Facing the challenges of e-learning initiatives in African universities

Samson O. Gunga and Ian W. Ricketts

Samson O. Gunga was a Commonwealth Research Fellow at the Division of Applied Computing, University of Dundee (United Kingdom), from October 1, 2005 to March 31, 2006. He is the chair of the Department of Educational Foundations, University of Nairobi, Kenya. Ian W. Ricketts is the chair of Assistive Systems & Healthcare Computing, Division of Applied Computing, University of Dundee. Address for correspondence: Dr Samson O. Gunga, Department of Educational Foundations, University of Nairobi, P.O. Box 2074, GPO, 00100, Nairobi, Kenya. Email: gungasamson@yahoo.co.uk. Prof Ian W. Ricketts, Division of Applied Computing, Queen Mother Building, University of Dundee, Dundee, DD1 4HN, Scotland, UK. Tel: +44 01 382 384 153; fax: +44 01 382 385 5; email: ricketts@computing.dundee.ac.uk

Abstract

This paper explores the possibility of bringing e-learning to African universities through collaborative networks of public–private partnerships. It is envisaged that this approach will solve the dual problem of infrastructural barriers and weak ICT policies. As technology is used more in education, the teachers' roles are increasingly integrated with those of support staff, administrators and technical staff. The needs of e-learning environments suggest the viability of multistakeholder networks to share expertise and resolve issues related to training needs. The paper concludes that collaboration networks that include e-learning sponsors, policy makers, telecommunication network service providers and educators are required to solve the problems of online education in Africa.

Introduction

e-Learning has the potential to enable Africa to achieve education for all. As Africa faces a severe shortage of trained teachers, e-learning is increasingly gaining universal acceptance as a viable means of enabling large numbers of students to access education. Although blended learning is ideal for beginners, the eventual advantage of e-learning lies in its capacity to serve both on-campus and distance learning students concurrently. Through Virtual Learning Environments (VLEs), universities are able to collaborate in content development and delivery practices.

Globalisation of knowledge and education

Globalisation of knowledge and alternative ways of acquiring knowledge have provided a system of filters that determines the validity, reliability, meanings and implications of what is learned, how it is learned and subsequently reconstructed. Knowledge based on scientific advancement, environmental maintenance, a healthy lifestyle and social responsibility, for instance, are universally agreed as worthwhile. They can be harnessed and made available to all through e-learning. Many strategic developments in business and industry point towards growth as virtual teams work together in a global network to establish common knowledge.

In education, the rise of virtual and corporate universities that offer competition to conventional tertiary institutions provides an opportunity for what Mason (2003) calls borderless education that crosses the boundaries of both time and space. This has given rise to a redefined setting for learning and teaching, thus changing the future principles, practices, policies and the underlying issues related to knowledge acquisition that define the value, worth, meaning and delivery of educational services.

As knowledge and technology evolve, materials from traditional sources of information and textbooks used in learning institutions become obsolete in a shorter time. Consequently, it is difficult and expensive to adapt them to specific contexts. However, using technology to support the reuse and sharing of educational resources is now possible with interoperability standards maturing in the ICT industry (Koper & Manderveld, 2004). Such efforts do provide an efficient and cost-effective update of knowledge schemes. The purpose of e-learning interoperability standards is to provide standardised data structures and communication protocols for e-learning objects and cross-system workflows. This gives the teacher computer-based materials and provides flexibility for customising, reusing and sharing learning materials. Further, it requires a contextualisation of the teachers' requirements into sharable curricular, lesson and course plans. Arrangements of this kind would lead to a remodelled teacher education framework that integrates pedagogy, technology and content.

Advantages of e-learning

With the increasing integration of computers and the Internet into education, there has been a shift from a centralised classroom-based education towards distributed e-learning courses (Alonso, López, Manrique & Viñes, 2005). The advantages of e-learning stem from its networked environment where rapid updating, sharing of information and instruction are conveniently performed. It promotes a team-learning pedagogy in which the primary focus is to foster a learning environment conducive to group interaction through collaboration and self-learning.

In institutions of higher learning, e-learning is increasingly supported by Course Management Systems popularly known as VLEs. A VLE provides a virtual space where students, staff and other learning support specialists discuss, interact, and share ideas and materials. Online forums can be arranged conveniently, during which the tutor may have a real-time and asynchronous communication with a particular group of

students. The tutor can track students' progress as they engage in online communication and provide feedback and support collaboration through signposting. The teachers' roles change (The Joint Information Systems Committee, 2005) as they become expert questioners rather than providers of answers and designers of student learning experiences rather than providers of content. They provide the initial structure to a student's work, encourage self-direction and remain sensitive to the various learning styles. In this regard, the teacher provides facilities that encourage learners to carry out research in order to 'discover' new knowledge through individualised initiatives and self-designed styles; individual or group tasks are guided by specific milestones. Students construct their knowledge and solve problems as they view topics from multiple perspectives; they become autonomous managers of their learning and devise questions for which they seek answers from the World Wide Web (WWW). The learners, therefore, require the ability to not only self-search for knowledge from the WWW but also the skills to identify relevant knowledge for their specific purposes. Therefore the teachers' role in guidance and counselling of learners is important, as the WWW is a network of both appropriate and inappropriate content.

Rationale for e-learning in African universities

There are many reasons for encouraging e-learning in Africa. According to a study by Prakash (2003), access to education in the developing countries is limited with less than 5% of students in tertiary education compared to the world average of 16%. The demand for education in Africa exceeds the ability to deliver and is not offered to significant portions of the population. This inadequacy of access to higher education in Africa is evident from the number of students who seek universities. For instance, in 2003, Kenya was reported to have sent 12 000 students to foreign universities of which 7,000 went to India and 5,000 went to Europe and the United States (Mutula, 2003). However, African students are beginning to expect education to emphasise the process of learning rather than the content as the 'shelf-life' of information is limited because of rapid innovations (Carroll, 2006). Increasingly, students expect technology to have a significant role in their learning as the demand for courses offered by the African Virtual University (AVU) increases (Juma, 2003a).

Challenges to e-learning provisions in Africa

Most African countries have inefficient ICT-related infrastructure such as electricity, telecommunications, computers and trained personnel. A survey carried out by the AVU revealed that internet connectivity in tertiary institutions in Africa is inadequate, expensive and poorly managed (Twinomugisha, Magochi & Aluoch, 2004). Therefore, the three pillars of the ICT revolution, that is, connectivity, capacity and content, are yet to be realised in Africa.

The average African university has bandwidth capacity equivalent to a broadband residential connection available in Europe, pays 50 times more for their bandwidth than their educational counterparts in the rest of the world, and fails to monitor, let alone manage, the existing bandwidth... . As a result, what little bandwidth that is available becomes even less useful for research and education purposes (Steiner, Tirivayi, Jensen & Gakio, 2005).

The problem in Africa is generally not just the near absence of e-learning programmes but also the inability of students to gain access even to the few that do exist.

At the end of the first 24 months of offering external internationally accredited programs in Africa through its network of Learning Centres at Partner Institutions across Africa, the AVU has recognized the challenges associated with this approach. The model was costly, difficult to scale, economically unviable, did not lead to significant skill[s] transfer and was, in some cases, putting [even] more pressure on the physical facilities at African institutions (Murray, 2005).

In an attempt to overcome some of these problems, the AVU centre at Kenyatta University is designed so that students present themselves at the learning centre to follow the courses. The AVU aims to utilise the Kenyatta University model to enhance the capacity of partner institutions to deliver their own programmes in Open, Distance and e-Learning modes in addition to the traditional residential programmes (Murray, 2005). This is expected to encourage commitment by partner institutions to make the AVU centres autonomous and responsive to changes in e-learning innovations.

Understanding the nature of e-learning as a remedy to technophobia
VLEs present both threats and opportunities for institutions (Britain & Liber, 1999). Threats are experienced by those who adhere to traditional 'certainties' while change agents see opportunities for increased efficiency. Studies dealing with the relationship between technology and society fall into one of two categories: technophilia and technophobia. The latter views technology as a dehumanising process while the former sees it as the solution to all human problems.

Technophobia invokes a wide range of negative emotions such as anxiety, incompetence, fear, stress and nervousness. In developing countries, the introduction of computerised systems in organisations may not be viewed positively unless sensitisation programmes precede their implementation. The fear of losing jobs through redundancy as a result of computerisation process is a common phenomenon. However, as the workforce realises that proficiency in computer operations also leads to one's personal development, resistance to the introduction of computers is reduced.

...the technophobes are most likely those who did not grow up using a computer.... Their personal aversion and anxiety about computers may be due to many reasons. They may like what they are used to doing and [do not wish] to change. They may feel embarrassed to be surpassed by people who are much younger and less experienced.... They may not want their awkward efforts to learn the new technology... subject[ed] to public scrutiny. They may feel that it is too late in their lives to learn something completely new and different.... They may be afraid of breaking a complicated and expensive piece of equipment (Soong, 2002).

Technophobia slows down innovations when the workforce is not willing to accept the new responsibilities for the change to take effect. Some of the steps towards solving the problems of technophobia are: (1) sharing information through seminars and workshops; (2) providing meaningful and sustained support to help individuals to identify and overcome their fears and (3) creating a friendly learning environment and rewarding people's efforts through mentoring.

Workers' perspective

Computers are used for everyday jobs that require a lot of analysis and other human-like thinking. Tasks such as generating letters and the routine distribution of information that previously was distributed on paper can now be performed via computers. Computers continue to take on more of the repetitive work on which peoples' employment was based, and this creates fear in the unskilled workforces that dominate developing countries. These workers see computers negatively as devices that expose them to possible redundancy (Orazem, Vodopivec & Wu, 2005). The perceived job insecurity creates emotional and psycho-social problems that have far-reaching implications upon job performance (Vidgen, 1997). A mindset guided by fear cannot participate meaningfully in making innovations and therefore, it is important to utilise the Soft Systems Methodology (SSM) to resolve issues that pertain to workers' perception of their welfare. SSM is a qualitative approach in systems analysis that examines the role and significance of new developments in an organisation to employees and clients (Wells, 2006). It is useful in situations where the issues for examination are unclear and variable. In this regard, it contributes to the sustenance of workers' self-esteem and assurance, both of which are crucial to the enhancement of work output.

Teachers' and students' perspective

An e-learning that encourages the sharing of educational resources is modelled on peer collaboration defined as the use of online strategies in which students learn with and from each other without the immediate intervention of the teacher. A meaningful collaboration requires an acquaintance with VLE. Students will use it when they know why it is necessary and how it will benefit them (Davies, Ramsay, Lindfield & Couperthwaite, 2005). They need to know how to play their roles in a collaborative interaction by understanding the capabilities of the VLE facilities and the kinds of activities that its tools support.

Research shows that teachers and learners prefer the blended learning approach, which mixes the traditional face-to-face teaching with online collaboration (Motteram, 2006). To produce a fruitful blend, a criterion ought to be used to identify the range of possible components that are necessary. Generally, a collaborative blend brings cohesion to the components and learners by providing face-to-face, electronic tutoring and mentoring facilities (Clark, 2003). The blend is determined when the desired content and learning outcomes have been clarified. In blended learning environments, students have the opportunity to listen and think more during sessions whenever they are aware that VLE materials can be used later in creating learning notes. They can, therefore, spare time to ask questions and work in a more active learning environment without worrying about missing salient points or essential explanations. Through peer learning, they focus on student-led workshops, team projects and student-to-student partnerships culminating in the acquisition of communication skills rather than the acquirement of facts.

International support for e-learning in Africa

There are a number of activities indicative of interest by local and international communities seeking to utilise e-learning technology to improve access to education. Governments and educational institutions look at e-learning as one option that can be exploited to achieve the important millennium goal, which is 'education for all' (Delamonica, Mehrotra & Vandemoortele, 2004). Attention is focused on areas that are perceived to improve access to education and economic empowerment. Various groups have endeavoured to set an agenda for online education. In the year 2005, the G8 group of rich nations announced debt relief and aid initiatives for African nations. These actions were seen as giving priority to socio-economic and educational improvement in Africa (Williams, 2005). In the same year, African governments showed a new vision both individually and by working together through the African Union and its New Partnership for Africa's Development (NEPAD) programme. Other efforts have encouraged a collaboration between African universities and the Open University in the United Kingdom (UK) (Rammel, 2005).

The role of the AVU in the empowerment of African universities

The AVU is an intergovernmental organisation whose mission is to increase access to educational resources throughout sub-Saharan Africa. It has over 57 learning centres in 27 African countries working to support economic development by employing modern telecommunications technology (African Virtual University, 2005a). Some of the AVU partner institutions that are actively engaged in offering online computer science courses include Addis Ababa University, Ethiopia; University of Cape Coast, Ghana; Ghana Institute of Management and Public Administration, Ghana; Kwame Nkrumah University of Science and Technology, Ghana; Egerton University, Kenya; Kenyatta University, Kenya; University of Namibia, Namibia; Kigali Institute of Science, Technology and Management, Rwanda; University of Dar es Salaam, Tanzania. The AVU functions as a technology hub in some of the host universities and contributes both to the enhancement of internet connectivity and to their technical capacities. Through the use of satellite communications, internet access and an online digital library to deliver academic courses, the AVU encourages its partner universities to gain independence by taking over the programmes (Prakash, 2003). The procedure ensures cost effectiveness in the capacity-building process and development of online courses. For instance, the University of Dar es Salaam as the Lead Partner University assumes the responsibility for the provision and accreditation of the Computer Science Program and the development of course (African Virtual University, 2004). It is expected that by the year 2007, 500 students will have completed their programmes (African Virtual University, 2003).

In her book *African Virtual University: The case of Kenyatta University*, Juma (2003b) details the work of the AVU ranging from the provision of short computer courses targeting the working class and preuniversity programmes for school leavers to undergraduate courses. Its delivery model allows for the use of content from overseas universities, and courses are delivered from either pre-recorded instructional programmes or online.

To address the challenges of education and training of teachers needed in sub-Saharan Africa, the AVU has initiated partnerships with the Open University of the UK, the University of Fort Hare in South Africa, the Tanzanian Open University, and the Commonwealth of Learning to design and implement the Teacher Education in sub-Saharan Africa programme (African Virtual University, 2005b). Other universities that have embraced e-learning and virtual learning exist mainly in South Africa, for instance, the Stellenbosch University. In Kenya, the United States International University has established a VLE.

Content development and access

The advent of globalisation brings to the fore the idea that all 'knowledge that can be categorised as educational' is universally valid and therefore logically sharable. Traditionally, the task of managing educational content in learning institutions has been the responsibility of teachers and archivists or librarians. However, the use of e-learning environments to support teaching and learning has had a considerable impact on the way content is developed and managed (Mwanza & Engeström, 2005). This has given rise to the need to create, store, access and distribute educational resources via technology-based systems, particularly databases and the Web. Current developments in open source and content management systems suggest potentially parallel developments in e-learning with regard to the availability of free educational resources (e-Learning Centre, 2005). The OpenCourseWare Consortium intends to provide free teaching materials as organised courses to anyone with access to the Internet, (Carson, 2005) and this will make education more accessible and affordable. Issues of contextual validity and adaptation may be resolved by local amendments appropriate to the prevailing conditions to avoid what Ziguras (2001) calls educational imperialism.

The role of public–private partnerships (PPPs)

According to Utsumi (2005), the Secretary-General of the International Telecommunication Union (http://www.itu.int/osg/), the problems of the digital divide can only be solved by harnessing the power of partnerships. Creating an enabling environment, readiness and the enhancement of ICT applications and services require collaboration. The advantages of partnerships are many and include collaboratively addressing educational and developmental issues, strengthening technical and human capacity building for teaching, learning and research. It is through partnerships with all who have a stake in improving the lives of people that we can accelerate development. Partnerships bring together innovative minds including experts from governments, business, civil society, academia and the international organisations.

The emergence of new technologies and new models of PPPs in education create many opportunities for African education (Debande, 2004). Universities form partnerships with private companies whose primary business is not education, but rather technology, software, content or any other resource provision that enhances institutional capacity. Examples from the developed countries show that many universities form partnerships or consortia with other universities and thereby cater for more learners with a lower outlay on resources. The Joint Information Systems Committee, for

instance, serves the further and higher education institutions by providing strategic guidance, advice and opportunities in the use of ICT to support teaching, learning, research and administration (Johnson, 2005).

Efforts that aim at harnessing partnerships in Africa are evident. Donors, governments and private telecom operators have connected much of Africa to the Internet (Prakash, 2003). Some of the PPPs in Africa include Partnership for Higher Education in Africa (PHEA) (http://www.foundation-partnership.org/) and the AVU (http://www.avu.org/default.asp).

Success cases in Africa
Several developments in Africa indicate the potential for the whole continent to embrace e-learning technology. In Ethiopia, under the UniversityNet programme, all 12 Ethiopian universities have been networked and have e-learning centres. Under the SchoolNet, 500 secondary schools including the Technical and Vocational Education and Training schools are networked via satellite (Reif, 2005). In Namibia, ICT has become the tool for teaching and learning at all levels—in rural as well as urban areas (Cowan, 2005). In the year 2005, six Somali tertiary institutions launched an Online Distance Learning Initiative that would enable students to attain accredited university qualifications through partnerships with institutions in other countries (African Virtual University, 2005c).

ICT policies
Borderless education through e-learning has policy and management implications relating to technology dependence and collaboration. The very fact of crossing borders poses a policy concern related to the need to remove barriers if a seamless global provision is to be achieved. Consequently, the concern about reducing national barriers is an ongoing debate in the World Trade Organisation negotiations on the general Agreement on Trade and Services (Mason, 2003). Some of the issues to be addressed are access, equity, affordability, benchmarking, quality control, content development and intellectual property rights. A good ICT policy would not only reduce the waste occasioned by duplication but also improve the return on investment through improved accountability and information sharing while promoting investment initiatives and liberalisation of the telecommunications sector.

ICT integration in learning processes depends on the support of the government, local authorities and the private sector (Bryderup & Kowalski, 2002). Essentially, the role of the government, content developers, educators, educational administrators, teachers, ICT network support staff, learners and their relationship with vendors of course management systems are defined.

Conclusion
In this study, it has emerged that e-learning as a global initiative potentially holds some of the solutions to providing access to education in Africa, especially where large populations of school-age students are involved. The integration of ICT in education

requires input from multiple stakeholders including some support sectors, which do not directly deal in educational matters. For instance, the telecommunication service providers, vendors of course management systems, educators and opinion leaders need to come together to provide online educational services through PPPs.

The current challenge, therefore, is to develop and nurture value-added partnerships in which members have complementary skills and are ready to establish a local presence in Africa. There is a need for capacity building to empower technical users (system administrators, web designers, programmers and database administrators) and end users (lecturers, students, administrators) and to influence organisational changes that include novel structures in which the new skills will be embedded. It is also necessary to create autonomous e-learning centres with efficient flexible management and delivery systems that can respond swiftly to the inevitable ICT innovations in education.

The global community has demonstrated a wish to improve online education in Africa. The efforts of the AVU and its connections with the World Bank, the Commonwealth of Learning and the International Donor Agencies, in an effort to empower African universities, are pointers to a potentially bright future for Africa. Regional and local partnerships are already responding to international benevolence by sharing their vision with governments and donor agencies. Notable examples are NEPAD, the Kenyan Education Network and PHEA, among others. Issues that can be resolved through partnerships are many and include policy formulation for online education, training online educators, content development, network support systems, content delivery and liaison with vendors of VLEs.

References

African Virtual University (2003). *RMIT celebrates success in Africa*. Retrieved August 28, 2006, from http://www.international.rmit.edu.au/AVU/news.html

African Virtual University (2004). *Capacity building with African partner institutions*. Retrieved August 28, 2006, from http://www.international.rmit.edu.au/AVU/partners.html

African Virtual University (2005a). *Addressing the teacher shortage crisis in sub-Saharan Africa*. Retrieved December 28, 2005, from http://www.hewlett.org/NR/rdonlyres/4CA0E28D-CA69-4301-9753-FA56FA14E2E4/0/OnepageAfricanVirtualUniversity.pdf

African Virtual University (2005b). *Making dreams come true*. Retrieved December 14, 2005, from http://www.avu.org/details.asp

African Virtual University (2005c). *Somali tertiary institutions launch online distance learning initiative*. Retrieved December 1, 2005, from http://www.avu.org/details.asp

Alonso, F., López, G., Manrique, D. & Viñes, J. (2005). An instructional model for web-based e-learning education with a blended learning process approach. *British Journal of Educational Technology*, *36*, 2, 217–235.

Britain, S. & Liber, O. (1999). *A framework for pedagogical evaluation of virtual learning environments*. Bangor: University of Wales. Retrieved February 2, 2006, from http://www.leeds.ac.uk/educol/documents/00001237.htm

Bryderup, I. M. & Kowalski, K. (2002). The role of local authorities in the integration of ICT in learning. *Journal of Computer Assisted Learning*, *18*, 4, 469–479.

Carroll, J. (2006). Short shelf life. *CA Magazine*, *139*, 4, 14.

Carson, S. (2005). *The OpenCourseWare Consortium*. Retrieved January 18, 2006, from http://www.hewlett.org/NR/rdonlyres/5C63FFC0-0196-4725-8833-EA8740C401E9/0/OnepageOCWConsortium.pdf

Clark, D. (2003). *Blended learning: an epic white paper*. Retrieved June 10, 2006, from http://www.epic.co.uk/content/resources/white_papers/Epic_Whtp_blended.pdf

Cowan, J. (2005). Global perspectives on e-learning. *British Journal of Educational Technology*, *36*, 4, 693–694.

Davies, A., Ramsay, J., Lindfield, H. & Couperthwaite, J. (2005). Building learning communities: foundations for good practice. *British Journal of Educational Technology*, *36*, 4, 615–628.

Debande, O. (2004). ICTs and the development of *e*-learning in Europe: the role of the public and private sectors. *European Journal of Education*, *39*, 2, 191–208.

Delamonica, E., Mehrotra, S. & Vandemoortele, J. (2004). Education for all: how much will it cost? *Development and Change*, *35*, 1, 3–30.

e-Learning Centre (2005). Products & services. Open source course and content management systems. Retrieved December 14, 2005, from http://www.e-learningcentre.co.uk/eclipse/vendors/opensource.htm

Johnson, M. (2005). Effective practice with e-learning. *British Journal of Educational Technology*, *36*, 4, 697–698.

Juma, M. N. (2003a). An evolution of an existing institution. In S. D'Antoni (Ed.), *The University-Current challenges and opportunities*. Nairobi: African Virtual University. Retrieved December 14, 2005, from http://www.unesco.org/iiep/virtualuniversity/home.php

Juma, M. N. (2003b). *African Virtual University: the case of Kenyatta University*. Nairobi: African Virtual University-Kenyatta University.

Koper, R. & Manderveld, J. (2004). Educational modelling language: modelling reusable, interoperable, rich and personalised units of learning. *British Journal of Educational Technology*, *35*, 5, 537–551.

Mason, R. (2003). A world of borderless higher education—impact and implications. In S. D'Antoni (Ed.), *The university-current challenges and opportunities*. Retrieved December 14, 2005, from http://www.unesco.org/iiep/virtualuniversity/home.php

Motteram, G. (2006). 'Blended' education and the transformation of teachers: a long-term case study in postgraduate UK higher education. *British Journal of Educational Technology*, *37*, 1, 17–30.

Murray, L. (2005). *African Virtual University open, distance and e-learning initiative*. Nairobi: The African Virtual University. Retrieved January 25, 2006, from http://www.avu.org/documents/ACEP%20Document%2009Nov05%20(English)%20(2).pdf

Mutula, S. M. (2003). *Assessment of Africa's telematics, policy and regulatory infrastructure: potential for e-learning*. Durban: The NTESU International Conference, July 9–11. Retrieved December 9, 2005, from http://www.ntesu.org.za/html/conference/papers/mutula.pdf

Mwanza, D. & Engeström, Y. (2005). Managing content in e-learning environments. *Journal of Educational Technology*, *36*, 3, 453–463.

Orazem, P. F., Vodopivec, M. & Wu, R. (2005). Worker displacement during the transition: experience from Slovenia. *The Economics of Transition*, *13*, 2, 311–340.

Prakash, S. (2003).The African Virtual University and growth in Africa: a knowledge and learning challenge. *Human Development*, *223*. Retrieved February 9, 2006, from http://www.worldbank.org/afr/findings/english/find223.pdf

Rammel, B. (2005). *UK and Africa university link-ups*. Retrieved December 28, 2005, from http://news.bbc.co.uk/2/hi/uk_news/education/4478868.stm

Reif, L. (2005). *Approaches for sustainable e-learning in Africa in German development cooperation*. Retrieved January 30, 2005, from http://www.hoffmann-reif.com/e3091/e146/e2271/publ_files2272/Sustainable_eLearning_in_Africa.pdf#search=Approaches for Sustainable E-Learning in Africa in German Development Cooperation.

Soong, R. (2002). *Technophobia*. Retrieved December 22, 2005, from http://www.zonalatina.com/Zldata271.htm

Steiner, R., Tirivayi, N., Jensen, M. & Gakio, K. (2005). *African tertiary institution connectivity survey*. Nairobi: African Virtual University. Retrieved January 24, 2006, from http://www.avu.org/documents/Partnership%20Connectivity%20Report-%20revised%2017-10-04.pdf

The Joint Information Systems Committee (2005). *The impact of VLEs on the roles of tutor and students*. Retrieved January 3, 2006, from http://www.jiscinfonet.ac.uk/InfoKits/effective-use-of-VLEs/intro-to-VLEs/introtovle-approaches/introtovle-impact-of-roles

Twinomugisha, A., Magochi, J. & Aluoch, S. (2004). *Investigation of bandwidth consolidation for partnership universities*. Nairobi: The African Virtual University. Retrieved December 13, 2005, from http://www.avu.org/documents/Partnership%20Connectivity%20Report-%20revised%2017-10-04.pdf

Utsumi, Y. (2005). *Connect the World official launch*. Retrieved January 17, 2005, from http://www.itu.int/partners/pdf/SG_preso.pdf; http://www.itu.int/partners/index.html

Vidgen, R. (1997). Stakeholders, soft systems and technology: separation and mediation in the analysis of information system requirements. *Information Systems Journal, 7*, 1, 21–46.

Wells, J. S. G. (2006). Hospital-based industrial therapy units and the people who work within them—an Irish case analysis using a soft-systems approach. *Journal of Psychiatric and Mental Health Nursing, 13*, 2, 139–147.

Williams, P. D. (2005). Blair's commission for Africa: problems and prospects for UK Policy. *The Political Quarterly, 76*, 4, 529–539.

Ziguras, C. (2001). Educational technology in transnational higher education in South East Asia: the cultural politics of flexible learning. *Educational Technology & Society, 4*, 4. Retrieved June 12, 2006, from http://ifets.ieee.org/periodical/vol_4_2001/ziguras.html