When many schools migrated from one account to the other, the existing PTA funds were not transferred to the new SMC account. Secondly, the SMC account has to be renewed in case the Head Teacher or the SMC Chairman of the school changes. If the school is a one-teacher school, then the account cannot be renewed if the teacher leaves and a replacement is not found. Thirdly, in some cases, there is no reason given by the supervisor/officer for funds not being transferred to the school's account.

Response to Treatment

Our discussions with villagers on response towards treatment reveal several interesting points. First, the village-level meetings were well received by the majority of the schools. This is attributed to the use of various methods of inviting schools and communities to the meeting. However, all participants reported that the intervention should have covered a longer time period with regular meetings. This observation was not only reported by Info-Meet and Info-Meet-Support schools but also by SMS-Meet and SMS-Meet-Support schools, where the eventual discontinuation of CDP after the pilot was not received favorably.

Further, for Info-Meet-Support schools, the newly elected members were not fully aware of the level of commitment needed for the job. Lack of support after elections resulted in poor integration of new executive body members into the SMC and the eventual loss of interest in pursuing school improvements. On the other hand, schools in SMS-Meet-Support overcame this problem of poor integration and lack of interest of new members by effectively monitoring the executive body's progress towards school improvement via the CDP. This monitoring was done through two mechanisms. On the one hand, participants directly sent SMS text messages to the CDP highlighting issues faced and improvements made by the school. The second and more effective method of monitoring was reading of summary SMS to the community by selected community volunteers and literate community members, and spreading the message through word of mouth. This method not only informed the larger community about school issues but also encouraged them to interact with SMC executive body members and to hold them accountable for school improvements. Such nudges from the community helped in motivating new members to fulfill their roles and responsibilities as integral members of the SMC.

9. Discussion and Conclusions

We provide evidence that in the case of education, building necessary institutions and eliciting community engagement in local decision making is crucial for the effectiveness of decentralization reforms. In terms of the Sindh Education Reform and the transfer of authority to SMCs, we note that communities and SMCs are provided funds in order to improve the condition of their schools, but that they often lack the accountability and impetus to spend those funds to match the preferences of their constituents.

We find that communities have a deficit of institutions that inhibits stakeholders from playing their expected role in school improvement process. An expansive literature demonstrates that participatory design and local ownership of institutions can change outcomes of education policies

that otherwise appear not to work.[60] We develop mechanisms that attempt to strengthen linkages between decision-makers and community members, such as sustained and open dialogue, grievance channels, and democratic participation. We investigate how Information Communication Technologies (ICTs) customized to local contexts may strengthen these linkages and in turn, can lead to greater community improvements compared to traditional methods of eliciting community engagement.

Our quantitative results demonstrate that nearly all of our mechanisms – with the exception of Info-Meet-Support – improved linkages between community members and SMCs as witnessed by improvements in school intermediate outcomes or school functionality. Overall, it appears that the Community Dialogue Platform-based (ICT) interventions contributed to the strongest improvements in hiring of additional teachers, student enrollment and infrastructure improvements.

These findings suggest that while village-level meetings may be effective in influencing SMCs and village elites to open temporarily closed schools, the Community Dialogue Platform based interventions were stronger mechanisms for sustaining dialogue on ongoing school improvements. The primary channel of improved school characteristics was sustained dialogue whereby, the CDP provided the community with a common platform in order to engage with the SMCs.

Our results indicate that the SMS-Meet-Support added the most value in terms of increased activity of SMCs to improve local school infrastructure. SMS-Meet-Support schools which did not have access to essential infrastructure were significantly more likely to spend on electricity and power line connectivity. Furthermore, we see that this intervention bin had the highest level of improvements in classroom construction. Given that classroom construction is a large expenditure, SMS-Meet-Support schools appear to be the most successful in mobilizing additional funds beyond the scope of the grants received from the government. Qualitative analysis reveals that a number of SMCs save for a period of 3 to 4 years to be able to afford expenditures such as constructing additional classrooms. From our analysis of SMCs' account balances, we know that the SMC grants did not comprise all funding used to enact school improvements, since we witnessed hoarding of funds in accounts across all treatment schools compared to control schools. This suggests that the CDP was complemented by empowering SMCs through elections and capacity-building, after which SMCs were more capable of responding to community-identified needs when resources provided by the Government were inadequate.

While ICT based interventions seem to have enabled linkages between communities and local elites overall, our evidence suggests that communities may have resisted interventions that directly interfered with local power dynamics. School functionality appears to be virtually unchanged as a result of the village-level meeting with additional election support, in contrast to the strong, positive impact on school functionality in the Info-Meet bin. This suggests that the presence of the TEO and implementation of a local democratic institution wiped out any impacts on school functionality. Initially, we conjectured that fresh elections may provide a channel of accountability, by making SMC members less complacent since there is a possibility of them being voted out of their positions, and also by greater inclusion of the Taluka Education Officers (TEO) in SMC affairs. However, the results suggest that in the context of rural Sindh where the social compact

[60] Pandey et al., 2009; Barr et al., 2012; Cerdan-Infantes & Filmer, 2015; Pradhan et al., 2011

between the state and the community is broken, the mere presence of the TEO (sub-district) government official has wiped away the credibility of message, washing away any treatment effects in the Info-Meet-Support bin.

The strong effects of the ICT-based interventions should encourage governments to seek innovative ways to connect stakeholders to decision-makers and retrieve feedback from stakeholders on service delivery. Given the prevalence of mobile phones in developing countries, governments should consider using SMS-based platforms. We show that technology can help communities circumvent power dynamics that may otherwise stifle community participation. In response to emerging evidence of the effectiveness of ICT-based platforms, the Pakistan Education Secretary started an SMS-based initiative to create linkages between teachers, students and parents (ILMI).

While our study comments on the role that mechanisms might play in strengthening community engagement, several potential areas and questions emerge for future research. The first is the role that village elites play in impacting service delivery outcomes. Furthermore, we have treated preferences as fixed in the conceptual framework. Instead of better mapping preferences, how might governments design mechanisms to influence the mix of preferences at the community-level in order to achieve improved service delivery in specific thematic areas? Lastly, we have demonstrated that even with stronger linkages between school officials, SMCs and community members, parents often do not know what is happening inside the schools. This is evidenced by the increase in the proportion of teachers absent in the schools that received an additional teacher as a result of the intervention. What can governments and policymakers do to improve community-level monitoring of schools by parents in order to improve teacher attendance, quality of teaching and student learning, and the institutions necessary for community monitoring to succeed?

Investigating these mechanisms is important to further the understanding of what mechanisms facilitate decentralization reforms to yield positive outcomes in the realm of public service delivery, especially in the context of areas like rural Sindh, where socioeconomic structures and power dynamics may preclude the de-facto delegation of authority. We demonstrate in our study that using local networks to one's advantage (such as the SMS platform), such studies can be conducted in an empirically robust and cost-effective manner.

Tables and Figures

Figure 1: Sample Profile

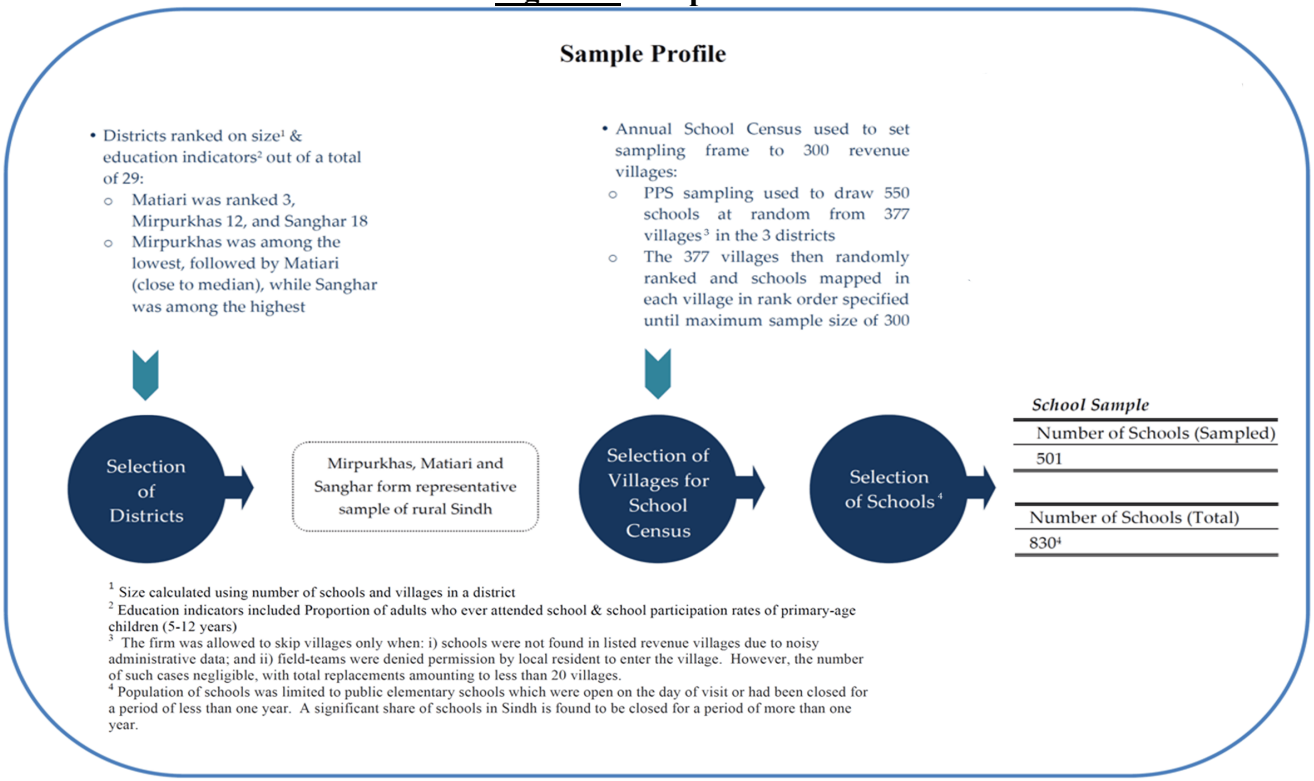


Figure 2: Field Experiment Profile

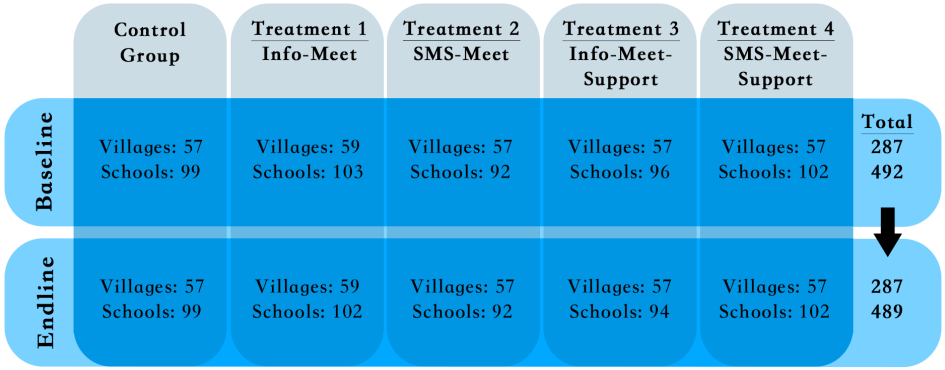


Figure 3: Experiment Timeline

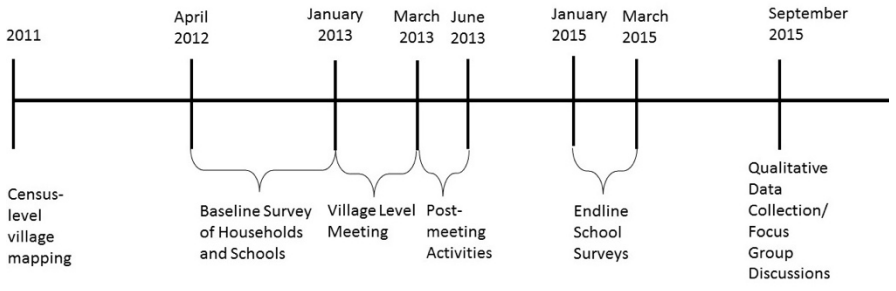


Figure 4: Sampled Districts

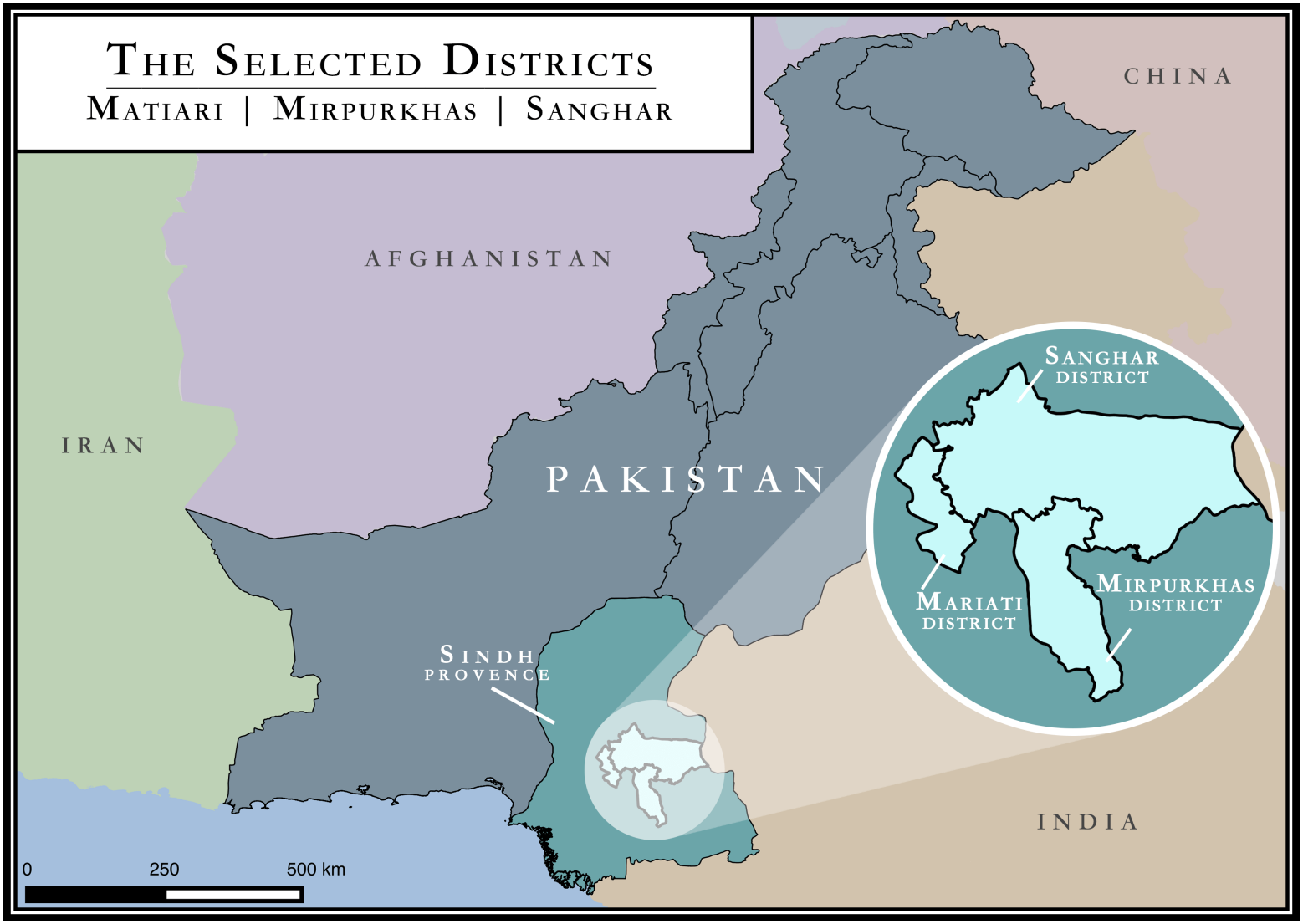


Figure 5: A Typical Sampled Village

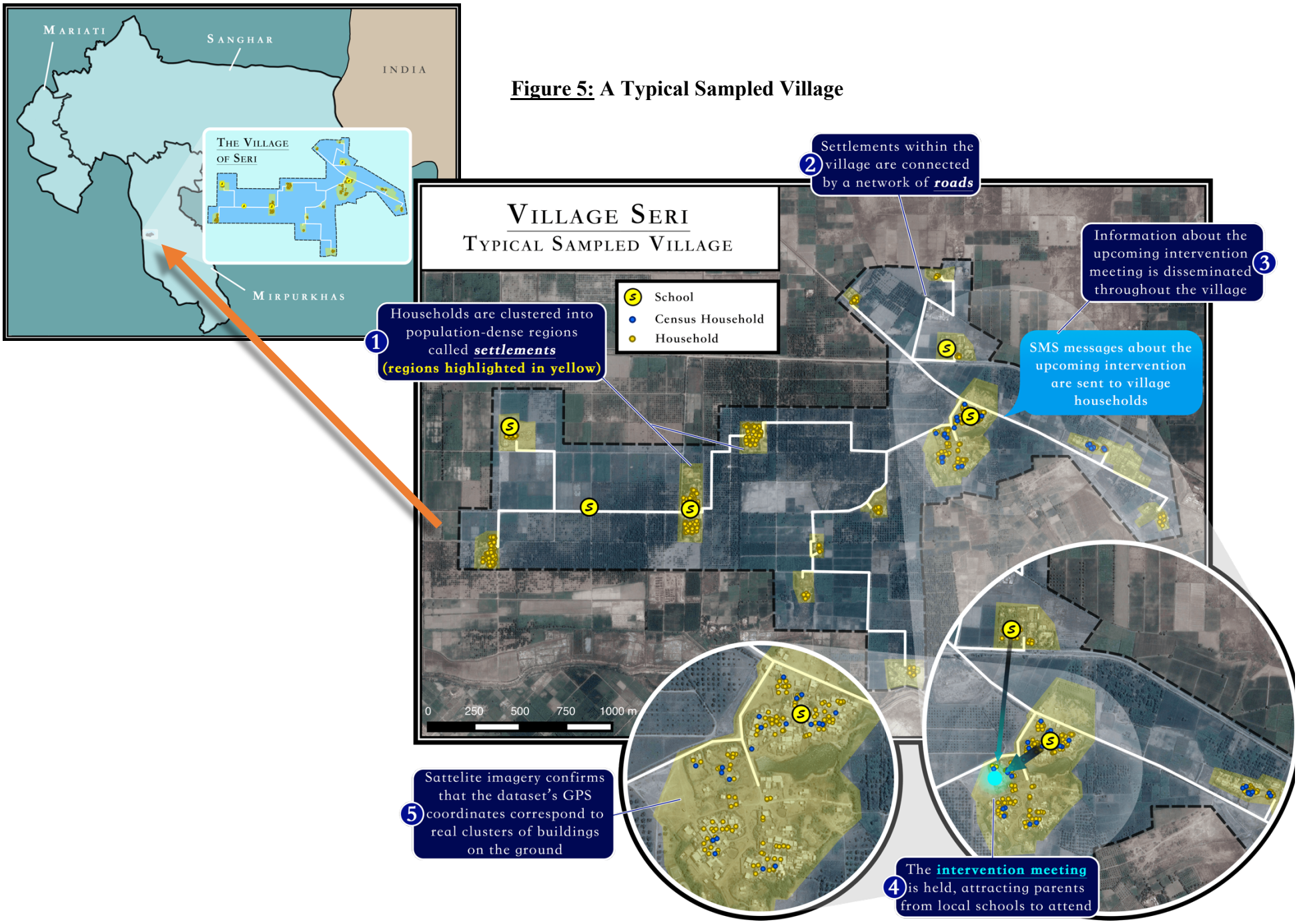


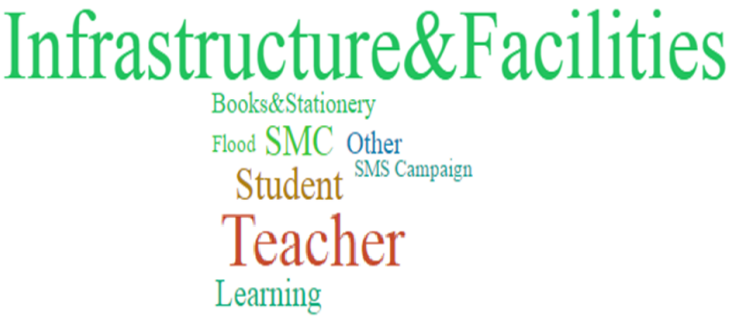
Table 1: Balance on Baseline Covariates

Variable	Mean and Std. Dev. for Control group	Difference in Mean with respect to control group (Treatment-Control)					Number of Observations
		Info-Meet	Info-Meet-Support	SMS-Meet	SMS-Meet-Support	All Treatments	
Panel A: School Functionality & Teacher Characteristics							
School is open on unannounced visit	0.83	-0.09	0.04	-0.09	-0.07	-0.05	284
	(0.34)	(0.07)	(0.06)	(0.07)	(0.07)	(0.05)	
School is open on announced visit	0.89	0.89	0.92	0.83	0.89	0.88	284
	(0.28)	(0.05)	(0.05)	(0.06)	(0.05)	(0.04)	
Total Number of Teachers in School	2.29	0.10	-0.03	-0.02	0.01	0.02	249
	(1.78)	(0.36)	(0.34)	(0.35)	(0.36)	(0.29)	
Proportion of Teachers Absent on Unannounced visit	0.09	-0.02	-0.01	-0.02	-0.01	-0.01	249
	(0.18)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	
Village resident	0.78	0.80	0.78	0.74	0.69	0.75	225
	(0.39)	(0.08)	(0.08)	(0.08)	(0.08)	(0.06)	
Years of schooling	12.96	13.12	12.52	13.21	13.14	12.99	268
	(1.77)	(0.39)	(0.41)	(0.33)	(0.31)	(0.28)	
Experience	18.14	19.49	17.92	18.39	18.14	18.49	262
	(8.51)	(1.48)	(1.63)	(1.56)	(1.59)	(1.29)	
Tenure	7.97	10.77	10.38	8.94	9.74	9.99	264
	(5.92)	(1.34)	(1.35)	(1.23)	(1.26)	(0.96)	
Monthly salary	21548.14	22146.10	20340.45	21141.88	20548.18	21048.51	258
	(6045.34)	(1114.14)	(1278.61)	(1285.85)	(1146.14)	(949.30)	
Average time spent teaching (per day)	4.83	5.73	4.87	4.43	4.22	4.85	247
	(2.74)	(6.51)	(0.58)	(0.53)	(0.55)	(0.46)	
Panel B: Infrastructure							
Number of Classrooms Available	2.13	0.05	-0.25	0.26	0.00	0.00	249
	(1.23)	(0.28)	(0.23)	(0.29)	(0.23)	(0.20)	
Number of Classrooms in Use	1.65	-0.04	-0.07	-0.05	-0.07	-0.06	249
	(1.17)	(0.22)	(0.23)	(0.22)	(0.22)	(0.19)	
Boundary Wall	0.66	0.03	-0.08	-0.06	0.12	0.00	261
	(0.42)	(0.08)	(0.08)	(0.09)	(0.07)	(0.07)	
Electricity Line	0.23	0.04	-0.03	0.02	-0.02	0.00	261
	(0.38)	(0.08)	(0.07)	(0.08)	(0.07)	(0.06)	
Water Source Available	0.53	-0.10	-0.02	-0.03	-0.02	-0.04	261
	(0.47)	(0.09)	(0.09)	(0.09)	(0.09)	(0.07)	
Toilet Available	0.65	-0.03	-0.05	-0.05	0.01	-0.03	261
	(0.42)	(0.09)	(0.08)	(0.09)	(0.08)	(0.07)	

Table 1 continued

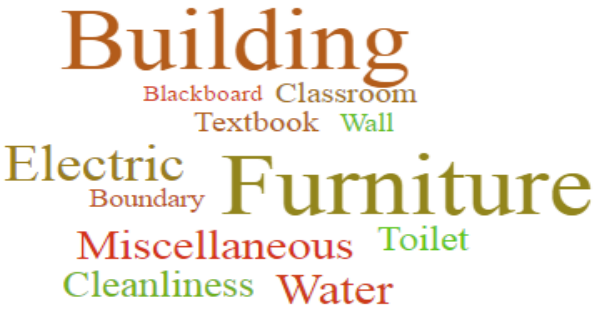
Panel C: Enrollment & Student Test Scores							
Average Enrollment Katchi + G5 Boys	48.00	7.76	4.49	2.18	4.37	4.84	249
	(36.21)	(7.16)	(7.08)	(7.51)	(7.37)	(5.86)	
Average Enrollment Katchi + G5 Girls	25.63	2.85	-2.12	-0.46	-3.50	-0.75	249
	(23.74)	(4.95)	(4.63)	(4.30)	(4.26)	(3.80)	
Average Enrollment Katchi + G1 Boys	20.05	3.27	0.68	1.43	1.27	1.69	249
	(16.96)	(3.28)	(3.21)	(3.65)	(3.31)	(2.73)	
Average Enrollment Katchi + G1 Girls	11.05	1.54	-1.40	1.49	-1.02	0.12	249
	(10.95)	(3.27)	(2.11)	(2.27)	(1.97)	(1.77)	
Number of siblings	4.26	4.66	4.42	4.61	4.38	4.53	192
	(1.15)	(0.27)	(0.30)	(0.29)	(0.26)	(0.22)	
Father Literate	0.37	0.47	0.33	0.34	0.34	0.37	192
	(0.31)	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)	
Mother Literate	0.21	0.23	0.15	0.17	0.17	0.18	192
	(0.27)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	
Native language: Sindhi	0.82	0.82	0.83	0.87	0.90	0.86	192
	(0.28)	(0.07)	(0.06)	(0.07)	(0.06)	(0.05)	
Student receives no help at home during homework	0.75	0.69	0.79	0.81	0.78	0.77	192
	(0.27)	(0.06)	(0.06)	(0.05)	(0.06)	(0.05)	
Number of English questions student expects to answer correctly out of 100	36.44	36.52	35.99	38.19	43.23	38.31	192
	(15.56)	(3.14)	(3..57)	(3.86)	(3.71)	(2.84)	
Number of Math questions student expects to answer correctly out of 100	36.98	37.56	35.78	38.69	40.76	38.11	192
	(15.66)	(3.18)	(3.48)	(3.71)	(3.64)	(2.83)	
English Normalized Scores (Tracked Only)	-0.60	-0.20	0.00	0.22	0.34	0.06	75
	(1.02)	(0.33)	(0.41)	(0.35)	(0.34)	(0.30)	
Mathematics Normalized Scores (Tracked Only)	-0.43	-0.11	0.09	0.11	0.23	0.06	87
	(0.88)	(0.27)	(0.33)	(0.29)	(0.31)	(0.25)	
English Normalized Scores	-0.25	-0.13	0.08	-0.03	-0.01	-0.03	144
	(0.89)	(0.22)	(0.26)	(0.23)	(0.26)	(0.19)	
Mathematics Normalized Scores	-0.24	-0.20	0.20	-0.07	0.01	-0.02	156
	(0.91)	(0.22)	(0.25)	(0.23)	(0.24)	(0.19)	
Test for Joint Orthogonality of All Variables (p value)		0.16	0.61	0.34	0.65	0.43	

Figure 6A: Elicitation of Preferences on CDP[61]



Weights per Item Mentioned in CDP	
Items	*Weights*
Books & Stationery	2%
Flood	1%
Infrastructure & Facilities	38%
Learning	8%
SMC	10%
SMS Campaign	3%
Student	12%
Teacher	22%
Other	4%

Figure 6B: Elicitation of Preferences on School Improvement Plan[62]



Weights per Item Mentioned in SIP	
Item	*Weights*
Blackboard	1%
Boundary Wall	3%
Building	24%
Classroom	4%
Cleanliness	6%
Electric	12%
Furniture	24%
Textbooks	4%
Toilet	6%
Water	9%
Miscellaneous	8%

[61] The word cloud merges some of the categories originally used for sorting. “SMC” here includes “SMC,” “SMC Fund,” “Parent,” “Money,” “S.I.P,” “Executive Committee” and “SMC Officer”. “Others” pulls together “Stipend,” “Budget,” and “Education Department.” “SMS Campaign” includes “SMS Campaign” and “Thanks”.

[62] "Buildings" includes floors, walls, ceilings, windows, doors and paint. "Boundary" includes boundary walls as well as main gates. "Water" includes water pipes, taps, motor pumps, hand pumps and water coolers. "Electric" wiring. "Classoom" involves paint, wall, ceiling and floor, where an SIP specifically states that these changes are made within a classroom. "Furniture" includes chairs, stools, benches, tables and cupboards. "Miscellaneous" includes mostly labor wages.

Table 2: Treatment Fidelity - Intervention Participation Rates

	Mean	Median		
Panel A: Village-meeting Participation Rates				
Info-Meet	65%	73%		
Info-Meet-Support	58%	57%		
SMS-Meet	69%	69%		
SMS-Meet-Support	58%	54%		
By District:				
Mirpurkhas	75%	83%		
Mitiari	49%	37%		
Sanghar	57%	57%		
Overall	**63%**	**63%**		
Panel B: CDP Registration Rates				
SMS-Meet	65%	69%		
SMS-Meet-Support	61%	62%		
By District:				
Mirpurkhas	61%	63%		
Mitiari	53%	51%		
Sanghar	68%	72%		
Overall	**63%**	**65%**		
Panel C: Capacity building meeting average attendance	**1st EB Meeting**	**2nd EB Meeting**	**3rd EB Meeting**	**Total Number of Villages**
Info-Meet-Support	4.76	4.80	4.83	57
SMS-Meet-Support	4.80	4.79	4.80	56
By District:				
Mirpurkhas	4.7	4.9	4.9	46
Mitiari	4.4	4.3	4.3	20
Sanghar	5.0	5.0	5.0	47
Overall	**4.78**	**4.80**	**4.81**	**113**

Table 3A: Village Characteristics (Baseline) Summary Statistics

Variable	Mean & Std. Deviation	No. of Observations	10th Percentile	50th Percentile	90th Percentile
School participation rates (ages 5-16)	0.43 (0.20)	284	0.18	0.42	0.7
Literacy Score Males	39.72 (21.68)	284	12.04	36.63	66.97
Literacy Score Females	30.97 (19.17)	284	7.41	27.67	58.33
Education Level (Male)	3.21 (2.01)	284	1.08	2.76	5.76
Education Level (Female)	0.70 (0.95)	284	0	0.43	1.83
No. of Primary Schools in Village (Census)	5.70 (3.25)	284	2	5	10
No. of Private Primary Schools in Village (Census)	0.05 (0.21)	284	0	0	0
No. of Functional Government Primary Schools in Village	2.95 (2.33)	284	0	2	6
Mobile phone penetration rate (Census)	0.74 (0.2)	284	0.5	0.8	0.95
No. of Settlements in a village	11.3 (6.05)	284	5	10	19
No. of Ethnicities in the village (Zaat)	17.55 (7.52)	284	10	16	27
Proportion of Landless households in the village	0.89 (0.09)	284	0.78	0.91	0.98
No. of Mosques in the Village	2.77 (2.11)	284	1	2	6

Note: Standard Deviations are given in parentheses. The table presents summary statistics of community characteristics at the village level from the baseline round of data collection.

Table 3B: School Characteristics (Baseline) Summary Statistics

Variable	Mean & Std. Deviation	No. of Observations	10th Percentile	50th Percentile	90th Percentile
School Open on Unannounced Visit	0.79 (0.41)	479	0	1	1
School Size (Katchi to Grade 5)	62.76 (43.52)	387	24.5	51	114.33
Katchi and Grade 1 Boys	20.99 (20.67)	387	0	16	40.83
Katchi and Grade 1 Girls	11.42 (13.41)	387	0	8	26
Katchi to Grade 5 Boys	51.38 (46.66)	387	1	40	107
Katchi to Grade 5 Girls	25.63 (27.12)	387	0	18	59.5
Total Teachers Registered	2.32 (1.99)	387	1	2	5
Proportion of Teachers' Absent	0.08 (0.19)	387	0	0	0.5
Total Classrooms Available	2.16 (1.55)	387	1	2	4
Total Classrooms in Use	1.61 (1.14)	387	0	1	3
School has a building	0.93 (0.26)	387	1	1	1
School has no garbage piles or stagnant water	0.79 (0.41)	387	0	1	1
School is clean on the inside	0.9 (0.31)	387	0	1	1
School has Satisfactory Boundary Wall	0.3 (0.46)	387	0	0	1
School has Functional Toilet (Boys)	0.34 (0.47)	387	0	0	1
School has Functional Toilet (Girls)	0.28 (0.45)	387	0	0	1
School has Functional Drinking Water Supply	0.45 (0.50)	387	0	0	1
School has an Electricity Line	0.22 (0.42)	387	0	0	1
Infrastructure Index	1.4 (1.17)	387	0	1	3
School was affected by flood	0.66 (0.47)	387	0	1	1
Teacher Knowledge Score English (%) (Endline)	72.77 (17.19)	313	46.67	78.33	86.67
Teacher Knowledge Score Math (%) (Endline)	82.43 (18.25)	315	63.33	86.67	96.67

Note: Standard Deviations are given in parentheses. The indicator on school functionality is defined for all schools covered in baseline and endline. Descriptives for all other variables are limited to schools that were open in the announced round of visit at the baseline and endline and that completed all modules of the survey. Number of observations fluctuate for teacher test scores because it is calculated at the announced visit at the endline and subject to attempting at least one question in the respective subject section.

Table 3C: Student Characteristics (Endline) Summary Statistics

Variable	Mean & Std. Deviation	No. of Observations	10th Percentile	50th Percentile	90th Percentile
Student Age	10.39 (1.70)	4568	8	10	12
Female	0.29 (0.45)	4568	0	0	1
Grade	3.94 (0.82)	4568	3	4	5
Expected Score in English (%)	21.32 (22.86)	4568	0	10	50
Expected Score in Mathematics (%)	31.32 (27.02)	4568	5	24.5	70
Score in English (%)	36.86 (23.72)	4521	8.33	33.33	75
Score in Mathematics (%)	45.91 (25.57)	4522	13.04	43.48	82.61

Note: Standard Deviations are given in parentheses. The table provides student level descriptives at the endline for students currently enrolled in grade 3, 4 and 5 that attempted at least one question in the respective subject.

Figure 7A: Treatment Effect on Total Teachers

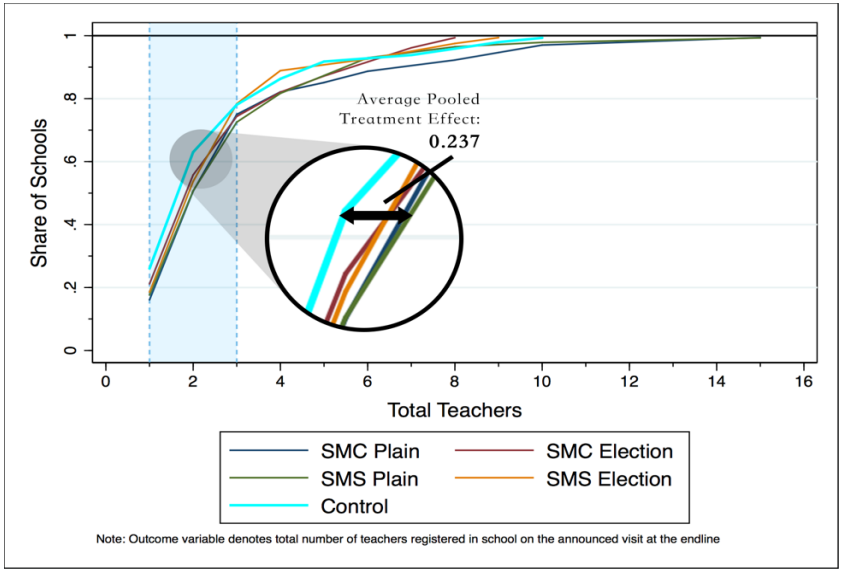


Figure 7B: Treatment Effect on Presence of Additional Teacher

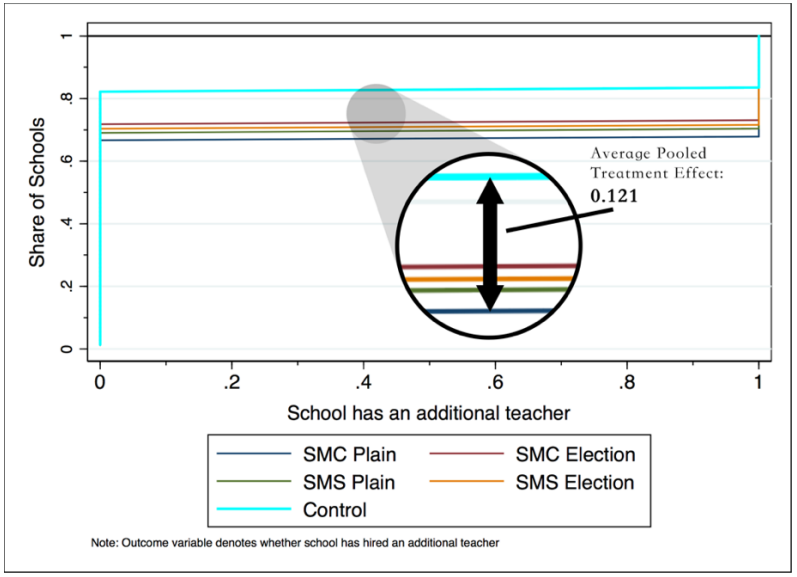


Figure 7C: Treatment Effect on Infrastructure Index

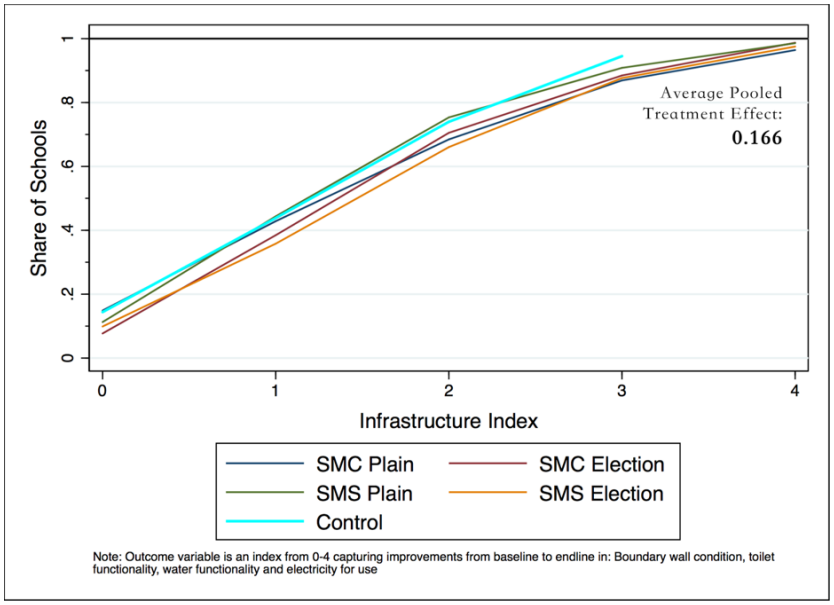


Figure 7D: Treatment Effect on Boys' Enrollment Rates (K to G5)

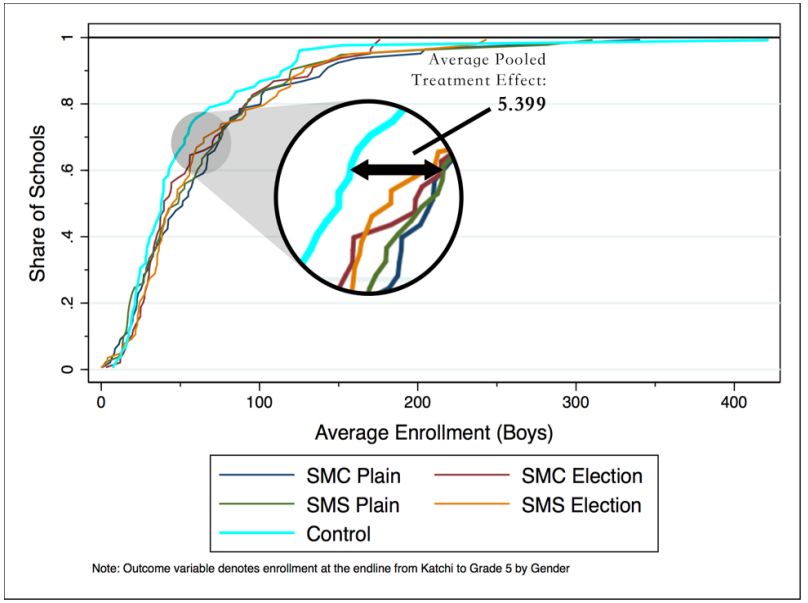


Table 4A: Impact on School Functionality & Teachers

VARIABLES	School Open, Unannounced Visit	Total Teachers	Proportion of Teachers Absent	Additional Teacher	Total Teachers Present
Panel A: Treatment Effects					
Info-Meet	0.104**	0.215	0.056**	0.116*	0.011
	(0.051)	(0.179)	(0.028)	(0.068)	(0.173)
Info-Meet Support	-0.010	0.112	0.033	0.090	0.085
	(0.059)	(0.157)	(0.030)	(0.062)	(0.157)
SMS-Meet	0.047	0.351**	0.043	0.134**	0.269
	(0.060)	(0.178)	(0.032)	(0.067)	(0.198)
SMS-Meet Support	0.066	0.148	0.082**	0.113*	-0.031
	(0.057)	(0.177)	(0.036)	(0.067)	(0.175)
Observations	479	387	387	387	387
Adjusted R-squared	0.037	0.721	0.002	0.095	0.597
Mean of control	0.796	2.247	0.0530	0.178	1.959

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Unannounced visit at the baseline represents the census survey. Sample for school is open includes all schools covered by the enumerator during the unannounced visit at the baseline and endline. The Control variable for this outcome indicator includes a dummy for flood. Sample for teacher related indicators cover all schools that were open on the day of visit (announced round) and that completed all modules of the survey at both baseline and endline. Controls for these include flood and school size (Enrollment in Grades 1 to 5).

Table 4B: Impact on Infrastructure

VARIABLES	CR Available	Improvement in CR Availability	CR in use	Improvement in CR in use	Improvement in Infrastructure
Panel A: Treatment Effects					
Info-Meet	-0.046	0.064	0.037	0.152**	0.126
	(0.129)	(0.059)	(0.109)	(0.061)	(0.180)
Info-Meet Support	0.027	0.065	-0.070	0.059	0.220
	(0.128)	(0.055)	(0.106)	(0.061)	(0.160)
SMS-Meet	0.238	0.005	0.142	0.085	0.062
	(0.147)	(0.057)	(0.111)	(0.056)	(0.169)
SMS-Meet Support	0.181	0.130**	0.121	0.175***	0.297*
	(0.124)	(0.062)	(0.125)	(0.061)	(0.172)
Observations	387	387	387	387	387
Adjusted R-squared	0.651	0.020	0.639	0.029	0.004
Mean of control	2.178	0.151	1.630	0.137	1.233

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample includes all schools that were open on the day of visit (announced visit) and that completed all modules of the survey. Control variables include flood and school size.

Table 4C: Impact on Students

VARIABLES	Enrollment Results: Katchi to Grade 5 (Boys)	Katchi to Grade 5 (Girls)	Katchi + Grade 1 (Boys)	Katchi + Grade 1 (Girls)	School Level LATs: English	School Level LATs: Math	Student Level LATs: English	Student Level LATs: Math
Panel A: Treatment Effects								
Info-Meet	0.348	3.279	1.624	1.994	-0.135	0.034	-0.273*	0.243
	(4.151)	(3.025)	(2.774)	(1.843)	(0.107)	(0.125)	(0.141)	(0.175)
Info-Meet Support	3.071	-1.385	1.654	-1.338	-0.118	-0.082	-0.099	0.009
	(3.796)	(2.226)	(2.042)	(1.213)	(0.134)	(0.134)	(0.188)	(0.208)
SMS-Meet	10.593**	-0.433	3.705	-0.900	-0.003	0.169	-0.062	0.226
	(4.943)	(2.501)	(2.652)	(1.477)	(0.123)	(0.145)	(0.194)	(0.209)
SMS-Meet Support	6.172	-0.811	4.072*	0.202	0.038	0.116	0.044	0.275*
	(3.890)	(1.910)	(2.132)	(1.163)	(0.114)	(0.119)	(0.162)	(0.164)
Observations	387	387	387	387	370	371	660	658
Adjusted R-squared	0.693	0.638	0.530	0.429	0.154	0.137	0.270	0.188
Mean of control	46.96	23.92	18.93	9.736	-0.0640	-0.0876	3.24e-09	-7.52e-09

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample covers all schools that were open on the day of visit (announced visit) and that completed all modules of the survey. Control variable for enrollment indicators includes a dummy for flood. Similarly, the sample for LATs analysis covers all such schools that successfully conducted the LATs. Control variables for learning outcomes includes student age, gender, grade, flood, school size and teacher test score averaged at school level. At school level, student test scores in each subject was condition on grade (3 to 5) and attempting at least one question in the respective subject. Scores are normalized against the control group and then averaged at school level. 24 questions for English and 23 questions for mathematics were considered for this analysis in line with baseline test. At student level, the same conditions applied but the sample varied because only students that met the criteria and were covered at both the baseline and endline were selected.

Table 5: Impact on School Functionality

VARIABLES	ANCOVA School is Open on Unannounced Visit	Multinomial Logit (Dy/Dx) School Changes from Closed to Open	Multinomial Logit (Dy/Dx) School Changes from Open to Closed
Panel A: Treatment Effects			
Info-Meet	**0.104****	0.094	**-0.082***
	(0.051)	(0.058)	(0.044)
Info-Meet Support	-0.010	-0.024	0.032
	(0.059)	(0.047)	(0.054)
SMS-Meet	0.047	**0.121***	-0.021
	(0.060)	(0.064)	(0.051)
SMS-Meet Support	0.066	0.083	-0.035
	(0.057)	(0.053)	(0.049)
Adjusted R-squared	0.037		
Panel B: Pooled Treatments			
Pooled Treatment	0.053	**0.069***	-0.027
	(0.046)	(0.042)	(0.041)
Adjusted R-squared	0.033		
Panel C: Pooled Treatment (Minus Info-Meet Support)			
Pooled excluding Info-Meet Support	0.074	**0.099****	-0.047
	(0.047)	(0.045)	(0.042)
Info-Meet-Support	-0.010	-0.024	0.031
	(0.059)	(0.047)	(0.054)
Observations	479	479	479
Adjusted R-squared	0.038		
Mean of Control	0.796	-0.031	-0.031
*P-value (*F-Test for Joint Significance of All Ts)	0.133		

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Unannounced visit at the baseline represents the census survey. Sample includes all schools covered by the enumerator during the unannounced visit at the baseline and endline. Control variable includes dummy for flood.

Table 6: Impact on Teachers

VARIABLES	D-in-D Total Teachers	ANCOVA Total Teachers	Difference More Teacher	D-in-D Proportion of Teachers Absent	ANCOVA Proportion of Teachers Absent	One Teacher School: ANCOVA Proportion of Teachers Absent	D-in-D Total Teachers Present	ANCOVA Total Teachers Present
Panel A: Treatment Effects								
Info-Meet	-0.0854	0.215	**0.116***	-0.023	**0.056****	0.038	-0.113	0.011
	(0.251)	(0.179)	(0.068)	(0.034)	(0.028)	(0.036)	(0.263)	(0.173)
Info-Meet Support	-0.1000	0.112	0.09	-0.014	0.033	0.033	-0.242	0.085
	(0.279)	(0.157)	(0.062)	(0.034)	(0.030)	(0.032)	(0.262)	(0.157)
SMS-Meet	0.0562	**0.351****	**0.134****	-0.031	0.043	0.002	-0.088	0.269
	(0.295)	(0.178)	(0.067)	(0.031)	(0.032)	(0.004)	(0.306)	(0.198)
SMS-Meet Support	-0.036	0.148	**0.113***	-0.011	**0.082****	0.041	-0.139	-0.031
	(0.259)	(0.177)	(0.067)	(0.034)	(0.036)	(0.036)	(0.277)	(0.175)
Info-Meet*Time	**0.418****			**0.077***			0.174	
	(0.200)			(0.046)			(0.229)	
Info-Meet Support*Time	0.166			0.047			0.217	
	(0.220)			(0.042)			(0.203)	
SMS-Meet*Time	0.189			**0.073***			0.182	
	(0.267)			(0.039)			(0.250)	
SMS-Meet Support*Time	0.135			**0.092***			0.021	
	(0.229)			(0.050)			(0.228)	
Adjusted R-squared	0.525	0.721	0.095	0.008	0.002	-0.036	0.499	0.597
Panel B: Pooled Treatments								
Pooled Treatment	-0.0444	0.203	**0.113****	-0.019	**0.054****	**0.030***	-0.146	0.078
	(0.214)	(0.127)	(0.048)	(0.028)	(0.022)	(0.017)	(0.228)	(0.126)
Pooled Treatment*Time	0.23			**0.072****			0.147	
	(0.165)			(0.035)			(0.170)	
Adjusted R-squared	0.527	0.722	0.101	0.011	0.003	-0.023	0.502	0.598
Panel C: Pooled Treatment (Minus Info-Meet Support)								
Pooled excluding Info-Meet Support	-0.0257	**0.233***	**0.120****	-0.021	**0.061*****	0.028	-0.115	0.076
	(0.220)	(0.136)	(0.051)	(0.028)	(0.023)	(0.020)	(0.236)	(0.135)
Info-Meet-Support	-0.1	0.111	0.09	-0.013	0.033	0.033	-0.243	0.083
	(0.279)	(0.157)	(0.062)	(0.034)	(0.030)	(0.032)	(0.261)	(0.156)
Pooled excluding Info-Meet Support*Time	0.252			**0.081****			0.124	
	(0.175)			(0.036)			(0.180)	
Info-Meet-Support*Time	0.166			0.047			0.217	
	(0.219)			(0.042)			(0.203)	
Observations	774	387	387	774	387	153	774	387
Adjusted R-squared	0.526	0.721	0.099	0.01	0.004	-0.03	0.501	0.597
Mean of control	2.247	2.247	0.178	0.053	0.053	0	1.959	1.959
*P-value (*F-Test for Joint Significance of All Ts)	0.836	0.112	0.019	0.483	0.014	0.088	0.521	0.538

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample covers all schools that were open on the day of visit (announced round) and that completed all modules of the survey at both baseline and endline. Control variable includes flood and school size (Enrollment in Grades 1 to 5).

Table 7: Impact on Infrastructure

VARIABLES	D-in-D CR Available	ANCOVA CR Available	D-in-D CR in use	ANCOVA CR in use	Difference Improvement in CR Availability	Difference Improvement in CR in use	Difference Improvement in Infrastructure
Panel A: Treatment Effects							
Info-Meet	-0.003	-0.046	-0.074	0.037	0.064	0.152**	0.126
	(0.203)	(0.129)	(0.158)	(0.109)	(0.059)	(0.061)	(0.180)
Info-Meet Support	-0.213	0.027	-0.024	-0.070	0.065	0.059	0.220
	(0.183)	(0.128)	(0.173)	(0.106)	(0.055)	(0.061)	(0.160)
SMS-Meet	0.344*	0.238	0.044	0.142	0.005	0.085	0.062
	(0.197)	(0.147)	(0.155)	(0.111)	(0.057)	(0.056)	(0.169)
SMS-Meet Support	0.019	0.181	-0.027	0.121	0.130**	0.175***	0.297*
	(0.177)	(0.124)	(0.151)	(0.125)	(0.062)	(0.061)	(0.172)
Info-Meet*Time	0.029		0.146				
	(0.197)		(0.125)				
Info-Meet Support*Time	-0.041		0.045				
	(0.172)		(0.135)				
SMS-Meet*Time	0.120		-0.056				
	(0.154)		(0.129)				
SMS-Meet Support*Time	0.169		0.116				
	(0.150)		(0.137)				
Adjusted R-squared	0.473	0.651	0.494	0.639	0.020	0.029	0.004
Panel B: Pooled Treatments							
Pooled Treatment	0.030	0.096	-0.023	0.056	0.068	0.120***	0.179
	(0.148)	(0.103)	(0.132)	(0.084)	(0.042)	(0.043)	(0.129)
Pooled Treatment*Time	0.072		0.065				
	(0.123)		(0.095)				
Adjusted R-squared	0.466	0.649	0.496	0.638	0.018	0.027	0.006
Panel C: Pooled Treatment (Minus Info-Meet Support)							
Pooled excluding Info-Meet Support	0.110	0.119	-0.022	0.098	0.069	0.140***	0.165
	(0.154)	(0.107)	(0.134)	(0.088)	(0.045)	(0.045)	(0.136)
Info-Meet-Support	-0.214	0.028	-0.024	-0.070	0.065	0.059	0.221
	(0.182)	(0.127)	(0.173)	(0.106)	(0.055)	(0.061)	(0.160)
Pooled excluding Info-Meet Support*Time	0.056		0.105				
	(0.132)		(0.100)				
Info-Meet-Support*Time	0.120		-0.056				
	(0.153)		(0.129)				
Observations	774	387	774	387	387	387	387
Adjusted R-squared	0.471	0.649	0.496	0.640	0.016	0.030	0.004
Mean of control	2.178	2.178	1.630	1.630	0.151	0.137	1.233
*P-value (*F-Test for Joint Significance of All Ts)	0.842	0.353	0.865	0.502	0.111	0.006	0.165

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample includes all schools that were open on the day of vi (announced visit) and that completed all modules of the survey. Control variables include flood and school size.

Table 8: Impact on Students

VARIABLES	**D-in-D** Katchi to Grade 5 (Boys)	**ANCOVA** Katchi to Grade 5 (Boys)	**D-in-D** Katchi to Grade 5 (Girls)	**ANCOVA** Katchi to Grade 5 (Girls)	**D-in-D** Katchi + Grade 1 (Boys)	**ANCOVA** Katchi + Grade 1 (Boys)	**D-in-D** Katchi + Grade 1 (Girls)	**ANCOVA** Katchi + Grade 1 (Girls)
Panel A: Treatment Effects								
Info-Meet	9.602	0.348	3.314	3.279	4.489	1.624	1.866	1.994
	(7.434)	(4.151)	(3.863)	(3.025)	(3.389)	(2.774)	(1.959)	(1.843)
Info-Meet Support	6.355	3.071	-1.066	-1.385	2.072	1.654	-0.757	-1.338
	(7.516)	(3.796)	(3.530)	(2.226)	(3.322)	(2.042)	(1.680)	(1.213)
SMS-Meet	3.076	10.593**	0.043	-0.433	1.267	3.705	1.185	-0.900
	(7.870)	(4.943)	(3.988)	(2.501)	(3.463)	(2.652)	(2.070)	(1.477)
SMS-Meet Support	1.372	6.172	-3.146	-0.811	0.642	4.072*	-0.850	0.202
	(7.517)	(3.890)	(3.379)	(1.910)	(3.343)	(2.132)	(1.690)	(1.163)
Info-Meet*Time	0.025		2.625		0.717		1.179	
	(4.212)		(3.045)		(2.984)		(1.953)	
Info-Meet Support*Time	2.533		-1.220		1.030		-1.086	
	(3.762)		(2.418)		(2.118)		(1.442)	
SMS-Meet*Time	10.258**		-0.477		3.398		-1.414	
	(5.079)		(2.556)		(2.857)		(1.570)	
SMS-Meet Support*Time	6.220		-0.159		3.968*		0.571	
	(3.910)		(2.125)		(2.154)		(1.407)	
Adjusted R-squared	0.037	0.693	0.047	0.638	0.037	0.530	0.048	0.429
Panel B: Pooled Treatments								
Pooled Treatment	5.198	4.873*	-0.185	0.221	2.165	2.741	0.356	0.042
	(6.524)	(2.838)	(2.835)	(1.787)	(2.906)	(1.674)	(1.417)	(1.049)
Pooled Treatment*Time	4.560		0.250		2.240		-0.127	
	(2.851)		(1.856)		(1.820)		(1.167)	
Adjusted R-squared	0.042	0.692	0.044	0.637	0.042	0.532	0.044	0.425
Panel C: Pooled Treatment (Minus Info-Meet Support)								
Pooled excluding Info-Meet Support	4.816	5.477*	0.106	0.750	2.196	3.102*	0.726	0.498
	(6.697)	(3.092)	(2.979)	(1.919)	(2.986)	(1.812)	(1.501)	(1.133)
Info-Meet-Support	6.353	3.050	-1.055	-1.368	2.078	1.655	-0.752	-1.326
	(7.498)	(3.784)	(3.523)	(2.224)	(3.313)	(2.037)	(1.676)	(1.211)
Pooled excluding Info-Meet Support*Time	5.230*		0.736		2.639		0.190	
	(3.112)		(1.970)		(1.974)		(1.251)	
Info-Meet-Support*Time	2.533		-1.220		1.030		-1.086	
	(3.752)		(2.412)		(2.113)		(1.438)	
Observations	774	387	774	387	774	387	774	387
Adjusted R-squared	0.040	0.691	0.042	0.637	0.040	0.531	0.046	0.427
Mean of control	46.96	46.96	23.92	23.92	18.93	18.93	9.736	9.736
*P-value (*F-Test for Joint Significance of All Ts)	0.426	0.087	0.948	0.902	0.457	0.103	0.802	0.968

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample covers all schools that were open on the day of visit (announced visit) and that completed all modules of the survey. Control variable includes flood.

Qualitative Results

Table 9A: Impact on Teachers Registered- Qualitative Analysis

Category	Observations
No Change in Total Number of Teachers Registered	**15 Schools**
Teachers same as baseline	10
Some teachers transferred out and have been replaced	5
Increase in Number of Teachers Registered	**14 Schools**
SMC Executive Body efforts	5
Appointed by the Government	4
Villagers and Executive Body efforts	3
Head Teacher efforts	2
Decrease in Number of Teachers Registered	**11 Schools**
Transferred out- teacher was not local resident of the village	6
Transferred out- by the Government	3
Deceased	2

Table 9B: Impact on Infrastructure- Qualitative Analysis

Category	Observations
Improved	**30 Schools**
New	**63**
Furniture	13
Room built	10
Water motor/ water tank/ hand pump	9
Blackboard	7
Electric fixtures	7
Toilet built	6
Paint	5
Boundary wall built	3
Gate	2
Shed installed	1
Repaired	**44**
Boundary wall	10
Furniture	9
Building	7
Door/window	4
Floor	4
Toilet	3
Gate	3
Blackboard	2

Table 9B continued

Water motor/ water tank/ hand pump	2
Other expenses	**8**
Mud filling for the ground	8
Some deteriorated some improved	**4 Schools**
Improved	**7**
Furniture: new/repaired	4
Door/window repair	1
Paint	1
Water motor/ water tank/ hand pump- new	1
Deteriorated	**5**
Toilet non functional	3
Boundary wall fallen	1
Water motor/ water tank/ hand pump- non functional	1
Same	**4 Schools**
Deteriorated	**2 Schools**
Toilet non functional	2
Water motor/ water tank/ hand pump- non functional	1

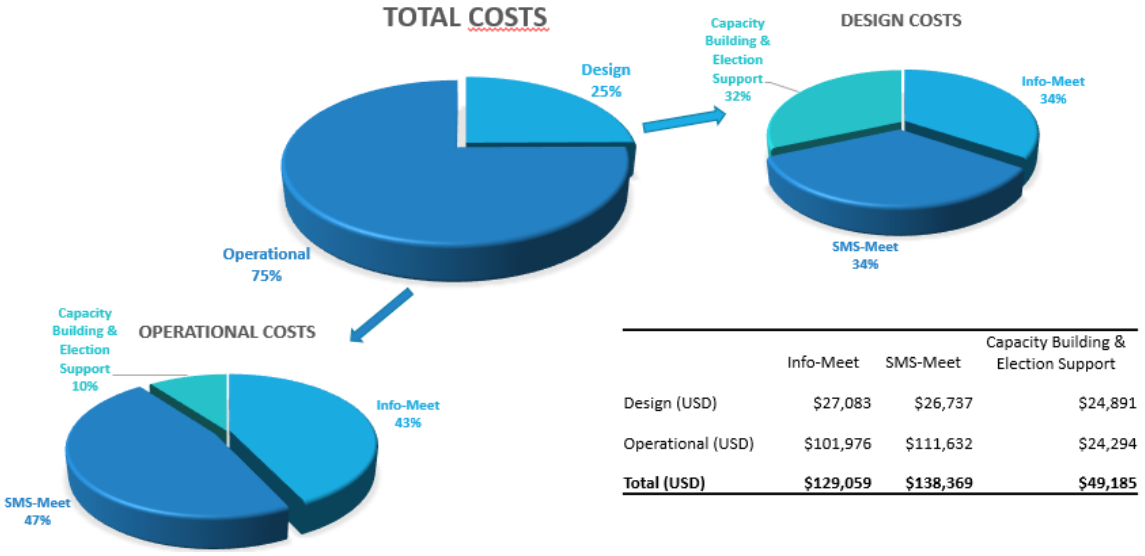
Table 9C: Impact on Early Grade Enrollment

Category	Observations
Main Reasons for Increase in Enrollment	**23 Schools**
Current teachers are hardworking and regular	16
Improved SMC efforts	9
Increase in community awareness towards education	8
Increase in number of teachers at school	7
Poor performance of neighborhood schools	5
Infrastructural improvement	2
In migration after flood	2
Main Reasons for Decrease in Enrollment	**17 Schools**
Out Migration (due to floods/ lack of employment)	9
Lack of teachers	7
Private school trend/ New schools have opened in neighborhood	7
Irregular teachers	3
Out Migration due to lack of employment	3
Better performance of neighborhood schools	2
Increase in poverty- child labor	2
Lack of awareness towards education	2
Lack of employment: Discourages education	2
Female social challenges	2

Table 10: Sources of Finance for Change in Infrastructure

Category	Observations
Improved	**30 Schools**
SMC Fund	15
SMC Fund + Other Sources	12
Other Sources	3
Some deteriorated some improved	**4 Schools**
SMC Fund	3
Other Sources	1
Same	**4 Schools**
No fund used	4
Deteriorated	**2 Schools**
No fund used	2

Figure 8: Project Costs



	Info-Meet	SMS-Meet	Capacity Building & Election Support
Design (USD)	$27,083	$26,737	$24,891
Operational (USD)	$101,976	$111,632	$24,294
Total (USD)	**$129,059**	**$138,369**	**$49,185**

References

Andrabi, T., Das, J., and Asim, I.K. "Report cards: The impact of providing school and child test scores on educational markets." (2014).

Asim, Salman; Abbas, Ali; Adil, Mariam Nusrat. (2015). Community engagement mechanisms: field experiment in Pakistan. Washington, D.C. : World Bank Group.

Asim, S. "The Public School System in Sindh: Empirical Insights." *The Lahore Journal of Economics*. 18, 49-66. (2013)

Banerjee, A., Kumar, S., Pande, R. and Su, F. "Do Informed Voters Make Better Choices? Experimental Evidence from Urban India." Unpublished Manuscript. (2011)

Banerjee, Abhijit V., Rukmini Banerji, Esther Duflo, Rachel Glennerster, and Stuti Khemani. "Pitfalls of Participatory Programs: Evidence from a randomized evaluation in education in India." *American Economic Journal: Economic Policy* 2, no. 1 (2010): 1-30.

Bardhan, P. "Decentralization of governance and development." *Journal of Economic Perspectives*. 185-205. (2002)

Bardhan, P. and Mookherjee, D. "Capture and governance at local and national levels." *American Economic Review*. 135-139. (2000)

Barr, A., Mugisha, F., Serneels, P. and Zeitlin, A. "Information and collective action in community-based monitoring of schools: Field and lab experimental evidence from Uganda." Unpublished paper (2012).

Barrera-Osorio, F., Fasih, T. and Patrinos, H. "Decentralized Decision-Making in Schools: The Theory and Evidence on School Based Management." World Bank Publication. (2009)

Bhatti, Z., Kusek, J., and Verheijen, T. "Logged On: Smart Government Solutions from South Asia." *World Bank Publications* (2014).

Bjorkman, M., and Svensson, J.. "Power to the people: evidence from a randomized field experiment of a community-based monitoring project in Uganda." *Vol* (2007).

Blimpo, M., Evans, D., and Lahire, N.. "School-based management and educational outcomes: lessons from a randomized field experiment." *Unpublished manscript* (2011).

Brixi, H., Lust, E., and Woolcock, M.. "Trust, Voice, and Incentives: Learning from Local Success Stories in Service Delivery in the Middle East and North Africa". The World Bank, n.d. (2015).

Bruns, B., Filmer, D., and Patrinos, H.. *Making schools work: New evidence on accountability reforms.* World Bank Publications. (2011).

Callen, M., and Hasanain, A. "The Punjab model of proactive governance: empowering citizens through information communication technology." *University of California, San Diego* (2011).

Carneiro, P., Das, J., and Reis, H.. *Parental valuation of school attributes in developing countries: Evidence from Pakistan*. University College London (2013)

Cerdan-Infantes, P., and Filmer, D.. "Information, knowledge and behavior: evaluating alternative methods of delivering school information to parents." *World Bank Policy Research Working Paper* 7233 (2015).

Channa, A. and Faguet, J. "Decentralization of health and education in developing countries: a quality-adjusted review of the empirical literature". *Economic organisation and public policy discussion papers*, EOPP 38. STICERD, London, UK. (2012).

Asim, S., Dar, A., Chase, R., and Schmillen, A. "Improving Learning Outcomes in South Asia: Findings from a Decade of Impact Evaluations". Forthcoming World Bank Research Observer.

Duflo, E., Dupas, P., and Kremer, M. "School governance, teacher incentives, and pupil-teacher ratios: Experimental evidence from Kenyan primary schools. Journal of Public Economics. 123, 92-110. (2015)

Dundar, H., Béteille, T., Riboud, M., and Deolalikar, A. "Student Learning in South Asia: Challenges, Opportunities, and Policy Priorities." *The World Bank*. (2014)

Gazdar, H. "State, community and universal education: A political economy of public schooling in rural Pakistan (Mimeo)". London, UK: Asia Research Centre, 2000a.

Gazdar, H. "Public Failure, Political Constraints and Political Resources -- Basic Education in Pakistan". Working Paper. Asia Research Centre, London School of Economics. May 2000b.

Gertler, P J., Rubio-Codina, M., and Patrinos, H. "Empowering parents to improve education: evidence from rural Mexico." *World Bank Policy Research Working Paper Series, Vol* (2008).

Gine, Xavier, and Ghazala Mansuri. "Together We Will: Evidence from a Field Experiment on Female Voter Turnout in Pakistan." n. pag. *Stanford*. (2010)

Hastings, J. and Weinstein, J. "Information, School Choice, and Academic Achievement: Evidence from Two Experiments." Quarterly Journal of Economics, 124(4), 1373-1414. (2009)

Keefer, P., and Khemani, S. "Mass media and public services: the effects of radio access on public education in Benin." *World Bank policy research working paper* 5559 (2011).

Khemani, S. “Making Politics Work for Development: Harnessing Transparency and Citizen Engagement.” *World Bank policy research report.* (2015)

King, Elizabeth M., and Jere R. Behrman. "Timing and duration of exposure in evaluations of social programs." The World Bank Research Observer 24, no. 1: 55-82. (2009)

Kremer, M., Daniel, C. “An Interim Report on a Teacher Attendance Incentive Program in Kenya.” Mimeo, Harvard University. (2001)

Kremer, M. and Christel, V. “School Committee Empowerment: Preliminary Notes.” Mimeo, Harvard University (2005)

Le Grand, J. "Knights, Knaves or Pawns? Human Behavior and Social Policy." *Journal of Social Policy* 26.2 (1997): 149-69. Web.

Lieberman, E. S., Posner, D. N., & Tsai, L. L. “Does information lead to more active citizenship? Evidence from an education intervention in rural Kenya.” World Development, 60, 69-83. (2014)

Mansuri, G. and Rao, V. “Localizing Development: Does Participation Work?” The World Bank. (2013)

McKenzie, D. “Beyond baseline and follow-up: The case for more T in experiments.” *Journal of Development Economics*. 99: 210-221. (2012).

Ministry of Education of Pakistan. *National Educaiton Policy*. (2009)

Ministry of Finance. Government of Pakistan. “Pakistan Economic Survey.” (2015) Web.

Muralidharan, K. and Sundararaman, V. "The Impact of Diagnostic Feedback to Teachers on Student Learning: Experimental Evidence from India*." *The Economic Journal* 120.546 (2010): F187-F203.

Muralidharan, K., and Sundararaman, V. "Teacher Performance Pay: Experimental Evidence from India.,." *Journal of Political Economy,* 119.1 (2011): 39-77. Web. 7 Oct. 2015.

Olken, B. “Direct Democracy and Local Public Goods: Evidence from a Field Experiment in Indonesia.” *American Political Science Review*. 104, 2. (2010)

Pandey, P., Goyal, S. and Sundararaman, V. "Community participation in public schools: impact of information campaigns in three Indian states*." Education Economics* 17, no. 3. 355-375. (2009)

Patrinos, H., Barrera-Osorio, F., and Fasih, T.. *Directions in Development: Decentralized Decision-making in Schools the Theory and Evidence on School-based Management*. Washington, DC: World Bank. (2009)

Petrosino, A., Morgan, C., Fronius, T.A., Tanner-Smith, E.E. and Boruch, R.F. "Interventions in developing nations for improving primary and secondary school enrollment of children: a systematic review." *The Campbell Collaboration*, 19. (2012)

Pradhan, M, Suryadarma, D., Beatty, A., Wong, M., Gaduh, A., Alisjahbana, A. and Artha, R. "Improving educational quality through enhancing community participation: results from a randomized field experiment in Indonesia." *American Economic Journal: Applied Economics* 6.2: 105-126. (2014)

Pritchett, L. "The Rebirth of Education: Schooling Ain't Learning". Washington, DC: Center for Global Development. (2013).

UNDP. "International Development Indicators – Pakistan Country Profile". (2015)

UNESCO. "Education for All 2015 National Review Report: Pakistan." *Comparative Education Review*. 59, S4 (2015)

Vermeersch, C. and Kremer, M. "School meals, educational achievement, and school competition: evidence from a randomized evaluation (Vol. 3523)" World Bank Publications. (2005)

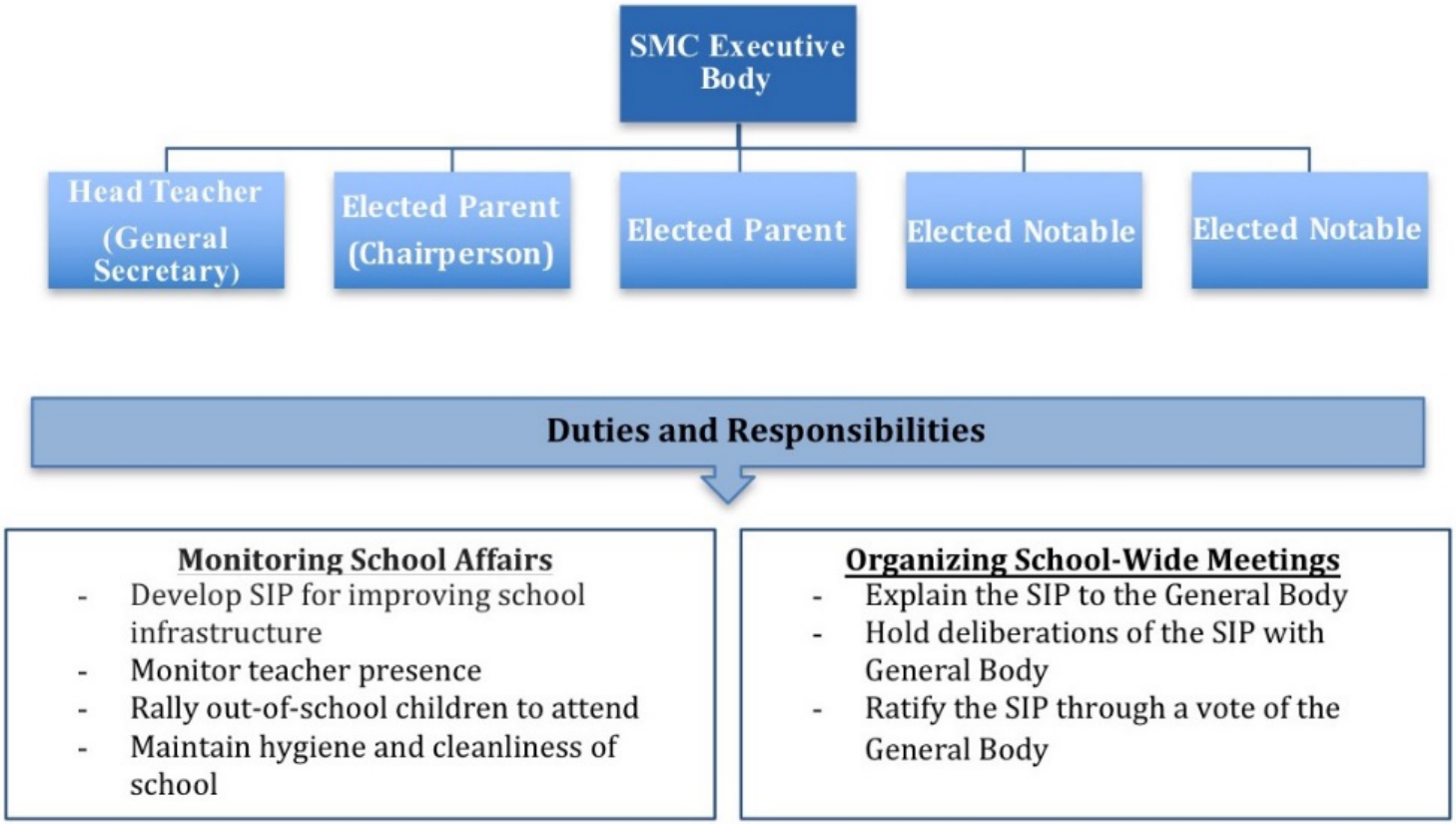
Wooldridge, J. *Introductory Econometrics: A Modern Approach*. 5 ed. South-Western, Cengage Learning. (2012)

The World Bank. "Implementation Completion and Results Report for a Sindh Education Reform Project [SERP I]." Washington, DC. (2012)

The World Bank. "Project Appraisal Document for the Second Sindh Education Reform Project [SERP II]." Washington, DC. (2013)

Appendix

Figure 9: SMC Structure[63]



[63] The SMCs comprise five members: a parent elected as chairman of the SMC; the head teacher who is the general secretary of the committee by default; an elected parent member and two elected notables – or village influentials – of the community. The committees are responsible for monitoring school affairs such as developing a School Improvement Plan (SIP) for improving infrastructure at schools through annual grants provided by the Government of Sindh; monitor teacher presence; rally out-of-school children to attend schools; reduce dropout rates; and maintain hygiene and cleanliness levels in school. The SMC EB members organize two school-wide meetings for all parents and community members, referred to as the General Body. In these meetings, EBs are tasked to explain the details and expenses in the SIP, allow the General Body to deliberate on the SIP and ratify it through a vote. Figure 7 illustrates the structure of the SMC EB and details their primary responsibilities.

Figure 10: Information, Voice and Action

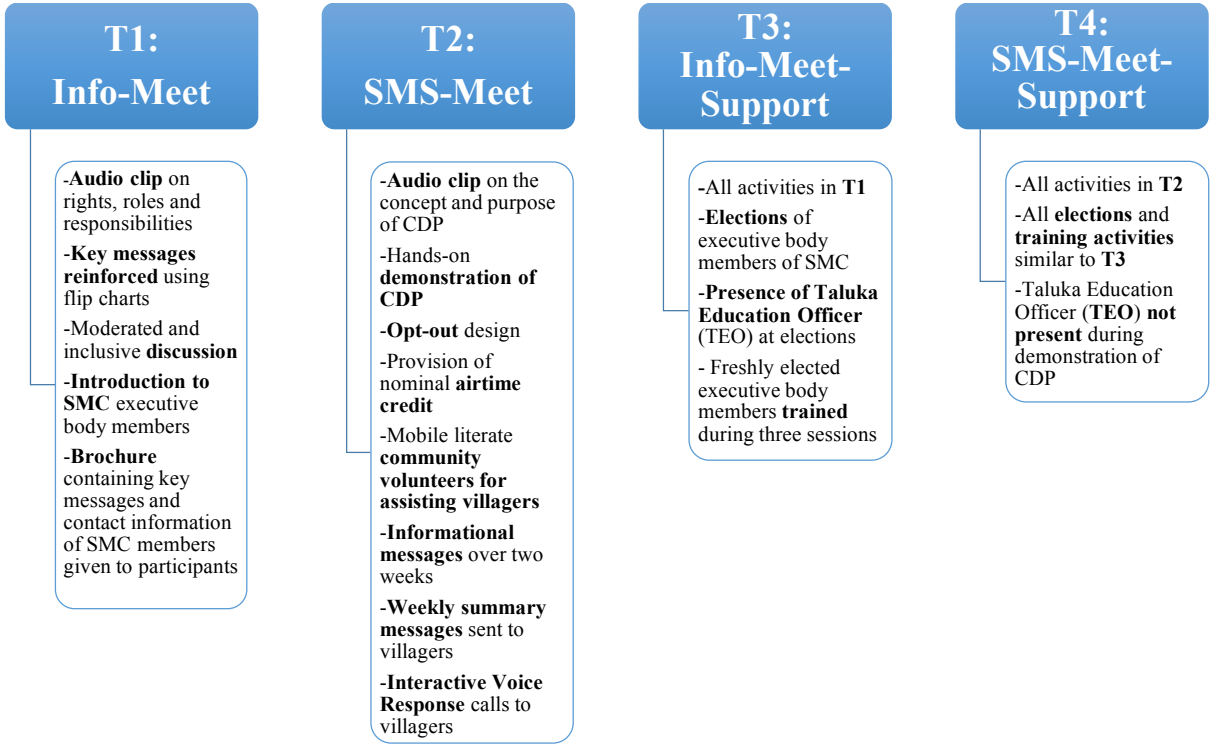


Figure 11A: Info-Meet & Info-Meet-Support

Figure 11B: SMS-Meet and SMS-Meet Support

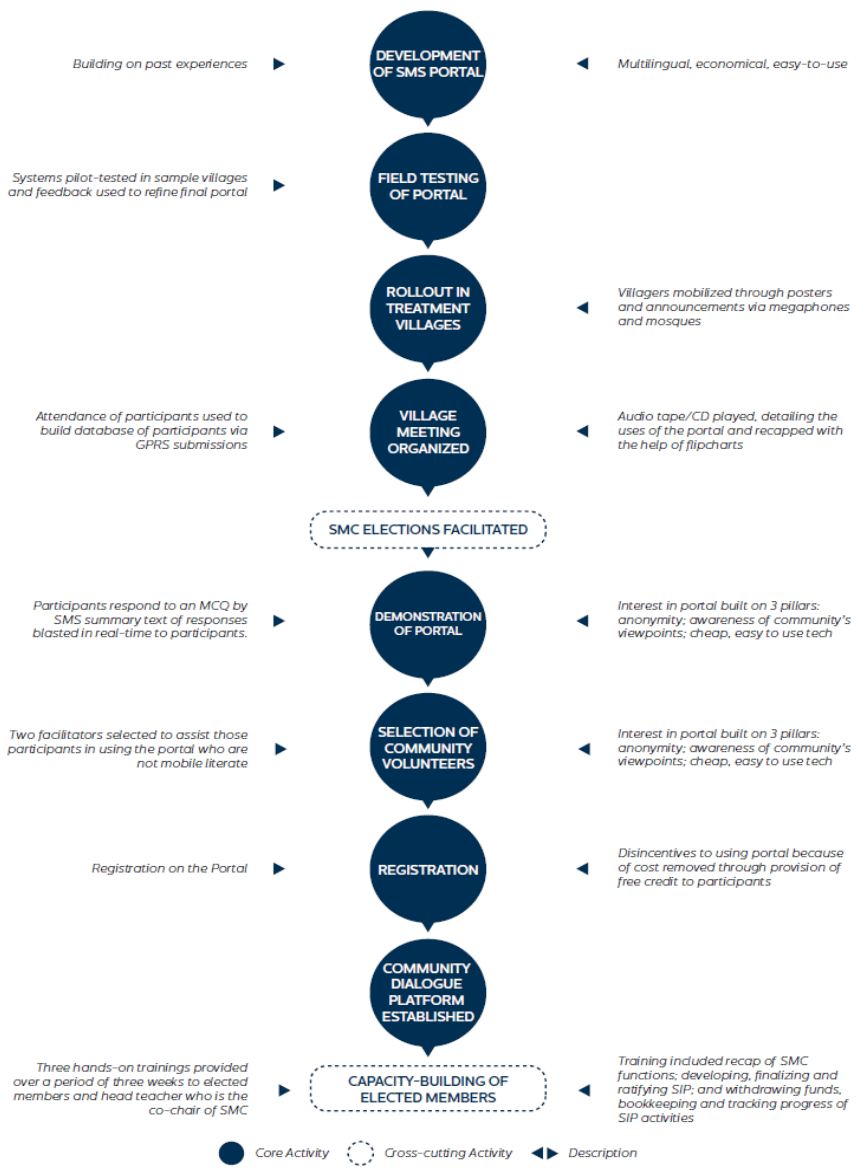


Figure 12: 360-Degree Intervention Design

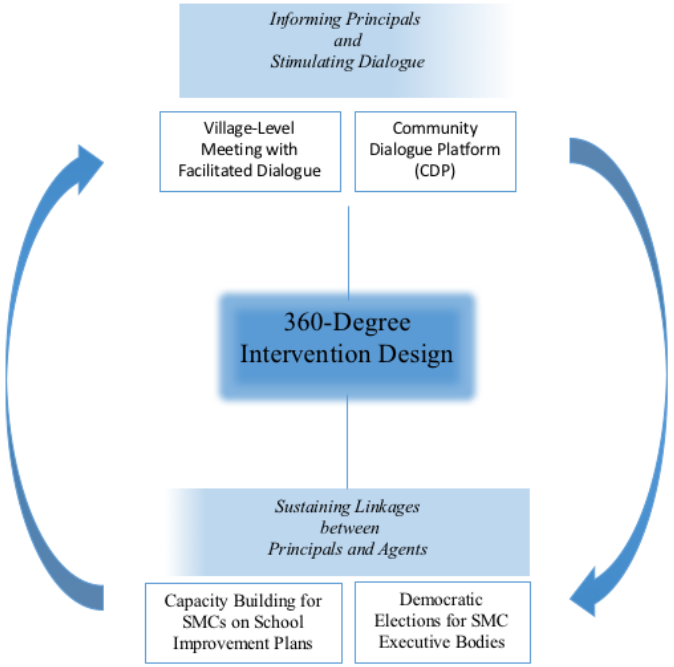


Figure 13: Description of Interventions

COMMUNITY ENGAGEMENT	
T1: Info-Meet	**T2: SMS-Meet**
A face-to-face meeting of community members was held to provide information on SMC and facilitate discussion on school related issues	A mobile platform, the Community Development Portal, was set up for two-way communication with the community on school related issues
COMMUNITY ENGAGEMENT PLUS SUPPORT	
T3: Info-Meet-Support	**T4: SMS-Meet-Support**
In addition to all activities in Info-Meet, the Taluka Education Officer presided over elections of the SMC Executive Body, and new SMC Executive Body members received capacity support	In addition to all activities in SMS-Meet, the Taluka Education Officer presided over elections of the SMC Executive Body, and new SMC Executive Body members received capacity support.

Figure 14: Sustained Community Dialogue via the Community Dialogue Platform

Table 11: Representativeness of Sample

Variable	Panel A: Sample compared to Rural Sindh			Panel B: Sample compared to 3 Districts		
	All Districts	Sample	Difference in Means	3-Districts	Sample	Difference in Means
Sindhi Medium	0.97 (0.15)	0.96 (0.15)	0.01	0.94 (0.20)	0.96 (0.15)	-0.02
Mixed Gender	0.6 (0.39)	0.69 (0.31)	**-0.10*** **	0.63 (0.39)	0.69 (0.31)	**-0.06** **
Primary Enrolment (Male)	33.8 (30.37)	34.56 (26.06)	-0.76	33.54 (47.63)	34.56 (26.06)	-1.02
Primary Enrolment (Female)	20.30 (22.55)	18.75 (17.97)	1.55	19.23 (23.30)	18.75 (17.97)	0.47
Total Teachers	1.91 (1.49)	2.11 (1.64)	**-0.21** **	2.05 (1.97)	2.11 (1.64)	-0.07
Total Teachers (Male)	1.56 (1.30)	1.75 (1.42)	**-0.19** **	1.56 (1.89)	1.75 (1.42)	-0.19
Total Teachers (Female)	0.35 (0.96)	0.37 (0.85)	-0.02	0.49 (1.17)	0.37 (0.85)	0.12
Student-Teacher Ratio	32.23 (16.54)	29.74 (13.31)	**2.49** **	29.54 (15.05)	29.74 (13.31)	-0.21
School Building	0.81 (0.28)	0.78 (0.23)	0.03	0.75 (0.33)	0.78 (0.23)	-0.03
Number of Classrooms	2.16 (1.08)	2.18 (0.84)	-0.02	2.30 (1.69)	2.18 (0.84)	0.12
Student-Classroom Ratio	28.19 (14.62)	27.34 (16.53)	0.85	26.24 (14.32)	27.34 (16.53)	-1.1
Boundary Wall	0.62 (0.36)	0.65 (0.29)	-0.03	0.64 (0.37)	0.65 (0.29)	-0.01
Toilet	0.67 (0.35)	0.69 (0.28)	-0.02	0.68 (0.36)	0.69 (0.28)	-0.01
Drinking Water	0.60 (0.38)	0.60 (0.30)	0	0.55 (0.39)	0.60 (0.30)	-0.04
Electricity	0.22 (0.32)	0.24 (0.28)	-0.02	0.19 (0.31)	0.24 (0.28)	**-0.05** **
Intake (Male)	16.56 (14.16)	15.5 (13.15)	1.05	14.84 (19.64)	15.50 (13.15)	-0.66
Intake (Female)	11.5 (13.66)	9.41 (9.52)	**2.08** **	9.96 (11.75)	9.41 (9.52)	0.55
SMC Functional	0.90 (0.21)	0.92 (0.16)	-0.01	0.91 (0.22)	0.92 (0.16)	-0.01
SMC Receives Funds	0.97 (0.12)	0.97 (0.10)	0	0.97 (0.13)	0.97 (0.10)	0

Notes: Difference of means between our sample and overall population of schools in rural Sindh (Panel A), and population of schools in Mirpurkhas, Mitiari and Sanghar (Panel B). The unit of observation is the school, as defined at the time of randomization. Components of infrastructure (Boundary wall, toilet, drinking dater and electricity) are defined in terms of their availability. Primary enrollment includes enrollment from Grade 1 to 5. Intake includes enrollment in Katchi and Grade 1.Only functional schools, open on the day of the visit were included. Robust standard errors in parentheses. Standard errors are clustered by village. Note also: 1% (***), 5% (**), and 10% (*) confidence.

Tables 12 – 17: Power Calculations for All Treatment Arms

Table 12: School Level Outcomes T1) INFO-MEET vs. Control

Outcome Indicators	School Functionality	School Infrastructure Index	Total Registered Teachers in School	Total Student Enrolment in School
	Power (κ)	Power (κ)	Power (κ)	Power (κ)
	0.8	**0.8**	**0.8**	**0.8**
Number of Schools	197	157	157	157
R^2	0.50	0.50	0.50	0.50
Significance Level (α)	0.05	0.05	0.05	0.05
Minimum Detectable Effect Size	**25.2%**	**28.2%**	**28.2%**	**28.2%**

Table 13: School Level Outcomes T2) SMS-MEET vs. Control

Outcome Indicators	School Functionality	School Infrastructure Index	Total Registered Teachers in School	Total Student Enrolment in School
	Power (κ)	Power (κ)	Power (κ)	Power (κ)
	0.8	**0.8**	**0.8**	**0.8**
Number of Schools	188	144	144	144
R^2	0.50	0.50	0.50	0.50
Significance Level (α)	0.05	0.05	0.05	0.05
Minimum Detectable Effect Size	**25.8%**	**29.5%**	**29.5%**	**29.5%**

Table 14: School Level Outcomes T3) INFO-MEET + SUPPORT vs. Control

Outcome Indicators	School Functionality	School Infrastructure Index	Total Registered Teachers in School	Total Student Enrolment in School
	Power (κ)	**Power (κ)**	**Power (κ)**	**Power (κ)**
	0.8	**0.8**	**0.8**	**0.8**
Number of Schools	189	151	151	151
R^2	0.50	0.50	0.50	0.50
Significance Level (α)	0.05	0.05	0.05	0.05
Minimum Detectable Effect Size	**25.7%**	**28.8%**	**28.8%**	**28.8%**

Table 15: School Level Outcomes T4) SMS-MEET + SUPPORT vs. Control

Outcome Indicators	School Functionality	School Infrastructure Index	Total Registered Teachers in School	Total Student Enrolment in School
	Power (κ)	**Power (κ)**	**Power (κ)**	**Power (κ)**
	0.8	**0.8**	**0.8**	**0.8**
Number of Schools	199	154	154	154
R^2	0.50	0.50	0.50	0.50
Significance Level (α)	0.05	0.05	0.05	0.05
Minimum Detectable Effect Size	**25.0%**	**28.5%**	**28.5%**	**28.5%**

Table 16: School Level Outcomes – Student LATS

Treatment Arms	(T1) INFO-MEET vs Control	(T2) SMS-MEET vs Control	(T3) INFO-MEET + SUPPORT vs Control	(T4) SMS-MEET + SUPPORT vs Control
Power (κ)	**0.8**	**0.8**	**0.8**	**0.8**
Number of Schools	157	144	151	154
R^2	0.50	0.50	0.50	0.50
Significance Level (α)	0.05	0.05	0.05	0.05
Minimum Detectable Effect Size	**28.2%**	**29.5%**	**28.8%**	**28.5%**

Table 17: Student Level Outcomes – Student LATS

Treatment Arms	(T1) INFO-MEET vs Control	(T2) SMS-MEET vs Control	(T3) INFO-MEET + SUPPORT vs Control	(T4) SMS-MEET + SUPPORT vs Control
Power (κ)	**0.8**	**0.8**	**0.8**	**0.8**
Number of Students	299	213	208	251
R^2	0.50	0.50	0.50	0.50
Significance Level (α)	0.05	0.05	0.05	0.05
Minimum Detectable Effect Size	**20.4%**	**24.2%**	**24.5%**	**22.3%**

Table 18A: Attrition

Variable	Endline Phase A and B Dependent Variable: Attrition Dummy	
	(1)	(2)
Treatment Variables		
T1 (Info-Meet)	-0.022	-0.139
	(0.034)	(0.109)
T2 (Info-Meet Support)	-0.027	0.071
	(0.035)	(0.137)
T3 (SMS-Meet)	0.023	-0.012
	(0.035)	(0.114)
T4 (SMS-Meet Support)	-0.012	0.106
	(0.034)	(0.168)
School Variables		
School Functional		-0.006
		(0.092)
Total Enrolment		0.000
		(0.001)
School Intake		0.000
		(0.001)
Total Teachers		0.019
		(0.015)
Proportion of Teachers Absent		0.125
		(0.155)
Infrastructure Index		0.021
		(0.021)
Classrooms Available		**-0.061***
		(0.032)
Classrooms in Use		-0.009
		(0.024)
English Score		0.004
		(0.041)
Math Score		0.080
		(0.069)
Interactions: T1 Dummy x School Variables		
T1*School Functional		-0.043
		(0.110)
T1*Total Enrolment		0.000
		(0.001)
T1*School Intake		-0.001
		(0.002)
T1*Total Teachers		-0.033
		(0.024)
T1*Proportion of Teachers Absent		-0.213
		(0.177)
T1*Infrastructure Index		0.009
		(0.028)
T1*Classrooms Available		0.032
		(0.035)
T1*Classrooms in Use		0.081
		(0.051)

Table 18A continued

T1*English Score	-0.031
	(0.062)
T1*Math Score	-0.091
	(0.079)
Interactions: T2 Dummy x School Variables	
T2*School Functional	-0.152
	(0.153)
T2*Total Enrolment	-0.000
	(0.001)
T2*School Intake	-0.001
	(0.001)
T2*Total Teachers	-0.020
	(0.020)
T2*Proportion of Teachers Absent	0.231
	(0.288)
T2*Infrastructure Index	-0.021
	(0.025)
T2*Classrooms Available	-0.003
	(0.042)
T2*Classrooms in Use	**0.059***
	(0.035)
T2*English Score	-0.002
	(0.045)
T2*Math Score	-0.101
	(0.072)
Interactions: T3 Dummy x School Variables	
T3*School Functional	-0.044
	(0.114)
T3*Total Enrolment	0.001
	(0.002)
T3*School Intake	-0.001
	(0.002)
T3*Total Teachers	-0.012
	(0.019)
T3*Proportion of Teachers Absent	**-0.429***
	(0.228)
T3*Infrastructure Index	-0.024
	(0.028)
T3*Classrooms Available	-0.012
	(0.041)
T3*Classrooms in Use	0.041
	(0.057)
T3*English Score	-0.036
	(0.056)
T3*Math Score	0.014
	(0.077)

Table 18A continued

Interactions: T4 Dummy x School Variables		
T4*School Functional		-0.147
		(0.148)
T4*Total Enrolment		-0.002
		(0.001)
T4*School Intake		0.001
		(0.002)
T4*Total Teachers		-0.009
		(0.018)
T4*Proportion of Teachers Absent		-0.154
		(0.160)
T4*Infrastructure Index		-0.025
		(0.025)
T4*Classrooms Available		0.008
		(0.048)
T4*Classrooms in Use		0.066
		(0.042)
T4*English Score		-0.043
		(0.053)
T4*Math Score		-0.102
		(0.075)
Constant	0.071***	0.118
	(0.024)	(0.080)
Mean & SD of attrition dummy for the control group		0.071
		(0.258)
Joint F-Test of Baseline Controls (minus interactions)-p-value		0.754
Joint F-Test of Interactions – p-value	with T1:	0.614
Joint F-Test of Interactions – p-value	with T2:	0.369
Joint F-Test of Interactions – p-value	with T3:	0.563
Joint F-Test of Interactions – p-value	with T4:	0.553
Observations	492	

Notes: Robust standard errors in parentheses. Standard errors are clustered by village. 1% (***), 5% (**), and 10% (*) confidence**.**

Table 18B: Attrition of Tracked Students

VARIABLES	Attrition in Students from Baseline to Endline
T1 (Info-Meet)	-0.060
	(0.038)
T2 (Info-Meet Support)	-0.013
	(0.036)
T3 (SMS-Meet)	-0.001
	(0.036)
T4 (SMS-Meet Support)	-0.032
	(0.037)
Constant	0.860***
	(0.026)
Observations	4,354
Adjusted R-squared	0.003

Table 19: Impact on Learning

	School Level				Student Level			
	D-in-D		**ANCOVA**		**D-in-D**		**ANCOVA**	
VARIABLES	English	Math	English	Math	English	Math	English	Math
Panel A: Treatment Effects								
Info-Meet	-0.068	-0.193	-0.135	0.034	-0.429	-0.320	-0.273*	0.243
	(0.231)	(0.227)	(0.107)	(0.125)	(0.431)	(0.424)	(0.141)	(0.175)
Info-Meet Support	0.130	0.268	-0.118	-0.082	-0.578	-0.243	-0.099	0.009
	(0.254)	(0.256)	(0.134)	(0.134)	(0.461)	(0.425)	(0.188)	(0.208)
SMS-Meet	0.050	0.013	-0.003	0.169	-0.211	-0.087	-0.062	0.226
	(0.248)	(0.254)	(0.123)	(0.145)	(0.400)	(0.409)	(0.194)	(0.209)
SMS-Meet Support	0.090	0.067	0.038	0.116	-0.386	-0.406	0.044	0.275*
	(0.232)	(0.245)	(0.114)	(0.119)	(0.399)	(0.396)	(0.162)	(0.164)
Info-Meet*Time	-0.190	0.254			0.109	0.511		
	(0.348)	(0.339)			(0.703)	(0.721)		
Info-Meet Support*Time	-0.313	-0.385			0.674	0.365		
	(0.372)	(0.381)			(0.720)	(0.718)		
SMS-Meet*Time	-0.174	0.101			0.260	0.505		
	(0.351)	(0.370)			(0.654)	(0.738)		
SMS-Meet Support*Time	-0.030	-0.002			0.604	0.682		
	(0.335)	(0.348)			(0.688)	(0.676)		
Adjusted R-squared	0.044	0.047	0.154	0.137	0.132	0.166	0.270	0.188
Panel B: Pooled Treatments								
Pooled Treatment	0.046	0.021	-0.056	0.057	-0.382	-0.280	-0.111	0.200
	(0.208)	(0.208)	(0.090)	(0.099)	(0.382)	(0.374)	(0.128)	(0.144)
Pooled Treatment*Time	-0.170	0.016			0.385	0.542		
	(0.302)	(0.305)			(0.637)	(0.650)		
Adjusted R-squared	0.047	0.043	0.153	0.134	0.118	0.165	0.256	0.183
Panel C: Pooled Treatment (Minus Info-Meet Support)								
Pooled excluding Info-Meet Support	0.022	-0.048	-0.036	0.102	-0.349	-0.289	-0.115	0.250*
	(0.212)	(0.211)	(0.092)	(0.102)	(0.386)	(0.379)	(0.130)	(0.146)
Info-Meet-Support	0.134	0.268	-0.120	-0.086	-0.575	-0.228	-0.093	0.010
	(0.253)	(0.255)	(0.133)	(0.134)	(0.466)	(0.426)	(0.188)	(0.208)
Pooled excluding Info-Meet *Time Support*Time	-0.130	0.127			0.333	0.572		
	(0.306)	(0.309)			(0.642)	(0.656)		
Info-Meet-Support*Time	-0.313	-0.384			0.676	0.361		
	(0.370)	(0.379)			(0.715)	(0.717)		
Observations	366	402	370	371	460	592	660	658
Adjusted R-squared	0.044	0.051	0.153	0.139	0.117	0.164	0.255	0.190
Mean of control	0.0582	-0.0146	-0.0640	-0.0876	-7.41e-09	4.76e-10	3.24e-09	-7.52e-09
*P-value (*F-Test for Joint Significance of All Ts)	0.826	0.921	0.537	0.563	0.320	0.457	0.388	0.168

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample includes all schools that were open on the day of visit (announced round), that completed all modules of the survey and that conducted the student LATs. Control variables includes student age, gender, grade, flood, school size and teacher test score averaged at school level. Student test scores in each subject is condition on grade (3 to 5) and attempting at least one question in the respective subject. Scores are normalized against the control group and have been averaged at school level. 24 questions for English and 23 questions for mathematics were considered for this analysis in line with baseline test.

Table 20A: Impact on School Functionality & Teachers (Restricted Sample)

VARIABLES	School open, unannounced visit	Total Teachers	Proportion of Teachers Absent	Additional Teacher	Total Teachers Present
Info-Meet	**0.098***	0.178	**0.062****	0.103	-0.038
	(0.054)	(0.171)	(0.028)	(0.071)	(0.165)
Info-Meet Support	-0.022	0.034	0.032	0.055	0.078
	(0.061)	(0.148)	(0.031)	(0.066)	(0.157)
SMS-Meet	0.053	**0.306***	0.047	**0.126***	0.238
	(0.063)	(0.169)	(0.033)	(0.072)	(0.192)
SMS-Meet Support	0.059	0.124	**0.081****	0.11	-0.028
	(0.060)	(0.166)	(0.036)	(0.070)	(0.170)
Observations	451	367	367	367	367
Adjusted R-squared	0.041	0.724	0	0.098	0.604
Mean of Control	0.802	2.231	0.048	0.185	1.954

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Unannounced visit at the baseline represents the census survey. Sample for functionality indicator includes all schools covered at the unannounced visit at the baseline and endline. Sample for teacher indicators includes all schools that were open on the day of visit (announced round) and that completed all modules of the survey at both baseline and endline. Control variables for functionality include dummy for flood and for teacher indicators include flood and school size. Treatment and control schools within 1 km of each other were removed from this analysis as a robustness check.

Table 20B: Impact on Infrastructure (Restricted Sample)

VARIABLES	CR Available	Improvement in CR Availability	CR in use	Improvement in CR in use	Improvement in Infrastructure
Info-Meet	-0.076	0.053	0.001	**0.142****	0.198
	(0.130)	(0.062)	(0.113)	(0.064)	(0.188)
Info-Meet Support	-0.032	0.025	-0.089	0.035	0.301*
	(0.132)	(0.059)	(0.109)	(0.065)	(0.167)
SMS-Meet	0.201	-0.023	0.115	0.06	0.136
	(0.142)	(0.060)	(0.116)	(0.060)	(0.174)
SMS-Meet Support	0.157	**0.116***	0.096	**0.161****	**0.352****
	(0.126)	(0.064)	(0.128)	(0.064)	(0.178)
Observations	367	367	367	367	367
Adjusted R-squared	0.663	0.021	0.629	0.028	0.008
Mean of control	2.169	0.169	1.615	0.154	1.169

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample includes all schools that were open on the day of visit (announced visit) and that completed all modules of the survey. Control variables include flood and school size. Treatment and control schools within 1 km of each other were removed from this analysis as a robustness check.

Table 20C: Impact on Enrollment & Learning (Restricted Sample)

	Enrollment Results				School-level Results		Student-Level Results	
VARIABLES	**Katchi to Grade 5 (Boys)**	**Katchi to Grade 5 (Girls)**	**Katchi + Grade 1 (Boys)**	**Katchi + Grade 1 (Girls)**	**English**	**Math**	**English**	**Math**
Info-Meet	1.691	2.861	2.358	1.582	-0.181	0.003	**-0.310****	0.175
	(4.152)	(3.151)	(2.788)	(1.900)	(0.110)	(0.124)	(0.141)	(0.177)
Info-Meet Support	4.735	-0.913	1.913	-1.635	-0.143	-0.098	-0.15	-0.006
	(3.959)	(2.478)	(1.930)	(1.306)	(0.141)	(0.136)	(0.188)	(0.210)
SMS-Meet	**10.375****	-0.064	3.661	-1.054	-0.058	0.093	-0.112	0.162
	(4.734)	(2.650)	(2.552)	(1.532)	(0.127)	(0.144)	(0.193)	(0.212)
SMS-Meet Support	**7.263***	-1.084	**4.733****	-0.254	-0.019	0.071	-0.018	0.203
	(3.857)	(2.030)	(2.092)	(1.201)	(0.114)	(0.117)	(0.162)	(0.168)
Observations	367	367	367	367	351	352	630	628
Adjusted R-squared	0.697	0.635	0.537	0.436	0.148	0.148	0.273	0.177
Mean of control	45.68	23.39	18.41	9.865	-0.0131	-0.0541	5.79E-09	1.84E-09

Note: Parameter estimates statistically different than zero at 1% (***), 5% (**), and 10% (*) confidence. District fixed effects added with standard errors clustered at village level. Sample includes all schools that were open on the day of visit (announced visit) and that completed all modules of the survey. Control variable for enrollment includes flood. For learning outcomes at school level, we limit our sample to students in grades 3 to 5 that attempted at least one question in the respective subject at both baseline and endline. Control variables for test scores include student age, gender, grade and teacher test score. Scores are normalized against the control group and have been averaged at school level. 24 questions for English and 23 questions for mathematics were considered for this analysis in line with baseline test. Similar conditions apply for student level analysis except that we limit our sample to students covered at baseline and endline. Treatment and control schools within 1 km of each other were removed from this analysis as a robustness check.

Survey Instruments

In both the baseline and endline, the school surveys collected detailed data on school-level variables such as enrollment, attendance, teacher on-task, facilities, infrastructure, SMCs, funding and expenditure. In addition, student tests were administered to randomly selected students and teachers.[64]

The school observation questionnaire and the teacher roster questionnaires collected information on the school's functionality and conditions. The head teacher, teacher, and student questionnaire provided insights into school, teacher and student characteristics and perceptions.

In the school observation questionnaire, enumerators recorded their observations of school conditions, functionality and infrastructure[65]. This instrument gathered information on the school building, facilities and amenities, hygiene conditions inside and outside the school, on-going classroom practices and teacher activities.

The teacher roster gathered basic information on all teachers serving at the school. This data included information on the teachers' subject areas, salaries and their presence at school. The endline teacher roster collected information on all teachers registered with the school at the time of the baseline as well as all teachers registered at the time of the endline survey.

The head teacher questionnaire gathered information on the head teacher's personal and professional background, as well as his or her knowledge of students, facilities and SMCs. The second part of the instrument collected information from official school records. This information included details on the School Improvement Plan (SIP), attendance, fees, and SMC funds and expenditures. The teacher questionnaire was similar to the head teacher questionnaire – with the omission of the school records section – and was directed at other teachers besides the head teacher. It also collected personal and professional information on teachers as well as their perceptions about student learning and SMC functionality.

Student tests and questionnaire

The Learning Assessment Tests (LATs) were norm-referenced tests designed to capture the learning levels of primary grade students. Each test had three components, Mathematics, English and Sindhi (the vernacular), aimed at measuring the child's performance across competencies. The test was administered both before and after the rollout of the intervention, and in all the treatment and control villages. We restricted testing to students in grades 3, 4 and 5 at endline. At least 20 students per school were randomly selected to take the test, wherever possible[66].

---

[64] Student tests administered to teachers follow an SDI style knowledge assessment in which teachers are asked to mark a random student's completed exam.

[65] Observations include whether the school was open at the time of visit, the number of classrooms in use and whether the school had access to boundary wall, electricity and/or drinking water.

[66] Strict guidelines were established to ensure high quality test data was collected. Students were expected to fill their responses to question on the test without the help of the test administrator. Double blinding was introduced in the grading of these tests, whereby members of the research team who served as graders were unaware of the treatment status of students at the time of grading.

Students who took the test also completed a short questionnaire at the end of the exam. The questionnaire captured students' personal information, feedback on teaching practices at the school, his or her perception towards learning and comments on school teachers.

Table 21: Distribution of Items on Learning Assessment Test by Grade and Competency

Difficulty Level	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total
Mathematics Competencies						
Number	1	0	2	0	0	3
Algebraic Operations	2	7	1	3	0	13
Measurement	1	1	3	0	0	5
Geometry	1	0	1	1	1	4
Information Handling	0	1	3	0	1	5
Total	**5**	**9**	**10**	**4**	**3**	**30**
English Competencies						
Reading Skills	0	0	5	0	0	5
Language Skills	2	6	4	2	3	17
Writing Skills	4	2	0	2	0	8
Total	**6**	**8**	**9**	**4**	**3**	**30**
Sindhi Competencies						
Reading Skills	0	0	0	4	0	4
Language Skills	1	17	6	2	4	30
Writing Skills	3	0	2	0	0	5
Total	**4**	**17**	**8**	**6**	**4**	**39**

Table 22A: School-Level Attempt Rates & Scores for English LAT Items

		Endline		
		Attempt Rates	Mean Score	Std Dev
	Panel A: English Test Items			
1	Missing Alphabets	0.87	0.80	0.40
2	Missing Alphabets	0.81	0.75	0.43
3	Capital and Small Letters	0.79	0.66	0.47
4	Capital and Small Letters	0.74	0.54	0.50
5	Concept of Vowels: using a an	0.71	0.71	0.46
6	Concept of Vowels: using a an	0.81	0.69	0.46
7	Verb: to be	0.71	0.45	0.50
8	Prepositions	0.82	0.43	0.50
9	Adjectives	0.78	0.42	0.49
10	Pronouns	0.80	0.59	0.49
11	Pronouns	0.77	0.56	0.50
12	Verb: to have	0.67	0.69	0.46
13	Question Words	0.63	0.28	0.45
14	Spelling words	0.56	0.83	0.38
15	Spelling words	0.52	0.80	0.40
16	Prepositions	0.60	0.55	0.50
17	Antonyms	0.71	0.47	0.50
18	Past tense	0.69	0.43	0.50
19	Irregular Plurals	0.65	0.51	0.50
20	Irregular Plurals	0.62	0.49	0.50
21	Days of the week	0.67	0.60	0.49
22	Picture recognition	0.54	0.57	0.50
23	Sentence formation	0.21	0.46	0.50
24	Spelling words	0.65	0.39	0.49
25	Adjectives	0.62	0.44	0.50
26	Comprehension	0.65	0.52	0.50
27	Comprehension	0.61	0.48	0.50
28	Comprehension	0.59	0.45	0.50
29	Comprehension	0.54	0.41	0.49
30	Comprehension	0.55	0.45	0.50

Table 22B: School-Level Attempt Rates & Scores for Math LAT Items

	Panel B:			
1	Numbers: Before and After	0.78	0.79	0.40
2	Place Value	0.63	0.36	0.48
3	Subtraction: 1 Digit	0.86	0.82	0.39
4	Subtraction: 2 Digit	0.84	0.73	0.44
5	Addition: 2 Digit	0.82	0.69	0.46
6	Subtraction: 3 Digit	0.80	0.64	0.48
7	Smallest and Greatest 4 digit Numbers	0.76	0.62	0.49
8	Addition/Subtraction of Units of Mass	0.74	0.65	0.48
9	Multiplication	0.78	0.68	0.47
10	Division	0.75	0.46	0.50
11	Division	0.70	0.51	0.50
12	Geometric shapes	0.63	0.62	0.49
13	Fractions: One third and Two thirds	0.72	0.54	0.50
14	Fractions: One third and Two thirds	0.70	0.65	0.48
15	Fractions: Halves	0.72	0.44	0.50
16	Multiples	0.66	0.63	0.48
17	Mutual Conversion of Units of Weight	0.69	0.52	0.50
18	Mutual Conversion of Units of Time	0.69	0.59	0.49
19	Measuring Line Segment	0.68	0.60	0.49
20	Calculating Perimeter	0.63	0.63	0.48
21	Parallel and Perpendicular Lines	0.67	0.74	0.44
22	Calendar months	0.64	0.65	0.48
23	Addition/Subtraction of Units of Time	0.29	0.77	0.42
24	Addition/Subtraction of Units of Currency	0.72	0.83	0.37
25	Reading a Bar Graph	0.73	0.62	0.48
26	Unitary method	0.69	0.73	0.45
27	Fractions: Subtraction	0.48	0.36	0.48
28	Decimals: Addition	0.41	0.42	0.49
29	Reading a Bar Graph	0.60	0.39	0.49
30	Reading a Bar Graph	0.58	0.52	0.50

Qualitative Study Guides

We designed the guides for interviews to be open ended in order to capture the relational and operational aspects of the school-community relationship. Specifically, these guides cover key outcome indicators of the intervention including (i) total registered teachers and teacher presence; (ii) school infrastructure and facilities; (iii) utilization of SMC funds; (vi) student enrollment and attendance and (v) response towards treatment.

The participants of these discussions include SMC EB members and teachers of the sampled schools. This allows for community as well as school level representation in the discussion. Each FGD had at least 5 SMC and school staff participants, 1 moderator and 1 note taker.

The Adult Literacy Test

The Adult Literacy Test was designed to capture respondents' cognitive ability through testing on thinking skills, numeracy skills, prose literacy and document literacy. Each component was further divided into basic, intermediate and advanced difficulty levels with each level containing 3 questions.

Careful consideration was given in choosing the questions and their difficulty level, it was made sure that:

- The difficulty level of questions within one difficulty level was the same.
- Difficulty of questions varied across difficulty levels so that the difficulty of questions was the greatest for advanced, less for intermediate and the least for basic.

Each question contained a set of instructions and a flashcard. The enumerator read out the instructions for the respective question and then showed the flashcard to the respondent, whereupon the respondent indicated his/her response by pointing to the option on the flashcard. The respondents could only progress to the next level of difficulty in a given category if he/she gave correct answers to at least 2 out of 3 questions on the current level of difficulty; otherwise the section was skipped.

The description of questions for each category in the adult literacy test is as follows:

Table 23: Adult Literacy Test: Description of Items

Category	Description of Questions
Prose Literacy	
Basic	Read and translate words/sentences
Intermediate	Short comprehension
Advanced	Reading a pamphlet
Document Literacy	
Basic	Picture recognition: reading simple bar graph
Intermediate	Reading a report card
Advanced	Reading a report card: Higher difficulty questions
Numeracy Skills	
Basic	Concept of number progression, simple addition and recognizing currency notes
Intermediate	Concept of two digit subtraction, simple multiplication and division
Advanced	Reading a local electricity bill
Thinking Skills	
Basic	Understanding simple patterns of geometrical shapes to indicate which figure follows
Intermediate	Pointing the odd figure in the pattern, and understanding patterns through examples to indicate which figure follows
Advanced	Higher complexity pattern questions

Table 24: Sample Selection

	T1 (Info-Meet)	T2 (SMS-Meet)	T3 (Info-Meet Support)	T4 (SMS-Meet Support)	Overall
Sample based on Intermediate Performance Indicators					
High	2	2	2	2	8
Mixed	1	1	1	1	4
Stagnant	1	1	1	1	4
Low	1	1	1	1	4
Total	5	5	5	5	20
Sample based on Outcome Performance Indicator: Student Achievement					
High LATs Score	-	5	-	5	10
Moderate LATs Score	-	4	-	6	10
Total	-	9	-	11	20

Table 25: Sample Characteristics by Treatment, District and Performance Indicators

	T1 (Info-Meet)	T2 (SMS-Meet)	T3 (Info-Meet Support)	T4 (SMS-Meet Support)	Overall
Sample by District					
Mirpurkhas	1	7	3	7	18
Matiari	1	2	0	6	9
Sanghar	3	5	2	3	13
Total	5	14	5	16	40
Sample by Intermediate Performance Indicators					
High	2	2	2	4	10
Mixed	1	1	1	3	6
Stagnant	1	1	1	1	4
Low	1	10	1	8	20
Total	5	14	5	16	40

Project Cost Estimates

Cost-effectiveness analysis of the project provides additional depth to our understanding of the impact of the project. This section lays the foundations of such an analysis, by highlighting the assumptions made in distributing costs across different project components, and specifying the magnitude of these costs.

Assumptions for Cost Distribution:

1. SMC villages are 119 in number (12,258 participants). SMS villages re 111 in number (13,384 participants).
2. 2/3rd of the cost of "Development of Audio Tapes" is attributed to Intervention 1(SMC) and 1/3rd of the cost is attributed to Intervention 2 (SMS).
3. For "Executive Body Meetings", cost is averaged over multiple schools in the same village.
4. For "Honorarium for ADOs", total cost is divided across the four months when honorariums were given: Feb-May 2013. Monthly exchange rates are used.
5. For "Half Day Workshop for District Officials", the exchange rate for the month of January 2013 is used.
6. For "Consultants' Fees for Portal Management", "SMS Charges", "Credit Transfer to Participants", "Credit Transfers to Community Volunteers" and "IVR Calls", monthly PKR to USD exchange rates are used.
7. For all "Monitoring Costs", average PKR to USD exchange rate is used for the year 2013 (duration of contract for SPDC).
8. For "Staff Time" in Total Fixed Development Cost and "Additional Staff Time" in Total Variable Cost, average PKR to USD exchange rate is used for the year 2012 in case of design costs, and for the year 2013 in case of implementation costs. All costs for "Staff Time are split equally across the three interventions. All costs for "Additional Staff Time" are split equally across the three interventions, with the exception of additional monitoring costs of the portal which are built into the cost estimate provided for Country Office implementation costs for intervention 2.
9. "Opportunity Cost for Participants" is calculated as: (Daily Wage / 2) x Number of Participants. For the Intervention 1, villagers were advised to conduct a second, non-facilitated meeting after the first general body meeting had been conducted by the project team. The strong assumption is made that in all Intervention 1 villages, the second non-facilitated meeting was conducted with the same participation rate as the first. Therefore, for Intervention 1, the overall opportunity cost is multiplied by two.
10. Daily wage approximated to be PKR 333, as per HIES 2010-11. Conversion to USD done using average PKR to USD exchange rates for 2012 & 2013
11. Source for PKR to USD exchange rate: "Sources: Monthly Statistical Bulletin, Annual Report of SBP and International Financial Statistics (IFS)

All costs are given in USD.

		Unit Cost (Village)	Total Cost	Unit Cost (Village)	Total Cost	Unit Cost	Total Cost
Fixed Development Cost							
Development of Audio Tapes	JWT		691		346		
Printing of Pamphlets/Posters	Weitek Group	13	1,500	13	1,500		
Staff Time	World Bank						
Staff/Consultants (HQ)			22,088		22,088		22,088
Staff/Consultants (Country Office)			2,803		2,803		2,803
Total Fixed Development Cost			27,083		26,737		24,891
Variable Cost							
Implementation							
General Body Meetings	Weitek Group	174	20,000	174	20,000		
Executive Body Meetings		87	10,348	87	9,652		
Honorarium for ADOs	Reform Support Unit					29	3,320
Half day workshop for District Officials							
Logistics							205
Refreshments							308
Operational Costs of Portal							
Consultants' Fees for Portal Management	M3Tech				9,286		
SMS Charges					10,593		
Credit Transfer to Participants					1,398		
Credit Transfers to Community Volunteers					86		
IVR Calls					1,202		
Monitoring Cost							
Staff Fee	SPDC						
Nadeem Ahmed			2,457		2,457		
Manzoor H. Memon			1,422		1,422		
Reimbursable Expenses							
Hotel, subsistence			1,970		1,970		
Local transportation			2,463		2,463		
Intercity transportation			985		985		
Additional Staff Time	World Bank						
Staff/Consultants (HQ)			14,911		14,911		14,911
Staff/Consultants (Country Office)			5,550		12,347		5,550
Opportunity Cost for Participants			51,235		22,564		
Total Variable Cost			101,976		111,632		24,294
Total Project Cost			129,058		138,368		49,185

Glossary

CDP	Community Dialogue Platform
EB	Executive Body
GoSindh	Government of Sindh
ICR	Implementation Completion and Results Report
ICT	Information and Communications Technology
IFS	International Financial Statistics
IVR	Interactive Voice Response
PAD	Project Appraisal Document
PKR	Pakistani Rupee
PSLM	Pakistan Social and Living Standards Measurement Survey
SBM	School-Based Management Reforms
SERP	Sindh Education Sector Reform Program
SIP	School Improvement Plan
SMC	School Management Committee
TEO	Taluka Education Officer
USD	U.S. Dollar
WDR	World Development Report
WB	World Bank