

UNIVERSITY LECTURERS EXPERIENCE IN THE DESIGN AND USE OF MOODLE AND BLENDED LEARNING ENVIRONMENTS

Frederick Kwaku SARFO

Department of Educational Leadership, University of Education,
Winneba, Kumasi Campus,
Ghana
sarfofredk2001@yahoo.com

Issifu YIDANA

Department of ICT Education, University of Education, Winneba
Ghana
iyidana@uew.edu.gh

Abstract : This study is designed to investigate into how academics (university lecturers) who were involved in the design and development of MOODLE based-courses use the blended learning system to facilitate teaching and learning in the classroom and what factors facilitate or impede the effective design of MOODLE by academics .Qualitative research design was used. Various existing courses of seven lecturers at various faculties of University of Education, Winneba were redesigned with the lecturers and instructional designers in accordance with the specifications of MOODLE learning environment. The lecturers implemented the designed MOODLE learning environment with face-to-teaching to teach students in the real classrooms of the University. The results of the study revealed that academics use MOODLE to prepare and present lessons and chart with students before and after face-to-face lesson in the classroom. The results also revealed that the way academics use MOODLE for assessment reflects their mode of face-face teaching in the classroom. In addition, the finding showed that training program, incentives and motivational packages are necessary for academics to adopt ICT. The major challenges faced as revealed by the results were: 1) low technology competencies, cumbersome institutional culture, and lack of adequate ICT facilities. It is concluded based on the findings that Blended learning systems seems effective and efficient in developing countries (Ghanaian context). However, its development and implementation by the users (academics) present a number of challenges that need to be addressed in order to achieve its full potentials to promote the development of the 21st century competencies

Keywords: Educational technology, Instructional design, Blended learning, MOODLE learning environment; Academics; University teachers; Blended learning; Face-to-face teaching

INTRODUCTION

The effective integration of information and communication technology (ICT) in conventional universities (in developing countries) towards an increased number of students coupled with inadequate resources is one of the issues confronting educational systems in the 21st century. E-learning is widely used in universities and other educational institutions all over the world towards the solution of massification on higher education and also to promote the development of the 21st century competencies in students. More especially, with advancement of the internet, large number of institutions is working on creating better web based tools such as learning management systems for e-learning to facilitate quality teaching and learning of large number of students in higher education institutions (Holbl & Welzes, 2010). As indicated by Dalsgaard (2006, p. 1) 'Whether focusing on distance education or campus based education, universities all over the world are using learning management systems to support and improve learning within their institution.' Research on successful integration of web-based learning is lacking in the Ghanaian context, as pedagogical integration of ICTs is not yet widespread among Higher Education institutions in the country. The few studies that have been done (e.g. Ludewig, 2011) document the processes and development of open educational resources for delivery of a number of medical programmes. There is therefore the need for development and a systematic evaluation of innovative low cost LMSs with face-to-face (F2F) teaching system that fit the context of higher institutions in Ghana as a developing country. It was in this light that the

Partnership for Higher Education in Africa Educational Technology Initiative (PHEA ETI), coordinated by the South African Institute for Distance Education (SAIDE) supported a number of African Universities, including the University of Education, Winneba (UEW), Ghana to develop the capacity to initiate and sustain effective educational technology projects which impact on the nature and quality of student learning experience and outcomes. The Initiative also supported knowledge creation and dissemination across and between partner universities on the use of educational technology. The PHEA ETI supported three interventions at UEW: i) a baseline study on the status of Educational Technology (ET) at UEW, ii) the development and deployment of MOODLE Learning Management System (F2F instruction), and iii) an investigation into how academics and students use MOODLE with F2F instruction for learning over a period of four years. This research study is focused on the third interventions of the PHEA ETI project. The investigation focused on the evaluation of user (lecturers) experience in the designing and use of blended (MOODLE with face-to-face) learning environments for teaching and learning.

Learning Management Systems and MOODLE

The advancement of research on how people learn and the evolution of information and communication technologies (ICT), more especially after the introduction of internet, have introduced new and important conceptions and strategies of teaching and learning. Learning management system (LMS) is one of the recent teaching and learning strategies in instructional technology promoted by internet. A learning management system is a software application for the administration, documentation, tracking, reporting and delivery of electronic instructional technology courses or training programmes. Learning management systems range from systems for managing training and educational records to software for distributing online blended/hybrid courses over the internet with features for online collaboration. Universities, colleges, schools and training institutions use learning management systems to deliver online courses and augment on-campus courses (Wikipedia, retrieved 8 January 2016). The history of LMS could be traced to a term “integrated learning systems” which offers additional functionalities, such as management and tracking, more personalized instruction, integration across the system, beyond instructional content. The adoption of LMSs for web-based instruction continues to increase in today’s higher education institutions (Vovides, Sanchez-Alonso, Mitropoulou, & Nickmans, 2007; Ullman & Rabinowitz, 2004). There are free learning management system (e.g., MOODLE, opened, open Emis), and commercial learning management system (e.g., Blackboard, WebCT).

MOODLE learning environment

Modular Object-Oriented Dynamic Learning Environments (MOODLE) is a type of free learning management system or a free software e-learning platform. It is also known as Virtual learning environment. MOODLE is an open source course management system originally developed by Martin Dougiamas at Curtin University in Australia. MOODLE as a learning management system is written in PHP and distributed under the GNU General Public Licence. MOODLE was purposely developed to help educators to create online courses with a focus on interaction and collaborative construction of content, and is in continual evolution. It provides all the necessary tools for educators to create a virtual classroom via the internet. MOODLE features include a list of participants (teacher and students), calendar with course schedules, a list of assignments, online quizzes, forums (where students can post comments and ask questions), glossaries of terms, and links to other web resources. With the customizable management features, MOODLE is used to create private websites with online courses for educators and trainers to achieve learning goals. It is used by most of educational and training institutions around the world (more especially in the advanced countries) to provide an organized interface for e-learning, or learning over the internet. It is for blended learning, distance teaching, flipped classroom, and other e-learning project in schools, universities, workplaces, and other sectors.

MOODLE development by Dogiamas (1998) is grounded by social constructionism (Papert & Harel, 1991) pedagogy which is essentially that learners learn best by communicating with one another and creating their understanding through words, pictures or artifacts in a collaborative environment. It is emphasized that culture plays a large role in the cognitive development because learners construct understanding of experience together, not alone. On the other hand, the pedagogical functions of MOODLE learning environments are also governed by social constructivist or social cognitive learning framework by Vygotski. According to social cognitive approach, learning is considered as cognitive and social activities (Vygotski, 1978; Brown, Collins & Duguid, 1989). Thus learners construct knowledge (learning experiences) based on their own mental and social activities. Ormrod (2004) argues that knowledge construction may occur as an independent activity of the individual or when individuals work together. Social constructionism is focused on the artifacts that are created or constructed through the social interaction of a group, while social constructivism is focused on an individual’s learning (construction of knowledge and skills) that takes place because of their interactions in a group. It is argued that social constructionist and social

constructivist pedagogical functions in MOODLE learning environments are closely related in the sense that learners work together to construct an integrated set of knowledge, attitudes, and skills individually (in the mind) to enable them solve (real life) problems and also create artifacts that are observable to reduce human discomfort.

MOODLE learning environment, if well designed has the potential to provide technological learning tools, which are also referred to as individual personal tools and collaborative personal tools (Dalsgaard, 2006). The pedagogical potential of these kinds of personal tools such as, weblogs, wikis, web pages, e-portfolios are to support students independent work process. And the pedagogical potentials of the personal collaborative tools, such as discussion forums, chats, links, e-mails, file sharing, wiki is to support interactions between learners and teachers, among learners, and between learners and content. The educational potential of the MOODLE depends very much on the utilization of the technological tools in line with specific learning activities based on social constructivist and social constructionist learning principles.

Naddabi (2007) reports that effective integration of MOODLE in teaching and learning process (by making use of the features such as forum, resources links of dictionaries and newspapers, quiz, and journal in teaching) has the following advantages: 1) enhancing students-student interactions and teacher students interactions, 2) finding a real audience to interact with; 3) helping students to do their research for their independent study project; 4) fostering students' independence; and 5) a change of routine. These advantages would commonly be found in any course management system, but it is still basic usefulness of MOODLE. To support its effectiveness, the results of a study conducted by Ahmad and Al-Khanjari (2011) showed that students who were introduced to online learning environment through MOODLE, had encouraging, optimistic, and positive approaches and attitudes towards MOODLE. Their learning was improved and their understanding of the course material was better. In addition, Hinkelman and Grose (2005) report the results of a pilot listening/reading comprehension placement test at Sapporo Gakuen University. They concluded that with sufficient hardware resources, MOODLE was successful in providing a practical technical platform for administering placement tests to large number of students in a short time with time savings in the making and analysis of test results. Furthermore, Stanley (2007) focuses on vocabulary acquisition in an intensive reading course at Kanda University of International Studies while using MOODLE. The results showed that MOODLE and its glossary module in particular have been of immense help to teachers while offering students opportunities to learn vocabulary well beyond the classroom even with limited class hours of learning. The finding of the study done by Zoran and Rozman (2010) indicates that the learner type, that is whether a full-time or a part-time student, has no influence on students' perceived usefulness of MOODLE learning environment. Goyal & Tambe, (2015) report that an elementary working knowledge of computers will enable teachers and students to use MOODLE system well. It is argued that there are consistent research findings in the literature to support the effectiveness, efficiency and ease of use of MOODLE learning environment to facilitate students learning processes.

Horton (2000) states that LMS/MOODLE can be used in one of three scenarios namely: i) in a completely online environment without face-to-face interaction; ii) in a hybrid course environment where the class frequently meets face-to-face, as well as conduct online meetings and activities; and finally iii) in a face-to-face course environment with the provision of web-based support materials and activities.

Face-to-face teaching is a traditional mode of teaching or a lecture whereby the students, teachers or facilitators meet together in the same classroom or place at the same time with the purpose of helping the students to achieve the learning goal. The traditional F2F teaching enables students to: 1) work with the new information presented; 2) interact with the teacher and the peers in the classroom; 3) question on the concepts they don't understand, 4) get immediate feedback from the teacher on their questions; and 5) observe the gestures and facial expressions of the teacher. The basic disadvantage of the F2F instruction is that it is inappropriate to foster constructionist and constructivist pedagogical principles effectively, more especially when the class size is large, to promote the development of 21st century competencies. A combination of face-to-face and online instruction is termed as blended learning (BL). Historically, blended learning is a combination of traditional face-to-face learning systems and distributed learning systems. It is learning systems that combine F2F instruction with computer-mediated instruction (Graham, 2004). More recently, blended learning is described as a combination of face-to-face and online instruction that varies based upon the needs of the learners (Florian & Zimmerman, 2015). According to Florian and Zimmerman (2015), as technology and delivery systems for blended learning have advanced, MOODLE has become the virtual platform of choice for education. In a study conducted by Ahmad and Al-khanjari (2011), most students preferred a F2F approach, supported with online material and activities (such as e-mails, chats etc) as a favourable mode of learning. Florian (2010) has extensively discussed a varieties of virtual platforms for schools with respect to

learning management systems and concluded that MOODLE is the best possible for institutions because of its constructivist learning design, cost effectiveness, ability to expand with the student population; data analysis capabilities; and ability to meet the diverse needs of institutions, instructors, and learners. As the schools continued to develop BL courses, MOODLE is considered as the optimal tool. The basic goal of the blended learning activity in this respect is to combine the advantages of F2F teaching and that of online learning (MOODLE learning environment). In a well-constructed BL course, the time in class either can lead the online requirements or it can follow, but the two parts need to be connected and depended upon each other to ensure a successful BL environment (Graham & Allen 2008). Research (e.g., Hsu, 2011) has shown that F2F learning group with e-learning (MOODLE) bridges the gap between students and instructors. Blended learning environments facilitate the acquisition of skills required by learners to enter the global work force: communication skills; collaborative skills; critical thinking skills; and ability to connect one learning opportunity to another (Florian & Zimmerman, 2015)

The context of the study

The University of Education, Winneba is a multi-campus teacher education institution in Ghana. The student population currently is 50,012, consisting of 23,746 distance education learners, 8,636 sandwich/part-time students, and 17, 630 regular on-campus students. University of Education, Winneba, in Ghana like other African (developing) countries has experienced serious escalation in the demand for higher education in the face of inadequate financial resources. Various classrooms in the university are not equipped technologically to facilitate the teaching of large class. Therefore, lecturers find it difficult to teach in accordance with constructionist and constructivist learning principles to promote the development of knowledge and skills required by learners.

The University of Education, Winneba (UEW) adopted the blended model (MOODLE with F2F classroom teaching) because i) the issue of large class sizes is a big problem that creates less lecturer-student interaction; ii) most of the academics have inadequate capacity and time for effective facilitation of full online courses; iii) the ICT infrastructures/facilities, particularly Internet connectivity, are not yet developed significantly to support exclusive online course delivery; iv) MOODLE is a free learning software platform and does not put any financial burden on the University; v) it is easy to use by academics who are not adequately competent in the use of computer; and vi) it is simple to learn and adopt.

As indicated, the blended instruction encourages different learning styles of large number of students and maintains quality lecturer–student interaction in the classroom at the same time. When instructors replace in-class time with online components such as uploading reading materials for students to download prior to class, discussion forums, quiz etc., the significant amount of the course learning activities has been moved online. This therefore, frees up time for the lecturer to address students’ learning problems or areas that students may find particularly confusing

However, some common problems among less computer literate teachers and students(even in Japan as more advanced country) in the use of MOODLE or BL are: 1) logging a large number of students for the first time is a difficult task; 2) lack of computer literacies of both some teachers and many students who used Moodle inefficiently; 3) jamming students’ email accounts with unwanted messages when they used sharing forum. To solve these problems, research findings by Moloney and Guterrez (2006) showed that there is the need to offer more basic and intermediate MOODLE training session as a part of faculty development (FD) activities for instructors who intend to use web based learning environment but who lack the fundamental knowledge and skills to use MOODLE before each semester in order to utilize it efficiently as well as systematically.

Moreover, the results of research study conducted by Morgan (2003) show that the use of an LMS is increasing at a rapid rate. It is however remarkable that the use is not focused on the interactive features of the LMS (MOODLE and blackboard) but on the content creation tools. The results also indicated that although instructors claimed that they had adopted the LMSs in order to meet pedagogical needs of students, it seemed that the actual use of the system was meeting class management needs. It is worth noting that even though the World Wide Web contains vast information and resources, the inefficient use of these resources can limit many instructors who may not know how to harness the strengths of these information forms and resources (Jungwirth & Bruce, 2002). What this means is that courses modeled to be delivered online should include a lesson on effective use of the technological tools of the web and appropriate learning and instructional principles to enable learners to use web-based platforms effectively and optimally.

Again, Greyling, Kara, Makka and Van Niekerk's (2008) observed that for instructors to have the relevant skills to be able to utilize LMS tools effectively and to incorporate relevant pedagogical practices in their courses they need to have indepth training and access to technical support and assistance. It is crucial that instructors are trained and supported to acquire the 'new' pedagogical role and the implementation advantages they can offer to educational technology. When pedagogical approaches to teaching are consistent with the technology, the efforts to use the technology are more likely to yield positive results. Topper (2005: 304) believes that "for teachers to use technology in support of their teaching, and to see it as a pedagogically useful tool, they must be confident and competent with the technology they are planning to use". As a consequence, it is essential that instructors have in mind both technology and pedagogy when designing their course content and assignments for MOODLE LMS delivery. The above research findings indicate that training and support is absolutely essential if instructors are expected to develop and implement blended learning system (MOODLE with F2F learning environment) as powerful learning tools (Nelson, 2003 cited in Vovides et al, 2007). The present study has thus considered carefully the training of academics (lecturers) in: 1) the pedagogical principles in the design of MOODLE; 2) online course (MOODLE) design and development; and 3) how to effectively use MOODLE with F2F teaching and learning as a critical components.

Aims and objective

The study is designed to investigate if blended learning environment can contribute to the solution of instructional and learning problems in UEW, Ghana. More specifically, it is intended to ascertain how academics who are involved in the training and design of MOODLE learning environments use the blended learning environments to facilitate teaching and learning; and the factors that facilitate or impede the design and use of MOODLE and the BL by academics for effective teaching and learning

The educational significance of this study lies in the fact that its findings will inform Educational Technology policy (makers and researchers) and technology professional development programme in (higher institutions) UEW about the best practices and challenges associated with MOODLE and BL. It will add new insight from the Ghanaian perspective to the literature on successful implementation and support of MOODLE and BL in learning environment with limited ICT resources to facilitate the development of 21st century competencies in students..

RESEARCH DESIGN

A general qualitative approach was used because this methodology helped the researchers to gather in-depth understanding of the situation and analyzing the situation data in order to frame issues and formulate emerging themes (Owen & Demb, 2004).

The participants

Two ICT lecturers and five non- ICT lecturers, from UEW, were the main participants in this qualitative study. Furthermore, as already been indicated, this study was a part of PHEA-ETI. As part of the overall planning stage of the Initiative, four researchers, six research assistants, three multimedia specialists and four MOODLE technicians were appointed to assist in the MOODLE management and online course development. SAIDE provided external MOODLE courseware workshop facilitators who were assisted by two UEW instructional designers and technologists. The research works were also subjected to both internal and external peer reviews to ensure that expected standards were met.

MOODLE learning management system and face-to-face interaction

To achieve the purpose of the study, seven courses (undergraduate and post-graduate) of seven lecturers from the various faculties of the university were selected. Content and the structure of the courses as tailored on the MOODLE learning environments were revised and redesigned with the lecturers and other participants (instructional designers and multimedia specialists) in accordance with the design standards provided by the SAID. As already has been indicated in the introduction, the intervention 2 of the entire project focused on the training of the participants and the development and deployment of MOODLE learning environments .A system of instructional delivery using MOODLE learning environment was adopted to supplement F2F lectures and practical classes. In this context, MOODLE was used to extend students' access to learning resources and activities online, enhance student-student, student-lecturer and student-content interactions using MOODLE personal and collaborative tools and to enrich activities and resources to support classroom interactions and assessment. The modules used by instructors included resources, assignments, chats, quizzes, forums, wiki's, surveys, glossaries, journals and choices. The expected activities under each feature as outlined in the MOODLE user manual was matched against actual activities carried

out on MOODLE during the implementation period. The closer these two sets of activities were the more optimal the use of these features and vice versa (visit: moodle@uew.edu.gh) The quality of MOODLE courses was evaluated using a course structure and learning pathway rubric as well as quality assurance checklist provided by SAIDE. Students accessed the environment using their UEW official user accounts (password protected). They accessed the MOODLE for the entire semester, MOODLE was set up and configured at the Network Operations Center (NOC) on a dedicated server procured with funds from the PHEA ETI.

Data Collection instruments and analysis

In order to answer the main research questions, the reflective journals of academics (RJA) on all processes that were carried out towards the implementation of MOODLE were examined. In addition, MOODLE user logs (MUL) for each of the courses were used by the researchers to provide evidence about how academics used the MOODLE platform for teaching and learning. More importantly, focus groups interview/discussion with selected lecturers who participated in implementation offered the researchers an opportunity to obtain qualitative data from their peer academics. Also, evaluation reports of Advocacy and MOODLE courseware development workshops (AMCWDW) provided useful data on how the MOODLE courses were developed by participating academics. The research data were analysed qualitatively according to the themes around the research questions and study constructs. Reliability and validity were achieved by triangulation of data collection methods: interview, observation and document review, and analysis (Patton, 1990, cited in Owen & Demb, 2004).

RESEARCH FINDINGS

To answer research question one (1), the central issues were focused on the following sub-questions: a) what kind of teaching activities were carried out by the academics when using MOODLE and F2F learning environments?; b) were the assignments and quizzes appropriate and aligned with instructional objectives?; and c) what were the perceptions/impressions of the academics about their use of BL systems?

The results of the investigation indicated that lecturers used MOODLE to prepare and present the course materials to students before face-to-face teaching. Interaction with lecturers (Peter Akayure) during focus group interview confirmed this:

Well I will say I used MOODLE to prepare my course material. Before MOODLE you had everything on you or you had to let the students photocopy some section of a book or something. But now I can extract the parts that I think are important to the course I will lecture, then I put it [lecture notes] there [on MOODLE] so before I come [to class] I expect the students to have read in advance.

Another academic from the Department of Mathematics Education corroborated Peters' view as follows:

I think that mostly we used [MOODLE] to also present PowerPoint. Now we upload them for the students to have a look at it before we come to class..... We also inculcated [incorporated] some class activities on the MOODLE so that they would participate in those activities.

From the user logs and classroom observation, it was observed that during the first lesson the instructors demonstrated to students how the MOODLE platform would be used together with the face-to-face teaching and how the students should log-in and update their user profiles. The use of the chat module by instructors was corroborated by statements of a lecturer during a focus group interview:

At the beginning of the class we used it [MOODLE] to chat with each other and I told them I would be online to chat with them

Observations from the user logs and Yidana's journal of activities confirmed this point.

It was observed that lecturers put up questions and statements in the discussion forum and students posted their thoughts or opinions and also commented on the postings or thoughts of their other classmates. Lecturers then commented on the replies of the students. Comments by lecturers during a focus group interview buttress this point:

I used the forum a lot. Because we would come to a stage in class [during] the face-to-face discussion where they would have to give their views.....

We did forums too where the students were able to comment on other students input.

I used the forums to talk about issues that I really want to pick their minds on during face-to-face.

The following comments of some lecturers corroborate this point:

I used journals to get their [students] feedback of what they have studied.....

Furthermore, during the focus group interview, a lecturer passed the following comment in support of the use of e-mails:

Some students too had problems with registration and we taught them how to use e-mail to send message so they used to send e-mail messages to us, requesting for help from us.

It was further observed that for the postgraduate courses, assignments and forum discussions were the dominant instruments used for assessment. Projects and laboratory practical works were the preference for Yidana, and this reflected in his mode of teaching (project and problem based teaching). Again, it was observed that some academics (Williams) used MOODLE to deliver quizzes and end of semester exams consisting of multiple choice types, short answers, and matching types which provided instant feedback. This also reflected the pedagogical practices – predominantly lecture approach – [of Williams]. It was observed that the discussion forum and journal assessment provided feedback but not immediately. Some of the comments from the academics during focus group interview confirmed the above:

I used quizzes as well, and then because it is a programming based course we have to do some practical work. That one they do it...

The following comments of some academics support this point:

I used journal for assessment or assessing the students.

With regards to the perception of academics about the use of MOODLE, the investigation revealed the following during the focus group interview:

For me I would say [MOODLE training and use] affected me positively because it is putting you the lecturer on your toes to provide good quality resources and material. Because students now have access to the internet, if you also do not research to put up to date information and resources online for them on MOODLE you will find yourself wanting during face-to-face teaching.

This comment also implies that teaching online places more load on instructors, at least for first time adopters and compels them to prepare well.

To answer the research question two (2), the central issues were focused on what actually helped and motivated the academics, which were not existed in normal learning environments, throughout the process of developing their own courses online and use it effectively in the classroom; and factors that impeded or slow down the process of developing and using MOODLE in classroom teaching and learning.

The results of evaluation of the External Facilitator's Courseware Development Workshop indicated that the workshop helped academics to acquire knowledge and develop skills in designing not only courseware but also utilize MOODLE in teaching and learning. One of the gains of the workshop as observed by the researchers was that academics' interest and enthusiasm were increased. However, the results indicated that academics would prefer hands-on practical activities and one-on-one mentoring during such workshops as observed by one of the participants' comments:

Meet course designers where they are and begin the assistance from that angle. I think this approach will do us much good since we have varied individual challenges though doing the same thing.

Overall, participants felt that the workshop was useful and helpful to them in their course development process. It also enhanced their understanding of the various modules of MOODLE as indicated in some of their comments:

Very interactive and learner-centered, some of the challenges I faced were addressed with examples and one to one instruction;

The activities helped to empower me: workshop met my maximum expectation; about 75% of my expectations were met.

The aspect of the workshop that participants found most useful included wiki and forums, chat rooms, journals, the one-on-one nature of assistance from resource persons, the chunking and overall planning of the course following Gagne's principles of instruction.

The investigation revealed that when lecturers were assured of monetary rewards and promised promotion using online courses their motivation to participate in the workshops also increased. Even though these promises were made to academics, some of the comments from academics point to the fact that they were not convinced about the university's ability to fulfil its promises:

I think incentives must be given for lecturers who make the effort to [develop and] upload their courses online. Because it is not that easy;

It [creating online courseware] is time consuming and it's even more than one research paper;

Yeah, there should be some motivation in that aspect;

*It [online courseware] is more than one research paper, an article;
So maybe we should be promoted or it [online courseware] should be granted as part of the promotion requirements;*

Others suggested the use of online platform to deliver future workshops as this will save time of participants who are already overloaded with other University tasks as pointed out by a participant:

*[I have]enjoyed it [workshop]. I'm wondering if it wouldn't make more sense in trying to do a workshop on-line rather than face-to-face. I like this approach better, but we should get used to being more efficient with our resources. A reality is that with more and more technology, we don't get more efficient..
This kind of workshop [should] be organised when school was not in session.*

On the courseware evaluation criteria that participants spent considerable time developing, some participants were of the view that it was premature to undertake that activity and would rather wait till the courses were considerably developed. A comment of a participant buttresses this:

The evaluation criteria stuff might be more appropriate later. I think it's better to focus on trying to get our courses up and running... Too much of the criteria focuses on the surface stuff - it's easy to get caught up in the layout/format issues and miss the deeper purpose of using the MOODLE (Source: external facilitators report).

Even though academics were able to develop online courses, some of them only used a limited number of the tools and features contained in the MOODLES LMS. The evaluation results of External Facilitator's Follow-up Workshop depicted that:

More than half of the respondents representing 55% highlighted they wanted technical and administrative assistance regarding the intermittent network breaks; 30% faced initial problems uploading pictures, books, designing questions and differentiating colours of activities from presentations.

Furthermore, participants evaluation report showed that: *some participants still had problems uploading graphics, using wikis and entering math symbols and expressions.* Other participants indicated that: *they still had difficulty creating multiple choice quizzes on MOODLE, while others had problems in chunking and creating content with graphics and animations.* Other challenges that were faced were: *unstable internet connectivity, frequent light off, inadequate computing facilities for academics and students, etc.* This includes *inadequate technical assistance* as it was observed by the researchers. The evaluation report of the first External Facilitator's workshop supported this:

However, the major challenge which was faced was the unstable nature of internet connectivity

It was also observed that the Project Management Team faced certain administrative challenges from the cumbersome administrative procedures and procurement laws of Ghana that delayed the acquisition of equipment and software. In addition, during the planning stage, the programme management team initially had difficulty in getting all team to meet regularly as a result of other institutional assignments.

During the focus group interview some of the academics also reported that:

some students complained that they had no reliable access to computer laboratories after classes and those who have computers to access the LMS they had challenges with the internet connectivity.

DISCUSSION OF MAJOR FINDINGS

How academics use MOODLE for teaching and learning

Clearly, the results of the study indicated that academics used MOODLE to chart with students before they have the face-to-face lesson in the classroom. They also used MOODLE to prepare and present their lesson, by using Powerpoint presentations. This implies that academics perceive MOODLE as a platform that assist them to develop the online components of their courses and extend learning resources to students outside of the F2F classroom settings, and use it as such. In addition, academics perceive and use MOODLE as a learning platform that encourages social interaction and collaboration among learners. Collaboration was achieved through hands-on online interactions, using Wikis, discussion forums, and chats. This finding is in line with Dukes et al. (2006) and Florian (2010) studies that blended instruction encourages different learning styles and maintains quality lecturer-student interaction in the classroom at the same time. For very large classes, as in the case of UEW, MOODLE expanded the opportunity to optimize time usage and to address individual learning problems that would be impossible in such

classes in the face-to-face mode (Greyling et al., 2008; Florian, 2010; Florian & Zimmerman, 2015). The academics were also of the view that they have to be co-learners in this new learning environment in order to remain functional and current. However, from the perspective of the academics, teaching online or using MOODLE places more load on the instructors as they have to research a lot in order to cope with students during the face –to-face teaching in the classroom. The positive aspect of this is that it enables the academics to be resourceful and current.

Moreover, the result of the study revealed that the way academics used MOODLE for assessment reflected their mode of face-to-face teaching in the classroom. The academics who taught at the postgraduate levels and used project and problem based teaching often used discussion forum, offline assignments and practicals for their assessments. The academics who handled the undergraduate levels and used lecture oriented teaching often used MOODLE for multiple choice types, short answers, and matching types assessments which provided instant feedback. This implies that there is a correlation between the way academics teach in the F2F classroom and how they use MOODLE for assessment.

Factors that facilitate or impede the effective design and use of MOODLE learning environment by academics

According to the findings of the study the aspect of the workshop that participants found most useful included the chunking and overall planning of the course following Gagne’s principles of instruction. Moreover, one of the gains of the workshops, as the results indicated, was that the capacities of the academics in designing online courses and utilizing MOODLE in teaching and learning in the classroom were enhanced. These results imply that the various workshops conducted promoted the understanding of the academics and enabled them develop appropriate skills and required technical/ICT skills for the development and effective use of MOODLE in the classroom teaching. This confirms the finding of Palak (2004) that if academics’ concerns and needs are factored into their training, they are more likely to benefit from the training and apply skills and knowledge learnt.

Moreover, the findings of the study showed that incentives and motivational packages (e.g. promotion as promised by the VC) are necessary for encouraging academics to adopt educational technologies. This result confirms Gautreau (2011) and Wilson (2003) that motivation is the key to a faculty member’s decision to learn and implement technology into their teaching. Online course development places extra burden on academics in terms of initial time investment, particularly in a situation where large class sizes resulted in increase in workload for academics. This implies that aside the intrinsic motivation and monetary consideration; there is the need for university to extrinsically motivate academics to adopt and use educational technology to improve the quality of teaching.

However, the results indicated that academics would prefer hands-on practical activities and one-on-one mentoring during such workshops. The point being made here is that a “a one size fits all” model of training is not effective for academics because i) probably, academics are at different level of competency and i) different academic disciplines may have peculiar approaches to ICT integration. This means there is the need for educational technology facilitators to make sure that support is tailored to meet the various diverse learning needs and styles of the academics.

Academics would also appreciate adequate attention paid to efficient use of resources rather than focus on technological competencies. Academics needed to focus on more on using the MOODLE for effective teaching and learning and accessing other educational technology resources to develop their courses rather than technical details of MOODLE platform. According to the results, those academics (at the university) who are new to technology integration , the digital immigrants (Prensky, 2001), can be frustrated if training focuses more on formalism and technical standards even though ultimately the desire is to design, develop and use pedagogically sound courses and instruction. This implies that doing so many things simultaneously for technology novices can complicate an already overwhelmed academic.

Another challenge related to the above as indicated in the results of the study, is low technology competencies among academics. Even though academics were able to develop online courses after series of training; they only used a limited number of the tools and features contained in the MOODLE LMS. This placed limitations on the interactive and collaborative nature of the courses developed. This is in line with a finding by Unwin, et al. (2010), which revealed that even among experienced users in some African Universities; they used only a small number of the features available to them in their local LMS. This in turn affects the teaching and learning process as these tool sets provided in LMSs are to ensure that the right amount of support is made available in a host of ways for learners.

Moreover, according to the results, one major problem that was faced during the planning of the programme is related to institutional culture. The procurement law and cumbersome procedures in getting things done posed a great risk to the smooth sustainability of the Initiative at UEW. It took an awful long time to even set up the structures for the implementation process to begin. This finding is related to Kearsley and Marquardt (2001) assertion that to successfully implement e-learning projects, organizations and institutions may need to change the way their organizations are structured or they need some changes in their organizational culture. Initially, during designing and implementing of the E-learning project, it is more important to be familiar with organizational culture, structure, corresponding and other potentially conflicting strategies (McPherson & Nunes, 2006).

Finally, one dominant challenge encountered based on the findings of the study was the lack of adequate numbers of computers, computer laboratories and reliable high speed internet infrastructure for students to use the MOODLE for learning. Academics complained that their students had no reliable access to these laboratories after classes and for those who had computers to access the MOODLE learning environment had challenges with the internet connectivity. This challenge is not limited to UEW alone but most African universities. According to the report of Dzvimbo (2009), the former Rector of the Africa Virtual University in E-Learning News Africa portal, access to affordable and reliable internet connections and infrastructure are prevalent problems in all African countries. According to him, educational institutions on the continent are unable to provide sufficient infrastructure and buy sufficient bandwidth to support the educational, research, and administrative needs of students and faculties. This adversely affects delivery and teaching using eLearning methodologies that rely on high-speed internet access and readily available ICT infrastructure.

CONCLUSION

It is evident from the present study that academics who are involved in the design of e-learning courseware use it effectively to supplement the face-to-face teaching in the classroom to suite the varieties of learning needs of students in a large class to promote quality learning. There is a correlation between the ways academics teach in the classroom and how they use technology for assessment irrespective of their training to use technology. This finding suggests that individual academics conception of teaching influences the way they use technology in their instructional practice, and to some extent it is new. This finding adds new insight, from African/Ghanaian perspective, to academics conception of teaching and the way they use technology in the classroom. Further research is suggested to investigate this. Furthermore, it is argued based on the present study that academics who use e-learning courseware effectively to supplement face-to-face classroom teaching are resourceful and current since they have to research a lot in order to cope with students during face-to-face teaching in the classroom. It is also evident in the present study that when academics are involved in the design of e-learning courseware and receive adequate pedagogical and technical training and support consistently it increases their capacity building, motivation and promotes effective use of BL system (MOODLE and the face-to-face teaching in the classroom). This suggests that if administrators and management involve the academics from the onset of the training programmes of technology innovations and the training addresses their needs they would be more likely to adopt and use technology for instructional purposes.

Even though intrinsic motivation is important, according to the findings of the study, for technology to be institutionalized at the university by academics, extrinsic motivation such as promotion, acknowledgement, and money are incentives that cannot be contested. In this respect, further studies is suggested to investigate academics needs and concerns in order to be committed in the development and use of e-learning courseware for effective teaching and learning. The results of the study reiterate that digital divide, inadequate computer skills (especially among the digital immigrants), increased load of academics, and institutional culture are still a constraint to academics for effective training and use of ICTs for effective teaching and learning. In addition to the theoretical, methodological, and practical contributions of the present study, it provides useful lessons that would guide larger scale successful development and implementation MOODLE and BL in the context of learning situations of higher education with limited ICT resources. It is concluded based on the findings of the present study that Blended learning (MOODLE with F2F) systems seemed effective and efficient in developing countries (Ghanaian context). However, its development and implementation by the users (academics) present a number of challenges that need to be addressed in order to achieve its full potentials to promote the development of the 21st century competencies.

REFERENCES

- Ahmad, N. & Al-Khanjari, Z. (2011). Effect of Moodle on learning: An Oman perception. *International Journal of Digital Information and Wireless Communications*, 1(4), 746-752
- Brown, S. J., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*. 18(1), 32-42
- Comeaux, P., & McKenna-Byington, E. (2003). Computer-mediated communication in online and conventional classroom: some implications for instructional design and professional development programmes. *Innovations in Education and Teaching International*, 40(4), 348-355.
- Dalsgaard, C. (2006). *Social software: E-learning beyond learning management*. Retrieved 5-4-2014 in http://www.eurodl.org/materials/contrib/2006/Christian_Dalsgaard.htm
- Dougiamas, M. (1998). *A journey into constructivism*. Retrieved 7-10-2015 in <http://dougiamas.com/writing/constructivism.html>.
- Dukes, L. L., Waring, S. M., & Koorland, M. A. (2006). The blended course delivery method: The not-so-distant education. *Journal of Computing in Teacher Education*, 22(4), 153-158.
- E-Learning News Africa Portal (2009). Interview with the Rector, Mr. Kuzvinetsa Peter Dzvimbo, *The African Virtual University*. Retrieved from <http://www.elearning-africa.com/newsportal/english/news5.php>.
- Florian, T. P. (2010). *Confidence-based assessment in Moodle: Insights from teachers, administrators, and programmers*. Retrieved 15-11-2015 in <http://www.proquest.com/>
- Florian, T. P., & Zimmerman, J. P. (2015). Understanding by design, moodle, and blended learning: A secondary school case study. *MERLOT Journal of Online Learning and Teaching*, 11(1), 120-128
- Gautreau, C. (2011). Motivational factors affecting the integration of a learning management system by faculty, California State University, Fullerton, *The Journal of Educators Online*, 8 (1).
- Goyal, E., & Tambe, L. (2015). Effectiveness of Moodle-enabled blended learning in private Indian business school teaching niche programmes. *The Online Journal of New Horizons in Education*, 5(2), 14-22. Retrieved 17-11-2015 in <http://www.tojned.net/pdf/v05i02/v05i02-03.pdf>
- Graham, C. R. (2004). *Handbook of blended learning: Global perspectives, local designs*. San Francisco, CA: Pfeiffer Publishing
- Graham, C. R. & Allen, S. (2009). Designing blended learning environment. In P. L. Rogers, G. A. Berg, J. V. Boettecher, C. Howard, L. Justice, & K. Schenk (Eds.) *Encyclopaedia of distance learning* (Vol. 2, pp. 562-570). Hershey, PA: Idea Group.
- Greyling, F., Kara, M., Makka, A., & Van Niekert, S. (2008). IT worked for US: Online strategies to facilitate learning in large (undergraduate) classes. *Electronic Journal of E-Learning*, 6, 179-188.
- Hsu, L. (2011). Blended learning in ethics education: A survey of nursing students. *Nursing Ethics*, 18(3), 418-430.
- Hinkelman, D. & Grose, T. (2005). Placement testing and audio quiz making with open source software. *PacCaLL Journal*, 1(1), 974-981
- Horton, W. (2000). *Designing web-based training: how to teach anyone, anywhere, anything*. New York: Wiley Computer Publishing.
- Jungwirth, B. & Bruce, B. (2002). Information overload: Threat or opportunity? *Journal of Adolescent and Adult Literacy*, 45(5), 400-405.
- Kearsley, G. & Marquardt, M.J. (2001). *Infostructures: Technology, learning, and organizations*. Educational Technology Publications, 27-32
- Liaw, S. S. (2004). Considerations for developing constructivist Web-based learning. *International Journal of Instructional Media*, 31(3), 309-321.
- Ludewig Omollo, K. (2011). Information and communication technology infrastructure analysis of Kwame Nkrumah University of science and Technology and University of Ghana. Retrieved from http://deepblue.lib.umich.edu/bitstream/handle/2027.42/85731/Omollo-ICT_Infrastructure_Analysis_of_KNUST_and_UG-FINAL.pdf?sequence=2

- McPherson, M. A. & Nunes, J. M. B. (2006). Organisational issues for e-learning: Critical success factors as identified by HE practitioner. *The International Journal of Educational Management*. 20(7), 542-558
- Moloney, B., & Gutierrez, T. (2006). An enquiry into Moodle usage and knowledge in Japanese ESP programmes. *Pac CALL Journal* 2(1), 48-60
- Morgan, G. (2003). Faculty use of course management systems. Retrieved 17- 10-2015 <http://www.educause.edu/ir/library/pdf/ers0302/rs/ers0302w.pdf>.
- Naddabi, Z. A. (2007). A Moodle course: Design and implementation in English for academic purposes instruction. A paper presented at *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher (ELEARN) 2007*. Retrieved 16-5-2015 in http://www.editlib.org/d/26540/proceeding_26540.pdf
- Ormrod, J. E. (2004). *Human learning* (4th ed.). Upper Saddle River, NJ: Pearson Printed Hall
- Owen, P. S. & Demb, A. (2004). Change dynamics and leadership in technology implementation. *The Journal of Higher Education*, 75 (6), 636-666.
- Palak, D. (2004). *Teachers' beliefs in relation to their instructional technology practices*. Unpublished doctoral dissertation, West Virginia University, Morgantown.
- Papert, S. & Harel, I. (1991). Situating Constructionism. Constructionism, Ablex Publishing Corporation: 193-206. Retrieved 21-10-2015 in <http://www.papert.org/articles/SituatingConstructionism.html>
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon: MCB University Press* 9(5)
- Severson, A. (2004). *Faculty support required for the implementation of a new learning management system*. Thesis submitted to the Simon Fraser University for the degree of Master in Distributed Learning.
- Stanley, I. (2007). Creating a student-generated glossary in Moodle: How is it done and how effective is it? *The JALT CALL Journal*, 3, 116-131
- Unwin, T., Kleessen, B., Hollow, B., Williams, J., Oloo, J. M., Alwala, J., Mutimucuo, I., Eduardo, F., and Muianga, X. (2010). Digital learning management systems in Africa: Rhetoric and reality, Open Learning. *The Journal of Open and Distance Education*, 25(1), 5-23.
- Vovides, Y., Sanchez-Alonso, S., Mitropoulou, V. and Nickmans, G. (2007). The use of e-learning course management systems to support learning strategies and to improve self-regulated learning. *Educational Research Review*, 2(1), 64-74.
- Vygotsky, L. S. (1979). *Mind in society*. Cambridge MA: Harvard University Press
- Wikipedia, LMS Data: Retrieved 8-1-2016 https://en.wikipedia.org/wiki/Learning_management_system#cite_note-ellis-1
- Wilson, W. (2003). Faculty perceptions and uses of instructional technology: A study at one university system revealed the current state of technology and some steps that could improve it. *Educause Quarterly*, 2, 60-62.
- Zhang, D., Zhao, J., Zhou, L., & Numamaker, J. (2004). Can e-learning replace classroom learning? *Communication of the ACM*, 47(5), 75-78.
- Zoran, A. G., & Rozman, K. (2010). Students perception of using Moodle. MOODLE. Si 2010, 4th International Conference Proceedings, Koper, 21 May 2010

ACKNOWLEDGEMENT

The authors would like to thank the following organizations who provided funding and numerous support for the successful completion of the interventions that led to the development of this paper: Partnership for Higher Education in South Africa Educational technology Innovative (PHEA,ETI), South African Institute for Distance Education (SAIDE), and Management of University of Education, Winneba, Ghana (UEW, Ghana)