Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS) 1 (2): 80-83

jeteraps.scholarlinkresearch.org

E - Learning in Agriculture Higher Education: A Case Study

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Abstract
E-learning strategies are increasingly being using in the higher education sector to facilitate the teaching - learning process. The Faculty of Agriculture, University of Peradeniya recently established a Leaning Support Centre (LSC), to which teachers can upload e-learning modules (ELMs) so that students would have free access to course related additional learning resources. During the time of this study, the LSC offered e-learning materials for 13 courses. The study was conducted to find out the (i) level of use of ELMs, (ii) undergraduates' attitudes towards e-learning, and (iii) limitations and challenges in using e-learning. Sixty one undergraduates were selected for the study using stratified random sampling method. A structured self administered questionnaire was used in data collection. Focused group discussions were also conducted with staff members to collect information. Frequency distributions, chi-square tests, and Spearmen's correlations analysis were used to explain the variables. Use of computers and the internet for academic work is fairly common among the undergraduates. About 95% of the respondents found to be using web for academic purposes at least once a week. Students who frequently use the internet for academic purposes had higher GPAs indicating higher academic performances ($r=0.266$, $p < 0.05$) and had favorable attitudes towards e-learning ($r=0.301$, $p =0.018$). Many (69%) students were seen using the LSC recommended for the ongoing academic semester. Average number of e-learning modules used by a student was limited to 3 although an average student has visited 5 such modules available in the LSC. The major challenges for introducing e-learning in the Faculty were seen as lack of advanced computer skills among the academic staff, less awareness on instructional design techniques, time constraints, and security concerns. Hence, it is important to provide the necessary technical assistance to interesting academic staff members to develop good quality e-learning resources.

Keywords e-learning, agriculture higher education, attitudes on e-learning

INTRODUCTION

E-learning strategies are increasingly being using in the higher education sector in facilitating teaching – learning process. Many institutions have initiated developing e-learning materials to supplement course materials, enhancing higher order learning skills. When compared to class room teaching, e-learning resources enable the learners to study the material at their own pace allowing repetition and revision (Collins et al., 1997) facilitating a variety of learning styles. Users will also have extended access to information beyond the normal training class material. When used effectively, multimedia material can enhance the enjoyment and engagement of learning which allows the user to pay attention for a longer time without feeling bored (Leacock and Nesbit, 2007). Having identifying the various advantages of e-learning , the Faculty of Agriculture, University of Peradeniya initiated a Leaning Support Centre (LSC), to which teachers can upload e-learning modules so that students would have free access to course related additional learning resources. One of the main objectives of establishing the LSC was to provide supplementary material that was lacking to promote student-centered learning which was envisaged in a major curriculum revision adopted by the faculty.

During the time of this study, the LSC offered e-learning resources for 13 courses. These e-learning resources were developed using basic software packages namely MS word, and MS PowerPoint. While some authors argue that development of e-learning resources, such as e-books, has been led primarily by technology instead of by users' requirements (Landoni and Diaz 2003), it was felt necessary and highly important to study the usability of digital -leaning resources among the undergraduates of the Faculty of Agriculture in order to make necessary recommendations to promote blended learning among undergraduates in the future. Hence, the objective of the study was identified as (i) to find out the present level of use of e-learning materials (ELMs) by the undergraduates, (ii) to identify their attitudes towards e-learning, and (iii) to determine the use of e-learning materials compared to other learning resources.

METHODOLOGY

This study was carried out at the Faculty of Agriculture, University of Peradeniya, Sri Lanka during 2008-2009. Second-year students were selected to participate in the study considering their exposure to e-learning resources. Sixty one students (male=31, female=32) were selected for the

questionnaire survey, using stratified random sampling while a structured self administered questionnaire was used in data collection. The questionnaire consist of five sections i.e. Level of use of computers by undergraduates, exposure to e-learning, frequency of use of e-learning and other learning resources, attitudes on the use of e-learning, and accessibility to computers and internet.

Attitudes of the respondents were measured using an attitudinal scale. This scale consists of 11 statements, including both positive and negative statements. Each respondent was asked to state whether they agree or disagree with them using a five point Likert Scale. A score of 5 was given if the respondents *strongly agree* with a positive statement. Similarly scores 4, 3, 2 or 1 was given if the respondents agree, neutral, disagree or strongly disagree with statements respectively. To evaluate negative statements scores were assigned vice versa. A reliability analysis was performed using the co-variance matrix method to select the statements that should be included in the attitudinal scale (Reliability co-efficient alpha was 0.7587). A mean score was then computed for each respondent by averaging the scores for each statement. **F**requency distributions, chi-square tests, and Spearmen's correlations analysis were used to explain the other variables. Discussions were also conducted with the Faculty staff during the workshops to identify the types of challenges faced when developing e-learning resources for undergraduates.

FINDINGS

Use of computers and internet

Computer skills make an important component of undergraduate curriculum of the Faculty of Agriculture. Each student must get a pass grade for a computer application course in order to complete the degree. This is necessary because many undergraduate courses demand for computer skills such as word processing, internet use, spreadsheet, database, and use of specialized software. To determine the frequency of using computers for different tasks, students were questioned how often they use computers for the tasks given in Table 1. According to the results, use of computers and the internet for academic work was fairly common among the undergraduates. Majority (95%) of the respondents searched the World Wide Web for academic purposes, at least once a week, while 25% of them used the internet for the same purpose as frequently as 5-7 days per week. This indicates that the agriculture undergraduates are using computers quite frequently.

Table 1: Distribution of students by the frequency of use of computers and internet

Task	Percentage of students (n=199)				
	5-7 days/ wk	2-4 days/ wk	Once a week	Monthly	Rarely/ never
Search world wide web for academic work	24.6	50.8	19.7	4.9	0
Typeset documents/ reports/ prepare presentations	8.2	18	26.2	27.9	19.7
Use e-learning materials (ELMs)	4.9	11.5	16.4	23	43
Check Emails	20	34.5	12.7	16.3	16.3

As shown in Table 1, many (52.5%) students were found to be using computers, at least weekly, to typeset assignments, prepare presentations, organize notes, data analysis, and computing purposes. About one third (33%) of the students used the e-learning materials as frequently as once a week while a few others (23%) were found using LSC once a month. The rest 43% rarely use such material indicating that their use of LSC is irregular. For instance some students used the LSC only during the study leave period. Some others used those only when the lecturer asked them to do so. Interestingly, two-thirds (66.2%) undergraduates were found to be using the internet to check emails at least once a week. This signifies the possibility of promoting more student teacher interaction using computers. Students who often use internet, for academic purposes, had higher GPAs indicating higher academic performances ($r=0.266$, $p=0.040$). This is probably be due to the effective study skills possessed by the students as they use computers in academic work more often than the others.

Access to Computers

The students were found to be using computers of their own, computers shared with family or friends, and public computer facilities such as Computer Centers in the university for their education purposes. Most of the public computer facilities were accessible to the student community free of charge. According to the results, more than half of the respondents (54.3%) had personal computers, either own or shared by their family, which they can use when ever they need. Interestingly forty percent of the respondents also had internet access for these personal computers.

Exposure to computers and e-learning resources

To determine the level of exposure to computers, students were asked for how long they had used a computer. Results (Table 2) show that (Table 2) the respondents were quite familiar with computers, as the majority (60%) of them had been exposed to

computers for 8 or more years. Interestingly all most all the respondents had computer exposure even before coming to the university.

Table 2: Distribution of students by computer exposure

Years of exposure	Percentage (n=199)
3 – 6 years	26.9
7 – 10	53.9
11 - 12	9.5
> 12	4.75
Total	100

One of the main objectives of the study was to determine the level of use of e-learning materials at the LSC. Thus the students were asked to indicate the number of ELMs they have visited and the actual number of ELMs they have studied. According to the data presented in Table 3, most (80.6%) of the respondents had visited the ELMs available in the LSC at least once. The availability of digital supporting materials for a course is usually conveyed to the students by the lecturer at the beginning of the semester. It is remarkable to find that the majority has taken trouble to visit the ELMs. However only 58.8% of the students stated that have used the ELMs as an additional learning resource. Average number of ELMs used by a student was limited to 1-2 while an average student has visited 3-4 ELMs available in the LSC.

Table 3: Distribution of students by the number of ELMs visited and used

Number of ELMs	Percentage used (n=199)	Percentage visited (n=199)
0	41.2	19.4
1 – 3	43.8	40.3
4 – 6	10.3	21.9
7 – 9	3.6	11.2
> 10	1.0	7.1

Attitude towards E-learning

The majority (70.5%) of the students had favorable attitudes towards ELMs indicating their willingness to use ELMs in the future (Table 4). Many (68.9%) students preferred websites to obtain information when compared to textbooks. This is probably due to the convenience and the unavailability of library books. A search for a piece of information in World Wide Web is quite fast when compared to going through the library catalog and then searching for the book. Frequent use of computers for academic and other purposes was positively related to computer exposure (r=0.256, p=0.049), indicating that students who are more familiar with computers tend use it more frequently. Further, students who used computers frequently also had more favorable attitudes towards incorporating e-learning in agricultural higher education (r=0.301, p =0.018).

Table 4: Distribution of respondents by attitudes on ELMs

Attitude Scores	Percentage (n=199)
1 – 2.5 (poor)	3.3
2.5 – 3.5 (neutral)	26.2
3.5 – 5 (good)	70.5

According to the findings, internet (100%), handouts provided by the lecturer (96.7%), text books (93.4%), and ELMs available in the LSC (85%) were the most commonly used learning resources among the students. Journals (47.5%), and Interactive CDs (35%) were used by a relatively lesser number of students.

Challenges in Developing ELMs

Lack of computer skills amongst the staff was seen as one of the major challenges to produce good quality ELMs. Staff members were confident with the content and the form of ELM, but did not have much exposure to sophisticated web page development software and was not aware of instructional design techniques. Further many academics lack comprehensive technical skills to develop ELMs which are educationally stimulating, facilitate active learner involvement and which meet diverse learner needs. This was similar to the observations made by Brahler et al (1999). Even the staff members those who had adequate computer skills could not engage in developing ELMs due to the other responsibilities they had such as attending lectures, research etc. Another important concern among the staff members were the reluctance to develop material which could not be adequately secured its content. It was seen that some staff members were not willing to develop e-learning materials because others can copy the documents and misuse the information. Finding mechanisms, to ensure security of material published on the web, would be helpful in persuading more staff members to produce e-learning materials in the future. However some others are of the view that it is more important to promote sharing information as it will lead to sharing knowledge in a broader context. Although early evaluations of the e-Learning material are crucial in providing a framework for further developments of e-learning resources (Govindasamy, 2002), it was seen that only a few ELMs been tested for its pedagogic aspects before uploading to LSC. Thus it is essential pay careful attention to evaluate ELMs with users and experts during the development process.

Methods to Overcome Challenges

Providing training on instructional design techniques and basic computer skills has benefitted many staff members and further influenced them to develop good quality ELMs. When the initial trainings on Adobe Flash and MS Front Page failed to produce results, later MS Power Point and MS Word were introduced as viable alternatives to develop ELMs. Use of PDF documents was also successful.

Final year students, who possess good computer skills, working with staff members to develop computer based learning materials has proven successful. These students were able to integrate sophisticated media elements to the learning materials making it more appealing for the users. One such multimedia product was regarded as excellent in terms of general format, quality of information, adequacy of information and ability to comprehend by fellow student during the testing of the material (Abesinghe et.al, 2008). Staff members who work as teams, and those who get the assistance of technically competent person seems to produce better quality teaching aids.

CONCLUSIONS

According to the findings, use of computers and the internet for academic work was fairly common among the undergraduates. Many students found to be using computers quite frequently for academic work during their leisure time. Computer accessibility was seen fairly satisfactory among the undergraduates while many students had access to their own personal computer, beside the public computer facilities made available in the university. The level of use of e-learning materials was also satisfactory among the agricultural undergraduates. The majority was regular users of ELMs however; there were a considerable number of students who use ELMs only when they think it is necessary. The greater part of the students has positive attitudes towards e-learning and most of these students frequently use computers and the internet. Hence it is possible to integrate e-learning materials in undergraduate work when necessary. The major challenges for introducing e-learning in the Faculty were lack of computer skills to produce ELMs by the academic staff, less awareness on instructional design techniques, time constraints, and security concerns. It is important to ensure simplicity and appropriate strategies to enable production and sustained maintenance of e-learning materials in agriculture higher education. Interested Faculty members should be given necessary technical assistance to develop good quality ELMs. It is important to obtain the students' feedback to make further improvements to the available ELMs.

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