

A Smart Partnership: Integrating Educational Technology for Underserved Children in India

Amina Charania^{1*} and Niki Davis²

¹Tata Trusts, India // ²University of Canterbury, New Zealand // aminasachin@gmail.com // niki.davis@canterbury.ac.nz

*Corresponding author

ABSTRACT

This paper explores the evolution of a large multi-stakeholder partnership that has grown since 2011 to scale deep engagement with learning through technology and decrease the digital divide for thousands of underserved school children in India. Using as its basis a case study of an initiative called integrated approach to technology in education (ITE) spearheaded by Tata Trusts in India working in partnership with an increasing number of other organizations, this paper seeks to illustrate what a large multi-stakeholder partnership in education is and how it can work to serve education equitably. In addition to tracing the growth and development of this multi-stakeholder partnership, the paper examines the ITE-related work partnership against seven characteristics of education-industry/community partnerships re-interpreted in terms of smart partnerships at EDUsummIT 2015.

Keywords

Smart partnership, Education industry partnership, Change with digital technologies, Integrating ICT, Digital equity

Introduction

Today, education-industry partnerships can assist schools to expedite the integration of digital technologies in their pedagogy and administration (Eickelmann, 2011). Multi-stakeholder partnerships known as smart partnerships (SPs) may be particularly valuable in terms of supporting the development of more equitable educational infrastructure and reducing the digital divide, which is the gulf between those who can readily and effectively access information and communication technologies (ICT) and those who, for various reasons, cannot.

According to Snow (2011), “Smart partnerships are collaborations linking the assets and initiatives of institutions with community assets and interests for powerful long-term impact.” UNESCO is just one large-scale educational stakeholder that promotes the multi-stakeholder partnerships as a means to “create equitable, dynamic, accountable and sustainable learner-centered digital learning ecosystems” (UNESCO, 2015, point 19). However, as Leahy et al. (2016) point out, scholarly literature contains little information on the development, utility and effectiveness of education-related multi-stakeholder partnerships that have “smart” learning environments (in relation to smart learning environments see Kinshuk et al., 2016).

At the EDUsummIT 2015, a discussion of multi-stakeholder educational partnerships recognized that some may be characterized as smart partnerships (SP) when they meet the following seven criteria (Davis et al., 2015; Leahy et al., 2016):

- draw partners from within and across a wide range of educational enterprises and stakeholders
- have a shared purpose (values, concept, vision) that evolves synergistically
- have a strategic and holistic approach
- enhance the quality of education via digital technologies (ICT)
- harness ICT smartly in order to monitor educational outcomes and provide feedback aimed at improving performance
- recognize their role in the emergent process(es)
- facilitate change within their own organizations.

In this paper, we explore the growth of one partnership that is developing large-scale integration of technology in teaching and learning through the initiative called Integrating Technology in Education (ITE) for school age children in India, which began its work in a remote area of the Eastern part of the country. The central stakeholder in this initiative from the start is the Tata Trusts, a philanthropic organization committed to the betterment of India and its people, and the purpose of the ITE initiative is to enhance deep learning experiences using technology of the upper-primary and secondary school aged children and adolescents which would also bridge the digital divide. In many

parts of India, the digital divide is all too apparent and is mediated by the variables of gender, age and socioeconomic status (see, e.g., Eamon, 2004). Socioeconomic status is particularly important with respect to the initiative discussed in this paper because it is a primary reason for the high dropout rate from school in many parts of India (see, e.g., Pankaj & Poornima, 2008). ITE objectives focus on ameliorating the effects of this type of inequality.

We begin our account with a brief explanation of how we conducted the study. We then trace the growth and development of the Tata Trust's ITE-focused partnership, after which we illustrate and discuss how and to what extent the partnership exhibits the seven SP characteristics listed above.



Key: Red = the first site in concept phase 1; Green = sites added in establishment phase 2; Purple = sites added in phase 3.

Figure 1. The spread of the ITE smart partnership in India from 2011-2015

Method

We used case study methodology to generate our data, which came from more than 20 documentary sources associated with the SP and its ITE initiative and from interviews, conducted by the second author of this paper, of the first author (an initiating stakeholder in the development and implementation of the initiative). Both of us reflected on and analyzed the data. The seven characteristic of a SP were applied deductively to seek out, identify and then describe each aspect. The study built on our collaboration with Twining to inform UNESCO Institute of Statistics development of new indicators for ITE infrastructure in education (Twining, Davis, & Charania, 2015) and work described in Leahy et al. (2016) to map the ITE SP on Davis's Arena of change with digital technologies in education, which was also used in Twining et al. (2015). Like other scholars who study practice in which they are

immersed, we were aware of the potential for bias. However, because the second author is not involved in the SP or the ITE, we consider that she was able to bring an independent perspective to her questioning and data analysis, especially in regard to probing for the complex and organic processes occurring in the SP's development to date. We also gave all other stakeholders involved in the SP opportunity to check and adjust, as they saw fit, the findings emerging from our analysis.

Growth of the ITE multi-stakeholder partnership

Our examination of the information that we collected allowed us to identify four clear development phases. The map in Figure 1 illustrated the growth of impact of the ITE SP starting with one site in phase one (red), the five sites added in the establishment phase two (green), and expanding to all other sites indicated by the circles on the map during scaling up phase three (purple).

The phases are described below and the evidence is summarized in Table 1.

- Phase 1. Creation of vision and concept:* The ITE initiative began in 2011 when the first author presented the ITE concept at North East Hill University conference. The first author's doctoral studies and research at Iowa State University Center for Technology in Learning and Teaching and with the second author heavily influenced the development of the concept. The concept was further developed as student centered use of technology for meaningful learning. This concept was then tried with a grant from Tata Trusts to the already supported non-governmental organization (NGO) Street Survivors so that they implemented ITE in their four coaching centers in a remote and challenging part of the Murshidabad district of West Bengal abutting the India-Bangladesh border (Charania & Meyers, 2014). The ITE approach calls on teachers to design lesson plans focused on encouraging students to create learning projects based on the curriculum using digital technologies and the Internet. The pilot was successful in terms of gaining students' interest in learning school subjects and teachers' ability to integrate technology-enabled student projects within curriculum, and it was at this point that the multi-stakeholder partnership really got underway. The approach also worked strategically to improve access to these technologies for underserved children in Murshidabad by generating expertise and resources that could be reused in increasingly "smart" ways to support the spread of the ITE in other Trust supported education projects. This experience at the pilot and the concept paper formed the basis of a presentation to the Tata Trusts Board, which agreed to spearhead expansion of the ITE initiative in other projects supported by the Tata Trusts in India.
- Phase 2. SP establishment:* During this phase in 2012/2013, the ITE initiative spread to other locations in West Bengal and Uttar Pradesh, mostly to education projects already supported by the Trust. For example, the Vikramshila Education Resource Society (another West Bengali NGO) joined with the ITE initiative at its learning centres in partnership with police and other community members; it was able to draw these partners into the SP. Similarly, the Trusts' partnership with the Suchana NGO (also in West Bengal) enabled ITE to be layered into this NGO's work with tribal communities in West Bengal (see Charania, 2015 for a description). Meanwhile, NGOs working in madrasas in Uttar Pradesh reallocated their existing budgets so they could integrate the ITE into their work. Each new partnering expanded the number of children served, broadened expertise across language and cultural parameters and drew in and made more cost-effective use of resources. These outcomes, along with external evaluations in the form of interns' and consultant's reports, papers and video recordings, confirmed the ITE concept as highly relevant to the partners and the children they were serving. By the end of its first two years, the partnership had reached out to and decreased the digital divide for 10,000 young people in the state of West Bengal and Uttar Pradesh. The ITE initiative had also begun spreading via existing Trust partners to other states.
- Phase 3. SP scaling up:* Over 2013-2014 the Tata Trusts' decision to scale up the ITE became a strategic decision. Trust leaders sought partners' advice on securing support and collaboration from government bodies and also agreed to bring in an additional project called CLIX developed with the Massachusetts Institute of Technology and Tata Institute of Social Sciences (Tata Trusts, 2016b), which would later facilitate the scaling up. In addition to "layering" ITE into partners' work, Tata staff deliberately sought government involvement so as to gain the leverage of its infrastructure and powers of authorization. The scaling up jumped significantly when new partners in the state of Assam enabled outreach to 74 schools and about 12,000 more students. In addition at this time, Vikramshila extended the ITE to about 35 government schools and madrasas in West Bengal and an increasing number of NGO partners made it possible to reach children in additional states and

districts, including those tending to have very low rates of literacy and retention in upper primary schools (see <http://www.dise.in/drc.htm>). Additional partners, such as Digital Empowerment Foundation NGO, were recruited to support innovations that increased access to ICT infrastructure with community-led wireless towers. When a private school (Samaritans Help Mission) joined as a partner, it brought more flexibility in timetabling and resources and the partnership became better able to trial innovations, such as students using Skype conferences to share their project work with neighbouring government schools and madrasas.

- *Phase 4. SP consolidation:* Mainstreaming of the ITE in government schools augurs well for sustainability in the future. The integration with the CLIX project is likely to increase the partnership between the initiative and Massachusetts Institute of Technology. The partnership has also increased its attention to address risks, such as that of cyber safety. Although Google-derived resources supported cyber safety in the earlier phases, the need to more firmly integrate cyber wellness into the initiative is imperative, especially for more vulnerable populations where there is little history and experience of ICT in society (Park, 2015). A proposal for the Tata Institute of Social Sciences to convert ITE training into certified courses for government-appointed and NGO teachers is also under consideration. This will call on more direct partnership with Tata Institute of Social Sciences and other experts from international universities. Additional challenges will also be addressed, such as increasing capacity for leadership within the partnership and for maintaining the position of ITE among larger projects that are supported by the Tata Trusts.

Table 1. ITE evidence summarized over the four phases

Phase	Year(s)	Partners (place, state or region)	Key processes	Outcomes
(1) Creation of ITE vision and concept (2011/12)	2011–12	Street Survivors (SS) NGO (West Bengal)	Field visit and further development of ITE concept with SS executive; Tata trustees at SS give approval for ITE pilot project in the form of computer education	SS integrates ITE component at four learning centers
	2012	Sir Dorabji Tata Trust/Tata Trusts NGO (nationwide)	Concept creation, discussion of pilot implementation at SS. Approval of the concept at the trustee meeting	Permission gained to develop ITE proposals for Tata funding with existing partners
	2012	Four SS learning centers + related communities and schools (West Bengal)	Two trainings in Murshidabad, with enthusiastic uptake	Exemplary products: students' projects, teachers' lesson plans; some teachers become first ITE "heroes" keen to spread the practice.
(2) SP Establishment (2012/13)	2013	University of California at Berkeley at Davis (USA)	External evaluation documented interns etc.	Outputs (Myers & Zhao, 2013; Charania & Myers, 2014)
	2013–	Vikramshila Education Resource Society NGO (West Bengal) Nalanda and PVCHR (Uttar Pradesh)	Introduction of ITE including training for volunteers and partner schools Online teacher portal	ITE expands in madrasas Online portal for student projects launched
	2013–	Suchana NGO working with tribal children	ITE volunteers training other organizations Innovative tribal ITE	Expansion of ITE to range of languages and cultures ITE teachers leading

		and schools in remote region (West Bengal)	implementation including teacher trained to drive ITE van bringing ICT access to remote areas	innovative strategies enable implementation in remote areas
(3) SP Scaling up (2014/15)	2014	Massachusetts Institute of Technology (USA)	Study visit to USA for key ITE staff facilitated by Tata Trustee Negotiation of CLIX connected learning initiative	Memorandum of understanding drawn up with Trust for CLIX (Tata Trusts, 2016b)
	2014	Ministry of Education state and district (West Bengal & Assam)	State and district authorities agree to leverage infrastructure for ITE in schools and validate participation	Ministry-provided list of Assam and West Bengal schools promotes ITE engagement
	2014–	South Odisha Initiative, Samaritans Help Mission, Society for Awareness Harmony and Equal Rights	Three additional NGOs adopt ITE approach in their work	Expansion of partners layering ITE into additional Indian including Assam, Maharashtra, Odisha, Uttar Pradesh, and West Bengal
	2014–	Digital Empowerment Foundation NGOs (New Delhi)	Introduction of wireless access	Deployment of wifi towers in North East Assam brings line-of-site connections to neighborhood schools
	2015–	Assam Ministry for secondary education (RMSA) (Assam)	Multiple meetings with state mission director including ITE teacher training	Implementation of ITE in more schools, including model schools in Assam
(4) SP Consolidation (2016–)	2016–	Tata Institute of Social Sciences (Mumbai)	Proposal to institutionalize ITE in the Centre for Education of Innovation and Action Research	Improved alignment between potentially competing projects University accredited teacher training

Extent to which ITE aligns with the seven characteristics of a smart partnership

SP include partners within and across educational organizations

ITE clearly meets the first SP characteristic. Tata Trusts rapidly reached out to other partners, especially between 2013 and 2015. The partnership, which began with Tata Trusts as the key partner in 2011, quickly brought in other partners. After the pilot in 2011/12 involving one NGO providing four coaching classes for 1000 children, the partnership expanded to 18 partners reaching about 17,000 children by 2015. Partners by this time included not only NGO members, but also researchers (education, technology and development studies), government agencies (education), civil society such as a police agency, higher education and related professional networks, industry-based organizations, and local communities made up of parents, village committees and their leaders, as well as youth forums. Local communities have been part of the partnership from the start and they, supported by the NGOs, who actively engage with them on the ground, have continued to be central stakeholders in the implementation and sustainability of the initiative. One of the NGO partners brought a strong connection with local police by setting up learning centers in the premise of police stations. This is an initiative of Kolkata police with the NGO to work closely with the children of migrant and slum dwelling communities. Partners also brought with them additional partners, such as particular types of schools and their communities like madrasas and global networks via the higher education and professional agencies. Since 2013, the Tata Social Internship program has organized internships on the ITE initiative. The first two interns, Masters students from the University of California at Berkeley, contributed

essential evaluation analyses at the end of the first year of implementation (Myers & Zhao, 2013). In 2015, another intern used video and photo-voice to document the impact of ITE at five organizations, which was uploaded onto internet as a YouTube clip in February 2016 (unpublished document specifying Tata Trusts, 2016a [video]). In addition, two scholars from Trinity College Dublin provided valuable feedback to ITE during extensive field visits in 2015.

Partners have a shared purpose that evolves into a synergy

Partners have a shared multi-faceted purpose clearly stated in ITE objectives that are to

- bridge the digital divide and foster digital citizenship
- create interest in learning that also improves attendance and retention in schools
- enhance learning achievement
- improve learning processes and pedagogy.

These objectives are informed by four key strategies enacted through workshops, exemplars, and extensive partnership negotiations and support with the partner NGOs. After the first conceptualization of the ITE concept at a national conference in India, the shared vision sharpened through implementation of the ITE pilot. After the pilot, those NGOs involved by March 2013 jointly confirmed the initiative's objectives. This shared purpose was then articulated within the grant proposals for the next batch of NGOs that wanted to implement ITE. The formal arrangements between and among existing and new partners also provide evidence and dissemination of a clearly articulated and shared understanding of the ITE. The shared purpose continues to be the key focus of the initial workshops and events that propagate the ITE initiative across and among new partners.

A SP has a strategic and holistic approach

Experience shows that the ITE approach is readily disseminated to and understood by new partners. However, implementation of the initiative has been problematic in some instances because of challenges that are mentioned below and the partners find ways to work around the challenges where possible. In doing so, they are illustrating the advantages (flexibility being one of them) that a strong partnership brings to educational change.

Workshops and other means through which the ITE initiative is propagated has kept the design, purpose and overarching approach of the ITE consistent across the participating organizations in different parts of the country and with partners who continue their work overseas. After the pilot, establishing and sharing the ITE approach with other potential partners (NGOs and other agencies) was not difficult because the student-made artefacts continue to become available online to clearly convey how the initiative works in practice. Showcasing these artefacts during meetings with potential partners led to the conclusion that, if students in such a remote area could create thought-provoking and creative learning artefacts using technology, then surely the approach could be more easily implemented in less challenging contexts. During meetings potential partners have also had hands-on experience of developing lesson plans and student projects because some participants role played as students. Furthermore, participants were asked to collectively engage in evolving the objectives of the ITE, and that process has led to a further shared elaboration of the ITE approach. Tata Trusts has continued to firmly articulate and thus legitimized this development when processing applications for funding grants by those organizations that wished to implement ITE.

Establishing a shared purpose between the Trusts and government departments has proved less straightforward. It is likely to be an ongoing challenge for several reasons, including staff changes in the departments particularly at top managerial level. For example, in 2015 Tata Trusts and the Assam Secondary Education Mission (RMSA) signed a memorandum of understanding in which the scope of the ITE was extended beyond its usual parameters to accommodate the professional development needs of the teachers, particularly those in the state's 14 model schools. Although the state officials were interested in the purpose of ITE, their most pressing motive for adoption was that ITE could serve the state's modernization agenda, which the model schools led. Regular communication between the ITE partners and witnessing of students engagement by the state officials is likely to influence these officials to support the roll out the initiative to more government-funded general schools in future because, as these officials see

the outcomes of ITE on the ground, they will appreciate the ITE's wider purpose and deeper approach to learning (see Fullan & Langworthy, 2014, in relation to deeper learning).

Establishing a share purpose for ITE can also occur indirectly. In West Bengal, Tata Trusts did not have a direct role in formalizing the partnership with district officials; this was done by the NGO Vikramshila. This NGO had already been working on quality improvement in education and had built rapport with the district departments before it layered the ITE into the schools and government madrasas. It is useful to note that Vikramshila, having gained pedagogic expertise in the ITE initiative through its partnership with the Trust, became sufficiently confident to showcase ITE to the government. The exhibits of the students' work and the teachers' growing confidence in integrating ICT in their lesson plans were impressive. In Assam, although the NGO Gramya Vikas Manch has less experience in pedagogy and understanding of the state's educational processes, it has strong connections with the district administrator and good reach on the ground and in the community. These advantages made it possible for the NGO to invite Tata Trusts to engage directly with the district to share the ITE concept. From there, the first author was able to conduct the Trusts' ITE orientation and training sessions directly with government teachers, an approach that helped them and their leaders to understand the concept and that increased their level of readiness to adopt ITE.

SP works to enhance the quality of education with the aid of digital technologies (ICT)

The continuing flow of student-produced artefacts complemented by logbooks maintained by teachers (see ITE handbook, Charania, 2012–2014) provides one means of assessing the impact of the ITE partnership on the quality of education. Although more evaluation work is required, progress to date suggests that the initiative is having the desired outcomes. Saxena (2014), for example, evaluated the ITE implementation of over 300 students in four private madrasas supported by the Vikramshila NGO. Analyses showed significant improvement of scores on tasks that measured about 150 students' ability to connect concepts with real life situation using technology as well as their research and analytical skills and this external consultant's report concluded,

[The] ITE component has made affirmative changes in the learning approach and environment within madrasas. Unlike the majority of IT interventions being carried, which are restricted to learning basics of computers and skills development around using certain software/applications, ITE intervention has focused on integration of technology in curriculum transaction and teaching learning processes ... ITE has fitted well with the curriculum, as it is woven into teachers' lesson plans ... With guidance from teachers, children have made multimedia presentations on lessons related to vitamins, water cycle, fractions, etc. They also have access to internet ... it has also been challenging for the teachers, as children are learning faster and better than them! According to the management of madrasas where ITE is being implemented, the presence of computers in the madrasas has generated interest amongst students; they have become more regular and attentive [and] it has also got parents interested ... (Saxena, 2014, p. 15)

In addition, USA university intern Kato in notes accompanying his video of the implementation and ongoing ITE practice at five different learning sites stated that the ITE had,

... enabled students to achieve real-life experiences incorporating higher order thinking. ... For example, in the community project about the river in Khanjanpur, students in Suchana were able to learn and discover how the lifestyle and culture of the villages around the river evolved as the river channel changed over time. (Tata Trusts, 2016a)

SP harness ICT smartly

ITE partners focused on encouraging teachers and students to use digital technologies to further learning outcomes and the quality of education. One of the most important uses of ICT amongst the ITE partners is that of monitoring the engagement of teachers and students with the initiative and providing teachers and students with feedback on the quality of that engagement. These mechanisms, essentially feedback loops, are an intrinsic part of the initiative every time it is rolled out in a new setting. The stakeholders can efficiently monitor the spread of the initiative, collect information (including teacher and student feedback), and analyze it. Further analysis is also used to provide advice and ideas for ITE-related improvements in the schools and learning centers.

As ITE has expanded, so too has the volume of feedback, and ICT has become more important to expedite this process. An example of this developing practice is evident in one of the most useful indicators — the increasing number and quality of student artefacts. The first author and the master trainers initially shared these projects via CDs or email. In 2013, a volunteer from one of the partner organizations, Child in Need India, established a blog in BlogSpot (<http://sdtite.blogspot.com/p/contact.htm>) so that student projects could be uploaded to the Internet. As the blog grew and became unwieldy, another organization and later a partner, the Digital Empowerment Foundation (2009) was recruited to create an ITE website and upload student projects onto it. This portal is now being maintained by the web master at the Digital Empowerment Foundation, who has also become an ITE associate at Tata Trusts working with a number of resource volunteers from other partners. The portal invited teachers to provide feedback, engage in discussion to share challenges and best practice. Discussions are led by a volunteer at Vikramshila.

In 2014, after the master trainer resource group had been formed, its members received training to identify the projects that best fit the ITE ethos. This training has enabled them to recognize quality lessons and projects, and they have developed assessment rubrics that teachers and other stakeholders can use. That information has been collected electronically and evaluated by the first author and resource group as a result there have been several modifications to the scope and practice of the ITE, as follows,

- *Reduction of the number accompanied by an increase in the quality of the learning projects selected for exhibition on the portal:* Too many projects were produced in the initial phase of the initiative, which resulted in shallow learning. The first author introduced a logbook so that teachers and students could keep an account of the types of lesson plans and projects that meet the quality objectives in the ITE manual (Charania, 2012-2014). After consistent emphasis during all the training, some of the partners also began to map lesson plans with the level of learning achieved against Bloom's taxonomy.
- *The inclusion of community projects:* Although the initiative did not emphasize community projects, some very good student-initiated projects appeared. As school and learning centers have become more adept at integrating ICT use into their curricula, community projects have become better established as part of ITE. These projects are also showcased on the ITE portal.
- *Installation of local language type fonts:* When it became evident that some children were struggling to express themselves because the interfaces they were using did not include fonts for their local language, volunteers installed these fonts for them. As a result, the quality of these children's projects increased almost immediately.
- *Spreadsheet training:* The logbook was introduced to monitor and showcase the variety of ways teachers could bring ICT use into their lesson plans. Reports indicated that by 2016, only about a quarter of the student projects had included spreadsheets, probably because teachers are not proficient in spreadsheet use, so further professional development is needed.

In SP Partners recognize their role in the emergent process(es)

SPs provide for networking within and across the partner organizations. These networks allow partners to compare the activities, successes and challenges evident in their own organizations against those in the partner organizations. These insights not only allow organizations to effect improvements or bring in new ways of doing things in their spheres of activity but also to actively contribute their ideas for improvement and new strategies in partner organizations. Each year all partners of the ITE initiative meet to discuss their success, challenges, and solutions. For example, a partner with expertise in a particular area such as power backup-up and connectivity solutions will share their expertise that address another partner's challenges and subsequent continue to support such partners to overcome the challenge. In this way, the partners gain an applied understanding of ways in which they can contribute to the partnership to assist in realizing its vision. Partners can also identify other organizations that they think may benefit from resource sharing. For example, the first partners in ITE lent their most experienced ITE coordinators to participate in an ITE exchange program, wherein the coordinators spent two weeks with newer ITE partners helping teachers in the classroom and leading some demonstration ITE classes. By engaging in these ways, all partners gain first-hand appreciation of their role in scaling up the partnering process and activities.

Another example of the emergent processes occurred in 2012 when Tata Trusts invited an NGO called Gramya Vikas Mancha (GVM) to work with its signature program in adolescent education. At the time, GVM was actively working in Assam's flood-prone areas and was the Trusts partner for diversion-based irrigation. In addition, GVM was working on a child safety initiative with another prominent organization in India. Because GVM has a huge volunteer force and strong connections with communities and local administrations, they were highly effective in implementing the adolescent program, which sought in part to encourage out of school adolescents to return to school. In the process, the NGO developed good ties with the education departments in the districts where they operated.

These ties, in turn, made it possible for Tata Trusts to encourage GVM to bring the ITE initiative into a number of village-based adolescent learning centers. Schools in neighboring vicinities became interested in what was happening and asked how they could participate. Tata Trusts provided some training, a process that facilitated interest from schools, learning centers and organizations in other districts and so further spread the ITE concept. So far GVM has brought an additional 50 schools into the ITE initiative so that ITE is now used in their classrooms by subject teachers. In addition, a memorandum of understanding between the state department and Tata Trusts to implement ITE in the model schools was initiated with GVM being the implementation organization. GVM's role in the ITE partnership and their engagement with the districts working on the adolescent education project, along with their strong connections with the community and local schools, assured the state education department that this NGO had the identity and credibility to work effectively with the state. These emergent processes have scale up the ITE initiative effectively.

Partners facilitate their own organizations to change

GVM provides the strongest illustration to date of how the organizations involved in a SP can facilitate change in their own organizations, so that they are better able to improve educational outcomes for teachers and students, which is central to all educational SPs. Since becoming involved in the ITE, GVM has evolved from a grassroots organization involved in child protection to become an education resource organization in the state of Assam. This development occurred as the scope of the ITE increased with each new partnering between the GVM and district and state agencies. Initially, GVM's typical community volunteers involved in the NGO's child safety and adolescent education activities had no professional educational qualifications. The Tata Trusts' ITE funding enabled GVM to hire ITE coordinators who had credentials in teaching, and special preference was given to those candidates who passed the teacher entrance test. In addition, GVM prepared its volunteers, program coordinators and credentialed teachers to liaise with state-government teachers and schools, a development that prompted requests from other district education departments to help them implement ITE in their districts. In promoting change within its own organization, GVM has been able to demonstrate its ability to become a leading NGO working with the state and the districts in the area of education.

Conclusion

This paper has provided an account of a large multi-stakeholder partnership that has co-evolved with educational technologies since 2011 to increase interest and engagement with learning through technology and bridge the digital divide for underserved students in India, including those in remote regions of the country. Over time, Tata Trusts, the founding partner which spearheaded the ITE initiative, has focused on scaling up the initiative by working with an increasing number of partners representing many different agencies, including NGOs and district and state government providers of education. This approach has been very different from the past where Tata Trusts had partnered with single NGOs on a project by project basis to fulfill its objectives. Tata Trusts has consistently moved away from its previous approach by drawing into the partnership (or encouraging its existing partners to do this) multiple agencies engaged in multiple interventions directed towards improving the lives of India's most marginalized people. Although partners and their stakeholders come to the partnership with different motivations, the vision of the ITE partnership has worked organically to enable alignments of those motivations within the vision of ITE. This has been evident when partners witnessed the student engagement and teacher confidence in the showcases and elsewhere. However, the strength of the partnership has not yet been tested by the loss of any one partner, although that is likely in the future.

The integrated approach of the ITE SP described in this paper appears to be the key to its success because it has normalized collaboration through promotion of a vision, in this case using ICT to increase equity of educational access and provision, and build capacity for this work in education and related services. Importantly, that activity is underpinned by an organizational structure of collaborative partners that has resilience, not least because it is promoted and strategically funded by the core partner, Tata Trusts. However there are challenges that include building capacity for leadership, and spreading that leadership among the partners, rather than centralizing it within Tata Trusts. Although partners have led implementation on the ground, more is needed to extend leadership in research and ongoing strategic development.

Scrutiny of our case study evidence reveals that the ITE has all seven characteristics of SP partnership identified at the 2015 EDUsummit, including embedding collaboration into the organizational cultures of the partnered organizations. However, some of these characteristics are more strongly in evidence than others. For example, while the ITE SP has been robust enough to encourage teachers to extensively integrate technology with curriculum, it has yet to find the expertise (whether within existing partner organizations or newly identified and invited partners) to develop and implement assessment practices. Similarly, although the ITE SP is providing some effective professional development for teachers, the need to ratchet up provision has been recognized. And although orientation and showcase events have included school leaders in hands-on activities that enable them to address misconceptions about ICT use in education, more support will be required to enhance their ability to integrate ICT into school curriculum (see, in this regard Mackey et al., 2015; Price, 2015). Given that both assessment and school leadership development remain common issues with ICT in educational contexts less challenging than those described for ITE in India (see, for example, Gibson, Downie, & Broadley, 2015; Fullan & Langworthy, 2014), it will be a measure of the utility and strength of the ITE SP if it were to effectively address these challenges in the future.

The SP characteristic (within characteristic 6) that may present ITE partners with the greatest challenge is to find ways to harness ICT to increase the rapid use of “smart” feedback from ongoing ITE interactions. For example, ITE has yet to design automated use of data analytics in its portal and there is little if any expertise in this area within the partnerships, including the implication for data security when working with children. This has also been hampered by limited digital access of many partners, particularly poor access for teachers and their leaders. However, this situation is likely to improve as the partnership grows and becomes more sustainable, because that will also facilitate improved access. Therefore it is recommended that the ITE initiative plan strategically to implement data analytics in the future so that it can inform their work with students as well as partnership processes so that this SP will become very smart indeed.

In conclusion, we recognize and applaud the way that the ITE multi-stakeholder partnership is building the capacity of teachers and students to make effective educational use of available digital technologies and to spread that capability among many languages and cultures to teachers and students that have been very much on the wrong side of the digital divide. This example in India provides an illustration of possibilities for other marginalized populations, including those in Africa and the Pacific. As more dynamic partners join this partnership and other SPs emerge to serve other regions, the divide could be reduced, which gives us hope that the World Education Forum (2015) may become a reality.

Acknowledgements

The authors wish to thank all of those mentioned in this article for their support and encouragement, including EDUsummit colleagues. We also thank our reviewers for their advice and critique that we have used to improve the paper. We are happy to include the following statement at the request of The Tata Trusts. Education has been one of the key focus areas for Tata Trusts. For decades, the Trusts have worked towards enabling access of quality education for rural India. With the role of technology in the contemporary global context, Tata Trusts have shifted focus on bridging the digital divide and building 21st century skills for improved learning experiences.

References

Charania, A. (2012–2014). *ITE manual*. Mumbai, India: Sir Dorabji Tata Trust. Retrieved from <http://tatatrustsite.org/wp-content/uploads/2015/11/ITE-Manual.pdf>

- Charania, A. (2015). India: Integrated ICT School supplements in community centres. In P. Twining, N. E. Davis, & A. Charania (Eds.), *Developing new indicators to describe digital technology infrastructure in primary and secondary education* (pp. 64-67). Montreal, Canada: UNESCO Institute for Statistics.
- Charania, A., & Myers, P. (2014). Integrated approach to technology in education: An initiative in rural East India. In M. Searson & M. Ochoa (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2014* (pp. 2447-2452). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).
- Davis, N. E., Leahy, M., Lewin, C., Charania, A., & Nordin, H. (2015). Thematic Working Group 1: Smart Partnerships. In K. W. Lai (Ed.), *EDUsummIT 2015 Summary Report* (pp. 9-15). Retrieved from <http://www.curtin.edu.au/edusummit/local/docs/edusummit2015-ebook.pdf>
- Digital Empowerment Foundation. (2009, May). *ITE in Nagoan and Garo hills in North East* (Unpublished funding proposal from Digital Empowerment Foundation to Tata Trusts). New Delhi, India.
- Eamon, M. K. (2004). Digital divide in computer access and use between poor and non-poor youth. *Journal of Sociology and Social Welfare*, 31, 91-112.
- Eickelmann, B. (2011). Supportive and hindering factors to a sustainable implementation of ICT in schools. *Journal for Educational Research Online*, 3(1), 75-103.
- Fullan, M., & Langworthy, M. (2014). *A Rich seam: How new pedagogies find deep learning*. London, UK: Pearson.
- Gibson, D., Downie, J., & Broadley, D. (2015). *Evolving learning paradigms: New directions for the UNESCO Institute for Statistics' global data collection in the post-2015 context*. Montreal, Canada: UNESCO Institute of Statistics.
- Kinshuk, Chen, N. S., Cheng, I. L., & Chew, S. W. (2016). Evolution is not enough: Revolutionizing current learning environments to smart learning environments. *International Journal of Artificial Intelligence in Education*, 26(2), 561-581. doi:10.1007/s40593-016-0108-x
- Leahy, M., Davis, N., Lewin, C., Charania, A., Nordin, H., Orlic, D., Butler, D., & Lopez-Fernandez, O. (2016). Smart Partnerships to increase equity in education. *Educational Technology & Society*, 19(3), 84-98.
- Mackey, J. K., Davis, N. E., & Stuart, C. R. (2015). Leading change with digital technologies in education. *SET Research Information for Teachers*, 2, 17-26. doi:10.18296/set.0014
- Myers, P., & Zhao, Z. (2013). *Evaluation of an integrated approach to technology in education* (Unpublished internship study report submitted to the Tata Trust). Mumbai, India.
- Pankaj, A. K., & Poornima, M. (2008). *Baseline survey of minority concentrated districts, 2009: PURNIA, (Bihar)*. Retrieved from [http://www.icssr.org/Purnia\[1\].pdf](http://www.icssr.org/Purnia[1].pdf)
- Park, Y. (2015). *Working group on digital safety and Cyberwellness at EDUsummIT 2015*. Retrieved from <http://www.unescobkk.org/education/ict/online-resources/databases/ict-in-education-database/item/article/working-group-on-digital-safety-and-cyberwellness-at-edusummit-2015/>
- Price, J. K. (2015). Transforming learning for the smart learning environment: Lessons learned from the Intel education initiatives. *Smart Learning Environments*, 2, 1-16. doi:10.1186/s40561-015-0022-y
- Saxena, N. (2014). *Impact assessment of Vikramshila Education Resource Society* (Unpublished report submitted to the Tata Trust). Mumbai, India.
- Snow, L. (2011). *Smart partnerships: More with less!* Retrieved from <http://luthersnow.com/smart-partnerships-title-page.html>
- Tata Trusts. (2016a). *Integrated approach to Technology in Education (ITE) - Tata Trusts* [Video file]. Retrieved from <https://youtu.be/weS1U3fEfWA>.
- Tata Trusts. (2016b). *CLIX - Connected learning initiative* [Video file]. Retrieved from <https://www.youtube.com/watch?v=2JodnGy9RIA>
- Twining, P., Davis, N. E., & Charania, A. (2015). *Developing new indicators to describe digital technology infrastructure in primary and secondary education*. Montreal, Canada: UNESCO Institute for Statistics.
- UNESCO. (2015). *Qingdao declaration - International conference on ICT and Post - 2015 education*. Retrieved from <http://www.unesco.org/new/en/education/resources/in-focus-articles/qingdao-declaration>
- World Education Forum. (2015). *Incheon declaration education 2030: Towards inclusive and equitable quality education and lifelong learning for all*. Retrieved from <http://unesdoc.unesco.org/images/0023/002338/233813M.pdf>