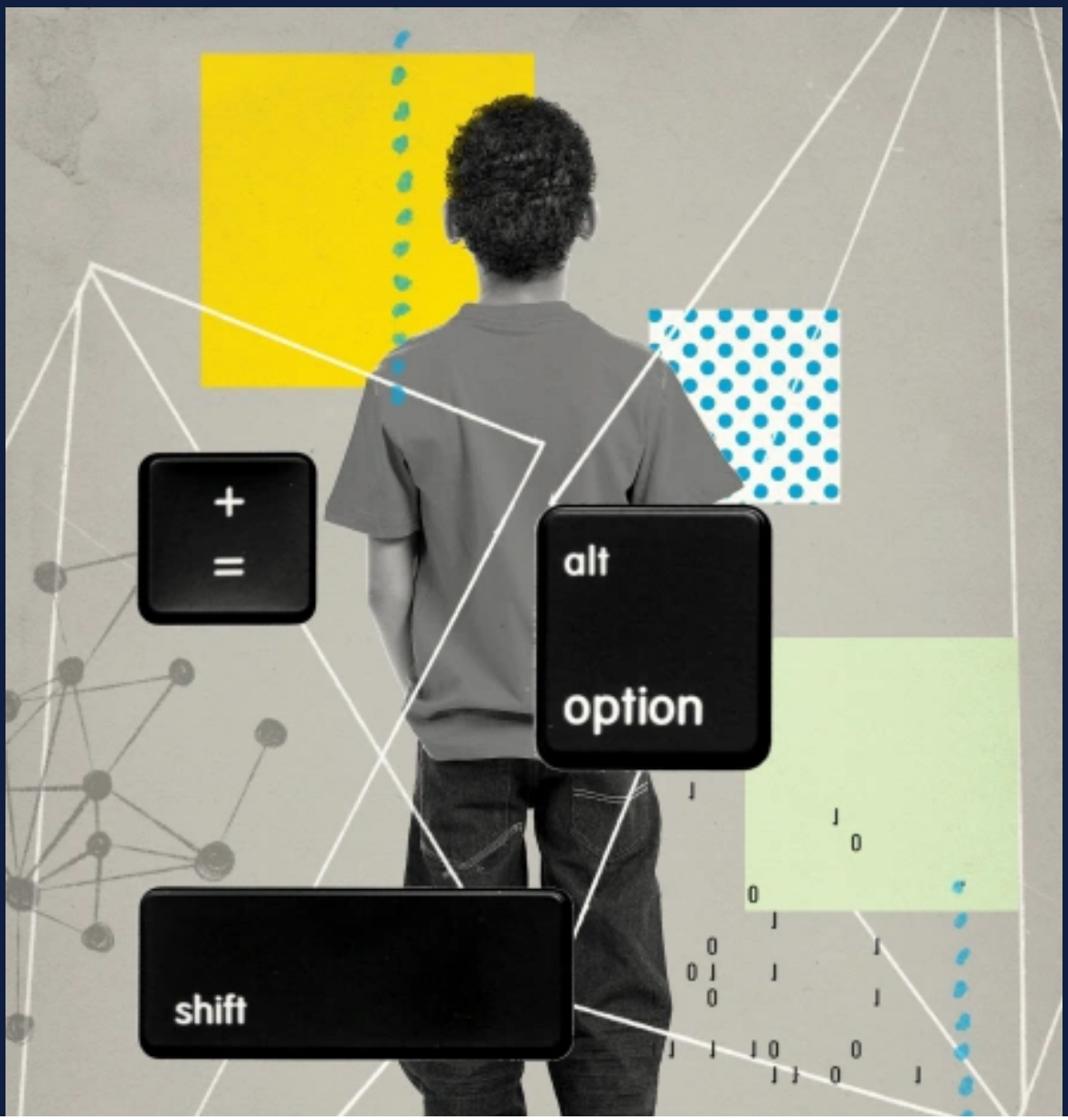
COMPUTING

Laptops alone can’t bridge the digital divide

The failures of One Laptop per Child have much to teach us about fixing educational inequities.

By Morgan Ames

October 27, 2021



ANDREA DAQUINO

In May 2020, two months after covid-19 shut down schools and public life around the world, Twitter CEO Jack Dorsey announced that he was giving $10 million to California's Oakland Unified School District to purchase 25,000 Chromebooks. Dorsey tweeted that his donation was intended "to give EVERY single child in Oakland access to a laptop and internet in their homes." The donation came just a day after Oakland mayor Libby Schaaf announced the #OaklandUndividedcampaign to raise $12.5 million to "close the digital divide for good" in the city.

Oakland's school district, along with much of the world, certainly needed the help. Despite the city's proximity to Silicon Valley's centers of power and wealth, 71.2% of its children qualified for free or reduced-price school lunch the year the pandemic hit. Half did not have the computers and internet connections needed to enable a sudden switch to remote learning. These numbers reflect nationwide trends. Lower-income households are much less likely to have broadband; over one-quarter rely solely on their smartphone's metered internet connection, and many share one dilapidated computer. In August 2020 a picture of two young girls sitting on a dirty sidewalk outside a Taco Bell in Salinas, 100 miles south of Oakland, using the restaurant's public internet connection to attend class on their school-issued laptops, went viral as a potent symbol of how difficult the pivot to remote learning had been for many students and how wide the digital divide continued to be.

Press coverage of Dorsey's donation has been breathlessly positive. I, however, was reminded of an initiative from more than 15 years ago that made similar promises for the poorest children. At the World Summit on the Information Society in Tunis in November 2005, Nicholas Negroponte, cofounder of the MIT Media Lab, unveiled a bright-green mock-up laptop outlined in black rubber. A yellow hand crank, which was meant to charge the machine, extended from the hinge between keyboard and screen. Despite its toy-like appearance, Negroponte said the device would be a full-featured computer, packed with educational open-source software, and would cost a mere $100. He asserted that hundreds of millions of the devices would be in the hands of children around the world by the end of

This story was part of our November 2021 issue

See the rest of the issue

Subscribe

2007, and that by 2010, every child in the Global South would have one—not only eliminating the digital divide in many countries, but providing children with all they needed to educate themselves. During the presentation, United Nations secretary-general Kofi Annan gave the hand crank a turn and, in a symbolically prescient moment, accidentally broke it off.

Still, reporting on what came to be known as One Laptop per Child (OLPC) was largely favorable in the years that followed, and technology firms donated millions of dollars and thousands of hours of developer labor. In dozens of high-profile venues throughout 2006 and 2007, Negroponte told unconfirmed stories of children using laptops to learn English and teach their parents to read, of impromptu laptop-enabled classrooms under trees, and of villages where laptop screens were the only light source. (Negroponte did not respond to a request for comment.) “I don’t want to place too much on OLPC,” he said in interview excerpts posted to OLPC’s YouTube channel in 2007, “but if I really had to look at how to eliminate poverty, create peace, and work on the environment, I can’t think of a better way to do it.”

“Disruptive” technology

Despite its prestigious pedigree and good intentions, OLPC struggled to fulfill the promises Negroponte made in its splashy debut. For one thing, the idea of powering the computers with a hand crank proved infeasible and they were shipped with standard AC adapters, refuting OLPC’s claims that its device could operate without electrical infrastructure and “leapfrog decades of development.” Moreover, two of the laptop’s most charismatic features—its mesh network, which was meant to allow the machines to act as wireless internet repeaters, and its “view source” button, which showed the source code of the program currently running—worked sporadically at best and were practically never used; the mesh network was dropped from later versions of the laptop’s software. And sales never reached the level that Negroponte had projected: rather than hundreds of millions of machines, One Laptop per Child has sold just shy of 3 million laptops total, including 1 million each to Uruguay and Peru. Nearly all these sales were in the early

years of the project; the original OLPC Foundation dissolved in 2014, though the Miami-based OLPC Association continues to manage the brand.

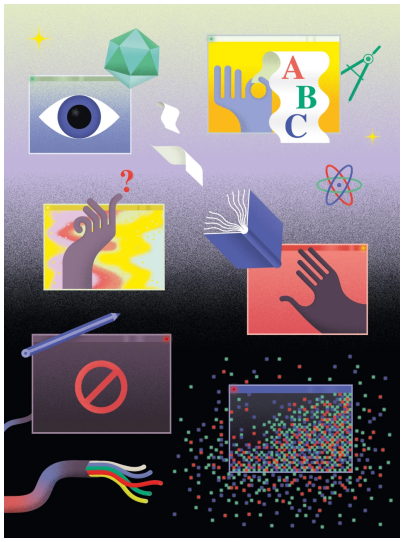
Finally, the laptops cost far more than $100. The device itself was around $200 at the cheapest, and that did not include the substantial costs of infrastructure, support, maintenance, and repair. These ongoing costs ultimately sabotaged even OLPC projects that started strong, like the one in Paraguay. With 10,000 laptops, this project was not the largest, but many in the OLPC community initially considered it one of the most successful, with a world-class team, connections to leaders in government and media, and a flexible approach. Paraguay Educa, the small NGO spearheading it, invested heavily in infrastructure, installing wall outlets, WiMax towers, and Wi-Fi repeaters throughout schools. Adopting best practices from other one-to-one laptop programs, they hired teacher trainers for every school and a full-time repair team that rotated between schools every week. When OLPC failed to supply parts for repairs, they purchased them from Uruguay, which got them directly from the manufacturers.

Overloaded school internet connections brought web-based learning to a halt, and batteries that started out charged drained halfway through class.

But even with these resources, students and teachers struggled with charging, software management, and breakage—the kinds of issues all too familiar to parents and caregivers who suddenly had to facilitate their children's remote education during covid-related school shutdowns. Though OLPC's laptops were built to be rugged and repairable, about 15% of students had unusably broken laptops just one year into Paraguay Educa's project. Many more had laptops with missing keys or dead spots on their screens that made them difficult and frustrating to use. Even students with working devices often forgot to charge

them before class or had uninstalled software teachers wanted to use. Overloaded school internet connections brought web-based learning to a halt, and batteries that started out charged drained halfway through class. Most teachers quickly gave up trying to use the laptops in the classroom, and two-thirds of students had no interest in them outside school either.

Related Story



How schools plan to close the pandemic education gap

Many students fell behind as a result of remote learning. Now, educators are trying to figure out how to catch them up.

Three years later, the proportion of laptops that were unusably broken had risen to well over half, and hardly anybody was using them. Paraguay Educa ran into a problem like one all too many NGOs face: it found it impossible to convince the funders who had enthusiastically bankrolled OLPC's "innovative" new laptops to finance the ongoing costs of maintenance and training. The OLPC project in neighboring Uruguay, in contrast, has enjoyed steady government funding and, as a result, is the only project still running—though it, too, has had difficulties maintaining its infrastructure and making repairs available in remote areas.

Failing to plan for these kinds of ongoing costs—or even worse, proclaiming that *this* time, *this* technology won't need to account for them, a hallmark of Silicon Valley's "disruption" rhetoric—thus further undermined the viability of One Laptop per Child. It also continues to perpetuate technological disparities around the world.

Similar problems have marred other school computer programs. One of the largest is the Los Angeles Unified School District's 2013 handout of 43,261 iPads to students in 47 schools. Mirroring the thinking of OLPC, the district's leadership hoped that these tablets, full of expensive educational software, would close the digital divide in Los Angeles and help lower-income students get the education they needed. And as in many of the OLPC projects, the devices were given out with little long-term support. They soon fell into disuse and disrepair. These results make it clear that without ongoing investments in infrastructure, support, maintenance, and repair—none of which are as exciting to potential donors as new devices—such projects will keep failing to live up to their lofty rhetoric.

The #OaklandUndivided campaign has talked about not just giving out laptops and internet hot spots to students but raising $4 million a year for ongoing maintenance and support. But #OaklandUndivided's press releases have focused almost exclusively on distribution numbers. These numbers are admittedly impressive: by July 2021, 14 months after its launch, the campaign had given out 29,000 laptops and 10,000 wireless hot spots to Oakland students, and the project's news page was full of declarations that it had successfully closed the city's digital divide. At the same time, in a statement to MIT Technology Review, Curtiss Sarikey, chief of staff for the superintendent of the Oakland Unified School District, said that the project is "still in the process of fundraising and building a sustainability model" to ensure its long-term future. Lessons from OLPC suggest this may be the most difficult part.

The individualistic approach

#OaklandUndivided would be wise to be wary of another thread in One Laptop per Child's story: the idea that hardware is the key to education. Nicholas Negroponte expressed this notion clearly in a keynote at the NetEvents Global Press Summit in 2006: he described how OLPC's laptop would replace teachers, who he claimed "might only have a sixth-grade education."

"In some countries, which I'll leave unnamed, as many as one-third of the teachers never show up at school," he asserted without evidence, "and some percent show up drunk." In October 2005, Negroponte told MIT Technology Review, "Technology is the only means to educate children in the developing world."

This kind of rhetoric collapses the many services, opportunities, and social experiences that schools provide—or should provide—into an individualistic experience between a learner and learning materials, where even the teacher is cut out of the process. Moreover, it reflects how the popular press, and many academics, continue to discuss the digital divide only in terms of basic access to an internet-connected computer. Even if these devices and networks are properly maintained, this is only a small part of what is needed to support children's education and well-being.

What is missing in the focus on getting laptops in the hands of children is the social component of learning—a component all too often taken for granted or even disparaged. As a culture, the United States has long loved the heroic idea of children teaching themselves. Movies and stories constantly retell this narrative of scrappy young people pulling themselves up by their bootstraps. These myths are especially common regarding technical knowledge. Even though higher education is the overwhelming norm among computer programmers, and most successful entrepreneurs are middle-aged, the narrative

that circulates in coding boot camps, in Thiel Fellowships for college dropouts, and across the technology industry more generally is that college and even high school are unnecessary for, and might even hamper, technological entrepreneurialism. These myths also feed the "do your own research" narrative of vaccine skepticism, obscuring the significant institutional infrastructure, professionalization practices, and peer review that make scientific findings robust. And it fuels the idea that children can teach themselves anything if only they are given the right tools.

These individualistic narratives invariably smooth over the social support that has always been an important, though unacknowledged, component of learning. Ideally, this includes a stable home environment without housing or food insecurity; a safe community with good infrastructure; and caring, skilled, well-resourced teachers. When covid-19 shuttered schools around the world throughout 2020 and, in many areas, into 2021, the work that schools and teachers did for students suddenly fell to parents and caretakers, and it became apparent that having a working laptop and internet was only one step toward learning. The youngest students in particular needed full-time supervision and support to have any hope of participating in remote classes. Parents, who were often also juggling their own jobs, struggled to provide this support. The results were stark. Millions of parents (especially mothers) dropped out of the workforce for lack of child care. Low-income children, without the benefits of private schools, tutors, and "learning pods," quickly fell months behind their privileged peers. Rates of child depression and suicide attempts soared. The stress of the pandemic, and the existing social inequities it accentuated, clearly took a toll on students—laptops or no.

To understand the importance of social support, we can also look at what students do with their laptops in their free time. In Paraguay Educa's OLPC project, where two-thirds of students did not use their laptops even when it was very well supported, those who did were most interested in media consumption—even when OLPC designed the laptops to make these kinds of uses more difficult. Other projects, including LA Unified's iPad rollout, have seen similar results. On the one hand, it's wonderful that kids were able to

make the laptops fit their existing interests: with guidance, these kinds of uses can help lead to meaningful learning experiences. On the other hand, there is evidence that when laptop programs are not well supported, disadvantaged children can fall even further behind as the computer becomes more of a distraction than a learning tool.

The singular focus on access creates the sense that if children fail to learn when they ostensibly have all the tools they need for success, it is nobody's fault but their own.

Outside forces can exacerbate the problem: in OLPC projects in Latin America, for example, multinational corporations such as Nickelodeon and Nestlé were eager to advertise to children on their new laptops. Branded educational technology platforms and automated monitoring tools are common today. While corporations' encroachment into schools is nothing new, surveillance and targeted advertising on devices meant for learning is deeply troubling.

Oakland Unified School District's Sarikey says hardware is "one of many critical parts of getting to educational equity," and that #OaklandUndivided has also included "culturally responsive tech support, investment in planning for city wide broadband," and partnership with the district's teachers. But it is hard to avoid messaging that places the emphasis on hardware. In May 2020, for example, Ali Medina, now executive director of the Oakland Public Education Fund administering the #OaklandUndivided campaign funds, stated that "having a computer and internet access empowers our children to thrive academically during this pandemic and beyond, and boosts economic and health outcomes for their families."

Along the same lines, in 2012 Negroponte wrote in the Boston Review that "owning a connected laptop would help eliminate poverty through education … In OLPC's view, children are not just objects of teaching, but agents of change." Such statements discount the critical role various institutions—peers, families, schools, communities, and more—play in shaping a child's learning and identity. Most crucially, this individualistic framing implies that if change fails to materialize, it is not the fault of the schools or economic conditions or social structures or national policies or infrastructure. The singular focus on access creates the sense that if children fail to learn when they ostensibly have all the tools they need for success, it is nobody's fault but their own.

Trojan horse

In OLPC's early days, Negroponte often described the project as a Trojan horsethat would give children opportunities to develop into free thinkers independent of the institutions around them. In 2011, even in the face of mounting evidence that OLPC was failing in its mission, he doubled down, claiming that children would be able to teach themselves to read and code with tablet computers literally dropped from helicopters. Here, as in the press coverage of #OaklandUndivided, the focus was clearly on giving out machines, with an implication that the rest—learning, success, transformation—would follow.

But just as the Trojan horse episode did not end well for Troy, OLPC's laptops diverted potential resources from reforms that could have bigger impact (even those as basic as introducing working bathrooms and living wages), and ultimately reinforced myths about what it takes to close the digital divide. And that was for *in-person* instruction. The remote schooling that 2020 required all around the world compounded all the problems OLPC faced and made it painfully clear that closing that divide will require more than just laptops and internet connections. What is really needed is the same robust social safety net so crucial in overcoming many other types of inequities.

Morgan Ames is author of The Charisma Machine: The Life, Death, and Legacy of One Laptop per Child. *She is an assistant professor of practice in the School of Information at the University of California, Berkeley*.