

Computers in schools - what should be done? The pros and cons of “one laptop per child”.

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The One Laptop per Child, OLPC, the “\$100 laptop”, was launched at the World Summit on the Information Society, WSIS, in Tunis in November 2005, as the solution to the world’s education problems, as a way of meeting the UN’s Millennium Development Goals on primary education. Since that launch many eminent people have supported the idea, and a number of countries have committed to buying the laptop in lots of 1 million laptops. Now just 2 years later preproduction versions of the laptop are in trial use, and mass production is about to commence. Should Nepal, or other developing countries, adopt the OLPC? If not, are there other ways of including computers in schools that might be more appropriate?

The OLPC and it’s advocacy

Technically the OLPC is very impressive, it is extremely rugged with no moving parts and a strong case, and is very efficient in its use of electricity so that it can run off solar power or through occasional hand-cranking. The keyboard is small, ‘child sized’ though easily usable by adults. It has in-built wireless, expecting to connect to other OLPCs in a mesh network of peers.

The software is based on Linux, with a much simplified interface to make running the machine easy for children. It comes with a number of educational applications, and the technology for educators to add more educational content, or to translate the content into their own local language.

The official OLPC website, olpc.com, has its leading statement:

"The mission of this non-profit association (One Laptop Per Child) is to develop a low-cost laptop - the "\$100 Laptop" - a technology that could revolutionize how we educate the world's children."

For a fuller description see the paper by Shankar Pokharel, 2007.

The website olpc.com really does not elaborate on exactly how it will revolutionize education, but does point us to the www.olpc.news.com site which leads us to an article posted in June 2007 by an anonymous 'Roland' about Seymour Papert who is described as "the mental father of the education part of OLPC". The article is well worth reading, but with a lot of circumspection. The essential ideas of Papert are that children learn best in the way they learnt before going to school - by exploration, learning from their errors and responding to challenges. These ideas date back fifty years to the social revolutions that swept the US and Europe following the second World War, the Korean war and later the Vietnam war. As well as giving giving birth to the women's movement, multi-racialism, and much else that led to a more equal society, this also gave birth to new approaches to education that were much more child centred, but not necessarily technology centred. Only a very small part of that educational revolution was devoted to using technology, with ideas like programmed learning and the LOGO programming language that Papert invented in 1967. There just wasn't the technology around then, but now that there is, the OLPC aims to embody exploratory learning through interactive multimedia software and access to the internet. But is there any evidence that it works? The OLPC web-sites offer none.

OLPC was conceived by Nicholas Negroponte while still the Director of the Media Lab at MIT. Negroponte is enthusiastic about computers, as can be seen in his book, *Being Digital*, first published in 1995. This book makes a good read, and describes a world that was emerging at that time and has since become real for many rich northerners, very much in line with the mission of the MIT Media Lab. Most significant for us here was his enthusiasm for computer based education, an enthusiasm based upon the advocacy of Seymour Papert, and now embodied in the OLPC.

You might think that we should be able to accept the authority of the former Director of the MIT Media Lab, but regrettably the evidence does not support this, particularly on big and expensive projects. Negroponte is clearly a very capable salesman, for in the 1990s he sold no less than the Media Lab to the governments of both India and Ireland. In exchange for substantial payments for using the "Media Lab" brand, and for advice and help in setting them up, Media Lab Asia was established in Mumbai and Media Lab Europe was established in Dublin. But just a few years later, the Indian government severed ties with MIT though the Indian government still runs the Media Lab in Mumbai, while Media Lab Europe in Dublin has closed down without producing anything significant. Both governments are reputed to have lost significant sums of money - the Irish figure has been reported as 40 million dollars.

Now of course this negative experience does not mean that OLPC is bad - but at least it should make us cautious about acting purely on the assurances of Negroponte. We need to seek other evidence about the value of OLPC.

Balancing Act, the African e-zine (www.balancingact.com) in its Issue 359 on 17th June 2007 had as its top story "One Laptop Per Child starting pilots in South Africa and Nigeria" - an interview with a South African enthusiast Antoine Van Gelder who is still looking for funding, and whose best evidence of success from Nigeria is 100% school attendance and "a lot of smiling kids". It was reported by BBC World on June 15th that OLPC is involved in trial use in Peru involving 250,000 OLPC laptops making this one very large and costly experiment.

So at the moment there is no evidence that OLPC itself helps education, it is too early to know, but surely there must be evidence that other forms of computing help. In particular we must ask why these OLPC computers are not being bought in large numbers in the US.

Evidence about computers in schools

The US has in fact been investing significant amounts of money in computers in schools, to teach children about computers and create in them a level of digital literacy sufficient to cope with the world as it now is, and also to help in enhancing education across all subjects. It has been estimated that 75 billion dollars have been invested over the years so far.

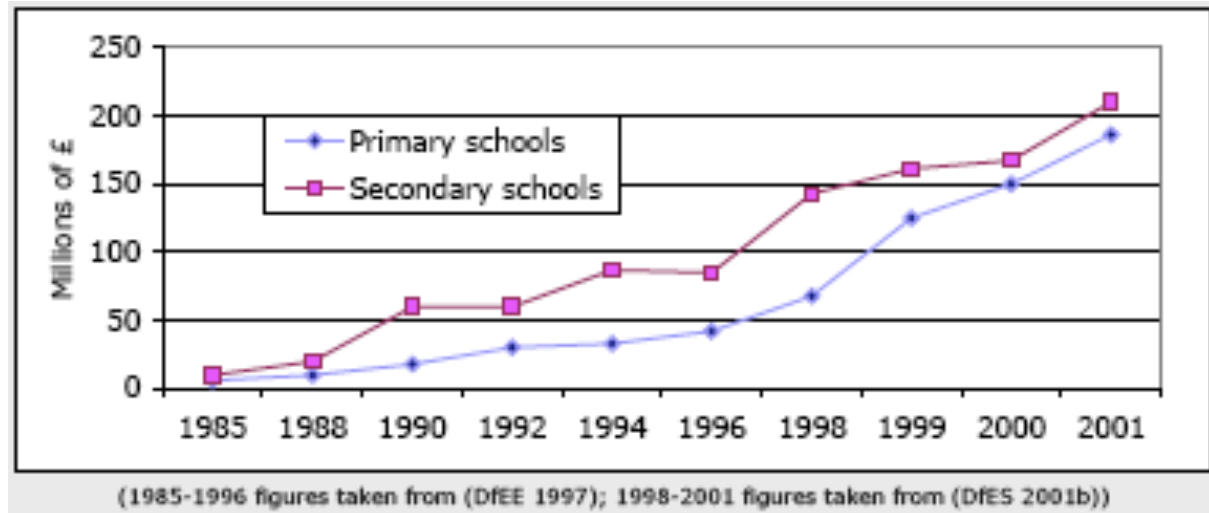
But there have been some people who have doubted the effectiveness of this expenditure. In 2001 Larry Cuban published a book revealingly titled "Oversold and Underused" where he concluded that the huge sums of money invested in hope of transforming teaching and learning had been largely ineffective, and he investigated why. He found that while school teachers may be avid home-users, they are infrequent classroom users. Computers tend to sustain rather than alter existing teaching practices, having the reverse of the effect intended. He concluded that before computers could become effective, the intractable working conditions of teachers, the many external demands made upon them, and the unreliability of the technologies must all first be remedied.

In 2004 Todd Oppenheimer published a much more strident criticism in his book "The Flickering Mind: the false promise of technology in the classroom and how learning can be

saved”, claiming that spending on computers had drained billions of dollars from urgent educational needs, and that the misuse of computers actually damages students. His criticisms were so strong and universal that many other critics of computers in schools found themselves defending the good practices that they had seen.

But isolated good practice does not warrant the widespread expenditure, and the New York Times reported on May 4 2007 that many schools are now dropping computers, troubled by laptop breakdowns and the need to manage the inappropriate use of the computers and the internet, and most damningly that there is "literally no evidence it had any impact on student achievement - none." and "It's a distraction to the educational process."

The UK too has been progressively spending more and more as is seen the following graph.



Then in 2005 the UK agreed a policy “Harnessing Technology. Transforming Learning and Children’s Services”, in part to validate previous spending and in part to encourage spending in areas where investment had not been made. In 2006 BECTA commissioned an evaluation of priorities 2 and 3 of the policy:

Priority 2 Integrated online personal support for children and learners

Priority 3 A collaborative approach to personalised learning activities

and reported (see Twining et al 2006) “the only firm conclusion that can be drawn on the basis of existing evidence is that specific technologies can enhance learning if used in specific ways within particular contexts” and “Try not to talk about ICT. Focus on educational priorities. Be involved with all people who are helping schools develop.” Computers can help education if teachers are trained, lessons prepared, parents involved, and children guided; the use needs child-centred education.

Twining and his colleague Diane Evans had been involved in the evaluation of tablet PCs, which like the OPLC, allow the screen to folded down to lie flat on the desk: “Tablet PCs ... offer significant potential ... not being fully realised.”

Gulek and Demirtas (2005) carried out a longitudinal study in Canada of the use of computers and concluded that there was a “substantial impact of laptop use on student learning outcomes”.

The research findings were summarise for me by Rose Luckin of the University of London Institute of Education in a personal communication as: “they only contribute to learning if teachers, learners and parents are closely involved in the design of their use, if the educational content is very well planned by the teachers, and if the parents are closely involved with their

child's learning”.

These cautious approach of North America and Europe is not matched in Development programmes. The New Partnership for African Development (NEPAD) is planning to instal computers in schools across Africa, starting with demonstration projects in 16 African countries. The aim is to teach ICT skills and enhance education. An early evaluation of these demonstrators found that:

- “a review of ‘best practices’ ... would have been useful” (p2)
- “importance of adopting ICT in their strategic education plans” (p2)
- “community groups are being encouraged, for a fee, to use the school as a learning centre” (p3)
- “Civil society organisations with experience in introducing ICTs in schools should have been welcomed into the partnership” (p4)
- “there was little evidence of integrated use of the technologies to enhance pedagogy” (p5)
- “they can produce their own learning materials.” (p5)

It seems clear that before such programmes are started, a proper consultation of the educational literature, and taking advice from experts like those cited here, would be very beneficial.

Alternatives

What are the positive uses of computers in schools in Nepal? Many organisations have provided schools with computers - for example FIT Nepal has recently installed ten telecentres in government schools, using funds supplied by KOICA; ENRD in Kaski has installed some of their telecentres in schools; Madan Puraskar Pustakalaya within its Bhasha Sanchar project funded by the European Union has installed small networks of four computers set up to work in Nepali in three schools. The Nepal Telecom Authority is currently planning to fund installation in a further 25 schools. These computers enable teachers to prepare teaching materials, and children to use educational programmes and become familiar with computers. Potentially, if internet connections could be established, these computers in schools could be used for schools management, interacting with computers in local District Education Offices and ultimately with the Ministry of Education and Sports - two locally developed proprietary schools management systems were demonstrated at CAN Softech in May 2007, and the open source Schooltool system has been localised to the Nepali language but needs further localisation to fit the way education is organised in Nepal.

An installation of 4 computers using a high-powered central 'server' and cheap recycled 'thin clients' costs 120,000 rupees (\$1,700). The computers have to be transported to the school, and installed, and then the people in the school trained, so that the final cost for the installation comes out at around 200,000 rupees (\$2,800). There are 26,277 schools (MOES figures for 2004) in Nepal, and equipping these with just this very simple network would come to 45 million dollars, with installation and training costs to be added.

Even at this level of provision schools need access to the internet, as well as an electricity supply of reasonable reliability. This infrastructure has not been costed in, since the need for it is common to all forms of use of computers in education.

An even greater potential use of computers and the internet is the development of teachers, to

disseminate the best teaching practices of Nepal to all schools. UNESCO together with MoES has just produced a video and toolkit to help disseminate some of the outstandingly good practice in inclusive education in Nepal. Why not across the internet to all schools. enabling them to ask questions of MoES and to share other good practices with each other? In the UK the first major success story in the 1970s of the then new Open University was the upgrading of the qualifications of school teachers, who made brilliant and highly motivated students. The Open University has helped introduce teacher education programmes in many parts of the world, why not in Nepal using a new schools network?

Other companies have been spurred on by OLPC, and have announced competing full-sized competing offerings. OLPC aspires to be the \$100 laptop, but at the moment costs between \$150 and \$200 dollars. AsusTek from Taiwan has announced a \$200 full-sized laptop. Intel has a Classmate PC offering of around the same price. InkMedia has recently announced a laptop “for well under \$300”. With a laptop each, the teachers could take distance education courses, share practices, develop educational materials, all to the direct advantage of the children they teach. Alternatively, for the same cost, 3 or 4 computers per classroom could be installed - taking the bill to equip every school in Nepal in this fashion to around 75 million dollars. If we want both teachers with laptops and 3 or 4 computers in class rooms it comes to around 100 million dollars.

Now, what about the OLPC proposal? The OLPC groups sell their proposal partly on price (they still say only \$100 even though everybody knows it is around twice that), its robust technology which is most impressive, and its claimed educational advantage. What would it cost for for all children in Nepal to be given OLPC laptops? The MoES website tells as that there are over 6 million school children in Nepal, and at current prices that would require over 1 billion dollars. OLPC would consume the entire educational budget of Nepal for the next 4 to 5 years. Put another way, for the cost of giving every child in a school a laptop each, you could rebuild and modernise the school. As they say in the land the OLPC comes from, this is a no-brainer.

Conclusions

We must conclude that Nepal is better off without OLPC, though some level of school-based computer provision would be worthwhile, as suggested at the start of this article. There is much excellent teaching practice in Nepal, that needs to be disseminated, good teaching that embodies the principles espoused by OLPC is what is needed, but not the OLPC itself.

The one really good thing about OLPC Nepal is that some very able and enthusiastic young Nepali engineers are working on it, localising software from outside and creating new content in Nepali. Now the great thing about all this is that you do not need an OLPC to use this software or view this content - the volunteers have deliberately made this possible. Lets channel this talent into supporting schools in an economically and pedagogically appropriate way.

References

- Cuban, Larry (2001) *Oversold and Underused, Computers in the Classroom*. Harvard University Press
- Gulek, J.C. and H. Demirtas (2005) Learning With Technology: The Impact of Laptop Use on Student Achievement’ *Journal of Learning, Technology, and Assessment* Volume 3, Number 2 · January 2005
- Negroponte, Nicholas (1996) *being digital* Vintage

Oppenheimer, Todd (2004) *The Flickering Mind. Saving Education from the False Promise of Technology*. Random House Trade Paperbacks.

Pokharel, Shankar (2007) 'The One Laptop Per Child project'. In this collection of further reading.

Twining, Peter ; Roger Broadie, Deirdre Cook, Karen Ford, David Morris, Alison Twiner and Jean Underwood (2006) *Educational change and ICT: an exploration of Priorities 2 and 3 of the DfES e-strategy in schools and colleges*. BECTA ICT Research

Twining, Peter and Diane Evans (2005) 'Should there be a future for Tablet PCs in schools?' *Journal of Interactive Media in Education* 22nd December 2005 [jime.open.ac.uk/2005/20]

Websites

olpc.com - the official OLPC site

www.olpc.news.com - news and comments about OLPC

www.balancingact.com - African e-zine

<http://www.moe.gov.np/> - Nepal Ministry of Education and Sports