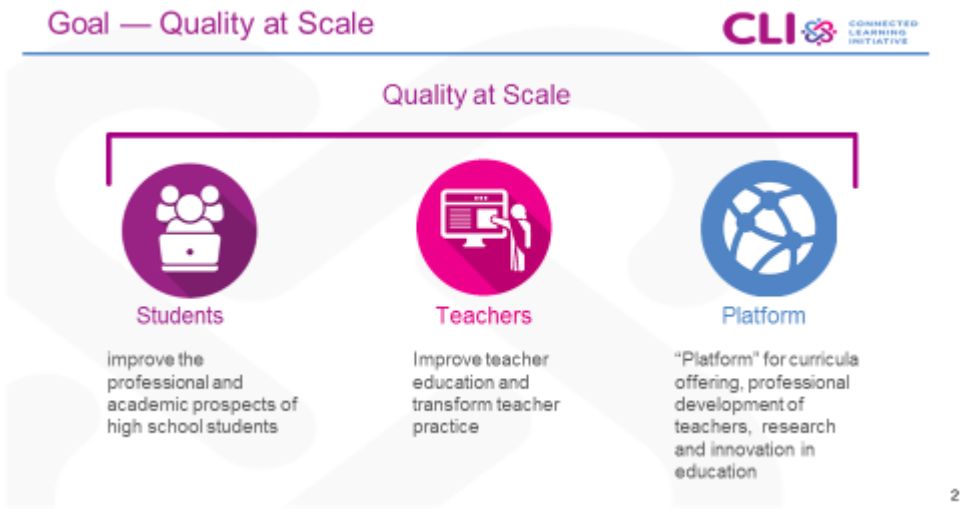
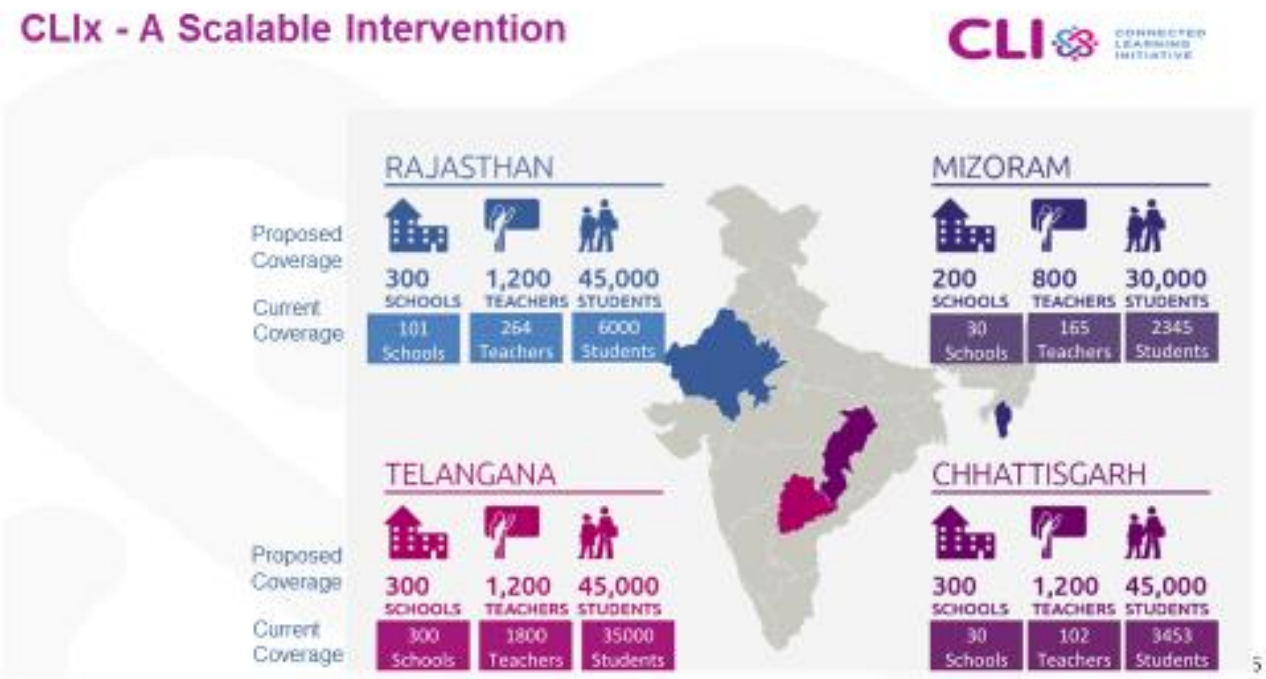
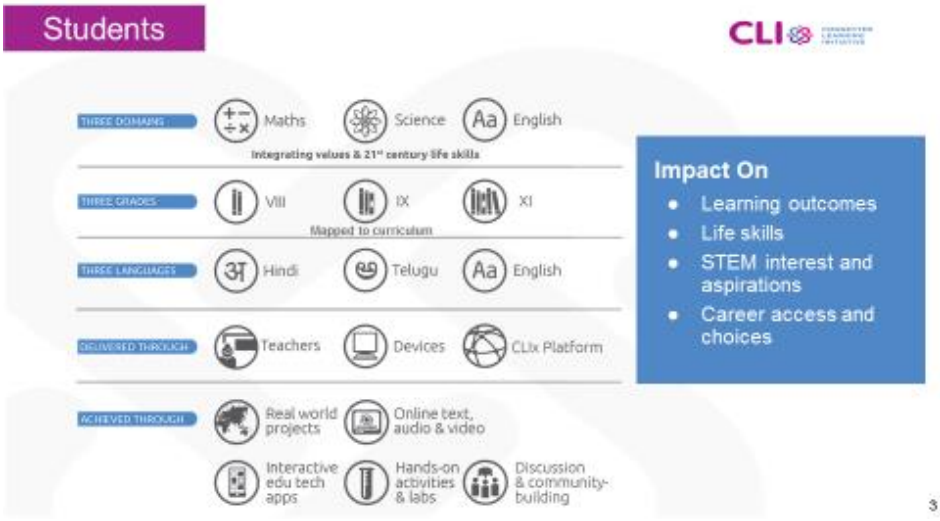
The connected Learning Initiative is a collaboration between the Tata Trusts, Tata Institute of Social Sciences (TISS), Mumbai and the Massachusetts Institute of Technology (MIT)(Cambridge, MA, USA) to enhance access to quality education for secondary school students particularly from Government schools, through the thoughtful use of technology.





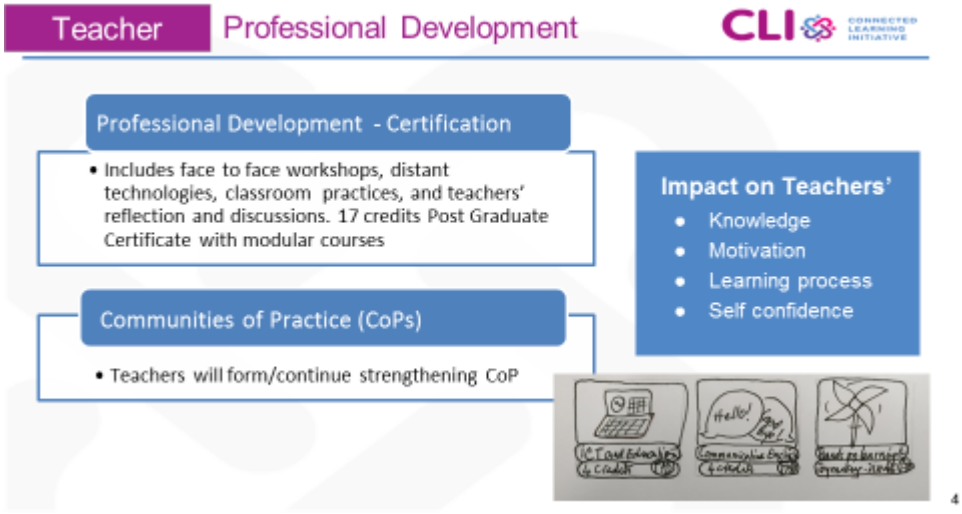
CLIx is designed to be a scalable intervention. CLIx keeps teachers at the centre of education quality transformation and teacher professional development is an integral part of CLIx. CLIx offers quality learning curricular modules to students in the areas of mathematics, science, communicative English and values and life skills. The current phase 2015-2018, is a *proof of concept* phase in which CLIx modules for students and for teachers are being developed and implemented in four states of India.

In this phase we are developing a range of valuable content that can be offered to students in which technology is incorporated to bring learning with higher order cognitive processes including problem solving, interaction, hand-on activities, communication, creation and collaboration. These are designed as modules that can be offered as a part of the curriculum, and are being vetted and adapted to local requirements. They are offered on the CLIx platform that has been conceptualised by the Homi Bhabha Centre for Science Education, TISS and MIT, which strengthens student autonomy and collaborative work and team work, that enables student artefacts to be produced and shared with others, and also can provide teacher dashboards to enable teachers to view, monitor and manage the whole class process. The platform and modules are designed to work off line on a local area network. They are also device agnostic. They can take advantage of opportunistic network to pull in new content and push out data. The platform can also nurture an ecosystem in which modules developed by others can also be integrated into the platform, as also offered in many Indian languages. The tools that have been developed are also available for teachers to use to develop their own content. All the CLIx resources are released as Open Education Resources.



The student modules currently being developed are for grades VIII and IX and are in the areas of science, mathematics, spoken English and values and life skills. The design of these modules is following a 'research based design' approach and also includes piloting, vetting and validation by State education experts and teachers. The resources are currently in Hindi, Telugu and English (the states in which we are implementing). They are designed for pair work (or groups of three students). Our preferred device is the laptop or desk top which allows students to create, manipulate and interact with the resources and tools and not only to 'consume'. Key board and mouse are thus essential, even if delivery takes place through a tablet. The design of the platform allows students to have a network experience and use content cached on the local server. The communicative English modules requires that each student have headphones and a microphone so that they can record and listen. The science modules get students to conduct small experiments and observations, simulate and organise information. The availability of additional peripherals such as USB microscope would also provide amazing exploratory experiences for students. Values and Life skills use a story and case study approaches to engage young adults in thinking about and developing ethical and moral reasoning, commitment to core values and orientation to professional ethics while introducing them to various aspects of the world of work. The modules are designed to allow students to start at their level of understanding and ramp up to more complex ideas and concepts. Several tools, games and simulations have been developed or are being adapted from existing OERs, to enable students to interact. The content is mapped onto the school curriculum. The student modules are designed to be offered through the CLIx platform and to be implemented in the classroom by their own teachers. They are being developed by the Homi Bhabha Centre for Science Education (TIFR), Eklavya, Madhya Pradesh, National Institute of Advanced Studies, Bangalore, IUCAA, Pune, MIT, USA and TISS, Mumbai.

Teacher professional development and continued support is thus central to CLIx implementation. Teacher own subject knowledge needs to be increased and deepened. They nee



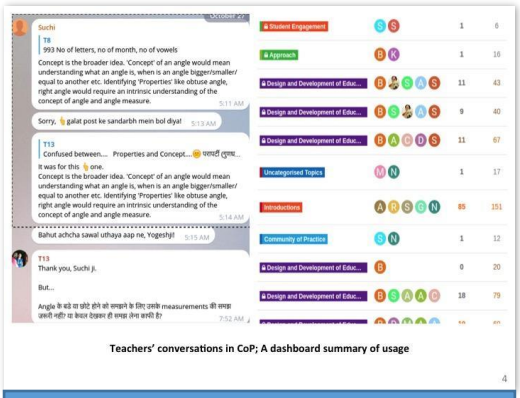
d to develop new pedagogic understanding to allow more interaction in the classroom. They need to be prepared for the digital capabilities of the next generation. They need to themselves feel empowered and able to use new tools and resources—to teach and for their own work. They also need continuous support.

Traditionally, quality in TPD has always been difficult to achieve because of the scarcity of quality resource persons Cascading models of training have been found to be ineffective, and workshops have limited impact. Continuous support on the ground is also very difficult to manage. Recent research also points to the importance of peer to peer learning in professional learning.

In order to address TPD holistically, we have adopted two strategies. The basic form of TPD takes the form of modular courses that have the certification option. And the formation of communities of practice for ongoing professional discourse and support. We have designed several modular courses (4 credits and 2 credits) that can be offered to teachers online/ blended (incorporating a few workshops and meet-ups), that follow the principles of building on teachers current practice and peer interaction and review. They include videos, short readings, quizzes and activities. We are creating and using OERs (including TESS-India, etc). The current menu includes ICT in education, reflective teaching of communicative English, active-science-learning, media for the classroom and values and the young adult (2credits). We have also organised this into a Post Graduate Certificate in Reflective Teaching with ICT which will be awarded by TISS. The range of learning includes ICT for the teachers own professional development and practice, (including digital learning), subject knowledge and pedagogies and specialised skills and capacities.

These modules are being offered on open-ed-x and will be hosted by IIT Mumbai. They are being designed to be accessed through mobile app (we have found that about 70% of teachers have smart phones). They are being designed to be offered as TISS certificate courses and teachers can accumulate credits and work towards a certificate/diploma/degree. We believe that this strategy will allow us to work at scale with large numbers of teachers and also to introduce rigour and motivation into INSET. In this we are following the recommendations of NCERT—reflective teacher, NCFTE and the Justice Verma Commission. We are in discussion with states for the recognition of these certificates for accreditation in the states. The involvement of the local teacher educator community in offering these courses along with the TISS faculty can ensure both local relevance and scaling. The TPD platform is being developed as a National online platform on which the CLIx/TISS TPD courses and others can be aggregated and offered as TPD-MOOCs. Going forward other courses

and modules could also be offered on this platform widely. These resources would also be of relevance in PSTE.

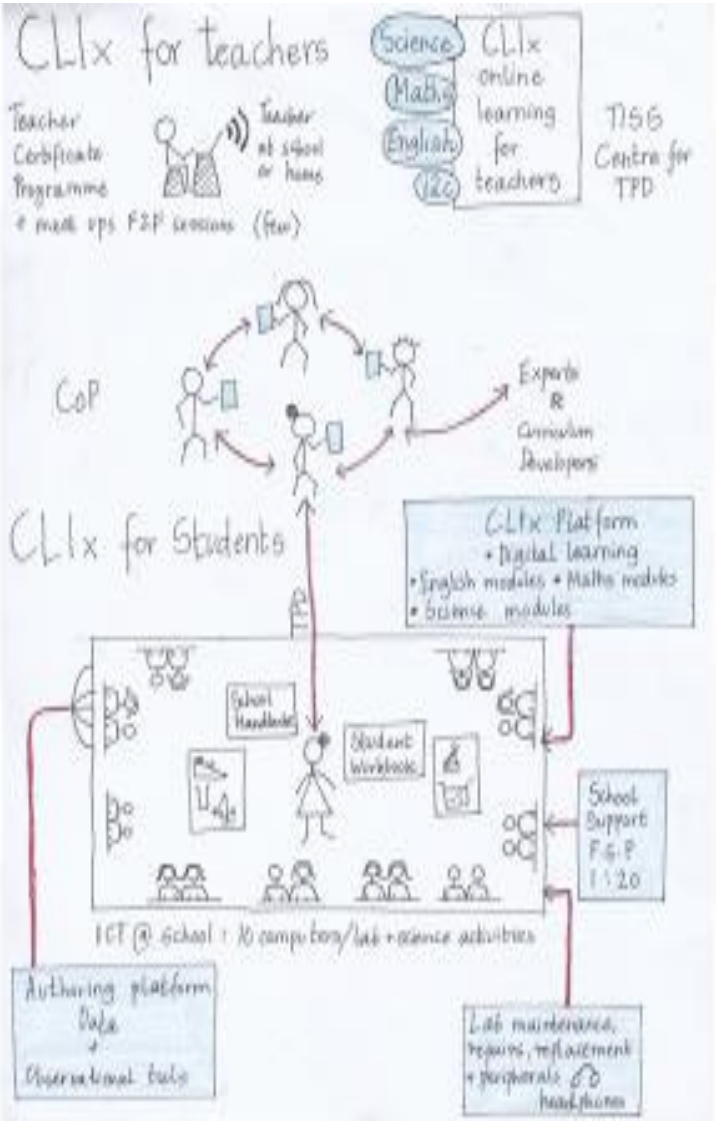


Screen shot of telegram discussion (not in ppt)

The discussion forums are important in TPD. These we call 'community of practice' (CoP). CoPs are currently through the Telegram app and are accessed by teachers on their mobile phones. The CoP gives teachers access to the work of their peers, access to ideas and resources, planning and review and to experts from outside with whom they can discuss their experiences. CoPs are also the strategy through which teachers are introduced to and learn to teach new modules and content, and share their experiences and ideas. Teachers value the authentic discussions in these fora and are motivated by them. Strengthening local involvement of TEs in the discussion forum is important to bring in. COPs cannot be left to chance and spontaneity. We have designed the protocols and processes necessary to support CoPs. This ongoing support to teachers through the mobile phone based CoP is an important element for scalability.

We have taken the approach that educational worthwhileness and pedagogic value, viability, efficiency, using existing resources and infrastructure, integrating into the system and cost effectiveness are the central values that should guide scalability.

So far in CLIx we have developed and implemented only one round of modules and basic teacher professional development. Even in this round of implementation (about 4 months) we have



CLIx

- Focus on conceptual understanding and application of foundational concepts through active learning
- Emphasis is on "Learning by Doing" [skills + knowledge + attitude]

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prepared the teachers to teach the students. We have a baseline study which has given us the initial data and we have planned a mid term study in January 2018 when we would have completed one full cycle of implementation (academic session 2017-2018) along with the teacher certification. At this point we have micro field based studies and experiences against which we have caliberated and evolved the interventions scope and strategies. We have tried to design keeping in mind what the field currently offers us in terms of hardware and connectivity, and existing schemes offer us in terms of resources and time for teacher training. We have tried to supplement the field minimally to make existing infrastructure work and to repurpose for clix modules (eg adding headphones It is against this field experience that we have basic validation of the core model of what CLIx offers and the model of working at scale.). We have an aspirational design that works under current field realities.

The problem of scaling is the problem of scaling quality.

Elements of Quality & Costs Scalability

CLIx CONNECTED LEARNING INITIATIVE

S.No.	Elements	Type/Cost
1.	Well designed Curricular Content for students	One time. Need to be validated for educational worth and have curricular relavance.
2.	Setting up labs in schools and providing devices and materials in labs	One time BUT devices become outdated and keep changing. In addition to computers, peripherals (headphones, USB microscope) are needed.
3.	Quality in TPD	quality resource persons scarse—Cascading leads to quality loss (loss of authentic communication)
4.	Continuous motivation of teachers	'Last mile' and continuous
5.	Field monitoring and Support	'Last mile' and continuous
6.	Maintenance of Labs	'Last mile' and continuous

The devil is in the details

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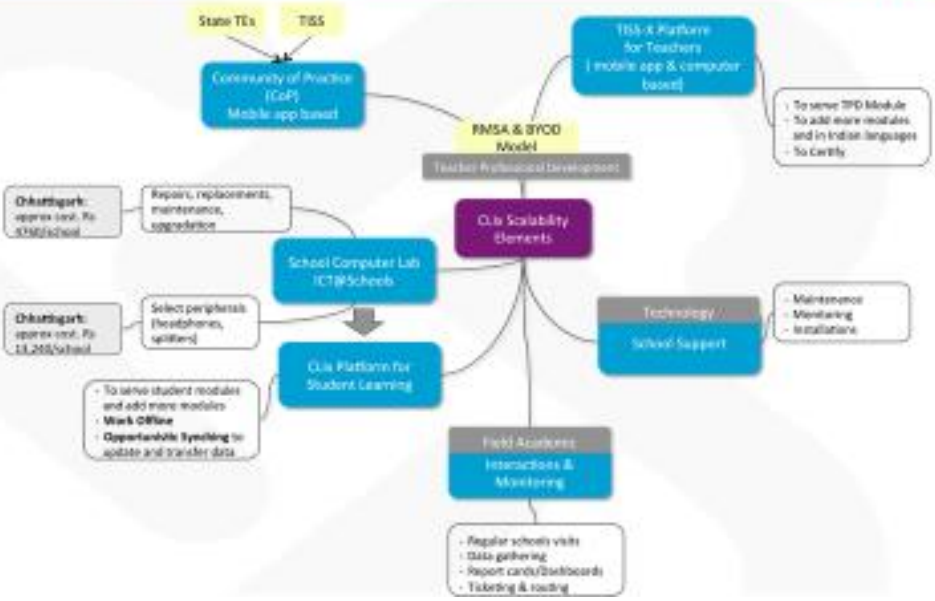
In order to present CLIx scaling, we have abstracted eight elements around which we have built the model for scaling and scalability. The use of technology in various ways is an important feature of the model. Needless to say technology (devices, network and software and tools) are necessary but are not sufficient for quality—the teachers (their capacity and motivation), the teaching-learning process, the student modules and the TPD are at the core, along with the supporting school environment and maintenance of the lab and resources. Having a state-level teacher educator resource group in place is also necessary. This may initially be 'difficult' but as the programme proceeds, teachers themselves can contribute. Further the platform and app based approach also allows this community to be widened, and to increase participation.

Elements of Scalability

CLIx CONNECTED LEARNING INITIATIVE



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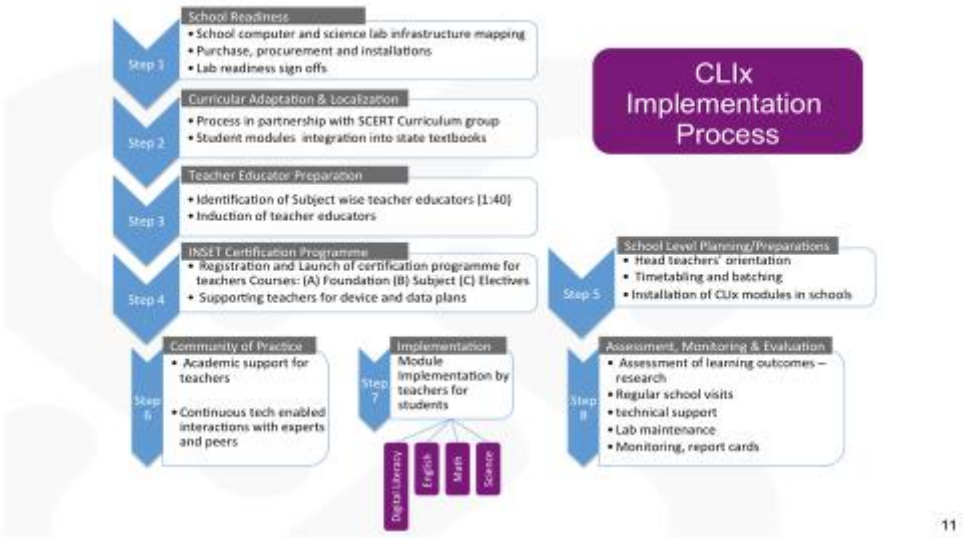
Access to networks is something that we do not have at this point of time, but if this becomes available, even for opportunistic syncing alone, the quality of the educational offerings to students, the quality of the TPD, the quality of the monitoring and feedback and the overall quality assurance would all be



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significantly impacted. We have been mapping various existing solutions for network access such as SWAN, NKN and Rail wire, which could be explored for this purpose.

Currently a team of 'field support persons' provided at the ration of 1:10 (and stabilised at the ratio of 1:20 schools support teahchers and the schools in various ways, in mapping the status of the lab, preparing the requirements for repairs etc and working on the lab to bring it up to useable quality. States have MIS persons at the block level who could contribute to this activity. We have also found instances of students who are able to initiative to contribute to lab maintenance. Adoption and maintenance of the lab requires schools to be oriented to the process. IN order to prepare schools for using resources, to enable them to 'batch' students to give access to labs (paticulary where the class size is large, or there are a number of sections in the school) are aspects of local action for which schools need orientation and support. These matters seem logistical but require mindset shift in schools. We have a process of HM orientation to enable them to exhibit the necessary leadership to adopt the intervention.

Who will do what

Stake Holders/ AxesOfScalability	Government (Centre/State)	Tata Trusts & TISS	Teachers	School Management	Local Community & NGOs
Content	yes	yes	yes		
Software Platform		yes			
Access Network Infrastructure	yes				
Teacher Professional Development	yes	yes	yes		
School Ecosystem				yes	yes
Monitoring Systems	yes	yes	yes	yes	

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Success will be visible and measureable at the level of the students learning, classroom culture, teacher capacity and motivation and school functioning, and support. The intervention monitoring tool as well as base and end line study, and platform analytics are being consolidated into an intervention monitoring tool. Baseline and endline studies several smaller case studies as well as an innovation diffusion study are documenting and producing knowledge on the processes of development as well as implementation and impact.