# The One Laptop School: Equipping Rural Elementary Schools in South India Through Public Private Partnerships

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## Abstract

This article reports on a Public Private Partnership (PPP) program in South India that provided information and communication technology (ICT) to rural elementary schools. The article examined the current status of rural, government-run elementary schools in India by reviewing reports like the Annual Status of Education Report (ASER) in India. Challenges like teacher absences, student drop-outs, lack of electricity, lack of separate toilets for genders, and a lack of teaching resources is discussed. To meet these challenges, the article describes the rise in popularity of India's PPPs. Then the article reports on a case study of a PPP, called the SSA Foundation, which implemented a "one laptop per school" program in rural areas in the Indian States of Karnataka and Tamil Nadu. Using ethnographic data from field research, the case study includes a description of how the students in a rural Karnataka elementary school use their school's laptop. The school was situated in a small village where most travel was non-motorized. Walking, usually without shoes, was the main form of transportation. A bicycle was considered a luxury. Most villagers worked in the surrounding ragi and millet fields; laboring, often with only simple tool blades. Wood fires were the main source of fuel for cooking. In this village, the school's laptop became a prized possession. The case study offers a "thick description" (Geertz, 1973) of how the village school's students used the laptop for learning basic computing skills and for learning English.

## Keywords

Elementary schooling, educational technology, public private partnerships, rural India, sociotechnical narratives

## Introduction

For more than twenty-five years, India's educational policymakers have shown a strong commitment to the vision of universal elementary education and they continue to craft policy to carry it forward. Most recently, the Indian legislature started to enforce The Right of Children to Free and Compulsory Education Act (RTE). This act, passed by the Indian parliament in 2009, legalized the right that all Indian children have to a free elementary

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 **Citation: Byker, Erik J. (2015). The one laptop school: Equipping rural elementary schools in south India through public private partnerships. *Global Education Review*, 2(4). 126-142**

education. RTE is the most significant of all of India's education related national policies (Byker, 2014a; National Council on Teacher Education, 2009). RTE includes many far-reaching, transformational educational reforms related to classroom resources, classroom size, and the professionalization of teaching. RTE also empowers Indian parents with a legal right to litigate if the rights of their children are not being met in schools. While RTE is a strong piece of legislation, there are many educational challenges in India that are barriers to its effectiveness. Challenges include teacher absence, student to teacher ratios, and the lack of resources—like chalkboards and toilets (ASER, 2014, Azim Premji Foundation. 2004, Chudgar, 2009). Providing equal access to education in India's rural schools is one of the most demanding challenges (ASER, 2014; Azim Premji Foundation, 2004).

For the last decade, an Indian non-governmental organization (NGO), called Pratham International, has organized an annual assessment of the status of India's education system especially in rural areas. The assessment is called the Annual Status of Education Report or ASER for short. Every year thousands of young adults in India volunteer their time to walk from village to village to collect data on what elementary-aged students know about literacy and numeracy (Byker, 2014a; Iyengar, Witenstein, & Byker, 2014). ASER (2014) found that it was more common for children to drop out of rural government schools compared to urban government schools. High illiteracy rates still persist, especially among girls (Chudgar, 2009). Additional challenges, like overcrowded classrooms and lack of resources also contribute to the inconsistent quality of education in many of India's rural elementary schools. For example, of the 15,000 plus schools included in the ASER 2014 survey, 24% are without drinking water, 35% are without a useable toilet for the whole school, 45% are without a toilet for the girls, and more than 20% do not have library books (ASER, 2014). These numbers provide a snapshot of the realities of rural education in India. Perhaps, the most eye-opening of these statistics, though, is the finding that less than 20% of the elementary schools have access to a single computer. Computers, while a common tool of the twenty-first century, are a mark of privilege (Byker, 2015). Computer technology costs money and typically requires a stable source of electrical power to operate. About 20% of elementary schools in India actually have a computer in the school (ASER, 2014). Although, private elementary schools are more likely to have a computer compared with government run public elementary schools; computers are uncommon even in India's private elementary schools (Byker, 2014a; NUEPA, 2011). To address the scarcity of computer technology in India's rural elementary schools, the Indian government has turned to donors and non-governmental organizations to provide computer software and hardware in rural schools. The coupling of the India government with private organization is called, Public Private Partnership (PPP) programs. The purpose of this article is to examine a case study of a PPP in a rural, government-run elementary school located in State of Karnataka in South India. Specifically, the article describes the unique approach of the PPP in providing computer technology to the case study's rural school. The study investigates how the school's teachers and students use and assign meaning to the computer technology at the school.

## Literature Review

In India, PPPs are becoming increasingly popular. The literature reports PPPs are set up to support: educational technology initiatives (Chaudhuri, 2012); professional development among teachers (Dundar, Beteille, Riboud, & Deolalikar, 2014); and English language learning in rural elementary schools (Advani, 2009).

While computer equipment and hardware are scarce, the Indian government makes a considerable investment in educational software through a PPP program called Computer Assisted Learning (CAL). In this program NGOs provide computer hardware and educational software CDs to government run elementary schools. In exchange, the elementary school provides or creates space in their school for a computer lab, called a Computer Aided Learning Center (CALC). Outside of school hours, the CALC becomes a computer center, where community residents can pay a small fee and have access to the computers (Azim Premji Foundation, 2008).

Pal (2009) found over 20,000 active CALC projects in India's rural elementary schools. The CALC center often has up to five computer stations set up at each school. Pal also found that even though there was a minimal amount of information and communication technology (ICT) equipment in the CALC, the elementary children reported that they were still eager to learn with the aid of the computer.

The literature also shows several corporate sponsored PPP projects focused on preparing India's elementary teachers to teach with technology. These projects are spearheaded by private computer technology companies such as Dell Computer, Intel, and Microsoft (Light, 2009; Suckow, 2010). Dell's program, called the *connected classroom*, invests in low cost notebook computers for Indian elementary teacher and students to use in the classroom. Part of this program includes an online training module for preparing teachers to use the laptops. Intel's initiative is called Teach to the Future Program. This program supports Indian elementary teachers with both face-to-face and online instruction for how to teach with technology (Light, 2009; Suckow, 2010). Microsoft's Project Shiksha, also called *Empowering the Future* project, began in 2002. The project is run in tandem with Indian states to equip and advance digital literacy among government-run elementary schools. Through Project Shiksha, Microsoft provides inexpensive software, in depth training, and packaged ICT curriculum. Since its inception, the *Empowering the Future* project has reached over 100,000 teachers and 5 million elementary students in India (Suckow, 2010).

While there are a few studies specifically related to PPPs in India, there are calls for more empirical studies in this area (Azim Premji Foundation, 2008; Chaudhuri, 2012; Dundar, Beteille, Riboud, & Deolalikar, 2014; Light, 2009; Pal, 2009). Much of the research about PPPs focuses on describing initiatives (e.g., Suckow, 2010) or examining the PPP from the educators' or NGO's perspectives. Children's perspectives about the PPP are largely absent from the literature. There are few studies that utilize a theoretical framework in order to *thickly describe* (Geertz, 1973) and analyze findings in relationship to a theoretical framework. This article addresses those gaps in the literature by including the students' perspectives about PPP and by utilizing a theoretical framework to analyze the study's findings.

## Theoretical Frame

The study is framed by the Social Construction of Technology (SCOT) theory. SCOT's core premise is that people give meaning and purpose to technology (Bijker, 2010). SCOT is part of the larger field of social epistemology called Science and Technology Studies (STS). This field examines how the wider social, cultural, political, and economic context frames the meanings that people assign to technology. SCOT has four main components: 1) relevant social groups, like teachers and students, construct a technology's meaning; 2) each social

group has unique interpretations about the purpose for a technology; 3) a unitary interpretation for the technology is negotiated among the social groups and that negotiation reflects the social groups' power dynamics; and 4) the wider socio-cultural context in which the social groups are situated affects how the interpretation for the technology is negotiated and agreed upon.

In this case study, the article uses SCOT as a theoretical lens into the PPP of introducing computer technology in a rural village elementary school that is referred to by the pseudonym, Jinka Public. The social actors in this case study are the Jinka Public's teachers, upper elementary students, and the NGO, which is referred to by the pseudonym, the SSA Foundation. The study describes how and why these social groups interpret and negotiate the meaning for computer technology in the rural village where Jinka Public is situated. The process of the social construction of computer technology at Jinka Public is called a *sociotechnical narrative* (Byker, 2012; Byker, 2014b). Sociotechnical narratives are the meaningful descriptions of ways that social groups use and repurpose technology in relation to their wider social context. In sum, using the SCOT theoretical framework, the article explains Jinka Public's sociotechnical narrative in order to illustrate the meanings for computer technology that emerged from a PPP in rural India. Using case study method, the study examined two primary research questions framed around the premise of sociotechnical narratives: 1) What is the sociotechnical narrative at the study's participating school? 2) How and why did that sociotechnical narrative emerge at this rural elementary school in South India?

## Method

Robert Yin (2008) stated that case study methodology is a research design for empirical inquiry that allows for the investigation of complex phenomena of authentic contexts. The strength of case study research design is that it allows the researcher to examine *how* and *why* questions. A *how* question is useful for identifying the processes that social actors use to negotiate and meet their objectives; whereas, the *why* question is important for understanding the larger context behind the processes. To examine these how and why questions, case study design uses both qualitative and quantitative data sources to describe and investigate the study's sample population.

### The Sample

The study's sample was drawn from a rural elementary school, called Jinka Public, which is located 25 kilometers from the city of Bangalore in the State of Karnataka, India. The target population at the school was fifth grade students and their teachers. The study focused on fifth grade students because they were more likely to have experience with computers than students in lower elementary grade levels. The study's participants included 11 students, three educators, and the director of the SSA Foundation (n=15). The NGO in this article is pseudonymously named the SSA Foundation.

#### *Context of SSA Foundation*

The SSA Foundation represents the private side of the PPP through their involvement as a NGO with the Indian government. The SSA Foundation's mission is to improve and nurture the development of basic skills in India's government run public schools through. The foundation's primary focus is on rural elementary schools in South India states like Andhra Pradesh, Karnataka, and Tamil Nadu. The SSA Foundation is just one example of a PPP that is focused on providing computer technology resources in India's rural schools. Yet, the SSA Foundation's vision for computer technology is unique to India. They believe that

computer technology works best when it is owned and directly in the hands of the children. The SSA Foundation mission is inspired by Dr. Sugata Mitra's (2002) work with the "Hole in the Wall" project[1]. The SSA Foundation's vision for its computer technology program is based on Mitra's research about how computer technology should be a tool to spark a child's natural curiosity. The SSA Foundation believes that even a single laptop in a school can be a valuable resource for collaboration and building basic skills in English. The SSA Foundation asserts that the best way for teachers to guide their students' curiosity is to allow the children to discover computer technology through collaborative ownership for using the laptop (Byker, 2012).

As part of their partnership agreement with the State of Karnataka, the SSA Foundation provides computer technology—usually a single laptop and USB drives—to more than 800 rural elementary schools. The SSA Foundation calls this initiative their "one laptop per school program." The SSA Foundation provides the laptop on the condition that the laptop is reserved primarily for student use. The foundation also installs Free and Open Source Software (FOSS), like EToys and OpenOffice, on the school's laptop.

**Data Collection**

This current study employed qualitative and quantitative methods to compile a case study of Jinka Public. There were four qualitative data sources: field notes from on-site observations, student focus group interviews, teacher interviews, and collected artifacts. The field note observations were recorded using time stamp notations and an observation protocol to help guide the note-taking. The observation protocol included taking notes about Jinka Public's: (1) type of computer equipment; (2) the hours of computer usage; and (3) the student and teacher interactions with computer technology. The student focus group interviews (see Appendix A) and teacher interviews (see Appendix B) were conducted using a semi-structured interview approach. Interview questions included inquiries into the participants' word associations with computer technology and their perceptions about the purposes of computer technology. Artifacts like curriculum documents and the student participants' computer related assignments comprised an additional source of qualitative data.

The study's quantitative data were made up of questionnaires for the students (see Appendix C) and teachers (see Appendix D). Both questionnaires had basic demographic related questions that were analyzed with descriptive statistics. The questionnaires also included items related to the purposes and perceptions for using computer technology in school. The questionnaires were adapted from two prior surveys (Law, Pelgrum,& Plomp, 2008; Vekiri, 2010).

**Data Analysis**

The study's qualitative data were analyzed using Miles and Huberman's (1994) three-step interpretive approach. First, the data were read several times and then coded as part of data reduction. Frequencies in the data were identified and analyzed to establish patterns, which were further categorized. Second, the data were displayed in visual ways—with charts and figures—to compare, contrast, and probe for additional categories across the artifacts and field observations. Third, conclusions were drawn as the categories were organized into themes. Additionally, the study used the constant-comparative method (Glaser & Strauss, 1967) to compare findings.

The quantitative analysis was at a descriptive level. Descriptive statistics provided the participant's demographics and "snapshots"

of the participant perceptions of computer technology. Theses quantitative data were descriptive and were not meant to infer causality or to imply that the findings are somehow universal.

## Findings

In reporting the findings, the article will address the study's two research questions. In answering the first research question, "What is the sociotechnical narrative at the study's participating school?," the article first examines the social context that situates Jinka Public School. Then, the article describes Jinka Public "one laptop per child" program. The article will move to the second research question, "How and why did that sociotechnical narrative emerge at this rural elementary school in South India?," with an explanation of the relationship between the SSA Foundation with Jinka Public.

### Rural Context

Jinka Public School is a government-run public school that is located about 25 kilometers from Bangalore's city center. The school day is six hours long, starting at 10 a.m. and ending at 4 p.m. Jinka Public serves about 60 students living in the Jinka village. The majority of students live in small, brick and mud dwellings called *kutchas*. These hut-like dwellings have either a thatched roof or a roof fashioned from pieces of metal. Most kutchas in Jinka village have a single room and are void of indoor plumbing and running water. Food is cooked on a wood fire. Even though their dwelling is small, 72% of the Jinka Public students indicate that their families have a television. All the participants' families own a cell phone.

Travel in the Jinka village is almost all non-motorized. Walking, usually without shoes, is the main form of transportation. A bicycle is considered a luxury. Most villagers work in the surrounding ragi and millet fields; laboring, often with only simple tool blades, bending the back and breaking already calloused hands. Wood fires are the main source of fuel for cooking. Save for the fact that most of Jinka's villagers carry cell phones; the village has an almost archaic quality of life. A quality that is defined by grit and a reliance on low tech tools like the rope that tethers a cow to a fence. Those who toil in the fields that surround Jinka village are known as the *krishikaru* or field workers. The krishikaru, who are mostly women, use hand-sickles to chop the ragi grain ears from the plant's stalk. The grain is pressed into bundles. The younger women, some who have infants tied to their hips, balance the bundles on their heads and transport the bundle to the threshing area. Older women working in the fields are burdened with large sheaves of dried ragi stalks. The area around the Jinka village is void of any kind of machinery. The work here is done by hand.

About 300 people call Jinka village, home. Yet, home is a loosely understood word, because many villagers are migrant laborers who have to travel from field to field to help with planting and harvesting. Other villagers are day laborers who go to Bangalore to work on construction projects. The children of the krishikaru and the day laborers make up the population of Jinka Public School.

### One Laptop School

Jinka Public is a "one laptop" school, which means they have a single laptop that the whole school community shares. As mentioned earlier, the laptop is provided through a Public Private Partnership program with the Bangalore based, SSA Foundation. The SSA Foundation's "one laptop per school" program supports the school administrator's effort to maintain consistent attendance among the school's upper elementary students. The primary use of the laptop is to help teach English language skills through typing and copying of word processing documents. Jinka Public's teachers explained that the laptop kept the students motivated to attend school because

they wanted to use the laptop to practice writing and communicating in English. It was also an incentive for the parents, most of whom were day laborers or seasonal field workers, to keep sending their children to the school.

The Jinka Public laptop is a Dell with a 15 inch screen. The laptop operates on a free and open source (FOSS) system called Ubuntu. Likewise all of the laptop's software is FOSS. Example FOSS titles include: (1) Etoys, a programming language for creating images and graphics; (2) OpenOffice, a FOSS of Microsoft Office like applications such as Word and PowerPoint; (3) Stellarium, a planetarium like software for identifying constellations and mapping the stars; and (4) TuxPaint, a child-friendly, painting software program.

Jinka Public's "one laptop school" program starts at the fifth grade. The school's fifth grade students share the laptop during their English language class period. Additionally, the Jinka Public's sixth and seventh grade students are allowed to sign out and take home the school's laptop. The sign-out system works like a library checkout system. The sixth and seventh grade students sign-out the laptop and get to take it home for one night. They return the laptop to school the next day. The fifth graders in this study, many of whom have older siblings, explained that the laptop is at the place they live about once a week. In fifth grade, the SSA Foundation distributes the students a USB two gigabyte (2 GB) thumb drive to store their projects and documents.

The USB thumb drive is the property of the student and becomes another source of motivation to raise school attendance. Students use their USB drive to save Writer (a FOSS word processor) documents and pictures they create using Etoys or Tux Paint. They also save their report card on the USB drive and short progress reports—written on paper in English—that they take home and explain to their parents. Jinka Public's seventh graders are responsible for monitoring the laptop's battery and re-charging the battery as needed. Additionally, the seventh graders are responsible for the laptop check-out system. The Jinka Public teachers assign one seventh grade student as the laptop leader. The laptop leader is usually a boy who the teachers identify as responsible, confident with the computer, and has an aptitude for speaking English. The laptop leader is responsible for bringing the laptop around the village to whoever checked it out. The laptop leader also provides some basic technical support for all Jinka students.

**Sociotechnical Narrative**

Jinka Public's sociotechnical narrative, thus far, is that it is a rural elementary school that has one laptop for the whole school to use. The laptop is funded through a PPP program that seeks to improve school attendance and, at the same time, help rural children practice their English through the use of computer technology. Sociotechnical narratives emerge from social actors' negotiated interpretations about a technology. So what are the participants' interpretations for the Jinka Public laptop? The case of Jinka Public, both the students and teachers shared the same primary interpretation about the school's laptop: It is for typing in English. One of the Jinka Public teachers explained in this way, "The computer [pointing to the laptop's screen] is in English. The keyboard is in English. The children learn English to make the computer and keyboard work." The Jinka Public teachers emphasized the importance of understanding English as the foundation for operating the laptop or "making the keyboard work." The pedagogical approach to learning English was based on vocabulary building through copying words. Thus, the laptop was seeped in pedagogy of replicating written English words and duplicating diagrams

and murals that were painted on the classroom walls.

Jinka Public's students and teachers perceived that the use of the laptop garnered many positive outcomes. One outcome was that the laptop was a tool for practicing and developing confidence with English language vocabulary. Another outcome was that the laptop's use also increased motivation to learn English. The teachers explicitly voiced this interpretation through explanations like "the kids want to learn English to make their life better" and "they see that English will help them the most, so they spend a lot of time learning to type in English." The students echoed their teachers' perceptions. The students shared how they were motivated to use the laptop to learn English because doing so might mean a better life and a better future. One student explained it this way, "If I use the laptop then I can use faster. Then if I learn English from using the laptop, I will have a better life."

## Discussion

Jinka Public provides an interesting case study of a PPP in rural India. Through the lens of sociotechnical narratives, the case study demonstrates how computer technology is used by elementary school students and for what purposes it is being used. In this discussion section, the article unpacks the narrative to explore themes related to the role of the SSA Foundation in providing Jinka Public's laptop. The article also discusses policy implications within three larger themes of this case study: ownership, scale, and contextual realities.

### Ownership

The degree of laptop ownership that the Jinka Public students had was surprising given that it breaks from the hierarchy that dictates much of India's elementary schooling—and most of the world's school systems—where teachers and principals are at the top of the school and students are at the bottom. Any degree of student autonomy is uncommon in Indian elementary schools, especially in government-run public schools, where students are told what to do and do it without question (Kumar, 2004; Sarangapani, 2003). Yet, at Jinka Public School the laptop was reserved for the students. The study's teachers acknowledged this fact in their explanation of how students are in charge of maintaining and being in charge of the school's laptop. The Jinka Public students and teachers spoke about the laptop as a tool for the students rather than for the teachers. The Jinka Public students had "ownership" for the laptop; they were responsible for the maintenance and upkeep of the laptop. This narrative regarding the laptop was supported by the SSA Foundation.

One policy implication of this study is that computer technology can be trusted in the hands of children. Policy is often driven by a top-down approach. In education policy, this means that a state board of education or school district institutes rules that all are expected to implement and follow. The SSA Foundation flips this policy model by putting the power in the hands of students. While English language learning is the main purpose of computer use at Jinka Public, a by-product of this intervention is that it transforms the teacher-student power relationship. Rather than domination of the teachers' meaning for the laptop there is a consensus about the meaning; and, certainly, a consensus about the use. Indeed, the Jinka Public students are empowered to use the laptop for learning English. If they have a problem with the laptop, they go to the laptop leader for help. Students refer to the laptop as "our laptop," as if there was a collective ownership. Jinka Public is an example of the possibilities of when a PPP is oriented toward the good of children student by putting technological tools—for learning English and for developing technology skills—in the

hands of a child. The policy does not just pay lip-service to children, but actually allows for students to collectively own a tool that they give purpose to through how they use it.

**Scale Meets Scarcity**

The case study of Jinka Public also has policy implications related to scale and scarcity. One of the study's participants was the SSA Foundation's director, Mr. Amit, which is the pseudonym used to identify this participant. When discussing the SSA Foundation's vision for their PPP, Mr. Amit started by describing the scale of India's government run public schools. He explained that over 80% of India's elementary schools are government run. Yet, government run public school resources and infrastructure are often deplorable. Teacher absence, student drop-out, lack of electricity, few functioning toilets as well as the lack of separate toilets for boys and girls, and a lack of teaching materials are issues that are common to government run public schools in rural areas. Mr. Amit said that supporting government run public schools was a "no-brainer" because these schools have the largest need and serve the largest amount of students. He put it like this, "Government run public schools represent the scale of India's problems and the scale of possibility—we desire to have a sizable impact throughout India's education system so the best place to begin is with government run public schools."

Of course, scale is one of the most important drivers of policy. Making a sizable impact is the goal of most policymakers. However, the SSA Foundation uses scale as a way to think differently about their PPP and the resources they provide to schools. Rather than providing a whole computer lab to dozen or so schools, the SSA Foundation provides a single laptop and USB thumb drives to more than 1000 rural elementary school across India. They do this because they wed scale with scarcity. The SSA Foundation's approach to scarcity is to teach students to plan the work they intend to do on the laptop. Each student receives a USB drive to save and store personal work. Planning, though, is the key part of making the one laptop program work because the students will have already thought about what they want to use the laptop for. The SSA Foundation's one laptop per school program is also a response to the opportunity cost and scarcity of electricity in India's rural elementary schools. The policy implication is to view scarcity not as a barrier as much as an opportunity for stewardship. SSA Foundation chose to provide one laptop for the whole school to use and take care of as a valuable resource. Mr. Amit made a distinction between the laptop as a learning resource (i.e., a person can use the Internet to learn more about a topic of interest) and a laptop as a material resource (i.e., it is manufactured and requires care and upkeep in order to function properly). Mr. Amit stated that donors and policymakers often forget about the laptop being a material resource. Scarcity has the outcome, perhaps unintended, that people—especially children—are better stewards of material resources that are scarce. The provision of only one laptop at Jinka Public created a perception of the high value in the laptop's material resource.

**Contextual Realities**

A final implication of the study is that policy must be situated in contextual realities. This is where the conceptual frames of SCOT theory and sociotechnical narratives can be quite instructive. Both of these theoretical frameworks take into consideration how computer technology is used in relationship to its wider social context. Context informs purpose. Even though the SSA Foundation is involved in teacher training and other school development programs (e.g., providing library books and

materials like paper and pencils), their main donor organizations are most enthusiastic about supporting technology based programs. Mr. Amit shared about how eager donor organizations are to fund computer technology in schools. Donors are apt to invest in something tangible, and want to know that their money is going for something that can help students today and in the future. An investment in technology, like a laptop or tablet, seems like a sound investment because it has the potential to be used right away and to prepare a child for the future.

Mr. Amit explained that the contextual realities of schooling in rural villages dictate that a single laptop is a good introduction to computer technology. In rural India electrical power is unreliable. India's rural schools typically have small budgets for electricity. The school principal is given a certain amount of rupees per month to pay for electricity and when those rupees run out so does the electricity. For a rural school—like Jinka Public School— to run a ten monitor computer lab they could go through their monthly electricity budget in just five days. Mr. Amit explained the contextual realities in economic terms, "Opportunity cost is an issue related to computers in rural areas. Schools often have to choose either to operate the computers for a couple of days or to run lights and ceiling fans for most of the month." The SSA Foundation takes into consideration the contextual realities of the rural locations where their PPPs are situated. Such consideration does not mean that rural schools are just ignored or neglected. Rather, it means that computer technology is smartly distributed so that it fits within the contextual capacity of rural locales. The inclusion of such contextual realities assessment should be the backbone of strong policy.

## Conclusion

Jinka Public offers a sociotechnical narrative of how computer technology was introduced and used in a rural elementary school in India. This sociotechnical narrative examined the context and the challenges of elementary schooling in rural India.. The Jinka Public narrative includes a PPP that sought to equip students with the opportunity that a laptop symbolizes. Such an opportunity included the chance to introduce students to computer technology, while at the same time building English literacy skills. The opportunity was framed around the scale of the need in India's rural elementary and the scarcity of technological resources.

This intervention benefitted students in other ways. Many of the Jinka Public fifth grade students would be identified by the Indian Government as Scheduled Caste (SC) or Dalits, which means that the students belong to a class that is underprivileged and historically disadvantaged within India. The Jinka Public students walk to school barefoot. Most students live in a one room kutcha where there is no indoor plumbing and food is cooked over firewood. A bicycle, if a Jinka Public student's family is lucky to own one, is the main source of wheeled transportation. Examining the Jinka Public sociotechnical narrative from the children's perspective, the one laptop program provides an opportunity to learn English. By learning English via the laptop, the Jinka Public students believed that there would be greater opportunities towards the promise, of what their teachers called, "a better life." A better life meant a life that was not confined to manual labor or working in the fields like their parents; it meant a life that was different than the Jinka Village environs.

India is known for its immense cities like Mumbai and New Delhi; however,the rural, village life still defines India. More than 70% of Indian geography is rural (ASER, 2014). Siddhartha Deb (2011) contrasts India's urban

and rural life. He explained that the world magnifies India's outsourcing industry and computer technology industry as representative of Indian life. Yet, Indian life is centered in the village and largely shaped by an agrarian lifestyle. Close to 400 million Indians are employed in farming (Deb, 2011). This case study shows a sociotechnical narrative of schooling in rural India. SSA Foundation's vision for their laptop program could lead to a life that is different from the Jinka Village. The foundation's organizational vision goes beyond just providing laptops, the foundation advocates for the village children. The laptop program is the foundation's way of equipping the Jinka Public students not only with English language skills, but also with confidence about using computer, responsibility, and the power of ownership. Thus, the Jinka Public technological frame is informed by the perception that the uses for a laptop can equip students with more opportunities than they may have previously had in rural India.

## Note

The "Hole in the Wall" project was conceived by Dr. Sugata Mitra and his colleagues. They placed a personal computer (PC) in a wall opening near their office building in New Delhi, India. The PC had an Internet connection and downloaded software programs, but there were no directions about how to use it. Children who played near their office began to use and play with the PC. In less than a year, the children learned, on their own, basic keyboard operations, how to use the mouse, and ways to go online to download multimedia.

## Author Note

Funding for this research study was provided by Michigan State University.

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**About The Author**

**Erik Jon Byker, PhD,** is an assistant professor in the Department of Reading and Elementary Education at the University of North Carolina at Charlotte. He has conducted ethnographic field studies in England, Cuba, India, South Korea, and across the United States on how elementary school students use and construct meaning for computer technology.

## Appendix A: Student focus group interview

Purpose: The purpose of the student focus group interview questions is to identify the students' interpretation(s) for using computer technology.

The questions are coded to show how each one aligns to the SCOT theory:

- IF stands for interpretive flexibility
- S stands for stabilization
- TF stands for technological frame

1. Why do you use a computer in school? (IF – perceived purposes of computer technology)
2. What does a computer help you do at school? (IF – perceived outcomes)
3. Do you ever have problems with using computers at school? If so, what kind of problems? If not, why not? (IF – perceived problems)

4. Follow up to anyone who answered yes to question #3: Who solves these problems? How do they do it? (IF – solving problems)

5. Why do you think your teacher wants you to use a computer? (IF – identifying the difference in interpretive flexibility)

6. What two activities would you choose to do on the computer (in school) if you had your own choice? (S – examining the stabilization of using computers in the school)

7. What two activities do you suppose your teacher would choose for you to do using the computer? (S – examining the stabilization of using computers in the school)

8. Do you think that your use of the computer in school prepares you for the future? If so, how? If not, why not? (TF – technological frame – identifying the future of computer technology)

## Appendix B: Teacher interview

Purpose: The purpose of the teacher interview questions is to identify the teachers' interpretation(s) of using computers in schools.

The questions are coded to show how each one aligns to the SCOT theory:

- IF stands for interpretive flexibility
- S stands for stabilization
- TF stands for technological frame

1. What do you understand as the purpose of using computers in school? (IF – perceived purposes of computer technology)

2. What does a computer help you do at school? (IF – perceived outcomes)

3. Do you ever have problems with using computers at school? If so, what kind of problems? If not, why not? (IF – perceived problems)

4. Follow up to anyone who answered yes to question #3: Who solves these problems? How do they do it? (IF – solving problems)

5. How do you think your students might answer the question about a computer's purpose in school? In other words, why do you think your students want to use a computer? (IF – identifying the difference in interpretive flexibility)

6. What two activities would you choose to do on the computer (in school) if you had your own choice? (S – examining the stabilization of using computers in the school)

7. What two activities do you suppose your students would choose to do (at school) when using the computer? (S – examining the stabilization of using computers in the school)

8. Do you think that your students' use of the computer in school is preparing them for a future job or career? If so, how? If not, why not? (TF – technological frame – identifying the future of computer technology)

## Appendix C: Student Questionnaire

Purpose: The student questionnaire's purpose is to generate demographic data and identify students' perceptions about using computer technology.

The questions are coded to show how each one aligns to the SCOT theory:

- IF stands for interpretive flexibility
- S stands for stabilization
- TF stands for technological frame

Directions: Please circle your responses.

1. What is your age? _____ (TF – demographic data)
2. What is your gender? Boy or Girl (TF - demographic data)
3. Which of these items do you have in your home (circle all that apply):

   A. Radio B. Television C. Computer D. Cell phone E. None of the above
   (TF – demographic data)
4. Which of these is used in your home to cook food?

   A. Firewood B. Kerosene stove C. Gas D. Hot plate E. Other: _____
   (TF – demographic data)
5. What kind of vehicle(s) does your family own?

   A. Motorcycle B. Scooter C. Bicycle D. Car E. Other: _____ F. None of the above
   (TF – demographic data)
6. How many books (not counting magazines or newspapers) are in your home?

   A. 1-15 B. 15 – 40 C. 40 – 100 D. 100 - 200 E. Over 200 F. Zero
   (TF – demographic data)
7. How many rooms are in your home?

   A. 1-2 B. 3-4 C. 5-6 D. 6-8 E. Over 8
   (TF – demographic data)
8. What items do you own or have?

   A. Bicycle B. Book bag C. An iPod D. A cell phone E. None of the above
   (TF – demographic data)
9. What do you believe is the most important thing which you can do on the computer?

A. Search for information B. Create movies/multimedia C. Listen to music D. Play games
E. Process information faster F. Communicate with friends (email) G. Learn basic skills
H. Other: _____ (please specify)
(IF – Perceived purpose)

10. What do you believe your teachers would say is the most important thing which you can do on the computer?

A. Search for information B. Create movies/multimedia C. Listen to music D. Play games
E. Process information faster F. Communicate with friends (email) G. Learn basic skills
H. Other: _____ (please specify)
(IF and S – perceived purposes and stabilization of those purposes)

11. What subject matter do you learn best *when using a computer*?

A. Reading/Literacy B. Maths C. Science D. Social studies E. Second language
F. Other: _____ G. None
(IF – Perceived purpose)

12. What subject matter do you learn best ***without*** using a computer?

A. Reading/Literacy B. Maths C. Science D. Social studies E. Second language
F. Other: _____ G. None
(IF – perceived problems)

13. I enjoy using a computer in school.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – Perceived outcome)

14. I am motivated to learn in school when I use a computer

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – Perceived purpose)

15. I work better with other classmates when using a computer.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – Perceived outcome)

16. I know how to use a computer for school related purposes.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – Perceived purpose)

17. My school work and home work are improved because of my computer skills.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcome)

18. I do better in math and science when using a computer.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcome)

19. I do better in reading, social studies, and second language when using a computer.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – Perceived purpose)

20. I learn more from the computer than from a teacher.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcome)

21. I am a better student because of computer technology.

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcome)

22. What kind of job would you like to have in the future? (Please write a short answer)

_____

(TF – demographic data)

## Appendix D: Teacher Questionnaire

Purpose: The teacher questionnaire's purpose is to generate demographic data and identify teachers' perceptions about using computer technology.

The questions are coded to show how each one aligns to the SCOT theory:

- IF stands for interpretive flexibility
- S stands for stabilization
- TF stands for technological frame

1. What is your gender? Male or Female (TF – demographic data)

2. To which age group do you belong?
A. Below 25 B. 25-29 C. 30-39 D. 40-49 E. 50-59 F. 60 or above
(TF – demographic data)

3. How many years of teaching experience do you have?
A. Less than 1 B. 1 -3 C. 4-6 D. 7-10 E. 11-15 F. 16-20 G. More than 20
(TF – demographic data)

4. What is your highest level of education?
A. Some college B. Bachelor's degree C. Master's degree D. Ph.D. degree
E. Other: _____ (please indicate)
(TF – demographic data)

5. How often do you use a computer at school? (If you answered A, B, or C, please move question 6 and 7)
A. Daily B. Three times a week C. Once or twice a week D. I do not use a computer
(TF – demographic data)

6. Where did you learn how to use computer technology in your teaching?
A. Self-taught B. Professional development at school C. College or university
D. A colleague or colleagues E. Other: _____ (please indicate)
(TF – demographic data)

7. What is your primary purpose for using a computer **at school**?

A. Communication (email) B. Book-keeping C. Creating media presentations (PowerPoint)
D. Entertainment (games) D. Research E. Other: _____ (please indicate)
(IF – perceived purposes)

8. Do you have a computer at home? Yes or No (If yes, please answer question 9)
(TF – demographic data)

9. What is your primary purpose for using a computer **at home?**
A. Communication (email) B. Book-keeping C. Creating media presentations (PowerPoint)
D. Entertainment (games) D. Research E. Other: _____ (please indicate)
(TF – demographic data)

10. What do you believe should be your students' primary purpose for using a computer at school?
A. Communication B. Use software to practice skills C. Create multimedia
D. Entertainment (games) D. Research (searching for information) E. Other: _____
F. I do not believe my students should use computers
(IF and S – perceived purposes and stabilization of computer technology)

11. What subject matter do your students learn best when using a computer?
A. Reading/Literacy B. Maths C. Science D. Social studies E. Second language
F. Other: _____ G. None
(IF – perceived outcomes)

12. What subject matter do your students learn best ***without*** using a computer?
A. Reading/Literacy B. Maths C. Science D. Social studies E. Second language
F. Other: _____ G. None
(IF – perceived outcomes)

13. The use of computers has helped to motivate my students
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

14. The use of computers has increased the level of student interaction and collaboration.
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

15. The use of computers has positively impacted my students' learning and achievement.
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

16. Most of my students can capably use computers at an age-appropriate level.
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

17. The use of computer technology has improved the quality of my students' work.
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

18. The use of computer technology can enhance school subject matter like math and science.
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

19. The use of computer technology can enhance school subject matter like reading, social studies, and second language?

Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

20. Students learn more from a computer than from a teacher.
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

21. I am a better teacher because of computer technology.
Strongly agree Agree Undecided Disagree Strongly disagree
(IF – perceived outcomes)

22. What is the most important thing that you would like your students to know about using a computer?
(Please write a short answer)

_____

(IF – perceived purposes)