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**One Laptop Per Child (OLPC) XO-1**



Short Description: The OLPC XO-1 is very innovative device that nevertheless raises serious issues about technology and social responsibility. It is included in the collection primarily as a warning against technological hubris, and the fact that no technologies are neutral from a social-cultural perspective.

Bill Buxton’s Notes

## Introduction

I have this computer in my collection as a reminder of the delicate relationship between object and purpose, and how no matter how well one does on the former, it will likely have no impact on making a wanting concept achieve the stated (and even valid) purpose any better. I include it in the collection as a cautionary tale of how the object may help sell a concept, regardless how ill-conceived – even to those who should know better, had they applied the most basic critical thinking.

For consumers, investors and designers, its story serves as a cautionary reminder to the importance of cultivating and retaining a critical mind and questioning perspective, regardless of how intrinsically seductive or well-intentioned a technology may be.

From the perspective of hardware and software, what the One Laptop Per Child (OLPC) project was able to accomplish is impressive. In general, the team delivered a computer that could be produced at a remarkably low price – even if about double that which was targeted. Specifically, the display, for example, is innovative, and stands out due to its ability to work both in the bright sun (reflective) as well as in poorly lit spaces (emissive) – something that goes beyond pretty much anything else that is available on today’s (2017) slate computers or e-readers. In short, some excellent work went into this machine, something that is even more impressive, given the nature of the organization from which it emerged.

The industrial design was equally impressive. Undertaken by Yves Behar’s Fuseproject

Ultimately, however, the machine was a means to an end, not the end itself. Rather than a device, the *actual* mission of the OLPC project was:

… to empower the world's poorest children through education.[[1]](#footnote-2)

Yet, as described by in their materials, the computer was intended to play a key role in this:

With access to this type of tool [the computer], children are engaged in their own education, and learn, share, and create together. They become connected to each other, to the world and to a brighter future.[[2]](#footnote-3)

Hence, making a suitable computer suitable to that purpose and the conditions where it would be used, at a price point that would enable broad distribution, was a key part of the project.

## The Underlying Belief System of the OLPC Project

Since they are key to the thinking behind the OLPC project, I believe if fair to frame my discussion around the following four questions:

1. Will giving computers to kids in the developing world improve their education?
2. Will having a thus better-educated youth help bring a society out of poverty?
3. Can that educational improvement be accomplished by giving the computers to the kids, with no special training for teachers?
4. Should this be attempted on a global scale without any advance field trials or pilot studies?

From the perspective of the OLPC project, the answer to every one of these questions is an unequivocal “yes”. In fact, as we shall see, any suggestion to the contrary is typically answered by condescension and/or mockery. The answers appear to be viewed as self-evident and not worth even questioning.

Those who have not subscribed to this doctrine might call such a viewpoint hubris.

What staggers me is how the project got so far without the basic assumptions being more broadly questioned, much less such questions being seriously addressed by the proponents. How did seemingly otherwise people commit to the project, through their labour or financial investment, given the apparently naïve and utopian approach that it took? Does the desire to do good cloud judgment that much? Are we that dazzled by a cool technology or big hairy audacious goal? Or by a charismatic personality?[[3]](#footnote-4)

To explain my concern, and what this artifact represents to me, let me just touch on the four assumptions on which the project was founded.

## Will giving computers to kids in the developing world improve education?

The literature on this question is, at best, mixed. What is clear is that one cannot make any assumption that such improvements will occur, regardless of whether one is talking about the developing world or suburban USA. For example, in January 2011, The World Bank published the following study:

Can Computers Help Students Learn*? From Evidence to Policy*, January 2011, Number 4, The World Bank. [[4]](#footnote-5)

* A public-private partnership in Colombia, called Computers for Education, was created in 2002 to increase the availability of computers in public schools for use in education.
* Since starting, the program has installed more than 73,000 computers in over 6,300 public schools in more than 1,000 municipalities. By 2008, over 2 million students and 83,000 teachers had taken part.
* This document reports on a two-year study to determine the impact of the program on student performance.
* Students in schools that received the computers and teacher training did not do measurably better on tests than students in the control group. Nor was there a positive effect on other measures of learning.
* Researchers did not find any difference in test scores when they looked at specific components of math and language studies, such as algebra and geometry, and grammar and paraphrase ability in Spanish.
* But report also notes that results of such studies are mixed:

*Studies on the relationship between using computers in the classroom and improved test scores in developing countries give mixed results: A review of Israel’s Tomorrow-98 program in the mid-1990s, which put computers in schools across the country, did not find any impact on math and Hebrew language scores[[5]](#footnote-6). But in India, a study of a computer-assisted learning program showed a significant positive impact on math scores[[6]](#footnote-7). One thing researchers agree on, more work is needed in this field*.

Before moving on, a search of the literature will show that these results are consistent with those that were available in the literature at the time that the project was started. The point that I am making is not that the OLPC project *could* not be made to work; rather, that it was wrong to assume that it *would* do so without spending at least as much time designing the process to bring that about, as was expended designing the computer itself. Risk is fine, and something that can be mitigated. But diving in under the assumption that it would just work is not calculated risk, it is gambling - with other people’s lives, education and money.

## Will a better educated population help bring a society out of poverty?

I am largely going to punt on this question. The fact is, I would be hard pressed to argue against education.

But let us grant that improving education in the developing world is a good thing. The appropriate question is: is the approach of the OLPC project a reasonable or responsible way to disburse the limited resources that are available to address the educational challenges of the developing world?

At the very least, I would suggest that this is a topic worthy of debate. An *a priori* assumption that giving computers is the right solution is akin to the*,* “If you build it they will come” approach seen in the movie, *Field of Dreams*.

The problem here is that this is not a movie. There are real lives and futures that are at stake here – lives of those who cannot afford to see the movie, much less have precious resources spent on projects that are not well thought through.

## Can that improvement be accomplished by just giving the computers to the kids without training teachers?

Remarkably, the OLPC Project’s answer is an explicit, “Yes”.

In a TED talk filmed in December 2007, the founder of the OLPC initiative, Nicholas Negroponte states[[7]](#footnote-8):

*“When people tell me, you know, who’s going to teach the teachers to teach the kids, I say to myself, “What planet do you come from?” Okay, there’s not a person in this room [the TED Conference], I don’t care how techy you are, there’s not a person in this room that doesn’t give their laptop or cell phone to a kid to help them debug it. Okay, we all need help, even those of us who are very seasoned.”*

Let us leave aside the naïvete of this statement stemming from the lack of distinction between ability to use applications and devices *versus* the ability to create and shape them.[[8]](#footnote-9) A failure of logic remains in that those unseasoned kids are part of “us”, as in “we all need help”. Where do the kids go for help? To other kids? What if they don’t know? Often they won’t. After all, the question may well have to do with a concept in calculus, rather than how to use the computer. What then?

No answer is offered. Rather, those who dare raise the serious and legitimate concerns regarding teacher preparation are mockingly dismissed as coming from another planet!

Well, perhaps they are. But in that case, there should at least be some debate as to who lives on which planet. Is it the people raising the question or the one dismissing the concern that lives in the real world of responsible thought and action?

## Can this all be accomplished without any advance field trials? Should one just immediately commit to international deployment of the program?

As recently as September 2009, Negroponte took part in a panel discussion where he spoke on this matter.[[9]](#footnote-10) He states:

*I'd like you to imagine that I told you "I have a technology that is going to change the quality of life." And then I tell you "Really the right thing to do is to set up a pilot project to test my technology. And then the second thing to do is, once the pilot has been running for some period of time, is to go and measure very carefully the benefits of that technology."*

*And then I am to tell you that what we are going to is very scientifically evaluate this technology, with control groups - giving it to some, giving it to others. And this all is very reasonable until I tell you the technology is electricity. And you say "Wait, you don't have to do that!"*

*But you don't have to do that with laptops and learning either. And the fact that somebody in the room would say the impact is unclear is to me amazing - unbelievably amazing. There's not a person in this room who hasn't bought a laptop for their child, if they could afford it. And you don't know somebody who hasn't done it, if they can afford it.*

*So there's only one question on the table and that's, “How to afford it?” That's the only question. There is no other question - it's just the economics. And so, when One Laptop Per Child started, I didn't have the picture quite as clear as that, but we did focus on trying to get the price down. We did focus on those things.*

Unfortunately, Negroponte demonstrates his lack of understanding of both the history of electricity and education in this example. His historical mistake is this: yes, it was pretty obvious that electricity could bring many benefits to society. But what happened when Edison did exactly what Negroponte advocates? He almost lost his company due to his complete (but mistaken) conviction that DC, rather the AC was the correct technology to pursue.

As with electricity, yes, it is rather obvious that education could bring significant benefits to the developing world. But in order to avoid making the same kind of expensive mistake that Edison did, perhaps one might want to do one’s best to make sure that the chosen technology is the AC, rather than DC, of education.

A little more research, and a little less hubris might have put the investments in Edison and the OLPC to much better use.

But the larger question is this: in what way is it responsible for the wealthy western world to advocate an untested and expensive (in every sense) technological solution on the poorest nations in the world?

If history has taught us anything, it has taught us that just because our intentions are good, the same is not necessarily true for consequences of our actions.[[10]](#footnote-11)

Later in his presentation, Negroponte states:

*… our problems are swimming against very naïve views of education.*

With this, I have to agree. It is just whose views on education are naïve, and how can such views emerge from MIT, no less, much less pass with so little critical scrutiny by the public, the press, participants, and funders?

In an interview with Paul Marks, published in the New Scientist in December 2008,[[11]](#footnote-12) we see the how the techno-centric aspect of the project plays into the ostensible human centric purpose of the project. Negroponte’s retort regarding some of the initial skepticism that the project provoked was this:

“When we first said we could build a laptop for $100 it was viewed as unrealistic and so 'anti-market' and so 'anti' the current laptops which at the time were around $1000 each," Negroponte said.

"It was viewed as pure bravado - but look what happened: the netbook market has developed in our wake." The project's demands for cheaper components such as keyboards, and processors nudged the industry into finding ways to cut costs, he says. "What started off as a revolution became a culture."

Surprise, yes, computers get smaller, faster, and cheaper over the course of time, and yes, one can even grant that the OLPC project may have accelerated that inevitable move. And, I have already stated my admiration and respect for the quality of the technology that was developed.

But in the context of the overall objectives of the project, the best that one can say is, “Congratulations on meeting a milestone.” However, by the same token, one might also legitimately question if starting with the hardware was not an instance of putting the cart before the horse.

Yes, it is obviously necessary to have portable computers in the first place, before one can introduce them into the classroom, home, and donate them to children in the developing world. But it is also the case that small portable computers were already in existence and at the time that the project was initiated. While a factor of ten more expensive than the eventual target price, they were both available and adequate to support limited preliminary testing of the underlying premises of the project in an affordable manner.

That is, before launching into a major - albeit well-intentioned – hardware development project, it may have been prudent to have tested the underlying premises of its motivation.

Here we have to return to the *raison d’être* of the initiative:

… to empower the world's poorest children through education

Hence, the extent to which this is achieved from a given investment must be the primary metric of success, as well as the driving force of the project. Yet, that is clearly not what happened. Driven by a blind Edisonian belief in their un-tested premise, the project’s investments were overwhelmingly on the side of technology rather than pedagogy.

Perhaps the nature and extent of the naïve (but well-meaning) utopian dream underlying the project is captured in the last part of the interview, above:

Negroponte believes that empowering children and their parents with the educational resources offered by computers and the Internet will lead to informed decisions that improve democracy.

Indeed, it has led to some gentle ribbing between himself and his brother: John Negroponte - currently deputy secretary of state in the outgoing Bush administration and the first ever director of national intelligence at the National Security Agency.

"I often joke with John that he can bring democracy his way - and I'll bring it mine," he says.

Apparently providing inexpensive laptops to children in the developing world is not only going to raise educational standards, eradicate poverty, it is also going to bring democracy! All that, with no mention of the numerous poor non-democratic countries that have literacy levels equal to or higher than the USA (Cuba might be one reasonable example). The words naïve technological-utopianism come to mind.

I began by admitting that I was conflicted in terms of this project. From the purely technological perspective, there is much to admire in the project’s accomplishments. Sadly, that was not the project’s primary objective. What appears to be missing throughout is an inability to distinguish between the technology and the purpose to which is was intended to serve.

My concern in this regard is reflected in a paper by Warschauer & Ames(2010).[[12]](#footnote-13)

*The analysis reveals that provision of individual laptops is a utopian vision for the children in the poorest countries, whose educational and social futures could be more effectively improved if the same investments were instead made on more sustainable and proven interventions. Middle- and high-income countries may have a stronger rationale for providing individual laptops to children, but will still want to eschew OLPC’s technocentric vision. In summary, 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.*

There is a delicate relationship between technology and society, culture, ethics, and values. What this case study reflects is the fact that technologies are not neutral. They never are. Hence, technological initiatives must be accompanied by appropriate social, cultural and ethical considerations – especially in projects such as this where the technologies are being introduced into particularly vulnerable societies. That did not happen here,

The fact that this project got the support that it did, and has gone as far as it has, given the way it was approached, is why this reminder – in the form of this device – is included in the collection. And if anyone ever wonders why I am so vocal about the need for public discourse around technology, one need look no further than the OLPC project.

Device Details

Company: One Laptop Per Child (OLPC) | Year: 2007 | Original Price (USD): $199.00

Degrees of Freedom: 2

Dimensions (L x W x H): 242 x 228 x 30 (mm)

Key Words

Primary: Computer

Secondary: Laptop, Touch Pad, Slate, Keyboard

Links

* <http://one.laptop.org>
* <http://olpc.com/>
* <http://www.ted.com/talks/nicholas_negroponte_on_one_laptop_per_child?language=en>
* Hachman, M. (April 9, 2012). Study: OLPC Fails Students as a Tool for Education. PCMAG.com: <http://www.olpcnews.com/about_olpc_news/goodbye_one_laptop_per_child.html>
* <http://www.pcmag.com/article2/0,2817,2402756,00.asp>
* Cristia, J.P., Ibarrarán, P., Cueto, S., Santiago, A. & Severíe. (2012). [Technology and Child Development: Evidence from the One Laptop per Child Program](https://microsoft-my.sharepoint.com/personal/bibuxton_microsoft_com/Documents/Buxton%20Collection/Collection/Shot/OLPC%20Laptop/OLPC_IDB_Working_Paper.pdf). *IDB Working Paper Series No. IDP-WP-304*. Washington: Inter-American Development Bank. (Also available [here](C://Users/Surface%20User/OneDrive%20-%20Microsoft/Buxton%20Collection/Collection/Shot/OLPC%20Laptop/OLPC_IDB_Working_Paper.pdf).)
* Kraemer, K.L., Dedrick, J. & Sharma, P. (2009). [One Laptop Per Child: Vision vs. Reality](https://microsoft-my.sharepoint.com/personal/bibuxton_microsoft_com/Documents/Buxton%20Collection/Collection/Shot/OLPC%20Laptop/Kraemer_OLPC_CACM.pdf), *Communications of the ACM*, 52(6), 66–73. (Accessible [here](http://portal.acm.org/citation.cfm?id=1516046.1516063&coll=DL&dl=GUIDE&CFID=18268716&CFTOKEN=14097594).)
* Huppatz, D. J.(2011) [Roland Barthes, Mythologies](https://microsoft-my.sharepoint.com/personal/bibuxton_microsoft_com/Documents/Buxton%20Collection/Collection/Shot/OLPC%20Laptop/Design_and_Cullture_3_1.pdf), *Design and Culture*, 3:1, 85-100.  
  <https://www.tandfonline.com/doi/abs/10.2752/175470810X12863771378833>
* Warschauer, Mark & Ames, Morgan (2010). [Can One Laptop per Child Save the World’s Poor?](https://microsoft-my.sharepoint.com/personal/bibuxton_microsoft_com/Documents/Buxton%20Collection/Collection/Shot/OLPC%20Laptop/Intl_Affairs_OLPC_Save_Poor.pdf) *Journal of International Affairs*, 64(1), 33-51.
* <https://www.youtube.com/user/OLPCFoundation>

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| **Image** | **File Name** | **Caption** |
|  | OLPC\_0779.JPG | Front view of open OLPC XO-1. |
|  | OLPC\_0782.JPG | Close-up of the OLPC XO-1’s water and dustproof keyboard and touchpad. |
|  | OLPC\_0784.JPG | Close up showing OLPC XO-1 game-control buttons in relationship to screen, keyboard and touchpad. |
|  | OLPC\_0786.JPG | Another close-up of the OLPC XO-1’s keyboard and touchpad also showing touchpad’s “mouse” buttons. |
|  | OLPC\_0787.JPG | View of the OLPC XO-1 with display folded back in slate position. |
|  | OLPC\_Study\_IDB\_Working\_Paper.jpg | Cover page for: Cristia *et al*. (2012). *Technology and Child Development: Evidence from the One Laptop per Child Program*. (Click on image to access document.) |
|  | OLPC\_Kraemer\_CACM.jpg | Cover page for: Kraemer et al. (2009). *One Laptop Per Child: Vision vs. Reality. (Click on image to access* document.) |
|  | OLPC\_Intl\_Affairs\_OLPC\_Save\_Poor.jpg | Cover page for: Warschauer & Ames (2010). *Can One Laptop per Child Save the World’s Poor?*  (Click on image to access document.) |
|  | OLPC\_Design\_and\_Cullture\_3\_1.jpg | Cover page for: Huppatz (2011) *Roland Barthes, Mythologies.* (Click on image to access document.) |

1. <http://one.laptop.org/about/mission> [↑](#footnote-ref-2)
2. Ibid. [↑](#footnote-ref-3)
3. To be fair, questions and criticism were publicly raised. For example, see Bruce Nussbaum’s essay, Is Humanitarian Design the New Imperialism? In Fast Company: <http://www.fastcodesign.com/1661859/is-humanitarian-design-the-new-imperialism>. But from my perspective, such commentary was too rare, and reasonable, as opposed to dismissive, responses to it were even more rare. [↑](#footnote-ref-4)
4. <http://siteresources.worldbank.org/EXTHDOFFICE/Resources/5485726-1288802844934/brochure.pdf> [↑](#footnote-ref-5)
5. Angrist, J. and Lavy, V. (2002) New Evidence on Classroom Computers and Pupil Learning. *Economic Journal*, 112, pp. 735-765. [↑](#footnote-ref-6)
6. Linden, L., Banerjee, A. and Duflo, E. (2003), Computer-Assisted Learning: Evidence from a Randomized Experiment, *Poverty Action Lab Paper No. 5*, October. [↑](#footnote-ref-7)
7. <http://www.ted.com/talks/nicholas_negroponte_on_one_laptop_per_child_two_years_on.html> [↑](#footnote-ref-8)
8. If this statement was generally valid, one might assume that the hardware and software developed by the project was created and debugged by kids, rather than trained professionals. [↑](#footnote-ref-9)
9. <http://www.olpctalks.com/nicholas_negroponte/nicholas_negroponte_lessons_learned_and_future_challenges.html> [↑](#footnote-ref-10)
10. Kraemer, K.L., Dedrick, J. & Sharma, P. (2009). One Laptop Per Child: Vision vs. Reality, *Communications of the ACM*, 52(6), 66–73. <http://portal.acm.org/citation.cfm?id=1516046.1516063&coll=DL&dl=GUIDE&CFID=18268716&CFTOKEN=14097594> [↑](#footnote-ref-11)
11. <http://www.newscientist.com/article/dn16304-one-laptop-per-child-ready-for-version-20.html> [↑](#footnote-ref-12)
12. Warschauer, Mark & Ames, Morgan (2010). Can One Laptop per Child Save the World’s Poor? *Journal of International Affairs*, 64(1), 33-51. <https://www.jstor.org/stable/24385184> [↑](#footnote-ref-13)