THE IMPORTANCE OF E-LEARNING IN AGRICULTURAL EDUCATION TO ACCELERATE DEVELOPMENT: LESSONS FROM THREE SELECTED COUNTRIES; TANZANIA, NIGERIA AND KENYA IN AFRICA

Nonhlanzeko Mthembu and Elliot Zwane

[1]Assistant Director: National Extension Reform, Department of Agriculture, Forestry and Fisheries. Email : NonhlanzekoM@daff.gov.za, Contact : 012 319 6133.

[1] Dr E.M Zwane is a Part time Lecturer of the University of Limpopo, Centre of Rural development and Community Empowerment, Department of Economics and Animal Science. Email: zwanefrank@gmail.com

ABSTRACT

The paper seeks to highlight the importance of e-learning in the process of development. It is evident that the need to improve agricultural education in the world is in the rise and this is evidence by the 17 crafted sustainable developmental goals. In the midst of challenges such as climate changes, economic meltdown increased food insecurity and environmental degradation, the paper argues that e-learning has the potential to make a contribution in accelerating rural development in developing economies. The study is basically a review of three selected African countries namely, Tanzania, Nigeria and Kenya. It has found that e-learning has the potential to address gaps in distance education and poorly delivered face-to-face education and training at secondary and tertiary institutions of learning by bringing innovative, flexible and unbiased quality education to learners across a larger scale.

The paper has found that improvement in education and training has both social and economic impacts for users and has shown potential to greatly boost agriculture and education sector of developing economies. However, limited funding, poor infrastructure and connectivity issues, amongst others, pose a great threat to optimal use of ICT in e-learning strategies employed by developing countries. The paper is making the following recommendations increased investment in ICT infrastructure, incentivise IT based capacity building programmes and create public awareness of the impact e-learning has in agriculture thereby promoting a culture of research and innovation that can translate to competitive agricultural sector. South Africa, as a fast developing

nation must harness efforts of e-leaning towards salvaging its crippled education and training system.

Keyword: ICT, E-Learning, Rural Development, Education, Producers, Extension, Communication, Information.

1. INTRODUCTION

The importance of e-learning in the process of development cannot be denied and evidence exist that the need to improve agricultural education in the world is in the rise. For example according to Tarus, Gichoya and Muumbo (2015), is one of the new approach to teaching and learning in most institutions of higher learning worldwide. There are organizations like World Summit on the Information Society (WSIS) Plan of Africa that calls for measure to ensure the systematic dissemination of information using ICT to teach agriculture in an effort to promote food security and agricultural development in developing economies.

 Several options can be applied however e-learning has been chosen as a point of discussion due to its potential to bring development in rural and developing countries. The question is what is meant by e-learning? The concept is understood in many ways hence there are many definitions. On the one hand, e-learning refers to learning facilitated and supported through the use of information and communications technology (Jenkins and Hanson, 2003).Naidu (2006) further gave two broad categories, namely synchronous and asynchronous.

Both categories have special usage and can benefit the learner in different ways like due to the fact that they offer low cost connectivity; adaptable and more affordable tools; advances in data storage and exchange; innovative business models and partnerships; and democratisation of information with open access movement and social media (TeleGeography, 2011).

The objectives of this paper is as follows

- To explore the meaning of e-learning
- To investigate the extent in which e-learning can be used as astrategy to fight poverty in developing countries

To critique evidence in three cases of countries found in Africa continent.

2. BACKGROUND

E-learning is becoming an increasingly popular emerging approach. Many authors have confirmed its adoption within higher education and training in developing countries as a highly effective and efficient means to facilitate learning and teaching (Dissanayeke and

Wickramasuriya, 2010E-learning material is used to supplement course material which has been found to significantly promote higher order learning skills. Olowa (2012) concurs that learning technology can be used to enhance learning capacity wherein students study at their own pace and apply suitable variety of revision styles. E-learning was further found to facilitate extended periods of learning because it invokes interest, fun and enjoyment in students and in the process creating a positive learning attitude (Dissanayeke and Wickramasuriya, 2010).

Numerous studies to determine the perceptions and attitudes of students and teachers towards e-learning, the limitations and advantages of e-learning including impact assessment surveys on education and training have been conducted (Olowa, 2012; Azubuike and Offordile, 2013; Tarus *et al*, 2015 and Mahense and Sanga, 2016). Some of the challenges revealed by these studies indicated that both teachers and students had limited computer skills and there was security concerns and limited underdeveloped facilities (Olowa, 2012).

Introducing e-learning therefore requires a paradigm shift and setting up of the required ICT infrastructure and efficient support mechanisms (Tarus *et al*, 2015). Of great interest is the fact that Higher learning institutions globally have been adopting ICT teaching and learning technologies in an effort to create favorable environments for teachers and students to share and gain access to information (Ololube, Ubogu, and Egbezor (2007). The introduction of ICT usage and its integration and diffusion has initiated a new age in educational methodologies and radically transformed traditional methods of teaching and learning patterns in the domain as well as offered contemporary learning experiences to teachers and learners (Ololube, Ubogu, and Egbezor (2007), Nyerere, Gravenir, and Mse, 2012).

3. RESEARCH METHODOLOGY

This paper has adopted literature review and it focused mainly in three countries that were selected on the basis that they applied the concept of e-learning. Numerous journal articles have been consulted due to easy accessibility from the Internet. The use of journal articles from reputable international journal have ensured that the data were reliable, accurate, up-to-date and sound. As such information used to compile this paper relied on assessment of findings from research and surveys undertaken in the three countries to examine the limitations and potential impact e-learning has in the advancement of agricultural education in developing countries. The review was limited in that accessibility of other relevant articles was restricted by not having subscription to those specific journals. Websites and books dedicated to e-learning in agriculture were also consulted.

Online research on e-learning is dominated by recent developments and achievements documented in Tanzania, Nigeria and Kenya, amongst other African countries. The widely

available online data sources enabled extensive review and assessment of the impact of e-learning at colleges and universities of agriculture in these countries so as to draw lessons for South Africa. These developing countries are leading in e-learning and share relatively similar economic status and geographic climate and farmer profiles to that of South Africa so lessons drawn can be feasible for application to the South African context.

4. RESULTS AND DISCUSSION

The results discusses the findings based on literature review from a variety of sources consulted as indicated in the methodology adopted. The first outcome relate to the first objective namely exploring the meaning of e-learning.

4.1 Objective 1 Exploring the meaning of e-learning

As far as the first objective is concerned namely the definition of e-learning, the study has shown that there is no single understanding of the concept. The most important definition which has emerged from the study is pronounced by Garison (2011), who defined it as "electronically mediated asynchronous and synchronous communication for the purpose of constructing and confirming knowledge."According to (Sangrà, Vlachopoulos and Cabrera, 2012) the concept can be considered as a natural evolution of distance learning, which has always taken advantage of the latest tools to emerge in the context of technologies for structuring education.

4.2 Objective 2   E-learning as a strategy to fight poverty in developing countries

Studies about information communication in technology (ICT) in Africa further reveal an interesting development, for example, the rate of adoption and its impact in farm productivity and efficiency was reported to be 71%, while 87% of farmers acknowledged the use of ICT to improve farming practices, 91% of farmers were reported that they entered into niche markets thereby creating thriving agribusinesses ventures as well as helping to boost yields and improve incomes. Another major breakthrough has been the significant increased participation of women and youth in agriculture that constitute a huge percentage of the rural labour force (Elletson and Burgees, 2015). These developments can be seen as the contribution towards fighting poverty especially in developing countries like Africa.

4.4   Objective 3 Evidence of cases of e-learning found in three African countries

The paper reviewed developments in e-learning made by three African countries namely Nigeria, Tanzania and Kenya, and the findings are discussed separately based on individual country in order to give a more focused attention.

4.4.1 E-learning in Nigeria

It is important to provide a short background about how Nigeria is structured before giving the account of e-learning and how it contribute towards fighting poverty.

It is a well-known fact that Nigeria is the most populous nation in sub-Saharan Africa with about 140 million people (Fan, 2010), occupying a landmass of about 923,768 square kilometres and with over 274 ethnic groups making up the federation. The social and economic dimensions of providing education for the population, within the context of prevailing national circumstances of dwindling financial and other resources in the face of developments needs are heavy. The ever-continuing growth in Nigeria's population, the attendant escalating demand for education at all levels, the difficulty of re-sourcing education through the traditional means of face-to-face classroom bound mode, and the compelling need to provide Education For All (EFA) irrespective of environmental, social or cultural circumstances have meant that the country, must out of necessity, find appropriate and cost effective means to respond adequately to the huge unmet demand for education. All these emerging situations have signaled the need for a comprehensive search for more viable, robust, reliable, efficient, effective, and cost-beneficial educational solutions, which is the most logical pathway to achieve these is by embracing distance education method (Ajadi, Salawu and Adeoye,2008).

Subsequently the Federal Government of Nigeria   has done many things to promote e-learning. some of the activities include the following : a) the initiated the adoption of ICT policies and laws aimed at guiding the development of the sector and harnessing its powers for national development imperatives (Odetola and Etammu, 2013), the resurrected of the National Open University of Nigeria in 2002 which was established in the early 1980's to provide distance education which was closed down by the Military Government, in the rise of ICT technologies that have since revolutionised teaching and learning in Nigeria (Ajadi *et al*, 2008).

The university boasts 28 study centres spread across the country offering a range of study programmes from Arts, Law to Agriculture (Ajadi *et al*, 2008).

Recent developments have been made by Nigeria in harnessing the use of ICT in e-learning as a tool to boost agricultural development for producers and promote equity in the provision of quality education and training through distance education. Sharing agricultural information and knowledge has been predominantly through national television and radio. The infiltration of

Increased information relevant to producer's situation has been found to be highly beneficial in providing opportunities for Open Distance Education thus overcoming problems of location, time, and lack of time among farming families (Mundi and Tenebe, 2013). Additional benefits include improved natural resource management practices; creating business opportunities

through the provision of agricultural market information; speeding up application processes in agricultural credit programs and better preparation for unforeseen threats (Adeyemo, 2013).

Globalization is focused on e-learning because e-learning technology has the potential to bring improved learning opportunities to a larger audience than has ever previously been possible. E-learning can play a critical role in preparing a new generation of teachers, as well as upgrading the skills of the existing teaching force to use 21st century tools and pedagogies for learning. E-learning has played an increasingly important role in supporting the economic and educational growth of industrial nations (Oye, Sulleh and Iahad, 2011). In Nigeria, e-learning strategies are increasingly being used in institutions of higher learning to facilitate online and offline structured teaching learning that is widely accessible and which transcends socio-economic and cultural barriers to accessing quality education (Oye *et al*, 2011; Olowa, 2012; Azubuike and Offordile, 2013).

4.4.2 E learning in Tanzania

The Ministry of Agriculture, Food Security and Cooperatives in Tanzania has heeded the call for transformation of the agricultural sector into a key driver of the country's economy. This is evidenced by the development and adoption of strategic frameworks amongst others namely, Strategy for Growth and Reduction of Poverty and Agricultural Sector Development Programme (Ngaiza, 2012).

Agriculture plays an important role in Tanzania's economy providing a livelihood to more than 70% of the population and accounting for nearly a quarter, 24% of the GDP. The sector also provides a formidable source of employment through inter-sectorial linkages with the non-farm sector, both forward and backward linkages. However poor access and low use of improved seed and fertilisers coupled with under-investment in the sector poses serious threats to its development. Sporadic rainfall and limited proportion of available water supply used for irrigation purposes further entrench barriers to the growth of the sector (Ngaiza, 2012).

According to (Ngaiza, 2012), the government is taking vast steps to revolutionise the sector by embarking in research and innovation projects at the Sokoine University of Agriculture and through public-private partnerships with financial institutions and civil society as a means of channelling investment into agriculture. One such venture is a partnership between Vodacom, Tanzania Government and the Agricultural Development Bank which undertook a seven year programme whereby information is provided by the Ministry of Agriculture to Vodacom. Producers and traders then access data and agricultural information such as daily commodity prices, through SMS, allowing for effective price negotiation between actors.

4.4.3 E learning in Kenya

Kenya has an 8-4-4 education system. Primary schooling takes eight years, followed by four years of secondary schooling and four years of first degree studies at university. The country introduced universal, free, non-compulsory access to primary education in 2003 that led to an immediate increase of 1.3 million students. This growth has created an accumulating demand for access to secondary education and, predictably, to tertiary education as well (Farell, 2007). As a Sub-Saharan country, Kenya has perceived the potential of ICT usage in teach and leaning and is at its infancy stage of implementing various e-learning programmes in schools and universities. It is thus essential for its educational planning that the opportunities offered by the new mode of learning be realistically examined within the framework of national development plans in general and educational policies in particular (Farell, 2007).

The first Kenyan Government policy to address Open Distance e-learning (ODeL) in higher education was the Act of Parliament of 1966, which established the Board of Adult Education. Since independence, however, a number of commissions and reports have highlighted ODeL as an alternative mode of education provision. The latest government initiative, as contained in Sessional Paper No. 1 of 2005 recommended the establishment of an open university and the use of ODeL in human resource development at all levels to date. The practice of ODeL in the country has been at all levels of education and has been provided by different institutions each governed by their own institutional policies (Nyerere, Gravenir, and Mse,2012).

Kenyan universities have also recently been compelled by the government within the framework of Kenya Vision 2030 to introduce e-learning and blended learning as an alternative delivery system to increase accessibility to higher education in Kenya (NESC, 2007).

Consequently, most of the universities are already using e-learning but mostly in blended mode with face to face teaching. At the University of Nairobi for instance, implementation of e-learning started in 2004 with a well-tested e-learning platform called Wedusoft. Kenyatta University launched the e-learning mode of teaching in 2005 and is currently using Moodle as an e-learning platform. E-learning programmes have also been in operation at Jomo Kenyatta University of Agriculture and Technology since 2006 with Moodle as an e-learning platform.

Implementation of e-learning in Moi University started in 2007 with MUSOMI as an e-learning platform. Moreover, the Government of Kenya has over the years improved the regulatory environment to promote growth of the ICT sector and increase availability of broadband Internet in the country. These e-leaning programmes has facilitated easier access to information; increased interaction and collaboration between teachers and learners; and increased learning outreach to remote areas in a cost effective manner (Tarus *et al*, 2015).

According to Motteram (2006), Kenya still face a lot of challenges in implementing e-learning which requires advanced level of technological infrastructure and heavy investment of resources especially at the initial stages, however a blended learning approach, which mixes the traditional face-to-face teaching with online collaboration is preferred in Kenya.

Kenya has partnered with the USAID and the Netherlands Development Organisation on using e-learning to address the need for timely and reliable livestock marketing information for producers, traders and policy makers in the livestock subsector (Gakuru, Winters and Stepman, 2009). The Masinde Muliro University of Science and Technology in Western Kenya, in partnership with Fire Africa, has introduced the problem-based e-learning systems for agricultural extension in efforts to improve knowledge, practices and attitudes of the farming communities.

According to the E-Readiness Survey of Kenyan Universities (2013) Report, Kenyan universities are allocating an average of 0.5% of their total recurrent expenditures on Internet bandwidth to support implementation of e-learning. As a result, the universities in 2013 achieved Internet bandwidth increase to 4.0 Mb/s per 1,000 students compared to only 0.431Mb/s per 1,000 students in 2008 (Kashorda and Waema, 2014).

5. IMPLICATIONS FOR SOUTH AFRICA

The Electronic and Communications Transaction Act, No. 25 of 2002, was established by the Department of Communications (DoC) in a bid to lead all ICT initiatives in South Africa and to develop a five-year national e-strategy which would empower all citizens, especially the education sector (Mdlongwa, 2012). The Department of Education has developed a Draft White Paper on learning and teaching through ICT in 2003 to address South Africa's participation in the information society, articulate how best to use ICT for optimal impact on access, cost effectiveness and quality of education and design how best to integrate ICT in teaching and learning (Mdlongwa, 2012).

Implementation of e-learning is already underway with key projects noted in the Western Cape (Khanya Project); Gauteng (Gauteng onLine) and Northern Cape (Connectivity Project). Other initiatives focus on ICT Programme Development; Infrastructure and Connectivity; and Electronic Content Resource (Mdlongwa, 2012).

Implementation of e-learning for enhancing quality of education is still at infancy stage and while it is beginning to show success in improving productivity in learning and teaching performance, evidence of barriers to implementation cannot go unnoticed. Surveys conducted on e-learning (Ramodise, 2006, Takalani, 2008 and Mdlongwa, 2012) indicate teething problems such as inadequate human resource capacity on the part of both teachers/course developers and

learner; poor connectivity and limited available ICT infrastructure. The e-learning report highlights that a lack of trained teachers and limited support mechanisms affect the impact e-learning can have in South Africa (Mdlongwa, 2012).

Research on best practices from other developing countries in respect of design and implementation of legislation and policy frameworks for e-learning has potential to improve delivery of quality education, which can be replicated across other key national priority areas.

6. CONCLUSION AND RECOMMENDATION

Improving the way in which learning and teaching happens and influencing the environment in which this takes place is essentially the thrust presented by the three cases highlighted in this paper. E-learning presents effective and efficient means of delivering quality education at schools and universities with the social and economic benefits going beyond the learner and teacher. Learners are motivated and enjoy learning whilst teacher can explore a variety of teaching methods that have far reaching and significant impact on learner's performance. Open distance education can dramatically revitalised through use of ICT as it enables access to remote areas and transcends racial, gender and age-biased barriers which limit traditional teaching and learning. E-learning has shown potential to greatly boost agricultural and education sector of developing countries.

6.1 Recommendations

From the findings of this study, the following recommendations are made:

- There is a need to create an enabling environment for implementation of e-learning in agricultural education. It is recommended that legislative and national frameworks need to be developed to guide both public and private sector, particularly institutions of higher learning;
- Proper and efficient monitoring and evaluation of e-learning programmes is important at the initial stages of implementation and it is recommended that such process should be done despite the challenges such as funding, infrastructure, connectivity, human resource issues (capacity, attitudes and performance).

- There is need to develop problem-based e-learning course material with a well-defined target audience and ensure optimal user-friendly programmes that accommodate limitations of users.
- Creating public awareness of the potential impact of e-learning in delivery of quality agricultural education; and

- To design incentives for e-learning initiatives to promote public-private partnerships.

REFERENCES

ADEYEMO A.B. 2013. An e-farming framework for sustainable agricultural development in Nigeria. *Journal of Internet and Information System.* Vol 3(1) 1-9.

AJADI T., SALAWU O., and ADEOYE F. 2008. E-learning and Distant Education in Nigeria, *Turkish on–line Journal of Educational Technology*. Vol 7 (4).

AZUBUIKE O.C. and OFFORDILE S. 2013. Strategy for improving the use of electronic teaching and learning (e-learning) in agricultural science and home economics in tertiary institutions of Anambra State-Nigeria. *Proceedings of the 1st International Technology, Education and Environment Conference African Society for Scientific Research.* Federal College of Education: Nigeria.

DISSANAYEKE U. and WICKRAMASURIYA H. 2010. E-learning in agriculture higher education: A case study. *Journal of Emerging Trends in Educational Research and Policy Studies.* Vol 1(2) 80-83.

ELLETSON H. and BURGESS A. 2015. E-learning African Report. ICWE: Germany.

FAN F.A. 2010. Implications of population growth for Nigerian development. *An African Journal of Philosophy.* Vol 13(1).

FARELL G. 2007. ICT in education in Kenya. World Bank: Washington DC.

GAKURU M., WINTERS K., and STEPMAN F. 2009. Inventory of innovative farmer advisory services using ICTs. The Forum for Agricultural Research in Africa.

GARRISON D.R. 2011. E-learning in the 21st century: A framework for research and practice (2nd ed.). Taylor & Francis: New York.

JENKINS M. and HANSON J. 2003. E-learning Series: A Guide for Senior Managers. Learning and Teaching Support Network (LSTN) Generic Centre: United Kingdom.

KASHORDA M., and WAEMA T. 2014. E-Readiness Survey of Kenyan Universities Report 2013. Kenya Education Network: Nairobi.

MAHENGE M.P.J. and SANGA C. 2016. ICT for e-learning in three higher education institutions in Tanzania. *Knowledge Management and E-learning.* Vol 8(1) 200-212.

MDLONGWA T. 2012. ICT as a means of enhancing education in schools in South Africa: Challenges, benefits and recommendations. *Policy Brief No 80.* Africa Institute of South Africa: South Africa.

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 Vol 37(1) 17–30.

MUNDI N.E. and TENEBE V.A. 2013. The role of distance education and e-learning in agricultural extension services. National Open University of Nigeria: Nigeria.

NAIDU S. 2006. E-learning: A guidebook of principles, procedures and practices. (2nd ed.). Commonwealth Educational Media Centre. New Delhi: India.

NESC. 2007. Kenya Vision 2030: A globally competitive and prosperous Kenya. National Economic and Social Council of Kenya: Kenya.

NGAIZA .R.S. 2012. FAO-University of Nairobi -Regional Workshop on an Integrated Policy Approach to Commercializing Smallholder Maize Production. Ministry of Agriculture, Food Security and Cooperatives: Tanzania.

NYERERE K.A., GRAVENIR F.Q., and MSE G.S. 2012. Delivery of open, distance and e-learning in Kenya. *The International Review of research in open and distributed learning.* Vol 12(3).

ODETOLA T. and ETAMMU C. 2013. Contribution of agriculture to economic growth in Nigeria. *Paper presented at 18th Annual Conference of the African Econometric Society, Accra, Ghana 22-23 July 2013. Abuja: Nigeria.*

OLOWA O.W. 2012. An assessment of Internet uses, practices and barriers for professional development by agricultural science teachers in Lagos State. *Education Research International.*

OLULUBE N.P., UBOGU A.E., and EGBEZOR D.E. 2007. ICT and distance education programs in a Sub-Saharan African Country: A theoretical perspective. *Journal of Information Technology Impact.* Vol 7(3) 181-194.

OYE N.D., SULLEH M., and IAHAD N.A. 2011. Challenges of e-learning in Nigeria university education based on experiences of developing countries. *International Journal of Managing Information Technology.* Vol 3(2).

RAMODISE P.T. 2006. The implications of e-learning in public FET institutions in South Africa. *Thesis presented in partial fulfilment of the requirements for the degree of Master of Philosophy.* University of Johannesburg: Johannesburg.

SANGRÀ A., VLACHOPOULOS D., and CABRERA N. 2012. Building an inclusive definition of e-learning: An approach to the conceptual framework. International Review of Research in Open and Distance Learning, 13(2) 145-159.

TAKALANI T. (2008). Barriers to e-learning amongst postgraduate black students in higher education in South Africa. *Thesis presented in partial fulfilment of the requirements for the degree of Master of Philosophy.* Stellenbosch University: Stellenbosch.

TARUS J.K., GICHOYA D., and MUUMBO A. 2015. Challenges of implementing e-learning in Kenya: A case of Kenyan public universities. *The International Review of Research in Open and Distributed Learning.* Vol 16(1).

TELEGEOGRAPHY. 2011. Accessed from www.telegeography.com 20 May 2016.