Victorine S. Che Thöner

Siegfried Lewark

STRENGTHENING LEARNING AND TEACHING IN FORESTRY AND AGRI-CULTURE IN AFRICAN UNIVERSITIES THROUGH E-LEARNING AND OPEN EDUCATION RESOURCES

Abstract

What do learners and educators gain or lose from e-learning? Learning and teaching is a process which has to be flexible and also structured to lead to needed competences to give future graduates the expertise they need to meet up with the demands of the labour market. Based on the experience of e-learners and e-teachers in different fields and from different parts of the world, it becomes apparent that e-learning is a good opportunity for progress, enhances knowledge and makes easy access to education for all. This could be the opportunity, most especially for developing countries (based on the general need for education and capacity-building in developing countries for students, in-service personnel, researchers, etc) to make education available for all. However, there are still a lot of administrative and technical limitations which have to be overcome to make e-learning more effective, especially in Africa. – An e-learning need and opportunities assessment was carried out for each of the African partner institutions in the AFOLM project (University of Ghana, Legon in Ghana, Federal University of Technology, Akure in Nigeria, and the University of Dschang in Cameroon) in order to propose the most effective way to make e-learning a valuable experience to many. In addition, the awareness of the partner universities to Open Education Resources was explored. The results of the survey indicated that internet-based distance education or e-learning is a promising way of improving education and training in agriculture and forestry but that the level of awareness on new developments in ICT or internet-based learning in agriculture and forestry education is still very low.

About the authors

Dr. Victorine Sirri Che Thöner obtained her Masters (Sustainable Forestry and Land Use Management) in 2004 at the faculty of Forestry and Environmental Sciences in Freiburg. She obtained her Doctorate in 2008 at the Institute of Forest Utilization and Work Sciences in Freiburg. Since 2009, she has been working as project manager at this institute within the EU sponsored project "European-African Network to Improve Higher Education Institutions in Agriculture and Forestry based on new Labour Market needs – AFOLM". Interests include forest and social science research (e.g. gender and diversity), sustainable natural resource management (e.g. forest use and conservation) as well as e-learning and development aid. Contact: victorine.che@gmx.de

Prof. Dr. Siegfried Lewark is Professor for Forestry Work Science at Freiburg University. Contact: siegfried.lewark @fobawi.uni-freiburg.de

Victorine S. Che Thöner

Siegfried Lewark

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Table of contents

Acknowledgement

1   Introduction

E-learning, in particular distance education via internet is regarded worldwide as an opportunity to improve education and make learning more flexible and available to a wider audience. The development of Information and Communication Technology (ICT) in Africa has been slow but progressive with a lot of people using computers and most especially the internet for educative purposes and for pleasure. Some institutions in Africa have already started offering distance education courses via internet as a better alternative to reach more potential students and hence improve the general level of education of both the employed and unemployed. According to OUÉDRAOGO, *"ICTs have already begun to exert massive transformation of education systems worldwide. Distance education universities are now quoted on the stock exchange. The best teachers in the world are becoming available anywhere at the click of a mouse while 'Lifelong Learning' has become the order of the day."* (OUÉDRAOGO 2006: 1)

It may be wrong for the key to progress in ICT in Africa to rely on development aid, but rather there it could be based on true engagement with the private sector, thereby creating opportunities. In order to initiate this move to involve the private sector, authorities in general and the universities in particular need to make sure they have a good environment to attract private sector investment. This involves improving the study programmes to meet the demands of the continuously changing labour market.

In essence, this review – based on a case study within the project "European-African Network to Improve Higher Education Institutions (HEIs) in Agriculture and Forestry based on new Labour Market needs – AFOLM" – is intended as a window of opportunity for the African states in general, for universities and other stakeholders in particular, to be aware of the difficulties they face and how they can come together to overcome these difficulties to be able to tap the potential that technology-assisted learning offers across the education spectrum for universities, vocational institutions as well as for marginalised groups like women, after all half of the populations. This would be a big step towards attaining the goal of increasing equitable and meaningful access to learning, knowledge and skills across Africa, through open learning resources and e-learning strategies. A presentation and discussion of the state of e-learning would be incomplete without touching questions of cost and potential earnings of the organisers. Whereas very often high cost of development of e-learning courses and programmes and their potential role as source of income for universities is stressed, at the same time there are ideas and efforts to develop low cost courses and programmes and also to share educational resources freely, which last point shall be shortly elaborated.

"Open education is a collective term that refers to educational organizations that seek to eliminate barriers to entry. Such institutions, for example, would not have academic admission requirements. Such universities include Open University in Britain and Athabasca University in Canada. Such programs are commonly distance learning programs, but not necessarily." (WIKIPEDIA 2011) According to the 2009 version of this article: *"Open education is a collective term that refers to forms of education in which knowledge, ideas*

or important aspects of learning and teaching methods or infrastructure are shared freely over the internet. It was inspired by related concepts like Creative Commons, Open source, Open data and Open Access, and expands them to include lectures and other courseware." (WIKIPEDIA 2009). These ideas meanwhile resulted in a movement for propagating these ideas and in the "Cape Town Open Education Declaration".

The concept of Open Education Resources (OER) looks like a really great idea, especially when looking from the perspective of developing countries. Because of the outstanding importance of this issue it must be considered more closely with the future concrete development of e-learning in the three African AFOLM universities. In this context the initiatives of ANAFE, the network, to which the three universities belong, for development of e-learning, deserves special mentioning and attention (ANAFE-MOODLE 2011, see below).

Success factors of e-learning of higher forest education, connected to forestry and forest based industry, under conditions of Southern Africa has been studied earlier in the forest work science team of the University of Freiburg (LÄNGIN 2006, LÄNGIN, ACKERMAN & LEWARK 2004). The results generally demonstrated the advantages of blended learning settings, using a combination of face to face and internet based learning units. Moderated course organisation gives feedback to the learners continuously and helps attaining the learning outcomes aimed at (LEWARK 2006, LEWARK & LÄNGIN 2007).

In a recent analysis of the state of distance education in forest sciences the conditions for realization, asking for framework, competence, need and will, have been described (LEWARK 2011). Obviously there is still little use of e-learning for distance education, after presenting the potential broadly some years ago (TAHVANAINEN & PELKONEN 2004).

Competence for e-teaching is proven and tested in different ways, by a number of teachers in forest sciences. The framework *"has technical and organisational or administrative aspects. At least the technical side seems to be sufficiently developed, in the first years sometimes with specifically developed e-learning platforms, today with commercial e-learning platforms or freeware ready to use. But administrative regulations, in particular for the mutual recognition still have to be developed further. Here WELAN may come into the game, which tries to make it its business to work for it."* (LEWARK 2011).

WELAN is the "World-wide E-Learning Academy for Natural Resources, Forestry & Wood Science". In order to use the potential of e-learning for improvement of higher education as outlined before the concept of WELAN has been developed by higher education specialists from IUFRO, IPFE and forestry faculties of six universities (cf. the WELAN flyer, LEWARK 2009, and LEWARK 2010). *"The basic idea is to build WELAN as a worldwide e-learning academy, which will promote, facilitate, organize and run e-learning courses in scientific education, further education and competence development in the fields of forestry and wood sciences as well as management of natural resources."* (LEWARK 2009).

"Activities of WELAN will start with the development of recommendations for administrative regulations including course formats, course delivery, credit recognition, accreditation, tuition fees in order to allow students from different universities as well as companies to have access to e-learning course information and to the courses of the collaborating universities and get their credits gained easily recognized." (LEWARK 2009).

1.1   Problem statement

Awareness raising or publicity on the potential of e-learning in general and on specific e-learning courses offered is very important to attract the participation of a large audience from different backgrounds. E-learning courses fit in forestry and agriculture study programmes just like in other fields. This would be perhaps even a better way of attracting new students by introducing new and flexible methods of learning and teaching and guiding them to convert their experiences into qualifications. E-learning courses could be offered to supplement, reinforce or support programmes in agriculture and forestry. Such online courses have been done and are still being done by many universities around the world. For example, University of Freiburg, Gender Roles in Environmental Management (Lewark 2006), University of Copenhagen, Applied Socio-economics in Tropical Forestry and Participatory Forestry Management (Chomba & Olsen 2008) and the Allama Iqbal Open University (Ahmed, Baig & Khan 2008) with its MSc. Forestry Extension designed completely as an open learning programme.

Based on feedback from some courses which have been offered online for a while (e.g. Gender Roles in Environmental Management over six years, Applied Socio-economics over four years), and from other people who use the internet for self-study, the following are the advantages of using e-learning for e-teachers and e-learners:

- The methods of learning or training give more room for learners to structure their studying at their own pace and they are able to access study material at any time and anywhere,

- E-learning could also be an opportunity for those people who have only been educated informally and have a lot of practical experience but with no recognisable formal education certificates and with no means to attend traditional face-to-face courses to obtain their certificates,

- The limitations of some institutions to offer the courses necessary for their students to gain necessary expertise is overcome by taking on these missing courses as e-courses offered by other institutions,

- E-learning is a great pacesetter for networking experience since it brings together participants from different backgrounds making it possible to exchange ideas, experiences and perspectives,

- E-learning makes it possible to invite professionals to join in the virtual classrooms and offer their professional knowledge without necessarily moving from their workplace,

- It could also be a means for the institution to earn money through tuition fees, while this is in contradiction to the concept of open education,

- In this computer age, it is no longer a luxury, but a necessity to be versed with computers and software. The participants therefore gain e-learning competence, including communication and writing skills, which will certainly be useful both in their professional and private lives.

It is therefore important in the frame of the AFOLM project to find out if learning institutions have appropriate policies which favour not only the traditional methods of learning and teaching, but e-learning as well and also support the training of e-lecturers at all levels. Other enabling factors to make e-learning effective and enriching experiences like the availability of functional hardware (computers), software (e-learning platform), fast internet connection, cheap internet access, availability of reliable electricity also need to be assessed.

It is important to know the technical capacities of each institution which involves internet access for students of different levels and backgrounds and lecturers. This is because the reliability of the internet connection has a major role to play regarding the level of complexity of equipment and software (e-learning platforms) that can be used. It is also important to find out whether each institution has trained personnel for the maintenance of the technical equipment.

Content management of the courses is also an important part of keeping any e-learning project alive and prospering. The institutions therefore need trained personnel as well to maintain the content of the different courses they plan to offer and also to tailor course content to suit specific target groups. This will involve keeping track of already existing e-learning courses in their field of study by other course developers in order to avoid repetition and increase the variety of courses available on offer. Accordingly, it is essential to assess if the universities have trained personnel for the design of courses and how the university administration supports further training of personnel either within or out of the institution through advanced training courses by experts in this field.

Are the African partners aware of this growing pool of open education resources as described above? If yes, how active are their students and lecturers in this movement? This pool of resources contains learning and teaching materials also in the field of forestry, agriculture, rural development, etc. which could be adapted for teaching by university lecturers. One of the aims of AFOLM is to encourage networking between authorities and institutions. This is the opportunity for these universities to join forces and share their interests, making research results, teaching material and courses openly available for sharing between them. This will be a step towards achieving the main objective of the project, which is to improve on education to make graduates competent enough to stand up to the demands of the changing labour market.

1.2   Objective

The main objective of this survey is to evaluate the potential of e-learning in forestry and agriculture education in the three African AFOLM universities and to develop strategies to introduce and strengthen e-learning in these institutions so lecturers can supply needed

competences to be able to give learners the expertise they need to meet up with the demands of the labour market.

The specific objective was to assess the level of Internet Communication Technology in each institution, what infrastructure the institutions need to facilitate this process of learning and most especially the level of training of lecturers responsible for producing content and offering such courses and for the maintenance of the technical equipment.

2   Method

A survey was carried out in the University of Ghana, Legon in Ghana, Federal University of Technology, Akure in Nigeria, and the University of Dschang in Cameroon through an open-ended questionnaire answered by lecturers from various departments and disciplines within agriculture and forestry. An open-ended questionnaire was chosen so as to glean as much relevant information as possible from the respondents.

The questionnaires were sent out by e-mail to the lecturers in the agriculture and forestry departments and those who participated also sent their responses by e-mail. The main focus of the questionnaire was to determine the level of Internet Communication Technology and e-learning as part of the university curricula, infrastructural limitations and the level of training of lecturers who are to work contents up and offer e-courses.

A total of 21 questionnaires were analysed leading to the results in this review. Three out of the 21 respondents were women. All the lecturers who participated in the survey are senior staff in the departments and disciplines within agriculture and forestry.

It was difficult involving more lecturers who complained their workload did not permit them to answer the questionnaires. However, the lecturers from the different institutions also indicated that the answers they gave were usually shared by their colleagues who could not be part of the survey. Therefore, even though the sample size appears to be small, it can be assumed that the views expressed here are representative of a majority of the lecturers within the agriculture and forestry departments.

Analysis of the questionnaires was done with the qualitative analysis programme MaxQDA based on which interpretations and generalisations were carried out.

3   Results

3.1   Level of Internet Use by Lecturers and Pre-knowledge

Most of the lecturers are already versed in using computers, mainly for power point presentations, e-mail, chatting, and internet research. A limited number have used computers to access courses offered on CD-ROM or in the internet thereby acquiring learning experience. None of the lecturers had e-teaching experience.

Many of the lecturers are aware of the growing pool of Open Education Resources (OER) usually through individual efforts with almost no encouragement from their institutions. The activity of the lecturers is mostly limited to accessing documents relevant for their research and teaching. They are not yet involved in the translation, reuse and making their

own material available for use by others. Some of the lecturers gave limited access to the internet as a reason for their inactivity in this respect. The lecturers also pointed out that students are increasingly doing internet research and using internet material in essays and theses. One of the lecturers at the University of Ghana is actively involved in a pool of OER and is currently involved in the development of such a resource pool with the African Network for Agriculture, Agroforestry and Natural Resource Education (ANAFE). Relating to one of the AFOLM project aims which is to share research and experience, the lecturers in the University of Ghana view the involvement of one of their colleague in this resource pool as an opportunity to get the other lecturers within and between the institutions to get involved in this pool of knowledge.

3.2   Potential of E-learning to Improve Education

The lecturers, most of whom already have basic experience with computer-assisted learning, were all positive about the fact that e-learning could optimise learning and teaching in their various institutions. The reasons given to support this statement include:

1. E-learning will permit a good number of people who had stopped or suspended their education either because they are working or are not financially capable of supporting themselves as full time students to further their education

2. A lot of information can be passed to the learner without necessarily travelling and workers can earn their living while they further their education. It is also important to note that e-learning should have a focus on learning and not on simply passing information.

3. The learner does not need a lot of administrative procedures to be registered.

4. E-learning would enhance student-lecturer communication because it can be designed to be used interactively.

5. E-learning will serve to increase student numbers (expand coverage) as it improves accessibility of study programmes to more potential students.

6. E-learning is better than the traditional distance courses with hard copies because it can be more illustrative. Students on campus could also benefit from the available ICT infrastructure on campus.

The institutions welcome this method of learning and teaching as a means to reach more potential students than they can admit in the regular programmes. According to the lecturers, e-learning could also serve to combat illiteracy if learning through this method is enhanced. Some of the reasons given for this include:

1. Majority of the illiterates are women (housewives). This technology and the e-learning courses offered will help them continue taking care of their families and learning at the same time.

2. This will help adults in general who do not have time to spend for effective class attendance.

3. For some adults who are frustrated by the fact that they will be taught face to face by people who are younger than them, e-learning is a chance for them to remove this barrier and acquire education otherwise not accessible.

The lecturers hope that e-learning can use videos and films to educate or train people who are not literate thereby facilitating the learning process. However, in their view, much still has to be done to improve on e-teacher skills in content development and management of e-learning courses. Currently, there is limited work being done on content development, distribution and management of e-learning courses.

Answers from the University of Ghana indicated that the curricula in the entire university are under review but on departmental level. New programmes will be run from the academic year 2010/2011. Some of the institutions have already organised a workshop or workshops to teach lecturers on how to prepare on-line courses. Others have plans to organise training workshops. For example, at the University of Ghana, there is an ICT centre and workshops are organised periodically to train staff on e-teaching skills. In the meantime, some lecturers are working privately to improve on their e-teaching skills.

The goal to improve on e-teaching skills is of low priority in most of the institutions mainly because of the infrastructural limitations. In all the countries of this study the university provides computers for use by the lecturers, administrative staff and students. However, the number of computers available connected to the internet is not sufficient. In most cases the internet is not reliable and is only working intermittently. There is still limited access to the internet on campus for lecturers and especially for students. All the institutions therefore still have infrastructural limitations to computer based distance education like:

1. Poor or variable electricity supply

2. Insufficient computer numbers and quality

3. Inefficient internet facilities like inadequate server band width

4. High cost of internet access (for teachers and students who have to access internet out of the university)

5. Lack of e-teachers

The lecturers insisted that the university administration needs to put more funds in advancing the infrastructure hence enhancing the chances of e-learning for learning and teaching to be effective to all involved. They made the following suggestions how these limitations could be overcome by their various institutions:

1. The institutions should make more efforts to buy computers

2. Reliable electricity supply by purchasing and maintaining a stand-by generator or any other alternative power supply

3. Employ competent staff and/or provide training for current staff

4. Lecturers need decent offices with internet services or an environment where learners can easily access the internet

5. Improve internet access management through the provision of more efficient servers and bandwidth

6. The skills and competences of the staff need to be upgraded to help manage the available infrastructure.

In order to come through with the above suggestions, the lecturers also pointed out that the universities also need committed authorities with a good institutional strategy to solve problems as well as cooperation with the private sector (industry, international and national NGOs, etc). It should therefore be a shared responsibility to attain the level of infrastructure necessary to make e-learning an effective way of learning and teaching.

3.3 Designing E-learning Courses

The various institutions reported that at moment, there are little or no new developments in the field of e-learning and the level of integrating e-learning into the curricula is still very limited. For the Federal University of Technology, Akure, there has been an introduction of a single e-learning course and a limited budget has been devoted to develop this form of studying. At the University of Dschang, this advancement has only been done at the distance education centre which has been existing for a long time now and improvements are currently being made to include e-learning into the distance education format instead of using the hard copy format. The present distance education programme at the University of Dschang, with the use of print medium poses difficulties because the material through this medium cannot be adequately used to present material of a practical nature which requires demonstrations to facilitate understanding of new concepts and their applications. In this wake, the university wants to introduce e-learning not only in their distance education centre, but integrate it in the individual faculty curricula. At the University of Ghana, there is a programme running at the institute of adult education and e-learning degree programmes in some subjects are currently being introduced, internet band width has been increased, there is the use of video conferencing for interviews, internet research by lecturers is improving and virtual meetings are also organised in the college of agriculture.

Based on the data available to all the institutions in relation to the educational needs of the population, the following groups have been targeted as participants on the online courses to be offered:

1. Civil servants and workers in the private sector

2. Council or Local Authorities personnel

3. Rural authorities

4. Farmers and extension officers

5. Students (undergraduate and postgraduate)

6. Adult illiterates - short time adult literacy classes

7. Pool of candidates who do not get admission in to the university although qualified

8. Unemployed youths

The target group involves a combination of students, the unemployed and workers who are interested in self development and the acquisition of additional or new skills. The universities have the challenge to develop training courses for these different groups with varying levels of access to infrastructure and varying levels of training. These courses could be Graduate and Post Graduate diploma courses as well as degree and professional short courses. The introduction of e-learning is therefore not meant only for the universities, but also to support communities. The following suggestions were made for courses which could be offered online:

1. Hydraulic infrastructure management

2. Water sanitation

3. Water resource management

4. Waste management

5. Introduction to agricultural economics

6. Agricultural marketing

7. Farm management

8. The economic aspects of project analysis

9. Diploma in agriculture

10. Introductory agroforestry

11. Introduction to range and forage management

12. Entrepreneurship development for self employment in various areas of agriculture

The lecturers all agreed that in order to be eligible to take the courses, the potential e-learners need to fulfil the following basic prerequisites:

1. Basic university admission requirements

2. Basic knowledge in the use of computers (e-mail, internet search)

3. Basic senior high school qualification

However, generally, the prerequisites would also depend on the courses being applied for. For example, short literacy classes would necessitate only basic knowledge in the use of computers, while graduate courses would necessitate in addition to basic computer skills, a senior high school qualification.

After defining the target groups that need training and what courses can be offered, the next step is deciding whether to offer the course by individual universities or in collaboration with other universities. The view on this issue was divided. Half of the respondents think it will be ideal at the initial phase to offer courses only by their university due to complexity of assessments and then only start collaborating when this method of learning has been well developed. The other half thinks it is important to offer courses already from the beginning with other universities to encourage collaboration (network) between the universities and also reduce costs.

Even though the respondents were divided about the model of offering courses at the beginning (individual or collaborative) it was also clear to them that in the future, collaboration between the universities is almost inevitable. Efforts therefore have to be devoted by the university administration concerning administrative regulations which could facilitate students from other universities to attend courses and to get their credits or certificates recognised at their university of origin. The following steps were proposed to be taken by the university administration to be able to achieve this goal:

1. Each institution involved should create a unit in charge of E-courses which will collaborate with the unit in charge of academic affairs and students follow up and they should create mutually acceptable rules specifying qualities, obligations and responsibilities between the institutions.

2. The development of harmonised curricula and memorandum of understanding between the institutions involved as well as interdisciplinary modular course delivery and development of new curriculum.

Answering the question on whether the courses should be purely internet based or blended with some contact hours, most of the lecturers opted for blended courses instead of purely internet courses for the following reasons:

1. Both internet and lecturing in classes are necessary because practicals, tutorials and examinations require the participants to be physically present. Forestry and agricultural education via internet would only be effective if there is adequate provision for practical facilities for students at specific periods of study. Hence theoretical content of some lectures can be disseminated through internet while students should attend practical sessions.

2. Blended courses are preferable to explain topics not well understood by the students

3. Just the personal interaction from time to time is essential and would give an opportunity to assess students' progress hence assure learning is done effectively. In addition, the fear that fraud during evaluation via internet could be facilitated and students maybe helped by more experienced people can be resolved when students are physically present for exams.

The few who opted for purely internet courses think the possibility of forums on e-learning platforms will solve difficulties and create a permanent connectivity between students and lecturers. These lecturers also stressed on the issue that aspects of forestry and agricultural education related to policy economics would be better served than disciplines that require intensive practicals.

Lecturers from all three universities would prefer most of the e-students to be off campus students. On campus students already attend traditional classes and can ask for help when needed. So there is no specific plan to deal with on campus students.

To make the courses intended to be offered widely known to a large audience, a mixture of publicity measures (newspapers, radio and TV announcements, flyers, posters, public administration, decentralised services, NGO, internet) are planned to be used. The goal of educating as many people as possible through e-learning can only be reached if the target groups are aware of the courses being offered.

4 Discussion

In this survey, it is recognised that the different countries may differ from one another in relation to the policies that influence how university education may affect economic growth. However, some policies also apply broadly and this analysis is directed to these similarities.

The use of open-ended questionnaires in this survey gave the opportunity to the respondents to freely express their views, producing a lot of information necessary to plan how to move forward with introducing or strengthening e-learning as a way of learning and teaching in the three institutions in particular and in Africa in general. The lecturers clearly illustrated their perceptions about e-learning, the problems they are facing and what could possibly be done to solve the problems and create a convenient environment for e-learning courses.

According to the results of the analysis, in all the institutions, tasks like teaching at university level (bachelor and master), advanced education for graduates and other tasks like training of the unemployed or uneducated were aimed at together. It was not clearly stated in the study how the universities are organised to be able to fulfil all these tasks because this survey was primarily aimed at higher education at university (bachelor and master). This point comes up here because when a curriculum is developed, it is mostly in relation to a degree or masters programme. Therefore training for the unemployed and uneducated is another task of the university besides its mission of training people who are qualified to

study at the university. After further enquiries on this subject it became clear that the coordination of these tasks within the university is separated. There is a special unit responsible for training people who are not yet qualified to be admitted into the higher education system. The name given to this unit varies among the universities. For example, this unit is called Centre for Continuous Education at the Federal University of Technology, Akure. At the University of Dschang, this task is coordinated by the Groupement d'Intérêt Economique (GIE) which is the business arm of the university, which offers and arranges for short courses targeted at the uneducated or unemployed depending on the request for the course or funding agency or the target group.

At the University of Ghana, Legon, this unit is called Adult and Continuing Education. Also in Ghana, the main university system organises a Matured Entry Exam for those formally not very qualified (without A-Levels) to enable them enter the university. Classes are organised by the university as well as private schools for this Matured Entry Exam.

Most of the African institutions work on extending university education to decrease knowledge gaps, to cope with technological development and to help reduce poverty in their various countries and in the African continent as a whole. In order to achieve this goal, a better strategic plan of implementation is required, which involves better planning and higher standards of management. To achieve this level of planning, contributions from all stakeholders, both public and private, and also from the international community are essential. Consequently, each institution needs to make it a priority to establish how it can realistically boost the higher education system as well as help to train uneducated people and the unemployed who are eager to acquire knowledge and expertise thereby contributing to the public good – enhancing economic growth.

The importance of e-learning should not be underestimated. E-skills can quickly make a worldwide education and labour market available to trained individuals online. In this way, e-learning does not only serve to improve on education, but also improve on the living standard of people who used to consider themselves to be ordinary African people. This gives the opportunities to train people who will not wait for change but go out to initiate change in the African economies.

It was pointed out in the study that most of the illiterates are women. This leads to the need to strengthen the inclusion of gender and diversity aspects and also of minority groups in any ICT or e-learning advancements. Access to technology-assisted learning to both men and women will serve to support gender equality and private and public initiatives could successfully utilise this involvement to tackle the social exclusion of marginalised communities.

It is important for the universities to be aware of the fact that it is not enough to acquire the technical devices and infrastructure necessary for technology assisted education. In order to also benefit from this, the universities need to make sure that the users at least have a basic proficiency level. Therefore, any project striving to successfully promote e-learning needs to take into consideration that staff and students have to feel comfortable when using computers which for many is a new learning environment.

In order to secure computer proficiency, the Africa University (AU) in Zimbabwe for example made a policy in 2002 that no student would graduate from AU without completing a computer literacy course. From the academic year 2010/011, the University of Ghana has also introduced a compulsory computer proficiency course which all students must take and pass. The University of Botswana is another example which has developed e-learning programmes and has the vision of providing a student-centred, intellectually stimulating, and technologically advanced learning, teaching, and research environment. The university recently won a Microsoft research award meant to encourage technological research to improve health, education, and socio-economic conditions. There are many other universities, especially in South Africa, which are really developing and continuously improving e-learning programmes to improve on education. These are just a few examples to show progress in this field in Africa and to serve as encouragement to the institutions which have just started or are about to start e-learning to improve on education in their various countries or regions.

The choice of the best learning management system or platform which could be used for e-learning courses was not a topic of discussion because the universities are still in the process of starting e-learning programmes. However, since this topic will come up sooner or later because a suitable software or platform is necessary to manage e-learning courses, this topic will be briefly discussed here. The universities usually choose a platform depending whether it is shareware or freeware or with paid licences. In the case of the African universities, a share ware platform is the best option. Many of these platforms are being used with the most widely used being Moodle (HTTP://MOODLE.ORG). Many universities, especially in Europe, with a glaring example being the University of Natural Resources and Applied Life Sciences Vienna, use Moodle as their core Learning Management System. The AU of Zimbabwe has also adopted Moodle as its e-learning platform. Moodle is easy to use and has features which are standard on an e-learning platform and many innovations like working tools permitting group work, thereby fostering cooperation amongst e-learners. There is also a question tool, where tests or exams can be designed to test target competences. The question types allowed include: multiple choices, true or false, fill in the blank, etc. It might also be best for the universities to try different platforms and choose the one best suited to their needs including the didactic advancement.

5 Conclusion

The general perception is that e-learning would be a great innovation in education because the learner is relaxed, works at her or his pace and convenience and is encouraged to work and think independently. It is expected that through e-learning, there will be a better mastering of concepts, increased self confidence, and innovativeness. This can greatly increase access to education and training for those who cannot attend university on campus and may ease pressure on teaching staff especially giving them time to attend sandwich programmes. E-learning also presents many opportunities that can overcome the handicap of not being able to be present for practical lessons regularly with the use of programmes which permit

demonstrations and illustrations. E-learning could therefore serve to provide improved knowledge of communication and consequently specific knowledge in some fields of study. The universities therefore see computer-based distance education or e-learning as a desired way of improving education and training in agriculture and forestry as well as other fields of study.

"Unfortunately, the particular opportunities presented by ICT as a means for transforming the path of development through education remain largely untapped in Africa" (OUÉDRAOGO 2006: 1). The level of awareness on new developments in ICT, in particular in internet-based learning in agriculture and forestry education is still very low. The major problems confronting the adoption of internet-based learning are poor electricity power supply and inadequate internet facilities. In addition to this, the number of computers available for use at the universities for lecturers and especially for students is inadequate and there is also real need for capacity building among academic staff to facilitate the use of e-learning in agriculture and forestry in the universities. The institutions considered in this study and other African institutions need to make a review of the ways e-learning can transform their education system graduating qualified people who can actively contribute to the global economy.

The open source movement should also be a major issue of consideration which should involve not only the three universities mentioned in this survey but other universities in the entire African continent. Other universities could be invited or visited to open discussions about experiences with open tools and content and how these can be successfully adapted to suit all the varying African learning conditions. This could include international organisations and others including interested individuals who could also showcase their experiences with open source repositories and furthermore illustrate the use of various open source learning management systems. African educational research is still severely underrepresented in international academic literature. It is important that researchers strengthen their participation in the scientific community. However, not only research, but also continuous teacher development should be supported by collaborative projects. Open educational resources, which come about from the collaboration between authorities, institutions and organisations, can be used to support teacher education. Practical learning and teaching strategies need to be identified and work intensified to improve or introduce the learning and teaching strategies deemed to be sustainable. Collaboration or networking is an approach which should not be neglected. E-learning can also be used to support collaboration across borders.

The African authorities also need to take active part in this venture, defining policies which promote private sector investments in telecommunication infrastructure and collaborating with the investors to improve connectivity to internet for universities as well as schools since gaining knowledge helps to build the necessary capacity of its citizens creating a skilled workforce to support the respective economies and empowering marginalised groups.

Just like in other fields and programmes of learning and teaching, particular attention needs to be focused on gender. Statistics show that many more men have access to internet

than women. Any e-learning strategic plan should take both men and women into consideration from the informal as well as the formal sector.

E-learning can therefore only play a role of improving education if it is properly conducted and the most useful facilities and infrastructures are in place.

Summary

E-learning, in particular distance education is regarded worldwide as opportunity to improve education and make learning more flexible and available to a wider audience. The development of Information and Communication Technology in Africa has been slow but progressive with a lot of people using computers and most especially the internet for educative purposes and for pleasure.

In order to evaluate the potential of e-learning in forestry and agriculture education, a survey was carried out in the University of Ghana, Legon in Ghana, Federal University of Technology, Akure in Nigeria, and the University of Dschang in Cameroon, developed based on the experience of the work science and e-learning team of the Institute of Forest Utilization and Work Science of the University of Freiburg, Germany. An open-ended questionnaire was sent by e-mail to the lecturers in the forestry and agriculture departments in these institutions. The main focus of the questionnaire was to determine the level of Internet Communication Technology/e-learning as part of the university curricula, infrastructural limitations and the level of training of lecturers who are to produce educational contents and offer e-courses.

The main result of the survey is that computer-based distance education or e-learning is a desired method of improving education and training in agriculture and forestry. However, the level of awareness on new developments in ICT or internet-based learning in agriculture and forestry education is very low and there is the need for capacity building among academic staff to facilitate the use of e-learning in agriculture and forestry in the University. Infrastructural limitations such as variable electricity supply, high cost of internet access out of the university campus and insufficient computer numbers and quality also contribute to slow down the effective use of this way of learning and teaching.

The importance of e-learning should not be underestimated. E-skills can quickly make a worldwide education and labour market available to trained individuals online. In this way, e-learning does not only serve to improve on education, but also improve on the living standard of people who used to consider themselves to be ordinary African people. This gives the opportunities to train people who will not wait for change but go out to initiate change in the African economy.

The general perception at the universities included in the review is that e-learning would be a good innovation in education because the learner is relaxed, works at his pace and convenience and is encouraged to work and think independently. It is expected that through this method, there will be a better mastering of concepts, increased self confidence, and innovativeness. This can greatly increase access to education and training for those who cannot attend university on campus and may ease pressure on teaching staff especially giv-

ing them time to attend sandwich programmes. E-learning also presents many opportunities that can overcome the handicap of not being able to be present for practical lessons with the use of programmes which permit demonstrations and illustrations. E-learning could therefore serve to provide improved knowledge of communication and consequently specific knowledge in many fields of study. The universities therefore see computer-based distance education as a desired method of improving education and training in agriculture and forestry as well as other fields of study.

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Annex: Survey Questionnaire

Survey on the Introduction/Improvement of E-learning/Computer Based Distance Education in University Curriculum and Content Development of the Courses

Dear Partners,

Distance/e-learning education initiatives are regarded worldwide as opportunities to improve education and make learning more flexible and to be available to a wider audience. Within the upcoming workshop on E-learning in Alicante, we will be focusing on exploiting the potentiality of e-learning as a whole and in forestry and agricultural education in particular.

It would be helpful, and much appreciated, if you could complete the following questionnaire with which we are hoping to gain more information concerning the level of Internet Communication Technology at your institutions, what infrastructure you need to facilitate this process of learning and most especially the training lecturers need to produce content and offer such courses. With this information, we will be able to jointly come up with sustainable solutions on what equipments are needed and how to implement suitable teaching modules in the forestry and agricultural sector which should be available for participants all over Africa or the world.

Please send this questionnaire by mail to your colleagues most especially in the forestry and agricultural departments and they can respond and send their replies back to me per mail: victorine.che@fobawi.uni-freiburg.de

For now the workshop is planned to take place in September, I would be very happy if you could encourage your colleagues to send in their responses by the 24th of May so that we can have time to analyse them.

Thank you in advance for your support.

Kind regards
Victorine

( ) Miss ( ) Mr ( ) Dr. ( ) Prof.

First name: ……………………… Surname: ……………………….

Lecturer in/field of expertise:

At which institution do you teach:

All information will be treated in confidence and the information will be used only in the context of the AFOLM project

Please, do not hesitate to use additional lines when filling in your answers. Use as much space as needed, there is no restriction!!!!!!!!!!!!!

For what do you use the computer during lecturing/teaching?

( ) Power point presentation   ( ) video conference   ( ) internet research
( ) e-mail/chat   ( ) courses on CD-ROM   ( ) courses on the internet
( ) video   ( ) other ....

What are the new developments in International Communication Technology (ICT) or internet based learning in education in your institution/country?

Do you have any experiences as a lecturer with computer-assisted learning? …………..

Do you regard computer based distance education /e-learning as a possible way to optimise education and training within your institution/country?
( ) Yes,   ( ) No

How? ………………

Do you think this technology can play a role to combat the high rate of functional illiteracy among adults?
( ) Yes,   ( ) No

Why? ………………

Does your institution have infrastructural limitations to computer based distance education?
( ) Yes,   ( ) No

If yes, please list these limitations
( ) Yes,   ( ) No

Do you have any suggestions on how to overcome these limitations?

What is the current status of interventions on integrating e-learning in your universities and other institutions of learning?

What progress is being made in the building of technical skills base for lecturers to support and sustain e-learning systems in your university?

Are you aware of the growing pool of open education resources?
If yes, how active are you or your students in this movement?

Do you have any suggestions on which e-learning /distance education courses your department/institution could offer?

For which target groups would you structure these courses?

Do you plan to tailor specific courses to suit specific target groups like only students or also include people who wish to continue their education who are not necessarily students?

Do you plan to offer courses in collaboration with other universities and institutions of learning or specific only to your university?

If other universities are involved: What recommendations for administrative regulations do you have which could facilitate students from other universities to attend courses and to get their credits recognised at their universities of origin?

What prerequisites do you think the students should have to be able to participate in the courses?

What publicity measures can you suggest to ensure that a wide audience gets to know about the existence of such courses ?

What approaches and systems are currently being applied to content development, distribution and management?

Would you offer your students a course only done over the internet, without lecturing in classes or combined?

Why?……………………………………….

Do you plan to blend off campus and on campus participants? If yes, do you plan any help with on campus participants?

What negative aspects might prevent your students from studying via computer on the Internet?

Does your institution provide computers for use by students?

Are the computers connected to the internet?

Do you think the number of internet connections are sufficient for you and the students?

What are your perceptions and expectations on distance education/e-learning?……………

What in your opinion are the greatest barrier and/or opportunities to the success of a distance education/ e-learning? …………

Further remarks and suggestions on forestry and agricultural education via Internet: …………

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