

ICTs in Education: Can Digital Dividend Replace Digital Divide?



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Introduction

The themes of this WITFOR [World Information Technology Forum] conference include Building the Infrastructure and Education and I shall concentrate on those two themes this morning. My title is ICTs in Education: Can Digital Dividend Replace Digital Divide. This session also highlights collaboration between international intergovernmental organisations. I am giving a practical example of such collaboration because I have prepared this keynote address with three co-authors.

First is Susan D'Antoni of UNESCO's International Institute for Educational Planning. Through the virtual forum that she has organised on virtual universities and similar events that she is planning for the future, Susan is helping to create a global community of practice in online learning.

Stamenka Uvalić-Trumbić, my former colleague at the UNESCO Secretariat in Paris, heads UNESCO's unit that deals with reform, innovation and quality assurance in higher education. Most recently she has guided the joint work of UNESCO and the OECD on the development of guidelines for the quality assurance of cross-border higher education.

The third co-author is Paul West, a South African colleague at the Commonwealth of Learning who guides our work in knowledge management. One of Paul's objectives is to help people in developing countries use online learning to expand the scope, scale and impact of education and training. For this reason he is particularly interested in discovering how the range of technologies that are used in developing countries can contribute to the learning experience.

The four of us are united by a common aim, which is to promote development through learning. Eradicating the grinding poverty that scars much of our contemporary world is not a simple phenomenon. In many places the notions of information or knowledge societies seem like mirages - or at best realities on the distant horizon.

Specifically we shall focus on online learning, or eLearning, which is currently a major manifestation of ICTs in education. We shall look at government interest in eLearning; barriers to eLearning that require a coordinated response; recommendations for coordination between partners; and what educational leaders can do to promote eLearning.

The fundamental question we shall try to answer appears in our title. Can digital dividend replace digital divide in the developing world? We shall focus particularly on post-secondary education: not because it is the most important level of education but because success there will spread through the education system. So how can we make eLearning a bridge across the digital divide?

Growing Demand for Post-Secondary Education

The major global trend in post-secondary education is growth in demand. UNESCO's 1998 World Conference on Higher Education (WCHE) brought four thousand participants from 182 countries together for a comprehensive policy debate. Education ministers were joined by other stakeholders and called for a radical renewal of higher education (UNESCO, 1998). A follow-up conference in 2003 found that even the startling changes thought necessary in 1998 underestimated the task ahead (UNESCO, 2003).

For developing countries the challenge begins with demography. Forecasts indicate a population of 7 - 8 billion people in the developing world in 2025 - more than half of them young people. We have already crossed the threshold of 100 million post-secondary students worldwide, and numbers are forecast to grow to 125 million before 2020. But this may be too modest. China, the USA, India, Russia and Japan already have 53.1 million students between them.

Today there is a huge discrepancy between the proportions of people in developing and developed countries who have access to higher education. 40-50% age participation rates (APRs) are becoming the norm in developed countries, whereas they remain below 5% in some sub-Saharan African countries.

Yet all indications support the statement that "...at no time in human history did the welfare (or poverty) of nations depend in such a direct manner on the quality and outreach of higher education systems and institutions" (UNESCO, 2003). The citizens of developing countries want post-secondary education, and their governments see it as essential for closing the gap with the rich world by tackling the challenges of globalisation.

In this context new providers of post-secondary education are proliferating. They include new campuses of existing institutions, IT companies delivering courses and certificates, for-profit providers and corporate universities. Some of these operate across national borders, sometimes by eLearning.

However, in a recent study we found that cross-border post-secondary education is, for the moment at least, a negligible phenomenon in developing countries (Daniel, Kanwar and Uvaliæ-Trumbiæ, 2005). In these countries the numbers studying courses delivered across borders are tiny compared to those studying with local institutions.

This means that developing countries must rely mainly on home-grown solutions to expand post-secondary education. Can eLearning provide the radical reconfiguration of the key variables of capacity, quality and cost that is needed? That is the key question. Can digital divide become digital dividend - and, if so, how?

We should link this to the wider challenge of improving the quality of life of the world's poorest people. Education can learn from the findings of C.K. Prahalad and his colleagues about serving those at the bottom of the world economic pyramid (Prahalad, 2004). Addressing themselves to multi-national corporations, they draw attention to the four billion poor people in the world who aspire to better lives.

They urge corporations to look at their globalisation strategies through a new lens of inclusive capitalism since, 'for companies with the resources and persistence to compete at the bottom of the world economic pyramid, the prospective rewards include growth, profits and incalculable contributions to humankind' (Prahalad & Hart, 2002).

What would be the implications of expanding post-secondary education amongst these four billion people? An APR of 35% within this group would yield 150 million additional post-secondary students, far more than total current enrolments worldwide. Post-secondary education would, however, face the same challenges as business in serving this clientele. It would require 'radical innovations in technology and business models'; changing from the ideal of "bigger is better" to 'an ideal of highly distributed small scale operations married to world-scale capabilities'; and 'helping people improve their lives by producing and distributing products and services in culturally sensitive, environmentally sustainable and economically profitable ways' (Prahalad & Hart, 2002).

Is eLearning the Solution?

Does eLearning fit this bill, or is it just another over-hyped but underperforming attempt to connect technology to teaching and learning?

In their study of the experience of eLearning in American post-secondary education Zemsky and Massy (2004a, 2004b) observed that eLearning has not fulfilled the grandiose promises of its promoters. They urged promoters of eLearning to talk less and do more, in particular to effect the fundamental changes in pedagogy without which eLearning will not achieve its potential.

The potential of the technology, most especially the growing availability of Internet connections, is clear. Such communication links are steadily changing the way that poor villages in the developing world function. The question is whether we can organise ourselves effectively to take advantage of this technological opportunity. Here the most promising innovation is the concept - and the developing reality

- of open educational resources (OERs). The term refers to open course content, open source software and tools. Essentially OERs apply to teaching and learning the basic principle of sharing that underpins academic research.

Distance educators have talked for years about sharing courseware. The reality has disappointed. One reason is the 'not-invented-here' syndrome that is a feature of academic institutions. Other reasons limiting courseware exchange have been a lack of collaborative mechanisms, copyright and the sheer difficulty of sharing and adapting learning materials that are not in digital formats.

I hope that the Southern African Regional Distance Education Centre (SARDEC), based here in Botswana at BOCODOL will provide a mechanism for collaboration and the Commonwealth of Learning is proud to support it.

Open educational resources could overcome the other difficulties and also reduce concerns that the course was 'not invented here'. OERs make possible the sharing and adaptation of courseware on a more equal basis. Re-usable learning objects are the equivalent of the published articles on which subsequent researchers can build. If providers of post-secondary education can successfully combine connectivity and shared courseware into a new business model they could massively increase access.

eLearning: the Four 'A's

What is required for this to happen? Potential learners ask four questions about the usefulness of eLearning (D'Antoni, 2002).

First, is it accessible? For eLearning to have any impact it must be accessible to the learner. In extending eLearning to developing countries the first priority is provide ready Internet connectivity.

The second imperative is to make OERs more accessible and to expand their numbers. The OECD and UNESCO are promoting accessibility by mapping OER initiatives in various countries. UNESCO's IIEP supports an international Community of Interest on free and open source software for eLearning, and is currently planning a new forum on OERs, specifically on open content.

This will link interested parties in both developing and developed countries in order to explore and discuss concerns and constraints associated with the provision and use of open content and propose ways to address them. The interaction and supporting documents will be organized for easy review on the IIEP web site.

Easy access to information about available open content or re-usable learning objects is essential if they are indeed to be re-used. The Commonwealth of Learning has tackled the problem of accessing multiple learning object repositories (LORs) when connectivity is poor and surfing from one repository to another is time-consuming.

The software is a combination of eRIB, a product of Canada's Canarie eLearning project, and

pakXchange, an open source product from the private sector. The outcome is free open source software with database and security features that enable the creation of multiple libraries of learning content, multiple contributing institutions and multi-level security. This can be downloaded the COL website at www.col.org/lor.

Is it appropriate?

Once eLearning is accessible, does it offer appropriate material? Does the content fit learners' needs and does it respect their cultural context? Few subjects and delivery methods are universally appropriate but OERs do allow learning materials to be made appropriate by local adaptation. Expanding the provision of OERs requires building up the confidence of users. Those who seek to adapt re-usable learning objects for their own teaching must have the experience of finding good and appropriate material rapidly and conveniently.

Increasing the volume, appropriateness and quality of OERs also requires a solid understanding of copyright, where the general rule is that "you can give away or sell what you own, but do not give away things you do not own". COL is working with Commonwealth experts to provide synthesised information on copyright in education to governments, institutions and the World Intellectual Property Organisation (WIPO). The aim is both to encourage copyright compliance and to overcome barriers to using content for educational purposes. Developing countries are spending millions of dollars needlessly on copyright clearances because they are unaware of the educational exemptions that exist. At COL we are alerting them to the ways that they can save money perfectly legally. Information on this is available on COL's website at www.col.org/copyright.

Is it accredited?

The third question is accreditation. In cross-border eLearning accreditation is a key concern. Accreditation in the country of origin is one indicator of quality and provides some consumer protection. However, learners' own countries must recognise the credential for it to be useful. What impact, if any, will OERs have on quality and accreditation?

Can the quality of eLearning be assessed using criteria already in use or does it need new models and approaches? This is a simple but important question. A survey of quality assurance in the mega-universities - the large distance teaching universities with more than 100,000 students - (Daniel, 1999) revealed that they were applying the same criteria to eLearning as those used for their other distance learning courses (Jung, 2005). This suggests that quality criteria can be valid across the spectrum of post-secondary education.

What can we do at the international level to promote trust and confidence in post-secondary eLearning? How can we develop the skills of quality assurance amongst providers and regulators and empower learners to assess the quality of eLearning, particularly for cross-border provision? The UNESCO-OECD Guidelines on Quality Provision in Cross-Border Higher Education are an encouraging response to these questions because they promote mutual trust and international cooperation in quality assurance and the

recognition of qualifications.

They reinforce the key principle that providers and receivers of post-secondary education share the responsibility for its quality. To protect students the guidelines call for partnership between six stakeholders: governments, institutions and their staff, quality assurance agencies, student associations, professional groups, and qualification-recognition bodies (www.unesco.org/education/amq/guidelines).

The essential condition for making this partnership successful is dialogue based on shared access to transparent and reliable information. The guidelines stress the role of national priorities as the basis for post-secondary education policy in cross-border education in general and eLearning in particular.

To help build capacity in quality assurance UNESCO is developing a Higher Education Open and Distance Learning Knowledge Base that makes available regional databases on post-secondary open and distance learning in Africa, Asia/Pacific and the CIS and Baltic States. These databases are linked to a search tool on the main UNESCO site using the Commonwealth of Learning's Knowledge Finder and a common taxonomy with the Global Distance Education Network (GDENet).

In addition, a decision-support tool addresses key questions about quality assurance in open and distance learning (www.unesco.org/odl). The development of this decision-support tool was itself a nice example of working across borders to provide education through technology. The technical work was done by the South African Institute for Distance Education while the content was provided by the Indonesia's Universitas Terbuka working in electronic consultation with a virtual advisory board (Varoglu, 2005).

Is it affordable?

Finally, to come to the fourth 'A', is eLearning affordable to the many? If the opportunities eLearning offers are not affordable in local contexts, digital dividend will not replace digital divide. Can OERs make the difference? They certainly have the potential to do so, but it all depends on whether the current enthusiasm for OERs is sustained amongst both providers and users - and on whether the two groups quickly merge into an OER community of mutual give and take.

Answers to these four questions, these four 'As', are vital because not everyone welcomes eLearning. The Maghreb countries recently dismissed all forms of eLearning as not providing quality education and excluded them from regulatory frameworks for the recognition of qualifications in Algeria, Tunis and Morocco (UNESCO, 2005).

But despite such holdouts expanding higher education through ICTs and on-line provision is a global trend (Uvaliæ-Trumbiæ & Varoglu, 2003). Developing countries like Tanzania, Kenya, Nigeria and Iran see it as a way to meet growing demand while reducing the brain drain. Some governments and international organisations link eLearning to the development agenda, as in the cyber universities in South Korea, the Nigerian University Network and other virtual university initiatives. One such is the Virtual University for Small States of the Commonwealth (see:www.col.org/vussc), which was requested during the dotcom frenzy of 2000 by the ministers of education of the 33 small countries that are part of the 53-

member Commonwealth. Fearful that their countries did not have the critical mass to be players in the world of eLearning, they called for small states to collaborate, through coalitions of the willing, to develop and share learning objects. This is a good example of the potential of eLearning to promote national and regional development. I am delighted that Botswana will be taking part.

What are Governments' Interests?

Let me now look at eLearning from governmental and institutional perspectives. What are the interests of governments in eLearning and their role in advancing it? What are the interests and roles of institutions?

Governments are attracted to eLearning, as to other applications of technology in post-secondary education, by the hope that it can increase access by promoting the three 'E's of efficiency, effectiveness and economy. In recent decades, for example, developed and developing countries alike have greatly increased participation in post-secondary education through the creation of open universities.

These institutions, like eLearning, combine technology with new forms of organisation (Daniel, 1999). ELearning could extend this revolution further because digital materials are much cheaper to copy, distribute, adapt and share than other formats. Even more importantly, well-designed eLearning can make the interactive aspects of teaching and learning, which are essential to the success of most students, more cost effective.

ELearning can support campus teaching as well as distance learning. This is important for developing countries because, although access to the Internet may be limited on campus, off campus it is often non-existent. Academics can put study material online for learners to access and, since institutions usually provide computer labs, students need not have their own computers. As one African academic said, "I did not have time to teach this in class, so I put it online and told the students to access it there. After they had studied it online we discussed it in class and saved time".

Institutions can also improve learner support by creating online discussions to give more time for debate and study. Moving some activities online and out of the classroom reduces demands on buildings, creating efficiencies in the use of plant that governments like to see.

What is Government's Role?

What should governments do and not do to further their interest in eLearning? Experience suggests that governments and their agencies should not operate eLearning programmes except for direct governmental functions. Governments' role is to create the context in which eLearning can flourish. This is a crucial task in developing countries, where the context for eLearning is usually unfavourable.

What are the barriers to eLearning that governments and institutions could surmount? We see five. First, bandwidth is limited because of telecommunications legislation and telecom company monopolies. Second, institutions do not usually buy bandwidth jointly in bulk. Third, institutions use bandwidth inefficiently through lack of policy and poor management. Fourth, the lack of affordable Internet

terminals off campus calls for accessible kiosks and study centres. Fifth, institutions may be unduly 'copyright-shy' through ignorance about copyright laws, their countries' copyright exemptions and ways of using copyrighted materials legally.

The issue of access to telecommunications handicaps developing countries. Their institutions can pay over 100 times more for Internet access than in the industrialised world. An individual in an OECD country may have a 500-kilobit home Internet connection, whereas in a developing country a 500-kilobit line is all that an institution can afford for sharing by hundreds of users.

Telecom companies add to the problem when they buy bandwidth from overseas Internet service providers. They could, for example, buy a broadband line connection and over-sell it to multiple clients - still promising each client a dedicated broadband connection. Making good Internet bandwidth affordable to institutions is an absolute necessity for any country aspiring to quality post-secondary education. Governments should ensure that their telecoms suppliers provide it. Expensive connectivity handicaps institutions and countries. This is a particular problem in here in Africa.

What should institutions do?

Maximising the benefits of bandwidth

Institutions can tackle some issues themselves. When they club together to buy bandwidth in bulk the price drops. In South Africa, for example, a small non-profit entity buys bandwidth for nearly 50 institutions at once. To gain this kind of negotiating power institutional leaders and IT departments must cooperate.

There is never enough bandwidth and solving the problems that we just listed will take time. Meanwhile, institutional managers should have policies for using bandwidth sensibly by defining acceptable use. These cover the kinds of data that may be transferred to and from the institution and the types of websites that may be visited. Such policies are an essential stepping stone to technical strategies that maximise the benefits of bandwidth day and night. To guarantee bandwidth during the day for research and study, management must focus on those functions and avoid usage for which there are alternatives. Demand for bandwidth is usually very low at night so it can be used other tasks.

If daily information use follows a pattern, information from particular websites can be "pre-cached" to local servers for use the next day. The more the information requirements can be predicted, the more the load on Internet lines during the day can be reduced, releasing bandwidth for those tasks such as Internet searches that cannot be cached.

Learners in developing countries do not usually have computers and Internet links at home. They go instead to Internet kiosks or cafés where access is very expensive in terms of local salaries. Students are unlikely to connect for long enough, at the low Internet speeds available, to gain much information. Governments could subsidise kiosk prices and institutions should provide Internet access on campus over extended hours from early morning until late at night.

Institutions also face important non-technical issues in developing eLearning. In 2003 UNESCO's International Institute for Educational Planning (IIEP) conducted a series of case studies on the creation of virtual universities on six continents (www.unesco.org/iiep/virtualuniversity).

They highlighted four issues that become particularly sensitive as institutions develop policies on open educational resources.

Institutional Development and Organisation

Face-to-face teaching institutions may find it difficult to develop general policy on eLearning because their existing policies and procedures were conceived for a different learning environment. However, although distance-teaching institutions may already have a general policy framework that is appropriate for eLearning, they may find developing policy on OERs a serious challenge.

For a large, high-quality distance-teaching institution like the UK Open University to make its self-instructional materials freely available could create a clear threat to its core business. Could the UKOU make OERs available to developing countries without giving competitors in the industrialised world the opportunity to compete against it with its own materials?

This is a tough question for institutional leaders. Only experience can really provide an answer. Whilst there is some evidence that making the texts of books freely available on the Web increases sales of the printed versions, we need more research on this issue for eLearning.

Management

Then there are some direct challenges of management. A brand new institution can develop its organisation and management around an eLearning business model. Existing institutions starting from an older business model may be wise to create a distinct entity for eLearning within existing structures. Either way institutions must be ready to invest without expecting immediate returns. Training in eLearning is vital for both faculty and technical staff, especially in developing countries where it presents such an important opportunity.

Training and sound information are particularly important in the choice of learning management systems. Many such systems, both proprietary and open source, are being developed. One result is that they are increasingly interoperable, so changing platforms need not mean scrapping previous investments in eLearning materials. However, the choice of a learning management system remains an important decision. COL has developed a [decision support tool](#) to help decision makers make a selection. Determining which learning management system an institution should choose is not COL's role, but this tool can be used by a management team to work through the decision in a systematic way.

Academic Issues

There are various academic issues, beginning with the choice of the right programmes. A feasibility study may help to identify subjects that are in demand and for which eLearning is appropriate. Whatever the subjects chosen, developing, supporting and rewarding the staff involved for creating a broad eLearning curriculum.

eLearning is often touted as student centred. To make this true requires careful planning of student services and student aid. Some services will need to be available continuously (24/7) and developing countries need study centres that students can come to.

National and International Environment

Finally, expanding eLearning has national and international implications. The high cost of developing eLearning argues for national and international partnerships and cooperation in its production and provision. This is what motivated the ministers of education of the small states of the Commonwealth to call for the creation of a virtual university as a framework in which they could work together to create courses and programmes, thus avoiding total dependence on larger states.

Creating the eLearning Revolution

I close by putting the challenge to you. How do we enhance collaboration between partners? What can we do to create and foster the eLearning revolution? The stakes are high. In other sectors ICTs and the Internet have created new business models that have made products and services more accessible by reducing their cost and improving their convenience. How can we effect similar transformations in education? Can eLearning take post-secondary education to the billions at the bottom of the pyramid? What must we do to rise to challenge of the four 'A's and make eLearning accessible, appropriate, accredited and affordable?

Mechanisms for Collaboration

Collaboration needs enabling mechanisms. We identify five.

First, it is invaluable to link the leading institutions and figures in eLearning through virtual forums, such as those organised by the International Institute for Educational Planning. These forums should become a regular series.

Second, some collaborative ventures require external funding. Here we pay a sincere tribute to the Hewlett Foundation, which has funded initiatives in eLearning and open educational resources in an effective and disinterested way, thereby helping to create an international eLearning community.

Third, collaboration in linking together learning object repositories is a natural extension of the vision of open educational resources. The aim, if I may re-order the title of my own institution, is to make learning

the common wealth of the whole world.

Fourth, training in both policy and practice for eLearning is a continuing need and a critical factor in its expansion. There is already evidence that eLearning is liberating for trained faculty in developing countries because what they can create is limited only by their imagination and knowledge, not by their institution's ability to afford imported materials or software licences.

Fifth and finally, as we have already noted, international collaboration is a necessary foundation for quality assurance through such mechanisms as the UNESCO/OECD guidelines on cross-border education and the regional conventions on the recognition of qualifications.

Conclusion

In conclusion, we encourage you to harness your energies to the goals that we have laid out. There is enormous pent-up intellectual creativity among the billions of poor people in the world. Sadly, existing models of post-secondary education have been too expensive and too inflexible to respond to their needs, most especially here in Africa. Surely our aim must be to combine connectivity with open educational resources so as to create a global intellectual commons accessible to the whole of humankind? Thank you

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