

Phone vs. Laptop

Which Is a More Effective Tool for Development?

Iqbal Quadir, the founder of Grameenphone, and Nicholas Negroponte, the founder of One Laptop per Child, discuss the role of technology in development.

Q. If we assume that technology will help bring the benefits of the modern world to developing societies, we can also assume that the resources to bring a full complement of that technology to poor countries probably don't exist. Both laptops and cell phones have proven to have dramatic effects on populations. Which offers more of a benefit?

Quadir. Having struggled to bring cell phones to poor communities since 1993, I of course have a biased opinion. I would say cell phones bring greater benefits. There are several reasons why. Prominent among them is the fact that voice communications do not require literacy and are thus more egalitarian and more inclusive. While cell phones are natural devices for networking, their inclusiveness gives rise to a profound network effect. The second important reason is that people find an immediate payback through enhanced communications, which leads to a willingness and capability of paying for cell phone services. Connectivity is productivity. This phenomenon changes the economic ground realities and produces greater traction for phones. Their benefits proliferate, organically.

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The question suggests that an absence of a full complement of technology is one of the challenges. The large number of units is a way to mitigate this challenge. For example, cell phone infrastructure in poor countries did not exist, but it emerged through the economies of scale. We should not just worry about technology, but how the technology is sustained and how an ecology around it can develop. The points I made above speak to how cell phones, through their immediate payback, give rise to their own ecologies. Entrepreneurs emerge to sell handsets, charge batteries, repair devices, and find ways to supply electricity. We shouldn't just think about technologies and the benefits they bring. We need to think about how they should self-sustain. The third reason is that all digital technologies become cheaper and more powerful over time, leading cell phones to increasingly do what computers can do anyhow. In fact, you should see cell phones as connected computers. Over time, this will become even more apparent than it already has been, say through today's iPhones.

Negroponte. Which is more important: health or education? I used to ask my father whether brakes were more important than steering wheels. To compare cell phones to laptops has a similar ring (pun intended). Connectivity is key. It is akin to good health in that without it the world is further compromised. There is no question that a connected world is a better one. The wireless infrastructure that has grown up is truly amazing in reach, growth, and pricing, all of which will get better and better.

Learning is many things, one of which includes reading. Another is the ability to control, create, and collaborate. Books have sizes for reasons. Keyboards have a size, too. Surely we are not going to force children into literary expression with their thumbs. A laptop is a window, a contemplative experience, nomadic not mobile. The cell phone is a point of contact, a burst medium, interruptive in both a good and bad sense. It is a lifeline in any sense. The device itself, however, should not be confused with connectivity. Laptops need to be connected too. Would I want an unconnected laptop over a connected cell phone? No; no more than I would want to be driving a car with brakes and no steering wheel.

Quadir. I very much agree with Nicholas that connectivity is like good health; once you are healthy, you can pursue education.

In other words, once the ground realities are more favorable, education follows. Udaia Kumar, the founder of SHARE, India's second-largest microfinance firm, put it this way: "If there is hunger and ignorance, which one will you address first? On the other hand, once a family is well fed, the parents automatically send their children to schools." Centuries ago, the same sequence occurred in England. In the late 12th century, about one-third of students at the University of Paris were English. When, around that time, foreign students and scholars were expelled from the University of Paris, they settled in Oxford, giving rise to the university there. For two centuries before, England had experienced a considerable boost in agricultural output and families, which could then afford education, sent their kids to

France. In other words, extra income has led to the demand for education that later gave rise to educational institutions. This is repeated in the American experience as well. Improved technologies led to higher productivity of the farms, giving rise to both the ability to pay for schools and a reduction in the need for children to work in the fields. Since Nicholas and I are both involved with MIT, we might want to remind ourselves that MIT, arguably the best known university in America with an emphasis in engineering and science, was established in 1865, after, not before, the industrial revolution in America. We need to identify what leads to the demand for education.

I fully support introducing any device that would open children's minds to the vast world of knowledge. In fact, my own education has played a critical role in everything I have achieved. Every child is better off getting an education. However, education's role in extending an individual's abilities can be quickly extrapolated to the conclusions that a whole country, if educated, would improve dramatically. This theory has led to the top-down introduction of education throughout the developing world, without necessarily resulting in a corresponding increase in prosperity. In fact, low-income countries of today, as far as the school enrollments are concerned, are doing better than the United States did in 1890, a time when the United States was well past its industrial revolution.

If education is somehow made available while the ground realities remain unfavorable for economic growth, education is abused, unused, or simply used to escape from the country. The majority of American immigrants from Africa are highly educated. Most corrupt government officials are educated. When the educated class in a poorer country makes up a large part of a corrupt bureaucracy that strangles the country's development, education is obviously used to gain a greater share of limited resources rather than to grow them. The real damage of the myth that education would unleash economic progress prevents us from identifying the actual roadblocks.

The real roadblock, I believe, is the economic stagnation of the common people in poor countries, rendering them vulnerable to their educated class who are more capable of exploiting them. This is why it is helpful to introduce technologies that have immediate payback to the common people. Their increased economic strength can turn the vicious cycle into virtuous one. And to this cause, cell phones, with their immediate payback, can and do make a contribution. The organic emergence of cell phone networks throughout the developing world is a testament to this immediate payback, a payback that strengthens the economic highway on the ground over which education, jobs, health care and other goods will arrive.

Negroponte. There is nothing "immediate" about primary education. It is a long-term investment. Surely we would not stop teaching reading and writing while we deploy cell phones. Suggesting that technology should not be used for learning would be likewise absurd.

I doubt anybody will propose providing six- to ten-year olds with cell phones instead of books. Think of the laptop as a book. It happens to be many other things as well, but just as a book, the benefit is undeniable. What has happened is that a question (perhaps gratuitous) about cell phones versus laptops has, in a way, devolved into adults versus children.

Quadir. There appears to be a clear distinction between what Nicholas and I are saying. He is for long-term investment for children through laptops. And I am for immediate payoff for adults through cell phones.

If poor countries need to climb a tall tree, they should get their energy initially from the low-hanging fruit. The trick is to discover the low-hanging fruit to be able to climb higher.

Actually, we are both arguing for long-term solutions. First of all, neither of us denies the usefulness of cell phones and laptops. Second, I am arguing for the environment in which children grow. It is this question about environment that brings the adults and their productivity into the picture. If the parents are better off financially, they will be able to offer a better home environment, and thus that is the best means for providing a better education for children.

No one in the world cares more for children than their parents. In fact, data shows that even illiterate slum-dwelling parents in India and Africa can decipher the qualitative difference between public schools and privately-run schools. According to [Newcastle University' professor] James Tooley's extensive research, slum-dwelling parents choose private for-profit schools over free-of-cost public schools. This is the case not because parents want to spend money, but because poor parents are willing to sacrifice for the well-being of their children.

Another piece of data illuminates why children's environment affects education. Michael Kremer, along with two other economists, found that treating children for intestinal worms in Kenya lifted school performance more than updating the school's curriculum. Indirectly influencing the environment has a greater effect than a direct effort on the school.

Consider the following analogy. Let's say that we had an opportunity to improve education by providing a poor village with one of the following: better plant seed for farms or a planetarium. The latter has a far more obvious educational function, but the former would enable farming families to increase their crop yields and thus their income would rise. With rising incomes, families could put more emphasis on the education of their children and be less beholden to the desperation and short-term thinking characteristic of dire poverty. Here, I would

argue, the indirect benefits of supporting the overall environment where learning takes place is a more effective long-term approach to improving life chances and educational prospects. In fact, the short-term payback from the seeds facilitates the longer-term solution. Overall, both adults and children benefit, both in the short and long terms.

I think it is also important to avoid separating technology from how it will actually fit into a community. The two are inextricably linked. If we “air-drop” technology from above, it is less likely to take hold and spread naturally. That the cell phone penetration is far higher than the Internet penetration in developing countries demonstrates that it is a technology that sets roots much more easily in poor countries.

If we are going to sow the seeds of progress, we should not choose the seeds just by the quality of flowers we wish to produce. We must also consider the soil in which the seeds will germinate and grow.

Negroponte. Hard to imagine how advocating child-centric learning, seamless education, and connecting the most remote and poorest children is akin to a planetarium. Nobody argues for crummy soil or poor infrastructure.

The best testimonial of bottom-up and viral growth is the Internet itself. Bringing children into that equation is crucial and will change the role of children, engaging them in the change, making them the agents of change. Think of it this way. The cell phone industry is moving slowly from voice to data. During this transition, Internet access is costly, clumsy, and sometimes impossible. In countries where we have done One Laptop per Child, the kids use Skype, having never seen a telephone. Asynchronous and high-latency communications are very inexpensive. Several hundred children can share a megabit per second. People shipping voice technology do not understand that.

I love the growth of cell phones. As a long-standing board member of Motorola, I have followed it carefully. But I also see an industry glued to average revenue per user, counting minutes of voice, and uncertain about data. By contrast, those who invented WiFi, the computer community, have brought a far more viral communications medium, one that can be built by the people, for the people.

Quadir. Perhaps an anecdote can illustrate my point. I once ran into a barber in Bangladesh who, after confronting the exorbitant up front cost of renting a

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street front store, abandoned the idea of renting space for his barbershop. Instead, he purchased a cell phone and a motorbike. He used the phone to schedule appointments with his clients and rode to their homes. He was able to increase his fees for the convenience of in-home service. Customers also saved time. The barber was able to serve a larger area with a greater customer loyalty. It is through these and countless other examples that economic empowerment takes hold for people in poor countries, who can then make their own choices to increase possibilities for prosperity for future generations.

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While laptops are an important learning tool, the economic realities—despite Nicholas’s efforts to reduce their costs—limit their distribution. Cell phones, on the other hand, get widely dispersed because of their immediate economic payback. Their scale enables greater utility and creativity, ultimately leading to factors like improved education, enhanced health care, and others to organically emerge. Today there are at least one billion cell phones in the poorest countries. If each of these phones increases economic activity by one dollar per month after paying for the services—an extremely conservative estimate—the poorest people of the world have increased economic wealth by \$12 billion per year, without any

further help for distributing this wealth. If only one percent of this money is dedicated to buying laptops, they can buy \$120 million worth of laptops every year on their own.

In introducing a technology, we cannot ignore economics. Within that economic calculation, we cannot ignore an important resource already well distributed and caring for children: the brains of parents.

Negroponte. Cell phones are low-hanging fruit. In parallel with picking, it is time to plant trees of the future. That is not by asking kids to explore literature on a postage-stamp-sized display or write with their thumbs. Likewise, it is not to make parents rich enough to send their kids to private schools. It is by enabling children to engage in collaborative, creative, joyful, self-empowered learning.

Something else is happening. Ten years ago, most students at MIT and Harvard wanted to start companies and make money. Today, those students want to be social entrepreneurs. They are more interested in changing the world and doing good.

In that same spirit, I will argue that Iqbal is self-projecting too much, as a great entrepreneur himself. There is no question about the need to drive economies, the importance of cell phones, or the need for telecommunications infrastructure. The correlation between wealth and connectivity clearly indicates the importance. I am fond of telling ministers of communications around the world that they are in fact ministers of education.

But we also have to take a deep breath and remember that education is a human right and civic responsibility. Paper books make no sense whatsoever. China and Brazil both spend over \$20 per year per child on books. OLPC's XO laptop now has one million free books available on it. When we ship 100 laptops into a village, each can have 100 different books. That means 10,000 in the village, without any connectivity other than to each other. Sure, they are also connected to the Internet, but not very fast and by no means in a way to browse. Our laptops currently cost \$187 and we have shipped over 100,000 of them, free, to countries like Rwanda, Haiti, Ethiopia, Mongolia, Afghanistan, and Palestine.

Are you really going to give those kids cell phones instead? If your answer is yes, you have got to be joking.

Quadir. I agree with Nicholas; cell phones have turned out to be the low-hanging fruit. This was far from obvious when I started in 1993, when about four percent of Americans had cell phones. I registered Gonofone (meaning "phones for the masses" in Bengali) in New York in 1994 to memorialize my dream for the masses in poor countries getting phones. Gonofone was the launchpad for what later became known as GrameenPhone. If poor countries need to climb a tall tree, they should get their energy initially from the low-hanging fruit. The trick is to discover the low-hanging fruit to be able to climb higher.