



On the Buenos Aires coffee plantation in Nicaragua, a sign points the way to the “school zone.”



Seeds OF A Quiet REVOLUTION

Lots of aid projects in the developing world provide materials—from latrines to laptops—but little in the way of involvement or input for the people they are supposed to benefit.

In Nicaragua a group of Penn alumni, faculty, and students are trying a different approach in a rural education effort that emphasizes sustainability and collaboration over technology.

By Nathaniel Popkin

LATE one evening in October 2010, Duilio Baltodano W'70 sat on the patio at Vista Hermosa, his house in the Barrio Altamira section of Managua. Baltodano, a prince of Nicaraguan coffee, was in good spirits. It was the start of the harvest, or *cosecha*, and that year's was expected to be the largest yet. With commodity prices high, it was also likely to be the most profitable in the nation's history.

Dinner was to be a celebration of sorts for Baltodano, his son Ernesto C'05, and their partners from the US, Sharon Ravitch GrEd'00, senior lecturer in the Graduate School of Education, and Matthew Tarditi GEd'10 GrEd'14. They had just completed the first year of an experiment in rural education called *Semillas Digitales* (Digital Seeds) that had started in the small primary school at Baltodano's rainforest-certified coffee plantation, Buenos Aires, in Nicaragua's highlands, outside the small city of Jinotega. The initial results were promising—students had made statistically significant gains in most subject areas—and that morning Baltodano had briefed the national media. During the press conference he wanted to make it clear that implementing the project, even at this modest scale, had heightened his expectations.

These are the seeds of a quiet revolution, he said. "Together, yes, we can change the system of rural education in Nicaragua."

Everyone at dinner agreed that the press conference had been a success. Although they had never been to the capital before, the children of Buenos Aires had presented themselves with poise and clarity. It was impossible not to feel inspired. But as dinner was brought out, the conversation shifted to the project's next phase. Starting in February 2012, Semillas Digitales would enter a school named Abisinia, in a much larger and more urban community about 45 minutes drive on dirt roads from Buenos Aires. From Abisinia, it would spread to another school at the plantation Los Potrerillos and four more schools in the region by the end of 2013.

The prospect seemed to trouble Duilio. Were they moving too quickly, or not quickly enough? Certainly, philanthropists had already donated hundreds of thousands of laptop computers to schools in poor countries. "I could give away some laptops, take a picture, and go home. That would be impressive. But really," he wondered, "what is our goal as a family? What do we want to accomplish?"

Born in 1948 the scion of one of Nicaragua's wealthiest families, Baltodano was not always so reflective. After he graduated from Penn in 1970, his father sent him to work as a trader in the coffee exchanges in Hamburg and Geneva. He convinced his father's friend Don Alfredo Pellas Chamorro to send cases of the famous rum that Pellas made, Flor de Caña—ostensibly so that he could market the product in Europe. But the gregarious and fun-loving Baltodano threw parties instead.

When he returned to Nicaragua, his father sent him to INCAE, the Central American business school set up by Harvard University in the 1960s. Baltodano studied sales and marketing, not trade. He lived large and gave little thought to questions of poverty and justice. He went to work managing CISA, the family's agro business, importing farm supplies and equipment and exporting coffee and other commodities. At that time, only the Samozas, who had kept Nicaragua under dictatorial control for four decades, exported more coffee than the Baltodanos.

But as the dictatorship grew more oppressive, Baltodano's awareness began to grow. Many among the elite—including his uncle Emilio, who was a member of

a powerful group of businessmen known as the "gang of twelve"—openly supported the growing Sandinista opposition. Nevertheless, after the Revolution in 1979, the government nationalized imports and exports. And that left Duilio "naked, broken, with nothing."

This was the third blow to the family's business interests in less than a decade. In 1972 an earthquake had destroyed much of the firm's infrastructure; then, during the Revolution, Samoza's bombs had decimated the main office. Now, Baltodano knew he would have to adapt to survive. He sent his wife Indiana and their newborn son Duilio to Miami.



Coffee-grower—and rural-education reformer—Duilio Baltodano W'70.

"I said to myself, 'I'm going to continue in Nicaragua, remain as long as I can,'" he recalls. "And so I had to decide what am I, a politician or a businessman. As a businessman I had to be quiet, never get mad with anyone. Once I get impatient or mad or aggressive, they will throw me out. The directors of the state companies: now we are friends, but then I was trying to reach common ground. It wasn't ideology, but pragmatism. I would always say, 'Let's talk about business.'"

The Sandinistas were badly weakened by the US-backed Contra war, and in 1990, they lost the first election held under a new, democratic constitution. A "concili-

ation" government, led by the conservative Doña Violeta Chamorro, loosened the market. The Baltodanos sought to revive their coffee-growing business.

The highlands, particularly near Jinotega, were still under the control of various violent militia, remnants of Sandinista and Contra fighting groups, who continued assaulting each other well after the war had ended, and who terrorized and even murdered small farmers trying to get on with their lives. To survive, most coffee producers sought high yield, achieved by growing their coffee trees in full sun. But just then Illy, Starbucks, and other high-end coffee roasters began look-

ing for better quality, and as a result growing philosophies shifted toward the use of shade and other natural methods. These clients also required improvements in housing, health, and education for the workers and their families.

In 1992, the Baltodanos purchased Buenos Aires. Almost immediately, Duilio fell in love with the lustrous hills. He preferred to sleep in the *casa técnica* at the center of the farm, where the farm managers took their meals. And he noticed the sorry state of the Buenos Aires school, a pitiful one-story wooden shack with a tin roof. The school kept no records, had no books, and no regular teachers.

“My grandfather said, ‘If you get a good education, then that’s the best inheritance, no one can steal it from you,’” says Baltodano. “My sense was that by giving opportunity to members of the community, we could not only increase efficiency and production among workers, but also bring hope.”

Education reform has long been a critical lever of economic advancement in Nicaragua. In 1980, the Sandinista “lit-

eracy crusade” reduced *analfabetismo* from 50 percent to around 10 percent. At that time, only 38 percent of children were enrolled in primary school. By 2006, when the Sandinista leader Daniel Ortega was reelected President, the rate of enrollment had doubled. He declared primary education a basic right and set the goal of 100 percent matriculation by 2012. But government investment in schools, at 3.7 percent of GDP, isn’t nearly enough to

build the necessary classrooms, and teacher pay is the lowest in Central America. So private-sector firms like CISA are expected to step in to fill the gap. The Baltodanos fixed up the Buenos Aires school, and eventually, with the help of a 2003 World Bank loan, built a new campus adjacent to the barracks used for *cortadores* (seasonal coffee pickers). For each grade cohort, a separate brick structure—albeit without electric-

ity or running water—was constructed. Volunteers painted the buildings blue and white, the national colors. The new buildings were designed to maximize both light and shade and to provide a safe, contained play area. But a modern school, in Baltodano’s mind, was synonymous with the use of technology. This made sense for even more pragmatic reasons. On a sustainable coffee farm it is necessary to measure the value of the inputs—wind, soil, sunlight, pruning schedule, and worker incentives—on the number and quality of the outputs, called “cherries” (ripe, pre-milled coffee beans are a shiny, dark red). Baltodano also wanted to precisely manage the complicated process of coffee harvesting, wet and dry milling, and distribution, and to do so he had software designed that required farm managers and foremen to use handheld devices in the field. Historically, the Nicaraguan coffee harvest had been the least productive in the region, but with a technologically literate workforce, it could surpass its rivals.

At around the same time, MIT Media Lab founder and chairman emeritus Nicholas Negroponte was designing a small, durable laptop computer, which



A technologically literate workforce is becoming more important as growers seek to measure the impact of inputs—wind, soil, sunlight, pruning schedules, and worker incentives—on the number and quality of outputs—ripe, pre-milled coffee beans, known as “cherries.”

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he believed—if widely distributed and connected to the Internet—could transform the lives of the world’s poor. Children would guide their own learning, instilling in them a sense of ownership and limitless possibility. The project was named One Laptop Per Child. In 2008, the first of Negroponte’s XO laptops appeared in schools in Nicaragua.

That year, the girlfriend (and now wife) of Baltodano’s son Ernesto, Adriana Chamorro GEd’12, was working as a volunteer at Nicaragua’s only psychiatric hospital. Chamorro was helping the

“I’m an education professor at an Ivy League university in a large city. We can’t even get our own school system together,” Ravitch says. “So what makes me an expert? Who am I to bring something to a community without engaging with them.”

under-resourced hospital staff devise systems of care. One of her colleagues told her about a researcher from the US who had been developing new standards for training and professional development of family therapists and school counselors in Ecuador and was an expert in applied international development at Penn’s Graduate School of Education (GSE). Chamorro tracked down the professor—Sharon Ravitch—who, in addition to running the project in Ecuador, had initiated a participatory study on women’s access to justice in war-torn countries and was working on teacher professional development in post-tsunami Banda Aceh, Indonesia. Ravitch agreed to conduct a workshop at the psychiatric hospital. In Nicaragua, Chamorro told Ravitch and Matthew Tarditi, a GSE student who had come along as a research assistant, about the Buenos Aires school. Would they like to drive five hours north to see it?

Ravitch, 41, has wild brown curly hair and a wide, persuasive smile. She talks with her hands, curses joyfully, and laughs like a knowing accomplice. She was raised with a strong social conscience. When she was young, her mother stopped celebrating Thanksgiving because it marked the beginning of the persecution of Native Americans. Her father, who grew up in a tough Philadelphia neighborhood, started out as a salesman, and her parents struggled financially. When Ravitch graduated from Temple University in 1993, she asked how she could ever repay them. *Tikun olum* (Hebrew for healing the world), her parents told her: just do good.

Since earning her doctorate at GSE in 2000, Ravitch has taken on applied educational-development projects around the world. In October 2011 she was named the senior international advisor to Haiti’s

Ministry of Education and assigned, post-earthquake, to guide the rebuilding of the nation’s system of education.

She and Tarditi took Chamorro up on her offer. At Buenos Aires, they accompanied Duilio and Ernesto Baltodano to the school. The children gathered around

Baltodano mentioned his desire to bring One Laptop Per Child into the classroom. He was certain that if the children of Buenos Aires were exposed to computers, “they will be the ones telling us what to do.” He asked Ravitch to run the project.

“It will fail,” she told him, explaining that implementing OLPC alone would repeat the same colonialist pattern that has dominated the field of international applied-development for decades and which proceeds with the assumption that Western outsiders bring expertise to infantile and incompetent (and even disinterested) locals.

“I’m an education professor at an Ivy League university in a large city. We can’t even get our own school system together,” Ravitch says. “So what makes me an expert? Who am I to bring something to



Two children try out the XO laptops.

while Ernesto and Duilio demonstrated on a sample XO laptop they had acquired in anticipation of bringing technology to Buenos Aires. That night Duilio brought Ravitch out to the porch of the family house, which sits at the highest point of the farm. From there, in the dimming light, the mountains seem to dissolve into the clouds and every few minutes a monkey howls, which has the effect of marking points in the unseen forest as stars do in the night sky.

a community without engaging with them in figuring out *if* they even want this kind of ‘innovation’ for themselves and their children? And so I said absolutely not.”

If the intention was to hand out computers with a few brief workshops for teachers, it wouldn’t build capacity, she explained, and ultimately it would be a waste of money and time.

“My argument was not to say, ‘If you build it they will come,’ but ‘If we co-construct it, it might be sustainable.’”

Give me a chance to study and engage with the community, she countered, to learn from and partner with the teachers, parents, and farm workers. Only then can adequate interventions be devised.

But, she insisted, this can only work if it's done rigorously and systematically. "I am a methodological purist," she says. Perhaps because she was raised on the aggressive streets of Philadelphia and Tel Aviv, where her family spent its summers, Ravitch is assertive, demanding, and sometimes severe in her judgment. She is also deeply compassionate. The combination of these qualities seemed to move Baltodano, who could have just as easily told her to get lost.

As it turned out, he wanted someone like her—someone persistent and confident who wouldn't be intimidated by the nearly overwhelming obstacles. And then there was chemistry, a kind of shared irreverence, and on that warm night on the farm, they shook hands and cemented a future of collaboration and hard work. Ravitch would head the project to build the curriculum and pedagogical framework of the Buenos Aires school, with the goal being to develop and advance a model approach to the other

15 schools sponsored by the Baltodanos' firm—and eventually, they concurred, their aspirations feeding off each other, to the entire nation.

Since OLPC's introduction in 2005 and after several redesigns of the XO, the bright green and white laptops have become a symbol of international development. Negroponte's vision was to place them in locales of deep poverty, where few children attend school and many teachers are illiterate, if they ever show up at all. (In Nicaragua a great many rural teachers travel to their remote schools on Monday, teach Tuesday, Wednesday, and Thursday, and go home on Friday.) The computers, under these harshest of circumstances, are meant to be everything: curriculum, school, and teacher. They are certainly powerful enough. Negroponte often notes that each XO can hold 100 books. It's impossible to imagine, he says, being able to afford sending thousands of books to thousands of villages in Africa, South Asia, and Latin America.

The reality has never quite matched Negroponte's vision. The vast majority of the two-million-plus laptops sold so far have gone to relatively wealthy

nations with the resources and digital and educational infrastructure to absorb them. In Nicaragua, with a primary-school population of some 835,000, about 27,000 XOs have been distributed to about 90 schools, most of them by the Zamora-Téran Foundation, OLPC's proprietary distributor in Central America. The relatively short reach makes sense, according to Mark Warschauer, a professor of Education and Infomatics at the University of California-Irvine and one of the most careful observers of OLPC.

Very poor nations such as Nicaragua can't afford to provide a computer for each primary-school student, Warschauer explains. The money spent on OLPC, he argues, would be more effectively invested in classrooms and teachers.

"OLPC represents the latest in a long line of technologically utopian development schemes that have unsuccessfully attempted to solve complex social problems with overly simplistic solutions," he wrote in a paper coauthored with Stanford doctoral student Morgan Ames in the *Journal of International Affairs*.

To help me understand Warschauer's point, Ravitch describes the ubiquitous case of a Nicaraguan school without a toilet or running water. USAID, which carries out a great deal of development in Nicaragua, would respond to the unhealthy conditions by installing latrines.

"The latrines were an answer to a question, but it wasn't a question Nicaraguans themselves were asking," she says. "The latrines didn't do away with health hazards, they increased them. And you will see there are latrines spread all over the rural landscape and upwards of 50 percent are already unusable. All too often in the development world, it's not about partnering to see what the local resources or the needs are, it's about buying latrines."

The lesson, Ravitch argues, is that international development projects have to be co-constructed—meaning that local people work directly to identify problems and to design and implement solutions—and they have to be porous, meaning all constituents learn from each other and help the project evolve in ways that may not be immediately apparent. The overall approach is called *participatory emergent design*.

"Everyone agrees that capacity building is critical," she says. "Yet what is required to develop and sustain a truly



Sharon Ravitch GrEd'00 and Matthew Tarditi GEd'10 GrEd'14 and students. The banner behind them reads: "Creating access to technology in coffee communities."

bi-lateral process is an incredible amount of interpersonal, psychological, and institutional consideration that goes well beyond clean research design.”

Ravitch agreed to build the project around the use of technology as a tool of innovation in the classroom. In exchange, Baltodano put aside his desire for immediate impact. He approved Ravitch’s proposed eight-month process of comprehensive ethnographic study of the farm community, which Ravitch calls the “gold standard” in applied development. The study would come to reveal the local knowledge, skills, and resources that could be brought to bear on the school.

But by far the greatest focus of the project and perhaps its most significant ideological break with OLPC is to concentrate resources on teacher professional development.

“Teachers around the world are deprofessionalized,” says Tarditi. In *Semillas Digitales*, despite the terrible government salary of \$190 per month, teachers are positioned as partners.

“It’s a dream,” says Baltodano. “But what we’re doing is training teachers. They’re the ones doing it and they’re anxious to be better at it.”

Ravitch and Tarditi, who had agreed to run *Semillas Digitales* in its first year and then hand it off to local managers, found a powerful and receptive ally in Duilio’s dark-haired 30-year-old son Ernesto, whom Ravitch calls “deeply and abidingly committed to Nicaragua, the legacy of a family who has suffered greatly despite their wealth.”

Like many children of the elite, Ernesto grew up in exile, in Key Biscayne, Florida. In 1992, with most political violence over and a friendly government in power, Duilio decided it was time for the family to reassemble in Nicaragua. Ernesto, who was 10, couldn’t believe it. Why leave an idyllic life in an American suburb for the beaten and fragmented landscape of Managua? “But within six months I realized I was wrong,” he says now.

Ernesto returned to the US in 2001 to attend Penn. After graduation, he spent two years in Boston, working for the interactive marketing agency, Digitas. The experience only fed his desires. What if Nicaragua finally capitalized on its immense natural resources? What if Managua became a center for innovation and commerce?



Ernesto Baltodano C’05 and Adriana Chamorro GEd’12 with students at the Buenos Aires school. Adriana, who is now married to Ernesto, first introduced Ravitch to the Baltodanos.

“It became my desire to see a more prosperous, stable country, where the standard of living for the majority of the population is far above the extreme poverty line,” he says. “But it was clear that would never be achieved if everyone who had the opportunity to receive a quality education stayed abroad.”

In 2007, Ernesto returned to Managua to enter the family business. He is CISA’s patient but ambitious visionary, says Ravitch, a quality he brought to *Semillas Digitales*. “He inspires me,” she says. “He may live in a version of the master’s house, but every day he’s assembling the tools to dismantle it. He will make himself far less comfortable to shift this country’s educational reality.”

When his father asked on the night of the press presentation if the family ought to reconsider its goals, Ernesto answered. “Our goal should be to change the national education system beyond the coffee region. If we stick to the coffee region,” he continued in his deep, grounded voice, with his hands resting behind his head, “it won’t be enough, and if it doesn’t get into the national agenda, we fail.”

And yet the very distances—from digital seed to economic harvest, from academic idealism and kind-hearted paternalism to full-throttle reform, from a walled garden to endless fields of intractable poverty—seem incalculable. Nicaragua is the second poorest nation in the Americas and very nearly its most corrupt. Can it really be possible to affect the national agenda? Exactly how far can love go?

Duilio, Tarditi, and I arrived in Jinotega on a Saturday afternoon. The temperature was falling, and just above the tips of the hills a perfect line of pearlescent clouds had formed. Jinotega is a tidy city of colorful one-story buildings that stretch out, like the telephone wires above them, between the hills. At the edges, as the city falls into forest and the bright wind carries away the mud and smoke, the smell of sewage and exhaust, the long lines of buildings dissipate into a clutter of concrete warehouses, *beneficios* (coffee mills), and offices of the various coffee exporters.

Tarditi, born in 1979, is tall, introspective, and deeply self-aware. He speaks

slowly, and then as he gets going the words beat forth in hot little riffs. For 16 years, his father was the mayor of Haddonfield, New Jersey, a wealthy town across the Delaware River from Philadelphia. His father would take him to fundraising events for Senator Frank Lautenberg and former Governor Jim Florio. “Politicians have a way of making you feel valid and comfortable and important, and I didn’t care if it was genuine or not,” Tarditi says.

When Tarditi was 28, his sister Sarah, then 31, died of leukemia. They had been close growing up and Tarditi had taken care of Sarah’s toddler-age son while she

in the community. “The people were so welcoming, endearing, hospitable, and appreciative of what I was doing,” he says. “On one of the first visits to their house, a grandmother of one of the kids, Doña Isabel [Castro Lopez], said, ‘To think that you came all this distance to help us, the least we can do is treat you as a member of our family.’”

Tarditi’s ability to ingratiate himself on the farm was invaluable, says Ernesto Baltodano. “He established his leadership, won the support of the CISA team, the farm staff, and most importantly the school and community. He was the heart of the project, he made sure to take every-

It was twilight as we climbed the swampy, rutted road to the farm. Vapid 1970s pop music played on the radio. The road was full of people: mostly farm workers with their ubiquitous machetes, but otherwise families and girls arm in arm on their way out for Saturday night. They emerged in the haze of the headlights like blots of watercolor paint. Tarditi’s heart was in the pit of his stomach. This would be his first time back to the farm since he had left the summer before. Duilio in front was quiet. Together, they seemed an unlikely pair: Don Duilio, as the Sandinistas say, an “oligarch,” and Mateo the “radical.”

These sorts of paradigms make Ravitch acutely aware of the complexities of her role. “I know I’m walking into a fraught history,” she says. “And there are tensions. We need to understand these tensions, not judge or hide from them.”

Early on Ravitch and Tarditi learned that there was enormous value in developing personal bonds with the Baltodanos, just as they were doing with the farm community. “I know how much the Baltodanos want to do this for the country,” Tarditi says. “I wanted to support them, learn from them, help them learn. I thought I could be a bridge between two worlds,” meaning the elite and the rural peasant. “The differences can be very shocking, and I wanted to help each of them understand the other.”

Daylight at Buenos Aires is coaxed by the pounding of corn masa into tortillas. On coffee-picking days, when there might be 500 or 1,000 people to feed, it starts at four. The kitchen is a vast wood and concrete building nestled into the lush hillside, with a long window where the workers line up to claim their meals. Inside, it feels labyrinthine, like a far section of a North African medina, and no less elemental: there are two wood stoves, recently repaired to reduce smoke ash; great pots of bubbling coffee; and fat balls of masa, mounded like the heads of snowmen.

On a busy day, five women prepare the tortillas, beans, and coffee, but this was Sunday and the kitchen staff was reduced to two. I had been wandering around the farm—it was the first I had seen it in daylight—when a four-year-old boy named Jason, with a runny nose and a florid cough, came running up to me. “Mateo! Mateo!” he called, delighted that his great friend had returned. “Mateo, Mateo!” he shouted



Tarditi, who Ernesto Baltodano calls “the heart of the project,” with a student.

was in the hospital for treatment and her husband was at work. He emerged from the trauma as the family’s therapist, the one most interested in observing the emotional roller-coaster and most capable of helping his parents and other siblings heal.

After Sarah’s death, he finished his master’s thesis and, in July 2009, returned to Nicaragua to start Semillas Digitales. “I am adaptable,” he says, describing the rough conditions of the farm, “but it was not pleasant. I was lonely, unhappy, sad, frustrated, stressed out, and I felt like an outsider.” But he soon immersed himself

one into consideration in order for people to believe in it.”

The experience radicalized him politically (on Facebook, he describes his political views as “Radical Liberal Marxist Democrat with a penchant for rebellion and civil disobedience”). At Buenos Aires, he acquired the revolutionary’s beard, which gave him the look of a Kibbutz pioneer as much as a Marxist soldier.

“I don’t think I did as much for them as they did for me,” Tarditi says. “As a young adult, as an activist, they inspired me. I want to get their story out. I want to battle in the trenches with them.”

to me—another gringo with a beard, yet not at all sure what to think of the *chele* before him—and gave me a big hug. “Mateo! Mateo!” he called back to me as he ran down the dirt path and into the kitchen.

Last school year, which ended in December, there were about 95 students enrolled in the Buenos Aires school, including Jason’s older sister Marjeris and a few other children of permanent farmworkers.



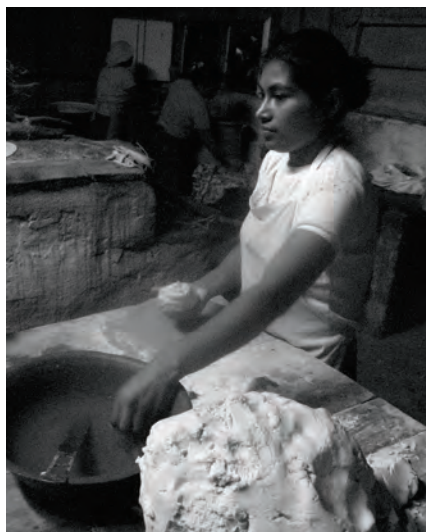
The rest of the students live in the small wooden houses (most of which have plots for growing corn and beans) scattered across the rolling remains of the rain forest. In rural communities, fundamental obstacles to schooling remain. “In my town,” said Michele Aquino, a Peace Corps volunteer on a nearby farm, “a young mother who cannot read tends not to care if her young children go to school. She didn’t do it, so why should they?”

In picking season, despite vague rules against child labor, children become *cortadores* or watch their younger siblings while their parents go off to work. Heavy rains and frequent holidays interrupt lesson plans. Teachers often don’t show. Nicaragua’s fertility rate is two points higher than the Latin American average, in part because of profound child sexuality. One of Buenos Aires’ top sixth-grade students told Tarditi he was leaving school to go to the “*escuela de papas*,” and indeed he had gotten an older woman pregnant

and was expected to care for the child.

Each first- through sixth-grader at Buenos Aires has a laptop (Baltodano installed a solar panel so that the XO laptop batteries could charge each night). Nearly everyone I spoke with was careful to qualify the XO as an enhancement, and not a replacement for the traditional role of teachers; nothing, they told me, replaces the learning dynamic of a classroom. “*Es máquina, no es mágico*,” cautions Martha Alicia Moreno, who is project manager of the CISA Corporate Social Responsibility division.

But if there was magic in the XO, it was in its power—as an emblem of progress—to attract both children and adults to the school. Tarditi’s first job was to involve community members in every aspect of the project. “I come in with a certain set of skills and knowledge,” he says, “and



On coffee-picking days, as many as 1,000 workers may be fed from Buenos Aires’ kitchen.

they come to the table with a certain set of skills and knowledge and experience. What this project does is create the conditions for people to empower themselves.”

The project was unlike anything else the school parents, teachers, and CISA facilitators had seen before; the mere fact of being involved was energizing and for the first time they began to imagine a better future. Parents participated in joint class sessions and collaborative classroom projects, and received regular home visits from Tarditi, CISA school-facilitator Nayibe Montenegro, and the teachers. Castro Lopéz, the grandparent who was

so welcoming to Tarditi at the start, took note of the impact of this approach, which was unprecedented since the early years of the Sandinista regime. “Now,” she told me, “the school is the heart of the community. It wasn’t that way before.”

Late on Sunday morning, a reserved, wiry man called Don Gonzalo arrived at the farm to escort Tarditi and me to mass at the Immaculada Concepción de María church. He wore a perfectly pressed pair of navy chinos, a crisp white polo shirt, and a Haddonfield little-league baseball cap (Tarditi’s parents have contributed a great deal to the community, including a MacBook, which the teachers use for lesson plans and to assess student performance). Don Gonzalo and his wife Rosa de Montenegro had 21 children, eight of whom survived. The youngest, Otoniel, was in the fifth grade at Buenos Aires.

Don Gonzalo has been a *cortador* at a small coffee plantation for nine years. “I am a poor man,” he said. “It’s easy to imagine changes, but harder to do them. If I want to build something I need wood, but how to get it? It’s expensive, and concrete—forget about it. *Patrones* don’t even have enough to pay their workers.” But Semillas Digitales had given them hope, in part because it had given the students so much confidence.

The day was warm and humid, and the church, which was a wooden box with a tin roof and a dirt floor, had the claustrophobic air of a stable. Bed sheets and dollar-store figurines took the place of stained glass and statuary. After the service, Don Gonzalo and Doña Rosa took us to see the progress of a new, much larger church with cinderblock walls and a concrete floor that the community was building just up the hill, a project that had already taken five years (a roof had recently been added).

Doña Rosa had the civic activist’s soft intensity, grounded in a belief in human goodness and a blunt willingness to ask for more. Oto, she said, was getting a fine education at Buenos Aires. “But past sixth grade, what happens then? There are many intelligent kids in the community who should be in high school. If there was a *secundaria* a lot of kids would go.”

The idea of bringing a secondary school to Buenos Aires was voiced frequently by the community members I spoke to and strongly endorsed by Ravitch and Tarditi. They have begun to assess the possibility with the Fabretto

Children's Foundation, which operates a mobile, agrarian-based curriculum in remote areas of Central America. At lunch, Tarditi raised the idea with Baltodano, who didn't see the immediate imperative. After all, only slightly more than 40 percent of Nicaraguan children complete sixth grade. Baltodano wanted to keep the focus on K-6. "Better to load up the pipeline in primary school," he said.

"Clearly, you'd like to do that initially," responded Tarditi, "but at some point you have to open the valve." Eventually, he believes, Duilio will support a secondary school. But what if, in the co-constructed model, co-constructors disagree?



Doña Rosa de Montenegro, with a photograph of her mother. Her youngest son, Otoniel, is a fifth grader at Buenos Aires school.

In class on Monday, the third through sixth graders were asked to write an essay describing their trip to Managua using the XO's draw function, which would enable them to present their experience simultaneously in text and video, with photographs and original drawings. Work began slowly, and at first it seemed that the laptops were a distraction. Couldn't they learn as effectively with pencil and paper?

I wandered outside. *Cortadores* in single file walked into the arbor. It began to rain. When I returned to the classroom, Tarditi was demonstrating something to the teachers on the MacBook and the kids were writing, placing their essays into bubbles as if they were to be part of a Venn diagram. Wrote Hector Uriel, a sixth

grader, "To me, the presentation was lovely because I got to meet different kinds of people from other places." And that was it, precisely: the computers were a writing tool that simultaneously taught these remote children how to communicate in the language of the wider world.

After lunch at Buenos Aires, the children were dismissed. Tarditi, Moreno, and Montenegro got in a pick-up truck to drive to the school at Abisinia. In the narrative of capacity building and sustainability, this was the rubber meeting the road. Moreno and Montenegro are both 40. Moreno has short hair and a sharp wit and Montenegro long hair and a knowing smile. As they drove across the valley, Moreno described the challenge before them. Abisinia was a former Sandinista military encampment that had become a loose and somewhat lawless community. It was isolated, and unlike Buenos Aires, unprotected. There were few jobs and as a result the community was beset by alcoholism, delinquency, child sexual abuse, extreme violence, and rape. "Everything out there finds its way into the school," she said.

"I've been doing a lot of thinking about the transition from Buenos Aires," said Montenegro, a former school principal. "Abisinia is another world."

The school, which was freshly painted, is the size of a small, 1960s era American elementary school. It sits at the edge of a wide field, where horses and donkeys graze. There are vegetable gardens and a large library, improvements that have resulted from a partnership with the French bank Société Générale, set up by Dania Baltodano, the former CEO of CISA's export division. More than 500 children attend the school, but because the facility can only accommodate about half that, high-school students come in a second shift, after lunch and on the weekends.

During the meeting in the school's library, Tarditi sat quietly, taking notes. Moreno and Montenegro asked questions about the electrical capacity, Internet connection, and the plumbing (it was constantly out of order). Montenegro pulled an XO out of her bag and Moreno demonstrated the laptop's math game, "Tuxmilla," a takeoff on the old pinball arcade game, "Asteroids." The teachers gathered around to give it a try. Electronic explosions—

indicating they were completing the math equations correctly—scored the air. Moreno, meanwhile, explained how the computers were integrated with the Ministry of Education's curriculum.

"The kids are playing," she noted, "but at the same time they are learning." And then she leaned forward and smiled. Of course, she reminded them, the skill of the teacher is what's important. "The computer is really no more than a complementary tool."

In mid-2011, management of the project was handed over to Moreno and Montenegro of CISA. They are the lynchpin of the capacity building and professionalization strategy. Initially the transition was bumpy—fraught with cultural miscues, miscommunication, and the blurring of roles—but during the 2012 school year, the second full year of Semillas Digitales, the Nicaraguan school coordinators began to assert control. Montenegro took over the role of lead facilitator, integrating teachers into the program, and Moreno assumed the position of overall program coordinator, in charge of methodology and the relationships with the Penn researchers and the national Ministry of Education.

As expected, the expansion to the school in Abisinia was challenging. They faced a climate of mistrust among the teachers and a severe lack of collaboration. The school's assistant director was accused of stealing four XOs from the school, and though they were later found over an hour away in her hometown, she remains in her position, probably due to political ties.

Yet, a core group of dedicated faculty has emerged and students' digital literacy has grown substantially. Last April, Abisinia students and teachers came to Managua to present to stakeholders. The progress was enough that Duilio Baltodano agreed to extend the project to the Flor de Maria Rizo school at the Los Potrerillos farm this spring, the first time Semillas Digitales will spread to a school outside the CISA network. ♦

Nathaniel Popkin C'91 GCP'95 is the co-editor of *Hidden City Daily* and co-producer and senior scriptwriter of the documentary film series "Philadelphia: The Great Experiment." He is author of *Song of the City: An Intimate Portrait of the American Urban Landscape*, *The Possible City: Exercises in Dreaming Philadelphia*, and the forthcoming novel *The Book of Masters*.