Towards the Introduction of Electronic Teaching & Learning Methods in the College of Agriculture, University of Ghana

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Abstract

Electronic Learning and Teaching (e-learning) has become a common tool employed by many universities world-wide to improve teaching delivery. It involves the use of electronic-supported technology to improve information processing and delivery. However, there is a limited use of this mode of teaching and learning in the College of Agriculture, University of Ghana. The purpose of this study is to assess the preparedness of the College to migrate from solely paper-based to a more e-based learning and teaching.

The study used structured questionnaires to interview sixty (60) randomly selected undergraduate students, twenty (20) post-graduate students and twenty (20) teaching faculty on the modes of teaching and learning, IT literacy and the use of e-technology for teaching during the 2011/12 academic year. The results indicated that though 40 % of the lecturers and 50 % of students had sufficient IT literacy skills, there was only very little e-based learning activity in the College during the period of the survey. The main IT-teaching method employed by the faculty was PowerPoint slides, and even so, only the basic features were employed. The survey showed that a number of challenges had to be addressed to facilitate the use of e-based teaching and learning methods. These include: (i) reliability of the internet system in terms of speed and capacity, (ii) availability of computer infrastructure in the college, including *WIFI* coverage, (iii) the need for training in e-based for teaching and learning and (iv) the need for a general policy guide for the promotion of e-learning in the College. The results from a limited e-learning pilot con-

ducted during the year, however, showed that there was willingness to embrace e-learning if the challenges could be addressed.

Keywords: e-learning and teaching, IT literacy, web-based teaching.

Introduction

Dramatic increases in student enrolment, increased number of academic programmes coupled with a very slow rate of expansion of physical facilities are some of the major challenges facing the maintenance of teaching and learning quality in the in the College of Agriculture, University of Ghana. Student numbers per class have increased from an average of 25 (in the 1980s) to 200 (2010). Limited availability of reference texts in the University's libraries aggravate the problem, with students having to rely, to a great extent, on lecturers' notes for learning.

Due to large class sizes, the face-to-face methods of teaching, which continues to be the dominant mode of teaching in the College has become ineffective. In many cases, not more than 30 % of students actively interact with the lecturer. More so, the classroom is limited to only one activity, namely, lecturers teach and students take notes. Conceivably, if course notes and other materials were made available earlier, the time in classroom could be used for a range of other learning activities, such as group discussions debates, etc. Whereas it could be argued that printed hand-outs could be made available to students before class, the cost of paper, ink, etc. could be prohibitive. Further, students in remote locations could not be easily reached with hard copies in a timely and cost-effective manner.

It is important to explore additional methods of course delivery in the College, given that technological advances in the last few decades have made it possible to overcome some of the limitations of face-to-face and solely paper-based teaching and learning methods. To date, course delivery via e-technology continues to be insignificant in the College, though the University of Ghana has for some time been making efforts to introduce e-learning. An E-learning Committee, set up in the University since 2009, developed a general policy framework (see Oheneba-Sakyi et al., 2011) but a proposed e-learning pilot to sensitize the university community has not yet materialized.

One issue of importance to the success of e-learning technology is the preparedness of the learning community in the College (students, lecturers, and supporting staff) to embrace e-learning and teaching technology, especially, the web-based systems. This issue, has hitherto, not been researched.

The aim of this project was threefold. First, it sought to explore the modes of teaching and learning in the College of Agriculture, University of Ghana. Second, it sought to evaluate the IT literacy level among the learning community and thirdly, the study assessed the preparedness of the learning community to embrace e-learning (especially web-based) methods in the course delivery system.

Materials and Methods

The College of Agriculture, University of Ghana.

The College of Agriculture, University of Ghana grew out of the Faculty of Agriculture which was established in 1953. Currently it has two Schools (Agriculture and Veterinary) and seven departments (Crops, Soils, Animal, Agricultural Economics and Agri-Business, Agricultural Extension, and Family & Consumer Sciences) as well as three Research Centres. The College runs both undergraduate and post-graduate programmes in all disciplines. The undergraduate programmes include a three-year Diploma and a four-year Degree. Post-graduate programmes included the Master of Agriculture (M.Ag.), Master of Philosophy and Ph.D. A total of about 700 students are enrolled in the College during the study period with about 20 % at the post-graduate level. The academic staff strength was about 77.

Project approach

This project was designed to achieve two main activities (Table 1), (i) needs assessment, and (ii) piloting e-teaching and learning in some selected programs.

Activity A: Needs Assessment
A1. Identify stakeholders A2. Analysis of the current teaching and learning methods A3. Stakeholder discussions on e-learning leading to the development of a mental map, and A4. Formal interviews and administration of questionnaires on teaching and learning.
Milestone A: Determination of the dominant mode of teaching and preparedness to adopt e-learning and teaching alternatives

Activity B: Piloting an e-learning and teaching for selected programmes
B1. Discussion of the results of Activity A with stakeholders (Lecturers and Students) B2. Identification of the types of e-learning that could be implemented in the short term and B3. Discussion of the steps needed to popularize e-learning in the College in the long-term.
Milestone B: Determine the success chance of e-learning in the College.

Table 1: Project Activities

Survey

Two survey approaches were used to assess the teaching modes and the lack of e-learning in the College (needs assessment). First, a focus group discussion was held in late July 2011 for a cross-section of students and lecturers and the outcome of this interaction was used to develop a mind map (Fig. 1) that documented the challenges and opportunities for introducing e-learning methods.

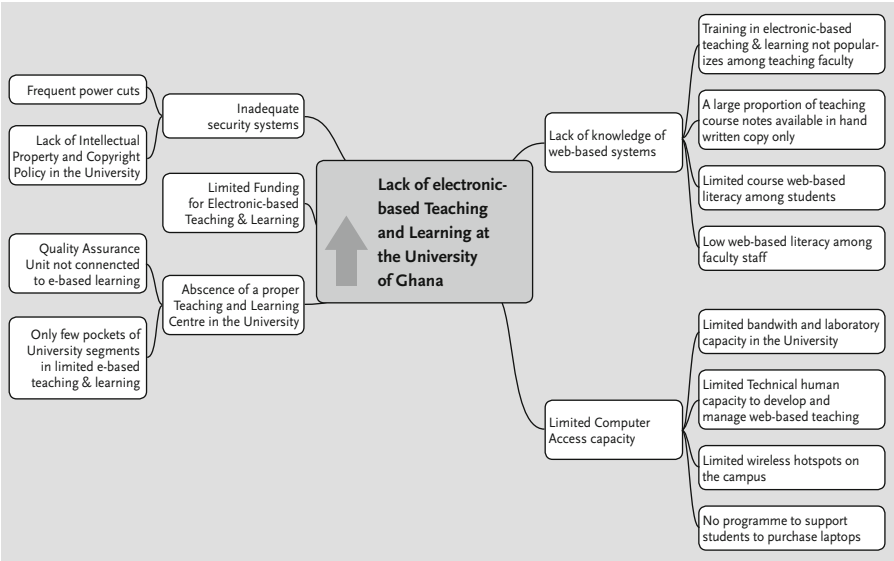

Figure 1: Mind map on the lack of e-based teaching and learning.

Second, formal survey instruments (structured questionnaires) were administered to sixty (60) undergraduate students from the second to fourth years and twenty (20) post-graduate students. Additionally, twenty (20) lecturers and two

(2) system analysts in the College were also interviewed. The survey questions focused mainly on:

- Current teaching methods,
- Access to computer laboratory,
- Computer literacy,
- Knowledge of downloading and uploading files from the internet,
- Laptop ownership, and
- Preparedness to embrace e-learning methods.

Summary and descriptive statistical methods were used to analyze the data.

Results and Discussion

Activity A

(i) Teaching modes
Both students and lecturers agreed that the dominant teaching mode was by face-face. Lecture notes were delivered via a range of methods including dictation by lecturers, (5 %), PowerPoint slides (38 %), and printed handouts (> 50 %). Most students and lecturers appeared to be somewhat comfortable with these modes of teaching.

(ii) Computer and IT Literacy
Computer literacy skills of both students and lecturers were satisfactory (Figs. 2a & b) but this was largely limited to word processing. Literacy in computing using Excel was average (33 %) whereas the skills for database management (e.g. ACCESS) and project planning (MSPROJECT) were negligible. On the other hand, most students (87.5 %) were internet literate and could upload and download items and other information from websites.

Figure 2: Computer literacy among (a) students and (b) lecturers

(iii) Challenges to embracing e-learning and teaching

A number of challenges were identified with regard to the introduction of e-learning and teaching into the College. From the students' point of view, limited access to computers and the internet (including *Wi-Fi* hotspots) in the College were considered as major handicaps (Fig. 3a & b). Only 43.5 % of the students could easily access these facilities in the College's computer laboratory. Ownership of personal laptops among students was low (5 %). About 92.8 % of students expressed the desire to participate in an "own a laptop" scheme, if the College would facilitate a hire-purchase agreement with computer companies. Most young lecturers owned personal computers and are linked to the University's Local Area Network (LAN). Access to internet was thus not a major issue.

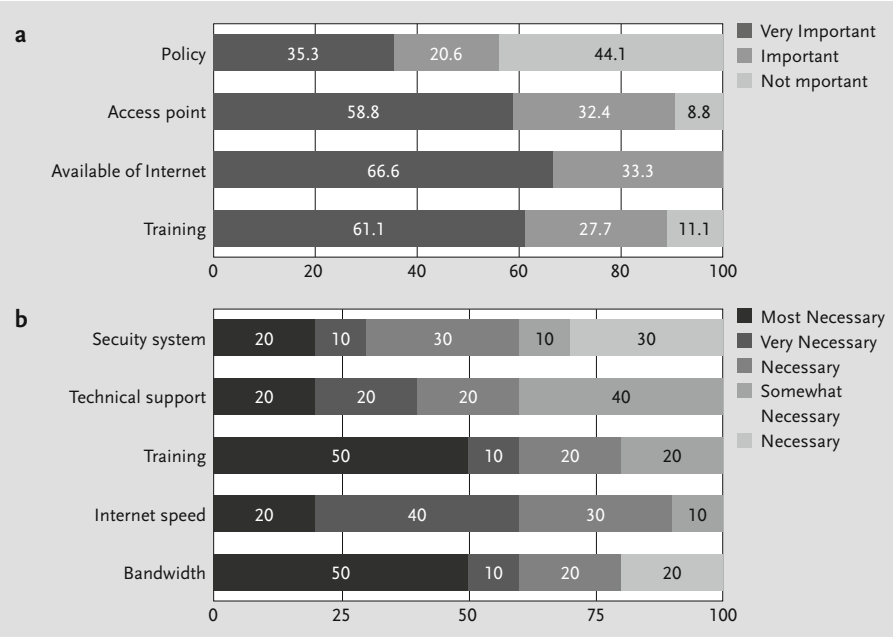

Figure 3: Challenges regarding migration to web-based learning by (a) students and (b) lecturers.

From the lecturers' viewpoint the major challenges to e-learning and teaching were bandwidth and training (Fig. 3b). Indeed, the results showed that only 5 % of lecturers interviewed had previously participated in an on-line learning and there is currently no online teaching going on in the College. It was quite clear that the lack of knowledge of e-learning was the most limiting factor. Hence a training workshop on e-learning and sensitization of the learning community was of utmost importance.

Interactions with the system analysts in the College indicated that the entire University of Ghana operates on a bandwidth of 155 Mb/s, and even though this is sufficient, there is no specific allocation of the bandwidth to any Department, College or institution. Thus, some departments may use up more, thereby causing an un-even share of the bandwidth. But regardless of this, the analysts were of the view that the bandwidth capacity was still sufficient to host most of the course websites to post course lecture notes and other reading materials, quizzes, and enable discussion chats and tutorials for students and to download completed student assignments. Furthermore, there was a drive to extend *Wi-Fi* to all student halls of residence and

departments to improve internet access. It is, however, important to note that if the whole University of Ghana (with 38000 students) migrates to e-learning, bandwidth challenges may become real.

(iv) Preparedness to embrace e-learning

The survey results indicated that about 60 % of lecturers claim to be ready or partly ready to embrace e-learning technology (Fig. 4). In the case of students, there was no experience of e-learning. However, given the fairly high IT literacy among students, there is some likelihood that with the appropriate sensitization and training, students would be willing to embrace e-learning.

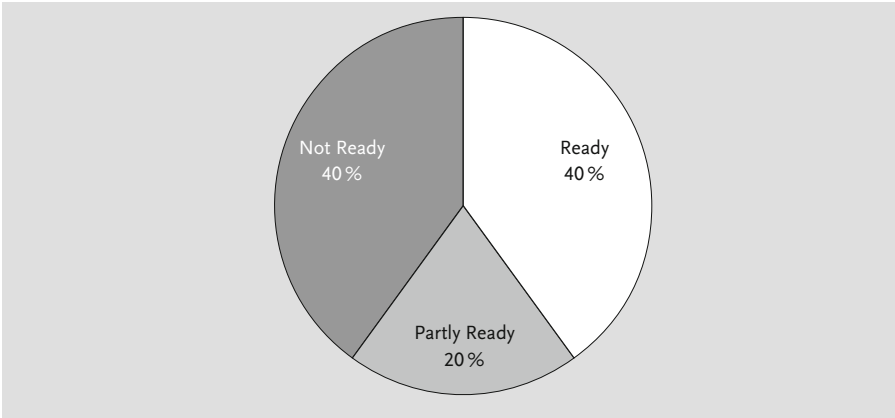

Figure 4: Readiness of lecturers to embrace e-learning

Activity B (E-learning pilot)

The discussions of the survey results with the interviewees indicated that the findings reflected their responses. The desire was expressed to run a pilot e-learning in the College. However, in the absence of a suitable platform, the pilot was limited to only two postgraduate soil science courses: SOIL 608 (Soil & Water Conservation) and SOIL 616 (Soils, Atmosphere and Global Climate Change). Both of these courses were taught by the author. For these two courses, a yahoo-group account was opened, with both students and the lecturer having the login and password. Lecture notes and assignments were posted to this email before actual lectures. Lecture hours focused on discussions and problem solving. The email site also provided an opportunity for on-line discussions after lectures.

Though the pilot was limited to only sixteen (16) post graduate students, there was a general satisfaction with the hybrid e-based and face-to-face mode of teaching. It was concluded that for small class sizes, simple yahoo-groups accounts could adequately facilitate teaching. For larger class sizes, a more appropriate platform may be necessary.

Future work

Observations from the survey indicated that some major steps and efforts are necessary to facilitate the migration from the solely paper-based face-to-face to more e-based teaching methods.

First, lecture notes need be digitized and other digital teaching methods including audio-visuals, *i-clickers*, videos, PowerPoint, etc. be demonstrated to lecturers.

Second, the development and dissemination of a general college-based policy on e-based teaching and learning is essential to guide against infringements of intellectual property rights, plagiarism, etc.

Third, further training of lecturers and students in computer technology is essential. It is proposed that courses in MSWORD, EXCEL, ACCESS and MSPROJECT be introduced into the curriculum. For students, these courses could be spread over the 4 years of undergraduate study. Appropriate credits should be assigned to these courses. In the case of lecturers, training courses could be available in the holiday periods. Lecturers must show evidence in form of participation certificates.

Fourth, a training scheme for e-learning has to be developed for students and lecturers. The tutorials must themselves be on-line and with an initial face-to-face introductory workshop. Tutorial upgrades should be available on-line from time to time.

Finally, technology support should be intensified. In particular, the "own a laptop" scheme for students has to be intensified. Some investment to improve college computer and web infrastructure is necessary.

Conclusion

This study has surveyed the status of the modes of teaching and learning in the College of Agriculture as well as the preparedness of the College to migrate from paper-based to a more e-based learning technology. It could be concluded that despite

the challenges, there is a general willingness to migrate, provided the challenges are addressed. An intensification of computer technology course in the College of Agriculture is necessary as well as a general policy framework to guide the migration process.

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