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Original article

# Utilization of Moodle in Teaching Undergraduate Students in West Africa

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**Introduction.** Teaching pedagogy has become more advanced and techno friendly. The goal of this study is to inspect effectiveness of e-LMS (learning management system) prevalent for students of West African University, mainly at Private University Colleges.

**Materials and Methods.** The samples were collected from Ghana, Nigeria, Sierra Leone, Togo and Benin. The research design is based on a survey method. Data were collected from 435-undergraduate students using questionnaires out of which 410-were found useful.

**Results.** The result hints towards enhancing infrastructure for technology, more seminars and encouraging students to use the same.

**Discussion and Conclusion.** Efficient use of LMS ought to be on obligatory institutional objectives and policies. The study recommends integration of LMS in curricula of undergraduate students of West African countries. The study further recommends efficient and useful information technology education to be made mandatory institutional policy for students and criteria for getting accreditation for organization.

*Keywords*: teaching pedagogy, e-learning management, undergraduate students, cross-sectional survey method, West Africa

The authors declare no conflict of interests.

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Оригинальная статья

# Особенности использования платформы MOODLE в обучении студентов уровня бакалавриата в Западной Африке

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**Введение.** Интеграция образовательных технологий в высшее образование привела к формированию новой парадигмы в преподавании и обучении. Педагогика образования стала более передовой и технологичной. Целью данного исследования является оценка эффективности электронной системы управления

обучением (e-LMS), распространенной среди студентов частных университетских колледжей Западного Африканского университета.
**Материалы и методы.** Для изучения проблемы в Гане, Нигерии, Сьерра-Леоне, Того и Бенине было проведено анкетирование. Для сбора информации применялся метод опроса. Данные были собраны у 435 студентов уровня бакалавриата с помощью вопросников, из которых 410 были валидными.
**Результаты исследования.** Полученные результаты свидетельствуют об улучшении технологической инфраструктуры, увеличении числа курсов и мотивации студентов к использованию виртуальной обучающей среды. Эффективное применение электронных средств обучения должно быть связано с обязательными институциональными целями и политикой. Авторы рекомендуют включить системы онлайн-обучения в учебные программы студентов уровня бакалавриата в странах Западной Африки. Также необходимо сделать высокий уровень осведомленности в сфере информационных технологий частью обязательной институциональной политики для студентов и критериями для получения аккредитации образовательной организацией.
**Обсуждение и заключение.** Полученные результаты вносят вклад в актуальный вопрос о необходимости электронного обучения среди студентов университетов Западной Африки.

*Ключевые слова*: педагогика образования, управление электронным обучением, студент бакалавриата, метод межсекционного опроса, Западная Африка

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## Introduction

The 21st century has seen rapid development and growth in the use of numerous technological devices such as computers, laptops, mobile phones, and iPods among others[1]. The emergence of the internet has accelerated the incorporation of online educational resources such as electronic textbooks and reading materials, e-libraries into the curricula of higher learning institutions [1]. As a result of this, the application of e-learning continues to gain importance in higher education globally. At the moment, the integration of educational technology in tertiary education in West Africa has profoundly led to a new teaching and learning paradigm [2].

Today, the majority of lecturers in various educational establishments across the world have taken advantage of the several innovations of the information and communication technology in delivering online educational materials to their students using the Learning Management System. The paradigm shift has facilitated a blended form of learning combining traditional face-to-face lecture style and web-based form of teaching [3]. The LMS is an incorporate of variety of instructional and educational tools, thus building an online learning atmosphere where students can easily access learning and teaching materials irrespective of time and place and could effectively contribute to online discussions [4]. A significant number of public universities in Ghana such as the University of Ghana, the University of Education among others are blending online learning with their traditional methods of teaching, allowing working students to efficiently continue their education while pursuing their personal goals and professional careers. A few selected private universities such as the Central University College that have fruitfully embraced an LMS to supplement their teaching and learning activities[2].

Many private university colleges introduced the Moodle LMS as a supplement to its traditional face-to-face lecture room teaching and learning methodology [5]. Regrettably, a few undergraduate students we interacted at the Private University Colleges indicated that the system had been underutilized since its introduction by the University. The views of these students seemed to suggest that the system does not meet their expectations. It is against this background that the study was carried out to establish: wheth-

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[2] Marfo J.S., Okine R.K. Implementation of e-Learning in Ghanaian Institutions (A Case Study of KNUST). Paper Presented at the 5th Conference of MIT's Learning International Networks Consortium. 2010. Available at: https://linc.mit.edu/linc2010/proceedings/session6Kabutey.pdf (accessed 20.05.2020). (In Eng.)

er undergraduate students were using the Moodle LMS for all their academic work? The study intends to explore why this problem is so. The objectives of the study are:

1. to understand awareness channel of Moodle LMS by the students;

2. to know the challenges encountered by management students whiles using the Moodle LMS and;

3. to find out whether students will use the Moodle LMS for their future academic work.

## Literature Review

Modular object-oriented dynamic learning environment (Moodle) is a free and open-sourcing learning management system for sharing and imparting knowledge. Moodle is promoting cognitive existence for teachers to share ideas by initiating conversations, exploring solutions, and providing resolutions to problems through a platform [6]. Claar et al. and Ellis et al. strongly believe that a well-planned higher academic institution aspiring to adopt an LMS should judiciously select one that would be able to accomplish six central activities for the institution [7; 8]. According to these scholars, these activities comprise; combined teaching initiatives on a scalable online learning platform, centralized and automated administration, support portability, use of self-service & self-guided services, standards & personalize content, assemble & deliver learning content rapidly, and enable knowledge for re-use. In addition to the above, Salmeron was of the view that the most vital success elements for the choice of an LMS are "asynchronous and synchronous communication tools, content structure, usability, standards compliance, cost effective, easy maintenance, students' attitude, assignments, and multimedia" [9, p. 277]. Additionally, Chaubey and Bhattacharya deliberate on several characteristics that a suitable LMS should be equipped with in order to be helpful to both faculty members and students in general [10]. These researchers recognized the provision of learning goals with content, teaching, assessment, integrating of legacy systems and tracking of progress as vital features for LMS. Furthermore, they emphasize that the safety of an LMS should be ensured as it could go a long way to breach the entire system depriving users of its useful benefits. Dahlstrom et al., came out with fascinating findings by merging results of 03-sources of about 17,000-faculty members, 800-educational institutions, and 75,000-students from a survey[3]. They found both faculty and students value the LMS as enrichment to their learning experiences and teaching with high satisfaction and encourage for collaborations & engagement. The (learning management systems) LMS is an outdated technology and the academics should take help of programmers and web designers/mentors assisting them in creating online material [11]. There is need for a comprehensive e-learning approach toward teaching and learning of Management Accounting at higher education institutions [12].

Aikina & Bolsunovskaya surveyed in Russia and concluded that, Moodle for English language is flexible and elastic in nature [13]. Further they advised reduction in de-motivating factors and improvement in positive motivating factors. De Medio et al. used MoodleRec hybrid system to arrange through a pool of amenable Learning Object Repositories [14]. Learning objects were listed according to social generated features for real life experiments. Dhika et al. said LMS has become popular among educators and students across Indonesia because of convenience in imparting education[4]. Elfeky et al. found e-learning classes through flipped classroom with the use of advance organizer could develop learners' skill and will have benefits for research [15]. Htun et al. observe

[3] Dahlstrom E., Brooks D.C., Bichsel J. The Current Ecosystem of Learning Management Systems in Higher Education: Student, Faculty, and IT Perspectives. Louisville, CO: ECAR; 2014. Available at: https://library.educause.edu/-/media/files/library/2014/9/ers1414-pdf.pdf (accessed 20.05.2020). (In Eng.)

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LMS e-learning system is essential for developing countries like Myanmar[5]. The challenges of students centered learning can be met through online learning systems to make the transformational changes in education. Kee observed direct interaction among teachers and adult learners is the best choice whereas LMS e-learning is suitable for learners in Malaysia [16]. Kerimbayev et al., 2019 tried to exhibit LMS Mooodle platform in arranging to take online classes for both synchronous & asynchronous learning in Universities of Slovakia & Kazakhstan [17]. The experiment was for follow-up study and was successful. Koh & Kan recommends digital learning should be student-centric which requires for which faculty and infrastructural up-gradation required [18]. Liu et al. found data are hard to interrogate in LMS[6]. They recommended Moodle engagement analytics plugin to enhance login metrics, assessment submissions and mass interactions. Maslov found user experience of Moodle is an efficient study tool but with problems of proper communication and lacks entertainment[7]. Mintii recommends for improvement of information technology competencies of students and teachers so that courses can be planned for long term basis[8]. Improvement in logistics, transparency, predictability and moreover to make it attractive, framework should be formulated. Mpungose recommends Moodle for South African Universities as it improves e-learning through content knowledge, pedagogical and technological platforms [19]. Muhisn et al. observed that knowledge can successfully be transferred from teachers to students through e-LMS in Iraq [20]. E-LMS enables students to grow their knowledge and motivate to share the same among fellow students. Rabiman et al. observed positive values of LMS-based e-learning system [21]. The feasibility of LMS e-learning was based on usability, learning design, communication and material content etc. The level of satisfaction was high among students of Mechanical Engineering. Rakic et al. found e-learning system has important relation with students' performance [22]. Sadikin et al. found by utilizing tools such as HAProxy, the implemented Load Balancing Clustering configuration mechanism delivers a competent e-learning system performance in higher education [23]. Simanullang & Rajagukguk recommends Moodle based LMS can increase learning activities among students through videos, discussions, chats, materials and quizzes [24]. Vershitskaya et al. observes popular e-learning systems are implemented in three universities of Moscow but the initiatives are not fully implemented due strategy failure and lack of technical support [25]. Wicaksono et al. found average learning interest enhanced to 16.38% with the use e-learning system [26]. Yusuf et al. found Moodle LMS based e- learning system is ideal for Physics learning due to pedagogical aspect, functional aspect, navigational aspect and layout aspect[9]. Zainul et al. found e-learning systems very useful during Covid-19 pandemic [27]. The system is widely accepted across Indonesia, needs continuous improvement in contents at par with time. Zlatkovic et al. recommends that the e-learning system has to improve in design, course, information, search in the context of learners for higher education institutions [28].

[5] Htun Y., Thuzar K., Tar P.P. E-Learning Activities through ACU Learning Management System: A Case Study of UTYCC. In: Proceeding of the 1st University Research Conference on Science and Engineering. 2020. Available at: https://www.utycc.edu.mm/download/urcse/Session%208%20Enginnering%20Edu.pdf (accessed 20.05.2020). (In Eng.)

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## Materials and Methods

Cross-sectional survey method was used to collect information. The sample comprised of undergraduate students of private university colleges of West Africa. The countries of survey were Nigeria, Ghana, Benin, Togo and Sierra Leone. Primary data was collected using a convenience sampling method. 440-samples could be collected out of 600-samples distributed. On verification, only 440-samples were found error-free. In order to give equal weight to all 5-countries, we selected 82-samples from each country and used 410-samples. Questionnaires were prepared with focus on the study. The study was conducted between December-2018 to June-2019. Sufficient time was offered to students to answer our questionnaire. The students exhibited enthusiasm in the completion of the questionnaires. Many private university colleges requested not to reflect their names on research paper. To safeguard against errors, the researcher had conducted a pre-test of the instrument before commencement of data collection.

## Results

This study examined the views of undergraduate students on the use of the MOODLE LMS. Data analysis was conducted using descriptive statistics by means and standard deviations. A total number of 410 samples collected with a response rate of 68.3%. Regarding gender distribution, males were (53.9%) and females were (46.1%). Regarding age, the majority of respondents (55%) were below 22 years whilst 25% were above 23 years and the rest were from higher age-group. Students' representation was as follows: level 100 (23.2%), level 200 (19.8%), level 300 (24%) and level 400 (26%). Here, Level-100 refers to 1st year students, Level-200 refers to 2nd year students, Level-300 indicates 3rd year students and Level-400 for 4th and final year students.

The findings obtained from the study have been analyzed and presented under the following themes: Channel Awareness of MOODLE LMS; Challenges using the LMS; and Future use of the MOODLE.

*Channel of Awareness of the MOODLE LMS*: The MOODLE LMS enables students to their submit assignments online, download course materials, and partake in discussion forums, quizzes among others. Table-1 below presents awareness channel of MOODLE-LMS by undergraduate students at the Private University Colleges.

The analysis of results from Table 1 revealed that the channel awareness of the MOODLE LMS by undergraduate students at Private University Colleges was quite small ($M$ = 1.31, $SD$ = 0.52). However, majority of the undergraduate students indicated that they heard about the MOODLE from their lecturers ($M$ = 1.49, $SD$ = 0.78). Others equally became aware of the system from their friends ($M$ = 1.36, $SD$ = 0.54). On the other hand, a few students ($M$ = 1.23, $SD$ = 0.42) also became aware of the system during their orientation program when newly admitted into the Private University Colleges and others through by checking on the various notice boards on campus ($M$ = 1.20, $SD$ = 0.40) and website (Mean = 1.28, $SD$ = 0.46).

Table 1. **Channel of Awareness of MOODLE LMS** (N = 410 in all cases across)

| Channel of Awareness | Mean | Standard Deviation |
|---|---|---|
| Awareness Subscale (5-Items) | **1.31** | **0.52** |
| Lecturers | 1.49 | 0.78 |
| Friends | 1.36 | 0.54 |
| University website | 1.28 | 0.46 |
| Orientation | 1.23 | 0.42 |
| Notice Boards | 1.20 | 0.40 |

*Source*: Field Data, 2019.

*Challenges faced by students whiles using the MOODLE LMS*: For effective utilization of the Moodle platform, one may need to have adequate infrastructure and technological skills. The challenges faced by undergraduate students a while using the MOODLE LMS has been presented in Table 2.

From Table 2, the result of the data analyzed revealed that undergraduate students at experienced high levels of challenges when using the MOODLE LMS ($M$ = 4.46, $SD$ = 2.29). From the analysis, the majority were battling with poor internet connectivity on campus ($M$ = 4.55, $SD$ = 2.23). Others lacked adequate computer skills ($M$ = 4.45, $SD$ = 2.14) whiles others lacked a personal computer to enable them effectively use the system ($M$ = 3.83, $SD$ = 1.03).

*Future use of MOODLE LMS*: Majority of university students may use the LMS to access their lecture notes and reading materials. Table 3 presents the potential utilization of MOODLE-LMS by undergraduate students of private University Colleges of West Africa.

From Table 3, it is evident that, the undergraduate students are eager to adopt MOODLE for learning ($M$ = 4.59, $SD$ = 2.39). The analysis reveals that undergraduate students will use the MOODLE LMS for their future course work ($M$ = 4.55, $SD$ = 2.33). Also, they agreed to the fact that that they will use the MOODLE LMS to do all their academic work as a result of its significant features ($M$ = 4.57, $SD$ = 2.19).

## Discussion and Conclusion

It could be inferred from the analysis that the channels through which undergraduate students at Private University Colleges became aware of the existence of the MOODLE LMS were very scare ($M$ = 1.31, $SD$ = 0.52). This possibly indicates that the majority of undergraduate students were not aware of the existence of the MOODLE LMS.

T a b l e 2. **Challenges encountered whiles using the MOODLE LMS** (N = 410 in all cases across)

| Challenges | Mean | Standard Deviation |
|---|---|---|
| Challenges Subscale (6 items) | 4.46 | 2.29 |
| Using the MOODLE LMS is stressful | 4.32 | 2.97 |
| It is frustrating using the MOODLE LMS | 4.45 | 2.14 |
| There is a lack of adequate ICT Infrastructure | 4.76 | 2.67 |
| I lack adequate computer skills on how to use the MOODLE LMS | 4.45 | 2.14 |
| Poor internet connectivity affects my usage of the MOODLE LMS | 4.55 | 2.24 |
| I don't have a personal computer to use the MOODLE LMS | 4.23 | 1.34 |

*Source*: Field Data, 2019.

T a b l e 3. **Future use of the MOODLE LMS**

| Future use of Moodle LMS | Mean | Standard Deviation |
|---|---|---|
| Subscale (3 items) | 4.59 | 2.39 |
| I will use the MOODLE LMS in the future studies | 4.67 | 2.65 |
| I will use the MOODLE LMS on a regular basis in the future for my course work | 4.55 | 2.33 |
| I always try to use the MOODLE LMS to do my academic work due to its useful features | 4.57 | 2.19 |

*Source*: Field Data, 2019.

This revelation may come as a surprise because the MOODLE LMS link is so visible on the Private University website that it should draw the attention of any curious undergraduate student to explore its contents. Others indicated that they got to know of the platform through their lecturers ($M$ = 1.49, $SD$ = 0.78) and friends ($M$ = 1.36, $SD$ = 0.54). This may suggest that the majority of the students rely on their lecturers and peers for information. As presently it may not be attracting students, the Private University Colleges could possibly create a lot of awareness on the use of the LMS for all academic on campus.

The analysis of results showed that undergraduate students were experiencing challenges when using the MOODLE LMS ($M$ = 4.59, $SD$ = 2.39). Concerning these challenges encountered, poor internet connectivity ($M$ = 4.55, $SD$ = 2.24), lack of computer skills ($M$ = 4.45, $SD$ = 2.14), the inability of students owning their personal computers ($M$ = 3.83, $SD$ = 1.03) among others may go a long way to hinder the effective employ of MOODLE-LMS.

About future use of the MOODLE LMS, the willingness expressed by the undergraduate students is a great guarantee for its continuous utilization ($M$ = 4.59, $SD$ = 2.39). Undergraduate students appreciated the positive impact of the MOODLE LMS on their academic work ($M$ = 4.57, $SD$ = 2.19) and a result was prepared to use it in for their future studies ($M$ = 4.55, $SD$ = 2.33).

From the findings obtained from undergraduate students at the Private University Colleges, the following recommendations are made for the benefit of higher education institutions considering or contemplating to integrate the MOODLE LMS into their teaching and learning curriculum.

1. First of all, there should be a mandatory intuitional policy supporting online teaching with clearly stated guidelines. Again, students should be made aware of the existence of the e-learning platform not only through posters, leaflets etc. but through workshops, conferences, seminars and an annual orientation programs when newly admitted.

2. Secondly, adequate computers should be made available for all students involved in e-learning. The cost of the computer could be included in their tuition fee when agreed by them. Students' restrictions on the use of computers in departmental libraries could perhaps be relaxed to make enhance accessibility of platform of e-learning.

3. Finally, University must ensure that there is an availability of internet facilities in offices, departments and students halls of residence. The internet should be reliable and fast so that students can access it at anytime and anywhere.

The MOODLE LMS is one of the e-learning platforms gaining much popularity on university campuses in Africa and beyond. As revealed by the study, there is a need for an awareness campaign and computer training for students at Private University Colleges. Also, there should be adequate computers and easily accessible internet facilities for all students on campus. Lastly, the internet should be well planned so that students with personal laptops can have access anywhere and at any time whiles on campus. The findings of the study will contribute to the ongoing e-learning discourse with new and fresh ideas for the students of Universities across West Africa.

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