

What do we know about using new technologies for learning and teaching? A ten year perspective. Digital Divide or Digital Dividend? Postcards from the South



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Transcript

'We firmly believe that the Commonwealth can contribute meaningfully to measures aimed at bridging and closing the digital divide and are resolved to do so. ICTs provide an opportunity for individuals to learn, to grow, to participate more actively in society and to compete more efficiently in markets'.¹

Does this overarching rhetoric adequately capture the cultural specificities and different needs of the Commonwealth Member States? Is the 'digital divide' only about the ownership and use of ICTs? What have we done in the last ten years to deal with the issue of the digital divide and what lessons have we learned? In each 'postcard'-which is open (doesn't require an envelope), informal (unlike an epistle), wide-ranging and brings news from exotic destinations--I will look at three key areas - each a postcard reporting success that travels across the digital divide with major implications for converting that divide into a dividend not just for the few, but for all. These promises of success are i) ICT in Education policy; ii) the emergent Open Education Resource (OER) movement and iii) the impact of technology on encouraging the emergence of the 'new learner'. Finally, these postcards generate some questions which stimulate us to reflect on what responsibility each of us has in converting the digital divide into a dividend.

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But first, what is the digital divide? According to one definition, the digital divide consists of 'differences due to geography, race, economic status, gender and physical ability in access to information through the Internet, and other information technologies and services, as well as in the skills, knowledge and abilities to use information, the internet and other technologies'.² Contrary to the general impression, the digital divide is a complex of various factors social, economic, cultural, and political; it can exist in low and high socio-economic areas; and is not limited only to developing countries.

If we look at the digital divide in geographical terms, in a country like Mozambique, its capital Maputo, will provide high speed connectivity comparable to that available anywhere in the world. Go further into Tete, the province headquarters and you will find ten computers for 4000 students in the largest secondary school. Go further still to the district headquarters and amid the mud huts and the brick barracks in Angonia, the very existence of computers would seem ludicrous. The education authorities are not even thinking of providing computers but of equipping schools with the basic wherewithal to provide livelihoods training to an increasing number of unemployed youth through TVET. In Mozambique then, as in many developing countries, the digital divide assumes an urban-rural aspect.

Does the digital divide have a racial component? After independence, South Africa found itself with four education ministries based on racial elements. In order to redress this, a single ministry (Department of Education) was formed but it was found that many of the teachers in the racially segregated institutions were un/under qualified. One of the first tasks then was to train 30,000 teachers in computer literacy.

Economic status is critical in determining where one is in the digital divide. In a developing country like Uganda with a per capita income of USD 310, how can schools afford to pay USD 250 per month for an internet connection?³

The digital divide is also the gender divide. A World Links study shows that girls cannot stay behind after school hours to access computer labs in Ghana and Uganda.⁴ However, when provided equal access, girls can perform as well as if not better than boys as has been demonstrated by the Hole in the Wall experiment in India.

In both remote rural and urban areas in the developing world, there are hardly any facilities for the physically challenged. In the 16 countries where the NEPAD eSchools demonstration project was implemented, there seemed to be no sign of any special access points for the physically challenged to access ICTs.

It is clear then that the digital divide is not simply a matter of having access to computers and connectivity but is a wider development issue. It is located within larger geo-political trends and often coincides with a country's ranking on the Human Development Index. Developing Commonwealth countries higher on the Human Development Index such as Singapore, Malaysia, Cyprus and Malta are achieving higher success rates in addressing the digital divide, whereas countries lower on the HDI are struggling with basic issues like infrastructure, electricity, appliances and training.

I. POLICY

Without policy, the ICT landscape is the modern equivalent of the Wild West and gunslingers abound fighting each other for power.

N. George

Enabling policies have a major role to play in integrating ICTs into the education sector. Increasingly, developing countries are beginning to invest in policy development as a systematic means of harnessing technology for improving and enhancing educational opportunities. A recent unpublished study entitled *Survey of ICT and Education in Africa*⁵ looks at ICT policy in 53 countries in Africa and is indicative of general trends in the global south. The past decade has witnessed a great deal of experimentation in ICTs in education with financial support from donors and implementation support from NGO's. The focus is changing and increasingly governments are giving priority to policy development and of all 53 countries surveyed, 36 have policy in place, in 12 countries policy is being developed and only in 5 countries there is no process so far.⁶

What does the study indicate?

1. *National ICT policies act as a catalyst for ICT policy development in education.* Of the 48 countries which have a policy in place or are in the process of developing one, 39 have education sector ICT policies and plans in one form or another.
2. *Most policies have been developed in the last five years.* ICT policy development for education has always been a long and complicated process involving multiple stakeholders and years of consultation.
3. *Most ICT/education policies are comprehensive* and include the sub-sectors of the education system. For example, South Africa and Kenya focus particularly on the school sub-sector.
4. *All policies stress enhancing access to ICT tools and connectivity*, developing ICT skills and the importance of teacher training. Some go beyond these basics to stress the need for content development, education portals, and the promotion of indigenous languages by developing content in those mediums.
5. *Policies show differential implementation progress.* Countries higher along the development spectrum such as the Maghreb nations and South Africa have greater ability to implement their policies. In other cases, policies are not implemented, often due to donor dependency.
6. *Public private partnerships are seen as critical in this respect.* Two excellent examples of such regional and continental partnership initiatives are-the Information Society Partnership for Africa's Development (ISPAD) put together by NEPAD through the eAfrica Commission and 5 major ICT companies to implement the NEPAD eSchools Demonstration project and the Kenya ICT Trust Fund.

7. That the *digital divide is also a gender divide* is evident from the differential access to and use of ICTs. Countries such as South Africa, Ghana, Zambia, Kenya, Tanzania and Uganda have some reference to gender equity and women's empowerment in their policies. But in some cases there is no implementation strategy. While Mauritius has no explicit reference to gender in its ICT policy, it does have a dedicated ICT literacy programme targeted specifically for women. The SchoolNets in Africa have been especially proactive in engendering the ICT agenda. SchoolNet Africa documents stories of leading digital pioneers in African education while SchoolNet Namibia publishes a comic magazine with positive female heroes and role models.

What are the key lessons for us?

1. It is necessary to situate ICT/education policies firmly within the overall development policy framework of each country. Such an approach will require liaison and collaboration among different ministries such as education, telecommunications and finance. At the institutional level, ICT policies need similar coordination between and among different academic and administrative departments.
2. Globally, ICT is a large industrial sector with huge investments and strong commercial interests. National governments will have to negotiate appropriate policy frameworks and regulatory mechanisms that will a) inspire confidence in investors and ensure fair returns to them on their investments and b) ensure that their social responsibility is reflected in the establishment of partnerships for sustainable development. Development of ICT infrastructure and its maintenance require huge initial capital investments and implicitly demand recurrent costs that education systems cannot sustain on their own and will not be able to recover from its beneficiaries. National policies on ICT have to provide for the necessary frameworks for cross-subsidisation, multiple sources of funding and long-term recovery of costs.
3. National ICT policies need to be able to underpin well thought out implementation plans that are realistic and sustainable. Though the commercial aspects of ICT industry are all too obvious, they need to be regulated to balance with the larger interests of society such as education and people's empowerment that do not necessarily guarantee a commercial return, A carefully conceived creative system of rewards and recognition, complemented by appropriate disincentives should be part of the regulatory mechanism for the industry.
4. A more proactive approach to gender mainstreaming within the ICT policy that ensures equal and non-discriminatory access to ICT infrastructure and connectivity is required so that girls and women can be empowered to participate in ICT use and application. A World Links study shows that 70% girls in schools in Mauritania get information which their families and society would not normally provide from the internet and they find this liberating.⁷
5. As there is an increasing convergence between ODL and face to face education, it is important to have ICT in Education policies that will provide access to quality education using flexible

delivery mechanisms. This will enable larger numbers of people in the developing world to pursue education and training programmes of their choice at all levels.

6. India is an instructive illustration of how the absence of a coherent policy for the integration of technologies in education results in a failure to serve the cause of education despite the many advances the country has registered in ICT development. India has made remarkable progress in education in ICT; yet it has not done much in integrating technologies in its education system. The country has the infrastructure; it has a dedicated education satellite; a dedicated education channel on its national TV network; an expanding telecom network (one in every five Indians has access to a telephone); and most certainly the trained human capital that can harness all these components to enhance the quality and reach of its education provision to very large sections of its population. The country's decision-makers are still reluctant to force the issue of integration despite the demonstrated capacity of technologies to improve quality, widen access and reduce costs. The fragmented approach of considering telecommunications as a service industry for profit, and education as a social service has certainly not helped. The need for a national consensus on a policy that provides for the processes and frameworks that help both the education and industry sectors is nowhere more evident than in India.

II. A NEW PARADIGM: OPEN EDUCATION RESOURCES

If you have an apple and I have an apple and we exchange these apples then you and I will still each have one apple. But if you have an idea and I have an idea and we exchange these ideas, then each of us will have two ideas.

GB Shaw

The pursuit of excellence has traditionally been an individual enterprise based on competition among academics and institutions. The Open Education Resource movement (OERs) is turning the focus away from competition to collaboration and a search for collective excellence. The OERs refer to open course content, open source software, and free course development and delivery tools. The OER movement has made a long journey in a very short time.

Educational communication in general and didactic transactions in open distance learning systems in particular reached a significant milestone with the appearance of the first on-line course in 1995. In just thirty-five years since 1969, when the British Open University registered its first cohort of students, ODL leapfrogged from the second to the fourth generation. The advent of on-line courses marked a significant shift in the nature of the relationship between the content and the delivery of education/training.

In the mid 1970s we made a distinction between technology *in* education and technology *for* education. The former referred to curricular and instructional design, while the latter to the applications of technology to the process of delivering education, as for example, the use of broadcasts, audio- and video-

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conferences. In the mid-nineties, we came to use tools like WebCT and others that simulate the function of instructional designers. It is here that technology comes in to serve education not only as a tool of delivering it, but also as a device for programming its content for easy and successful assimilation by learners-the *in*- and the *for*-functions of technology in relation to education/training merged for the first time.

Further, in our present work on Learning Objects, we have moved beyond the stage of ICT applications represented by WebCT. Developing learning objects marks an extension of the technology *in* education function. In the first half of the previous century, educational innovators introduced programmed learning⁸ -a teaching item was broken into small bits of information, which could be assimilated easily; each bit was accompanied by a question designed to elicit the 'right' answer; the information and the related question together were called a frame; many frames put together would cover the whole teaching item. Correct answers to the questions were made available elsewhere in the text for the learners to check their answers. These were the earliest attempts in technology in education as well as in the preparation of self-learning study materials. What mainly torpedoed this innovation was the amount of paper required for presenting such materials to the learner, since even a small teaching item would take reams to cover the small frames. Contemporary ICTs have resolved this problem, because computers can accommodate any number of frames and the related meta-data can retrieve them easily for construction, deconstruction and reconstruction for use and reuse.

While we can trace the genesis of the contemporary Learning Objects to the forgotten frames of programmed learning, it is clear that there is a merger of two distinct functions, that of building the content of education/training that is efficiently manageable (from the institutional perspective) and easily assimilated (from the learners' perspective), and that of offering it with facility to anyone, anywhere, anytime. As this movement becomes universal, we move closer to the goals of equity and access.

The last five years have seen tectonic shifts in how technology is being used to close the digital divide. Pioneered by the MIT, the Open Courseware movement, based on the principle of knowledge sharing marks the first generation in which knowledge is seen as our common wealth. The online course materials of the UKOU is the second generation wherein existing self-instructional materials are being put into online format. The third generation is collaborative course development as exemplified by the wikiEducator, a course authoring tool being used to develop materials for the Virtual University for Small States of the Commonwealth (VUSSC). The wikiEducator is emerging as a dynamic and collaborative tool of free content development. In this phase, the focus is shifting from 'this courseware is mine to this courseware is for (open) mining'.⁹ The OER movement is largely based on four principles: i) encouraging mass ownership rather than elitism; ii) acknowledging faith in everyone's inherent capability to self-organise; iii) enlisting amateurs as producers of content; and iv) promoting collaboration for the common good.

At the request of the Commonwealth Ministers of Education, COL has set up the Virtual University for Small States of the Commonwealth (VUSSC). This virtual institution is by, for and of the 32 small states of the Commonwealth. Course materials are being collaboratively developed across the Commonwealth

on the WikiEducator. Teams of academics first come together in a three-week face-to-face 'bootcamp' that builds capacity in instructional design, content creation and the uses of technology. Following this initial training, the teams continue to work together to develop free open content as well as to train other colleagues in the use of technologies.

Some of the key lessons of this initiative have been:

1. 'Ownership' is critical. Once the content has been developed collaboratively, who will use it? COL helped to develop STAMP 2000+ modules for teacher training by facilitating the training of 140 course writers in the SADC sub region but very few institutions in Africa have taken ownership of these materials. The 46 modules are available on the WorldSpace satellite and can be downloaded free but to date have been put to limited use. It is important to develop a clear strategy not only for the development of free content, but also for the delivery of that content and the identification of its potential users.
2. It is important to develop and sustain an interface between the decision-makers and implementers. For the initiative to be sustainable, champions are needed in both the ministries and the implementing institutions. A clear agreement on roles and responsibilities for each participant within a consortium is a key success factor.
3. One of the founders of Wikipedia, Larry Sanger learned that the democratization of information can also degenerate into an egalitarianism which can corrode professional standards and creativity. He has set up an alternative model in the Citizendium which seeks to balance 'public participation with gentle expert guidance'.¹⁰
4. *There are several critical success factors that can contribute to the emergence of a collaborative community.* These are: a) the training of people in appropriate ICT skills, ii) the creation of a critical mass of trained people and c) the existence of a policy that ensures that appropriate processes and frameworks are in place to coordinate, promote and integrate the applications of technologies with the education system.

In the developing world collaborative content development is still in the nascent stages. The Infodev/COL report indicates that there is dearth of documented content in Africa. Further, content is available only in English rather than in the indigenous languages. The OER movement has the demonstrated potential to create communities of practice and enhance capability at both the local and global levels by bringing together different cultures, epistemological traditions and multiple perspectives, However, a key question that arises from the OER movement for Africa is whether the coming together of collaborative communities has a transformative potential or creates further hierarchies and power relationships. Would those who have better access to technology and better English language skills have more power than those who do not?

The challenges are many. First, it is never going to be easy to get all the stakeholders on a common platform since the interests are diverse and often in conflict. Secondly, ICT infrastructure is highly

expensive, and education systems, perennially short of resources even for survival, find it impossible to make the necessary investments to create and develop their ICT infrastructure. Third, donor dependency has harmed rather than helped sustainability.

III. THE NEW LEARNER: A NEW TEACHER?

How much worse will it have to get for these clever chaps to change?

Hills

The nature of the twenty-first century student has changed. Today, half of the world's population of 6.5 billion is under 20. There are two billion teenagers in the developing world alone.

In today's developed world, it is difficult to imagine life without some kind of electronic appliances, whether at work or at home, in education or entertainment, in business or in communication. The question no longer is whether or not ICT plays a part in the ordinary person's life, but to what extent, it has become a part of daily existence. On one side of the divide or the other, we are all inhabitants of the new digital world.

The 'new learner' is a 'digital native', a twenty-something, who takes to technology as a fish to water. This is in contrast to the 'digital migrant'¹¹ the adult who has adopted technology relatively later in life. The digital native is a multi-tasker who can perform several tasks at the same time.

According to Wood and Zurcher, the 'new learner' seeks immediate gratification rather than delayed responses; prefers fun rather than suffering; wants education that is meaningful and relevant to real life and would much rather have social relations and interactivity than isolation.¹²

The 'new learner' may be the adult who needs continuing professional development combined with full-time employment. She would have little time for synchronous instruction. Such an academic *customer* is on the rise in both developed and developing contexts. Traditional universities do offer services such as *evening* and *week-end classes*, but these remain at the peripheries of the system. Makerere University, Uganda runs midnight classes in management and professional disciplines so that the institution is open round the clock and throughout the week.

Then, there is the traditional young learner, who by virtue of her circumstances is forced into a job or a family. In a different situation, perhaps she is the out-of-school teenager, who chooses not to - or lacks the matriculation credentials to join a traditional university. The 'new learner' belongs to a very diverse constituency and has a range of needs that the traditional institution thus far has never known.

The 'new learner' in nine developing countries is expected to receive the One Laptop Per Child (OLPC). The current price of USD 185 will come down to USD 100 by 2009 and USD 50 by 2011. Fifty thousand laptops will be delivered to Ethiopia in the next few months. The OLPC initiative has some basic principles to which the receiving governments must agree: i) the laptops are owned by the children; ii)

unlimited connectivity is provided; iii) each village is saturated before moving to the next; iv) open source software is used.

Ninety percent of all maintenance and repair will be done by the children themselves. Not only has OLPC made learning much more appealing but it also helps children to learn better. Nicholas Negroponte has found that children who can write computer programmes, understand learning and can learn better. Teachers are affected too and the wives of teachers in Nigeria found that the husbands were working later than ever in the schoolroom. By putting learning in the hand of the child and opening up the world, this initiative can become a major digital dividend.

So what of laptops for the new teacher? Pakistan has entered a deal with Intel to provide a 20 GB memory laptop for under USD 300 to teachers who can take a loan and repay an easy instalment of USD 10 per month to the local bank.

But the provision of laptops for everyone may not be the only alternative. Mobile telephony is the fastest growing field in the developing world. In the last ten years, the most exponential growth in ICTs has been in the area of mobile telephony. By 2010, there will be 2.5 billion users in the developing world.¹³ What implications does this have for the way we teach and learn?

The recent study at the University of Pretoria (UP) could be indicative. The Unit for Distance Education offers distance learning programmes to about 14000 teachers mostly located in rural South Africa. While only 1% of these have access to email, 99% own cell phones. The UP first began by using cell phones to provide administrative support by sending SMS's to remind students of important dates such as i) contact classes; ii) examination registration; and iii) notification of study material despatch. This not only cut postal costs and saved time but had a positive impact on 58 % students who registered for and attended contact classes in time as opposed to the expected figure of 40%. Two years later, the cell phones were used to send academic messages as well. These included an opportunity for students to i) pose their academic questions and receive feedback via SMS; ii) take multiple-choice quizzes; iii) receive inputs regarding specific academic resources needed for specific tasks and iv) listen to mini-lectures via interactive-voice response technology. Through this personalised intervention from the university, students are more motivated than before and are satisfied with both the administrative and academic support provided.¹⁴

This means that the 'new teacher' must unlearn many of her existing practices. The focus is now on i) creative and innovative thinking rather than memorisation; ii) using different ICT tools rather than relying only on the printed text; iii) encouraging multiple perspectives rather than the instructor-identified "right" answers; iv) helping learners construct knowledge for themselves, and most importantly v) sharing best practice.

The new teacher will not be tenured faculty but associate staff from a range of professional backgrounds. S/he will have contractual appointments, and will not necessarily be aligned to any one educational institution. Indeed, s/he may be working for more than one institution. Rather than deliverers

of instruction, they will provide *academic facilitation*. Competent facilitation will require expertise in a particular subject/discipline, communication skills, and distance and on-line teaching techniques. A typical academic will be a sound scholar, an excellent communicator, a versatile instructional designer, a computer expert and an effective mentor/guide. How many of us as teachers can meet the requirements in this description?

Most academics are 'digital migrants', while the many they teach are 'digital natives'. If the digital migrants think learning is work and the natives are convinced that learning should be fun, how will the twain ever meet? Teachers face a radical challenge as they prepare to meet the new learner. As access to communities becomes increasingly networked, we see yet another shift taking place. Are we moving from 'constructivism' to 'connectivism'?¹⁵

Yet there is a change at every level. A student in Senegal noted: 'Our teachers because of our participation in collaborative projects and Internet access, have to do a better job. They carefully prepare their lessons before coming to class. We challenge them: we are no longer passive receivers of information. We analyse and question things'.¹⁶

Technology has caused a revolution in the ways we teach and learn but there can be no real revolution unless the faculty change how they teach.¹⁷ There is an urgent need to a) research the 'new' learner; b) equip the 'new' learner to be an agent of change and c) to transform pedagogic practice.

IV. TOWARDS A DIGITAL DIVIDEND FOR ALL

1. The last ten years show that we have moved through three generations of technology development: the first was a top-down approach in which governments decided the best course of action such as the India Pan-Africa network, an arrangement between the Indian government and the African Union to provide free satellite technology to Africa for higher education and professional development in health. The focus was primarily on technology. The second generation can be exemplified by the first phase of the African Virtual University (AVU), which brought academic content from North American universities to African institutions-the emphasis here was on sharing content-and was ultimately not sustainable for various reasons. The Virtual University for Small States of the Commonwealth (VUSSC) marks the third generation of this development, which places its emphasis on people and learning rather than technology and could be a more sustainable model. These far-reaching changes within a short span of a decade show how quickly paradigms change and how responsive we need to be if the divide is to be converted into a dividend.
2. As we have seen there have been many interventions in the last ten years to bridge the digital divide. But building bridges can only be a temporary solution for the bridge does not eliminate

the chasm. So we either need a new vocabulary or new strategies to close the gaps. What will these be? What have been our successes and our failures?

3. In a 2004 World Bank workshop on the digital divide in Africa, the key conclusion was 'training, training, training'. But training and capacity building by itself is not enough. It must be situated within the macro-economic developments within a country and lead to job creation and empowerment. Globally, we do have the technology to change the world but do we have the politics and the political will to do so?
4. The digital dividend will have to be achieved through partnerships and innovation. The government of Karnataka in India contracted the National Institute of Information Technology (NIIT) to equip and maintain school computer labs and to provide an instructor during school hours. In return the provider was given a five-year contract and could use the school facilities after hours. This has been a win-win situation for the schools, for the providers as well as for the community, within which 1400 jobs were created.¹⁸ The dividend is all too obvious. Whose responsibility is this? The government's? Development partners? That of civil society? Or all of the above?
5. Finally, there has been a great deal of south-south collaboration in recent times. How can the 'north' and the 'south' collaborate to complement each other's strengths to promote quality education for all? What strategies can we devise to ensure that OERs are effectively used? How can we convert, in concrete terms, the digital divide into a digital dividend?

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