Facilitating Teaching and Learning: The Effect of Technology - Mediated Tool

I. Introduction

The prime objective of education is the conversion of humans into an intellectual capital for a nation’s benefits. Traditional method of learning has its own limitations to the achievement of this objective. Virtual learning is becoming an indispensable part of the main stream of the educational system of many countries. Technology has made it possible to provide the best and most up-to-date education at a reasonable cost and without geographical boundaries. The phenomenal development of information and communication technology (ICT) is having a significant impact in all areas of human activity. The advent of the internet and the web has made it possible for a more specialized field of distance teaching and learning. In today’s developed countries, using e-mail and the World Wide Web for teaching and learning, without being restricted by time and space, is seen as a necessity. Distance learning programs, correspondence education, home study, independent study or external studies and open learning are feasible with the interactivity provided by the internet to both teacher and learner. Commission on Technology and Adult learning (2002) states that more advanced teaching mode encompasses instructional content or learning experiences that are specifically delivered or enabled by electronic strategy, and incorporating a wide variety of learning strategies and technologies, from CD-ROMs and computer-based learning, to video-conferencing, satellite-delivered learning, and virtual educational networks. In most of the developing countries the blackboard and chalks are common teaching materials. Students and teachers do not usually use virtual learning technology. Teachers physically present lessons to students within stipulated times. But now, the use of computer technology and ICT tools are making virtual learning possible. The concept of distance learning is emerging in tertiary institutions. The mode of teaching as well as learning needs to be shifted from physical to virtual delivery of content in order to achieve the greatest results from teachers and learners. E-learning is becoming part of educational system in most of the renowned academic institutions. The traditional classroom method of teaching is now being widely supported with ICT teaching aids such as Blackboard and Moodle in many institutions in the developed world. The World is becoming a global village due to web technology and development in ICT. Royle (2011) cited in JISC (2011) that technology and learning are developing together, and that co-evolution of learning and technology is really important for us to understand and to develop. Sharples (2011) also cited in JISC (2011) that people have to be given the space to experiment, try things out, be innovative and also the space to fail and try again. Virtual learning can help achieve this.

II. Review of Related Literature

Different writers contemplate on the differences that exist between E-learning and traditional learning. Siemens and Yurkiw (2003) see that neither those who think e-learning are the same as traditional learning nor those who think e-learning differ from traditional learning is accurate but rather E-learning is simply a different way of learning. E-learning delivers learning using different interface between student and content and modifies the role of the teacher or instructor. There is an argument that traditional learning is the best way of maintaining a learning process. Other models are always considered to be inferior or less efficient. However, according to Rashty (2013) there are no findings to support this argument, and research shows that e-learning models are at least as good as traditional learning. Students have expressed higher satisfaction from the computer mediated learning, and rated the learning as more effective than in the traditional framework.

In traditional learning the teacher conducts the lesson according to the study program and the existing curriculum but in E-learning the student may have the option to select learning materials and type that meets their level of knowledge and also interest participates to determine the subject matter, the studying is based on various sources of information, including web data banks.
The pivot of every research work is the methodology since it determines the impact of using VLE.

### III. Research Objective

The research seeks and provide new insight and knowledge into the means by which students and teachers can use virtual learning environment to enhance teaching and learning through web-based learning, computer-based learning, virtual classrooms, and net-experts located by the student. Traditional learning also makes the students learn “what” and not “how”; the students and the teachers are required to complete subject matter quota; the students are not involved in inquiry-based education and in solving problems, but rather in tasks set by the teacher. This is not so in E-learning where the learning is better connected to the real world and is based on “how”, the subject matter is richer and includes material in different formats and the Self-paced learning modules allow students to work at their own pace.

According to Joint Information Systems Committee (JISC-UK) as cited in Weller (2005), the term ‘virtual’ as used in virtual learning environment may sound unreal because of the use of the word virtual and that the term VLE refers to the components in which learners and tutors participate in on-line interaction of various kinds including on-line teaching and learning.

A journal written by EVICAB, the European Virtual Campus for Biomedical Engineering (2012) explained Virtual Learning Environment (VLE) to be a software system designed to facilitate teachers in managing educational course for their students. Weller (2007) states in a simpler term that VLE (or LMS) can be described as “a set of software systems that combine a variety of different tools used to systematically deliver content online and facilitate learning experience around that content”. It is a primary tool for distance education that can be used to supplement the face to face classroom and is built on two key elements: computer technology and education.

Kenneth (2009) explained that E-learning is an approach to learning and development where a collection of learning methods using digital methods or technologies. This can help distribute and teaching and enhance learning. However, E-learning can mean different things to different people. It is defined differently according to how you use or view it. To many people, e-learning is about the loneliness of the long-distance learner sitting at a keyboard, working his or her way through readings, exercises and tests. They think of it as distance learning, or as self-study, lacking the interactions of more traditional ways of learning. However, this notion has changed over time due to advances in technology for more interactions in the form of audiovisuals. This view of e-learning then leads to a lot of misconceptions. Some people have experienced e-learning that conforms to this stereotype, and this has brought about hostility to the very concept of e-learning. Some e-learning methods are better suited to knowledge acquisition rather than skill development.


### IV. Research Methodology

The pivot of every research work is the methodology since it provides the basics for formulating research questions and testing of theories. Methodology is a way of thinking about and studying social reality (Strauss and Corbin, 2008). The researchers use qualitative research paradigm and explained the common methods used in the qualitative research justifying their choice, Action case study.

The aim of this research work is to support teaching and learning with a technology mediated tool called Moodle. The researchers therefore present the conceptual framework to depict the major factors and constructions used in the study and the presumed relationships among them. Goodyear et al. (2001) synthesized this model for network learning and the model for internet-enabled student collaboration. Whitley and Bell (2001) as cited in Ussiph (2012) shows the conceptual framework for this study as in figure 1.

The research project was conducted in a community school called Kumasi Academy Senior High (KUMACA) in a suburb of Kumasi called Asokore Mampong municipal Assembly in the Ashanti Region of Ghana. Kumasi is the capital city of Ashanti Region in Ghana and it also doubles as the second capital for Ghana. Asokore Mampong where the research site is located is a new municipal assembly created. The students’ population is about 2000. They have a computer laboratory with about 40 computers having micro soft office as the only program running on their systems. Their curriculum is based on the West African Council Syllabus. The computers in the laboratory were not connected to the internet. The researchers provided internet service by using USB modems.

Moodle is an acronym for Modular Object-Oriented Dynamic Learning Environment. It is an open source Course Management System (CMS) that universities, colleges, businesses, and even individual instructors use to add web technology to their courses. More than 50,000 educational organizations around the world currently use Moodle to deliver online courses and to supplement traditional face-to-face courses. Moodle is available for free on the Web (www.moodle.org). Moodle is a Course Management System that is designed using sound pedagogical principles to help educators create effective online learning communities. Some VLE’s like Moodle have more modern functionalities. Moodle has modern communication and content management features “Blogs” and “Wikis” and supports RSS. Moodle offers an easy way to upload and share materials, facilitates online discussions and chats, provide quizzes and surveys, submission and reviewing of assignments, and recording grades.
V. Description of participants

The participants are made up of boys and girls totaling 24 of which 12 were boys and the rest were girls. Out of these 8 have above average performance, 8 from the average group and the rest of the 8 were also of the below average performance. The average age of these students was 14 years. None of these groups of students has engaged in any form of e-learning before neither have they used MOODLE before. There is only one school laboratory technician and he gave a helping hand in the implementation of the research. The researchers were also there as a participating observer. There are also only 4 ICT teachers for the whole school and each class meets the ICT teacher once a week that lasts for only 80 minutes. Opportunistic sampling of applicants was used in the selection of applicants. The sample size was based on available resources such as the number of working computers in the laboratory. Questionnaires were used to gather demographic information of participants since they were all involved in the data collection.

VI. Observations and Analysis

During the implementation, data collection and analysis were carried out. There were focus group discussions between the researchers and the participants during the buffer periods. This data was gathered in a research diary. In this first cycle participants were not conversant with the system as participants were struggling with the operations. Some of the difficulties faced by the participants included the fact that they were slow in the basic operations which consumed a lot of time. Some participants also had problems with logging in. There was a problem with the internet connection which was breaking intermittently. There was also power outage occasionally as the lesson went on. Even though the researchers and the participants planned spending two hours, the problems encountered made us spend three hours. We ended this cycle by discussing the prospects and the short falls of this cycle and this formed the basics for the second cycle. Another orientation phase was carried out to prepare students for the next phase of cycle. At this point participants were taken through the following: how to log in, how to use the Moodle. And also how to connect to the internet when the link goes off. After all these the stage was set for the second and final phase of the cycles. This phase exhibited some level of improvement. The complains at this phase were less even though the internet connection still had some problems and also the power went off some times. There was 3 days’ buffer period that was used to gather data through focus group discussions in order to reflect on the first cycle and make amendments for the next cycle. This formed the climax for the evaluation of the first cycle.

Participants after going through the orientations started with cycle two. In this cycle participants performed better than the first cycle due to increase in their confidence and the rise in their enthusiasm in E-learning. 14 out of the 24 who took part in the

![Fig. 2: Depicting the Moodle interface used for the implementation of the VLE.](image-url)
Due to the great satisfaction that the participants had with this new technology, they recommended that the schools and the ministry of education should approve of the use of virtual learning to supplement traditional learning in schools and colleges. Out of the 20 participants who were interviewed, 16 of them responded positively for the approval of this new system. This is evidenced in the Figure 3. The participants who wished for the approval of this technology stated that the government needs to support the implementation of this system financially and also the government should add it to its educational curriculum. Participants also added that the school should help in acquiring enough computers and internet connection in order to succeed in the implementation of this program.

VII. Conclusion
This research looks at the use of virtual learning environment to support teaching and learning. There have been problems of using the traditional learning system and the use of virtual learning environment has led to efficient teaching and learning. This study has contributed to knowledge in the area of learning technology as follows:
1. It has been found out that no single pedagogy suffices. There is the need to combine multi-system pedagogies including different kinds of learning theories to achieve the target objectives in teaching and learning.
2. The use of multi-system pedagogies can enhance effective teaching and learning. Effective learning takes place when learners are actively engaged in constructing knowledge (thus, creating or doing), rather than passively reading, memorizing, or viewing. Moodle is educational software grounded in a philosophy of collaborative learning, often referred to as social constructionist pedagogy. This approach views learning as a creative social process where people learn together by investigating, analyzing, collaborating, sharing, and reflecting. Moodle was built with elements and tools that embody pedagogical understanding, when pedagogies are implemented effectively it can lead to increased results. The use of different learning pedagogies has increased student performance and has also motivated students to learn. The pedagogies used included: resource based, peer-to-peer, collaborative and problem-based learning to motivate learners and challenge their intelligence to improve upon their critical thinking and problem solving skills.

The use of different learning theories in teaching and learning has also improved learner’s performances and enhanced effective teaching and learning.

References

Author’s Profile

Insanatu Muntaka was born in Kumasi, Ghana in the year 1979. Growing up as a versatile person with IT Education as a foundation, she received her B’Ed Degree in ICT with a blend of professional and skilled based certificate from the University of Education- Winneba-Kumasi Campus in 2009. Insan Muntaka furthered her career goal by studying Information Technology at the Master’s level in KNUST and completed in the year 2014. She joined the Information Technology Department at the Kumasi Academy Senior High School since 2009 and has been teaching ICT since. Having shown high level of commitment and confidence in delivering her lessons and teaching resulted in her as, Muntaka rise to the position of Head of Department for Kumasi Academy I.T section.
Siddique Abubakr Muntaka was born in Kumasi, Ghana, in 1986. Growing up as a versatile person with Art as a foundation, he received his BFA Degree with a blend of Professional and skilled based Certifications in Information Technology from Kwame Nkrumah University of Science and Technology (KNUST). Muntaka furthered his career goal by studying for a Master’s Degree in Information Technology from KNUST in 2019. Since 2015, he joined the Information Technology Services Department of Kessbeen University College as the I.T Manager and subsequently as a Technical Instructor in 2018 and an Assistant Lecturer for the School of Physical Sciences in 2019. With concentration in Systems, Networking, Data center design and Engineering, as well as Security, Muntaka has executed several network engineering projects for Nursing and Midwifery Training Colleges as well as Colleges and Universities in Ghana. In 2019 he joined in as a resource person for Computer Science and I.T Department of Garden City University College for Web Design class. His current research interests include Network Design and Engineering, High Availability and Cluster, Security, Open Source, Operating Systems, Virtualization, Data Center Design and Engineering, Web Design and Content Management Systems, Multimedia and Streaming Systems, IOT, Cloud Computing and Cloud Systems.