EXPERIENCES IN IMPLEMENTING THE STRENGTHENING AGRICULTURAL AND ENVIRONMENTAL CAPACITIES THROUGH DISTANCE EDUCATION (SAEC-DE) PROJECT

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Abstract

The "Strengthening Agricultural and Environmental Capacities through Distance Education (SAEC-DE), is a pilot distance education program being implemented by a consortium of partners; Makerere University - Uganda, University of Nairobi Kenya, University of Florida and CIAT and funded by USAID. The program was developed after realizing that the face-to-face mode predominantly used in SSA for training has increasingly been found to be inept to meet the diverse needs of the prospective clients (e.g. working class and remotely living students). The objectives of the program are to: (i) develop long term collaboration among universities in the North and South and CGIAR for joint capacity strengthening and mentoring of students (ii) demonstrate an alternative and complementary model for ICT-based MSc. training, (iii) increase capacity of individuals and institutions in relevant program and distance education, and (iv) advance distance education in partner institutions.

The program was phased into three phases, namely; testing, piloting and full implementation. The testing was done in Fall (Sept-Dec) of 2005, using 12 guest students Colombia, Kenya, Tanzania and Uganda to generate experiences to inform the piloting process. The Pilot phase was started in the spring of 2006 with four candidates that were recruited from the Universities of Nairobi, Makerere and Columbia in Environmental Soil Science and Agricultural Entomology. The content delivery is largely electronic complemented by multi-media products (e.g. CDs, books, lab kits) delivered by courier. In terms of research work, the students are at various stages with some having started addressing locally relevant issues under joint supervision of the universities professors and CGIAR researchers.

Based on the implementation so far, it can be deduced that distance education offers a viable alternative for lowering education costs, increasing professional retention and keeping trainees within their professional and home environments. This proposal seeks to provide a platform for sharing with stakeholders our experiences in implementing the Web-based ICT-based postgraduate training in agricultural and environmental education in the region that enhances exposures and motivates learners in intercultural platform. The platform will provide an opportunity for stakeholders to share relevant lessons and experiences on Policies and programmes that enhance student learning, development of course content that are internationally appealing and conduct of locally relevant research. It is hoped that we will come out with the answer the question –What distance learning programmes and policies are requisite to produce a graduate that is locally relevant yet can favourably compete for the job market globally in the relevant agricultural fields?

Key words: Agricultural & Environmental capacity, Distance Education

APPROACH

The PCF5 is viewed as an opportunity to receive feedback on our experiences. We will have a 1-day shared pre-conference meeting in which various presentations will be presented and also an ochestrated discussion session. The presentation will cover background, project objectives, status of the project, lessons learned, challenges and way forward. These will be in form of lcd power point and poster presentations. Discussions and feedback will be received on:

1. What is the real problem limiting agricultural and environmental capacity?
2. Is the project most suited to address the problem?
3. What components are critical for the project?
4. How best can the project be scaled up and out?

The major issues captured during the preconference will then be presented to an ochestrated session of the general assembly. The foundational content for the presentation is herein enclosed.

INTRODUCTION

There is often a high cost associated with long-term degree education that takes professionals out of their professional roles and away from their homes for extended periods. These costs include the tuition, travel costs, living costs (often with families), social costs, and opportunity costs. Faced by a long-term absence in their professional roles, and other factors in their countries, student that leave for training often choose not to return. This lower retention of degree recipients in local institutions adversely affects the development of institutional capacity and sustainability.

The Strengthening Environmental and Agricultural Capacity through Distance Education (SEAC-DE) program is a USAID/CIAT sponsored project that aims at building institutional capacity, especially in southern countries, through methods that combine reduced costs with enhanced international collaboration among participating institutions and individuals. The project is premised on the fact that collaboration among people and institutions with diverse experiences can exploit current developments in Information and Communication Technologies (ICTs) to improve the quality and relevance of research both in southern and northern countries. The arrangement in the SEAC-DE is such that the project links international distance education with locally relevant research for agricultural development and environmental protection at diverse institutions around the developing world. It is important to note that distance learning is not a new phenomenon but the development of ICTs give distance learning new shape. This property is what makes the SEAC-DE program unique.

Project Objectives

(a) Increasing the numbers and quality of faculty and scientists in developing country institutions.
(b) Developing long-term collaboration in capacity-strengthening through distance education.
(c) Building collaboration between faculty, scientists, and students in participating institutions.
(d) Increasing CGIAR scientists' courtesy and adjunct affiliations with universities.
(e) Developing and strengthening locally relevant MSc and PhD programs through team teaching, faculty exchange, and joint course development and enhancement.
(f) Using knowledge sharing techniques as well as information and communication technologies (ICTs) for higher education.

A test phase was conducted in spring 2005 to identify the opportunities and challenges that may occur so that corrective measures could be taken. Building on the previous test phase, which focused exclusively on International Canter for Tropical Agriculture (CIAT) in Colombia, the project expanded the number of guest students to include the two educational partner institutions in Africa and CIAT researchers located in Africa and Colombia. A pilot project in Uganda and Kenya has been successfully launched with five students enrolled in Master's degree programs, supported by thesis advisors from the CGIAR (Consultative Group on International Agricultural

Research), the University of Florida (USA), Makerere University (Uganda) and University of Nairobi (Kenya). In this paper, we provide insights and experiences into new approaches of building human and institutional capacity both in southern and northern countries using distance learning aided by ICTs.

STATUS OF THE PROJECT

The project was planned to operate in phases. Students would be recruited depending on availability of funds. The first phase was initiated in January 2006 with the registration of two students, one from Makerere University (Uganda) and the other from University of Nairobi (Kenya) both in the Soil and Water Science department, Institute of Food and Agricultural Sciences, University of Florida. Two more students joined in August 2006 in the Crop Science Department of the same University.
The MS degree candidates, their academic advisors, and areas of study include:

- Glady M. Njumwa, University of Nairobi, Kenya
  Candidate for MS in Entomology & Nematology, University of Florida
  Advisor: William A. Overholt, University of Florida
  Research topic: Post-release impact assessment of the exotic parasitoid, Cotesia plutellae, on diamondback moth, Plutella xylostella, at Yatta and Athi-River in Kenya.
- Miriam Githingo, University of Nairobi, Kenya
  Candidate for MS in Soil & Water Science, Environmental Science Track
  Advisor: Andrew V. Ogram, University of Florida
  Research topic: Non-thesis MS degree
- Bernard Fungo, Makerere University, Uganda
  Candidate for MS in Soil & Water Science, Environmental Science Track
  Advisor: Sabine Grunwald, University of Florida
  Research topic: Geostatistical modelling of Lunnyu soils in the Lake Victoria Basin, Uganda
- Brian Gidudu, Makerere University, Uganda
  Candidate for MS in Entomology & Nematology, University of Florida
  Advisor: William A. Overholt, University of Florida
  Research topic: Investigation of the biology of tip-feeding midges of *Hydrilla verticillata* in Uganda
- Marcela Quintero, CIAT, Colombia
  Candidate for MS in Soil & Water Science, Environmental Science Track
  Advisor: Nicholas B. Comerford, University of Florida
  Research topic: Soil erosion control and water quality as ecosystem services in the Colombian Andes

Each of the above students is assigned three mentors of whom one is from University of Florida, another form the home University/institution and the third from a CGIAR center. All the three mentors are involved in advising the students on their thesis projects so that they can conduct research that meets both academic requirements as well as practical significance. Course materials (e.g. textbooks, lecture notes and assignments are supplied to the students mainly through the internet). However, where textbooks cannot be accessed locally, they are provided directly from the course instructors or purchased from the publishers on his/her recommendation. The students are provided with computers connected to the internet to enable them carry out their studies. Through online chats (both text and voice), students are able to communicate directly with their mentors to discuss issues relating to the research projects. Three of the students are expected to complete their master's degree programs between June and December 2008.

LESSONS LEARNED

Based on the implementation so far, it can be deduced that distance education offers a viable alternative for lowering education costs, especially for developing countries. This is especially with those costs involved in transporting and maintaining students outside their home countries

and the opportunity costs of leaving their jobs. The use of cost-effective distance learning for graduate level training has the potential of increasing the number of graduate level trainees in southern countries. Considering the costs of transport, accommodation, medical insurance and contingencies, e-learning is relatively cheap and will encourage a larger number of students to have access to learning opportunities.

A major benefit of the program is its ability to retain trainees in their professional roles and not taking them away from their homes for extended periods. Although the training adds a burden the daily activities, committed trainees feel it better when they enjoy the company of their relatives and friends at home and work place.

SAEC-DE initiative pioneers Web and ICT-based postgraduate training in agricultural and environmental education in the region, which enhances exposures and motivates learners in intercultural platform. The program has been seen to promote interaction among students and instructors, and among fellow students in different parts of the world. The discussion boards provide for students to communicate directly to the instructor and to fellow student through discussion boards. Where a colleague has an idea that another wants to get details about, it is possible to ask directly without necessarily interfering with the class time. Communicate information in a more engaging fashion than in the face-to-face mode. Use of ICTs in distance learning offers a wide range of texts, diagrams and images with video and sound, including virtual real technology that enhance learning.

Joint supervision from both Universities and research institutions enhances quality and relevance of student research. Beneficiaries would contribute to increased agricultural production and development in their countries, hence alleviate poverty and improve food security. Partnerships are useful in developing programs and course content that are internationally appealing and conduct of locally relevant research. Collaboration in teaching and research is crucial for successful development of international-level problem solving approaches. The SEAC-DE program goes beyond student-student and student-instructor interaction to institutional levels. For instance, three broad categories of research institutions can be recognized; Universities, whose major aim is to build capacity of individual scientists through teaching, government institutions such as National Agricultural Research Organizations, and Non-government research organizations such the CGIAR. Although there is apparently some level of collaboration, it seems to be more at individual, rather that institutional level.

In many cases, Non-government institutions only provide funding to individuals conducting research that meets the goals of the donor institution with no emphasis on the academic goals of the institution administering the funds. The initiative of SEAC-DE provides a basis for improved collaborative efforts to develop research programs that link well the objectives of the various collaborating institutions. So far, University professors from Makerere and Nairobi Universities are keen and active partners in the initiative, as they can clearly see the value of long-term collaboration between scientists, faculty, and students in CGIAR canters, northern and southern Universities.

Furthermore, there is a possibility of widening the scope of research where collaboration is eminent. The tendency for many researchers is to conduct research in their home institutions with hope that the findings will be extrapolated for wider application. However, collaboration through the distance-learning program introduces a new concept of developing research that encompasses more that several research sites, implying that there is a possibility of comparing case studies and arriving at a more realistic representation of the theoretical conclusions. In addition, the methods of teaching to which the students are exposed, enable them to make necessary adjustments to help them auger well in a dynamic society.

As students continuously interact with their various supervisors from various research and academic institutions, there is wider exposure to experiences based on real world situation. Professors from University of Florida see an opportunity to broaden their research scope and make their course offerings more interesting for international audiences. All partners are learning

to deal with new ICTs, and southern partners plan to use these new skills in future distance-education courses for their constituencies in Africa.

Records of discussions are retained allowing for later reference using threaded discussions or bulletin boards: Distance learning with the help of e-learning accommodates different learning styles such as discussions boards, chat sessions, assignments and photography. Hence, it fosters learning through a variety of activities that apply a different learning style. E-learning is superior to the face to face approach because the later does not support easy exchange of information in the various formats. Thus, e-learning mitigates these constraints and improves learning. Enhances self-placed learning whereby students can learn at a rate they prefer because materials are posted online and students have time to recap the message: In the face-to-face approach, the students must keep the same pace as the instructor or else they miss part of the message. In cases where a student is absent from class, it is not possible for him or her to access the lecture discussions. In e-learning, however, discussions are stored and can be accesses at the later date. This gives room for slow learners to re-cultivate the message and extract as much useful information to them as possible. This will not only benefit the current class, but also potentially useful for future reference for other classes.

The more flexible e-learning time-table encourages students to take responsibility for their asynchronous learning and succeed in building self-knowledge and self-confidence. The is nothing like missed lectures since all the information remains available, ranging from lecture notes to bulletin boards, external links and achieves of discussion boards. In addition, students are, on many occasions, referred to information through external links and it is there responsibility to look for the information and make proper use of it. In other words, not all the information is provided to the student but the instructor may guide them in looking for the information by providing external links.

The method also develops knowledge of the Internet that will help learners throughout their carrier: The use of ICTs is becoming inevitable in every part of the world, including teaching and research. As students learn through the internet, skills related to searching information, on-line communications skills and information exchange are learned. The current trend in development of ICTs suggests that the use of the internet will form an important basis for most activities.

On the part of the instructor, e-learning allows him/her to package information for all students to access so that he or she can concentrate on high level activities. The root of this is that learning is student-centered, the instructors' role being that of moderating and refocusing learning activities. For example, less time is spent on discussing content that is already available on-line because the instructor provides external links and the students dig out the details.

Automated continuous assessment ensures consistency and accuracy: Methods are available for instructors to set timed exams, which students can do any time they feel they are, ready or within a specified time. Test formats also allow for flexibility in the type of questions that cover all aspects of learning (evaluation, synthesis, analysis, application, understanding and knowledge) objective, re-structured, and essay type questions are all provided for.

CHALLENGES WITH DISTANCE-LEARNING

The major challenge in developing countries lies with internet connectivity may hamper student learning and instructor’s delivery. Technical difficulties related to Internet bandwidth may not be robust enough to support the desired level of multimedia accessories. Costs of accessing the Internet are still prohibitive. Often the situation is aggravated by power outages. Although connectivity circumstances particularly in Eastern Africa are still very limited, creative ways have been found to deal with these in the mean time. For instance, distance education students are assigned computers with privileged access to the Internet; study materials are designed in a way to require little bandwidth, some course materials are provided on CD-ROM; and, arrangements have been made with international centers in the region to allow students use their facilities.

Difficulties in delivering practical oriented courses fully on-line: For example, field visits, laboratory practical may necessitate some face-to-face interaction with the instructors. What has been done so far is to provide the students with photographs and video recordings of practical sessions conducted by on-campus students. Thus, the message may not necessarily reach the students as may be intended. Therefore, the face-to-face approach becomes inevitable under such circumstances. This shortcoming can be improved using such methods as the virtual field laboratory (Ramasundaram et al., 2005).

Online-supervision of students where complicated laboratory or field procedures are involved can be challenging. One of the students on the SAEC-DE project is studying a local soil infertility problem (Lunnyu) and his research topic is entitled "Geostatistical modelling of Lunnyu soils in the Lake Victoria basin, Uganda". Because of the unique nature of the problem, both the UF and CGIAR have had problems visualizing the real world situation. The second from University of Nairobi was studying microbiology but because of the nature of her research, the UF supervisor had to travel to Nairobi to interact and develop the study together after visiting some of the study sites. This experience suggests that on-line supervision that is used in the SAEC-DE project can create some gaps in the understanding of the research project by the student and the supervisor alike.

Gaps in computer knowledge of students and instructors may call for prior training to make them familiar with computer and e- learning programs. In developing countries the assumption that all students are able to effectively use computers may not always hold. Under such circumstances before a student embarks on a distance learning degree program there is need to take them through rigorous training to ensure that they understand the basics of the program. This is especially important during timed examination and discussion sessions. Students working with e-learning at an individual level are pioneers and do not have the support of a network of more experienced colleagues. In the SEAC-DE program, students were first trained for a semester by giving them trial courses before they were recruited the following semester. Feedback from the trial was the used to correct area that could hinder effective learning such as accessing course materials and participating in chats.

Instructors may need to be familiar with electronic text books, internet–based research material, copy right laws and other e-learning related topics: This is important as is limits the availability of reference texts available to students. The SEAC-DE program tried to minimize students travelling to foreign universities as is the case in the face-to-face approach. However, there is still need to buy books from foreign universities to complement electronic material. A transformation form purely hard copy to both electronic and hard copy materials may avert this shortcoming.

WAY FORWARD

Generally, previous experience shows that through inter-institutional collaboration in teaching and research coupled with the rapid development in ICTs, there is a possibility of increasing the number and quality of graduates in developing countries through distance learning. However, key to success of this program will largely depend on establishment of wide internet connectivity among collaborating institutions so that students and instructors have access to computers and the Internet with appropriate bandwidth. There is also need for transformation to electronic information systems and improvement in laboratory equipment and materials, especially in the developing countries. The face-to-face approach cannot be avoided completely, especially for practical courses, in which case short courses may be organised by the host institution to enrich practical aspects of the students.

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