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Research Article

Using Learning Management System as a Tool for Improved Students Academic Achievement: A Case Study of the University of Bamenda Teaching Experience

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Abstract

The ineffective use of digital education tool such as the learning management system (LMS) and the decline in students' academic achievement is a predominant issue in the teaching-learning process in higher education institutions. This paper presents unique experience from lecturers and students in The University of Bamenda based on their use of the LMS as a tool for improved students' academic achievement. Cross-sectional survey research design and simple random probability sampling technique were used in the study. The study sample was made up of 300 students out of 7,343 third year undergraduate students of College of Technology, Faculty of Education, Faculty of Science and Higher Institute of Commerce and Management. Moreover, the study made used of 100 out of 399 staff from these establishments in the university. The data was collected using two sets of questionnaires and the Cronbach's Alpha reliability for the questionnaire was found at 0.88. The data collected were analysed using descriptive and inferential statistics. The main findings of the study were that a unit increase in the use of the LMS by lecturers and students is expected to increase students' academic achievement by approximately 0.298 units. The results also indicated that, the inability of students and lecturers to use the LMS as an innovative teaching tool and the poor connectivity around the campus were among the principal challenges disrupting the effective use of LMS and leading to a decline in students' academic achievement in The University of Bamenda. Consequently, it was recommended that, the Departmental, Faculties /Schools calendar of activities should state clearly the period for seminars on LMS and these training sessions should be incorporated on the university's online portal and strictly implemented. The university authorities should ensure that on-campus internet connection is provided regularly and free of charge to enable staff and students carry on with some compulsory Moodle Platform activities.

Keywords

Learning Management System, Tool, Students' Academic Achievement, Teaching Experience

1. Introduction

There is a going need for a shift from early educational tools like hornbooks, mimeographs, Abacuses among others, to digital education tools such as learning management systems (LMS). In other words, today, the context of the university should be that which both lecturers and students should use LMS such as Canvas and Moodle. Research

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consistently [11] points out that effective use of the LMS (Moodle platform) as a tool means to engage students through multimedia presentations, fostering interactive learning experiences, evaluating students understaning, monitoring their progress and providing feedback as well as recording and generating reports on their performance and progress. This can only be possible if both lecturers and students understand the functioning of the LMS and use such knowledge to foster teaching and learning. However, some university teaching staff face difficulties using the LMS. According to previous research [23], the difficulties encountered by some university teaching staff arise from their inability to engage their students with well structured learning task and discussions that enable them to engage in mutual and reciporal interactions with their peers.

Generally speaking, it is the responsibility of lecturers to use the LMS to streamline course organisation, assessment and content delivery that enables students to share views and learn. This is because, students' academic performance depends on the effective use of LMS as a tool [11]. Yet, it is hardly superising that some university teaching staff have difficulties in devising good courses, managing and evaluating them effectively or motivating the students through the quality of their lecturing [23]. This implies that, the inability to use LMS in the learning process typically results in low students' engagement and interaction [11]. Due to this low students' engagement during the teaching learning process, an outstanding problem may eventually become a generalized inadequate use of LMS characterized by low completion of learning tasks, poor down loading of learning materials and limited tracking of progress, all contributing to low level of students' performance in the course [5]. From the foregoing discussion it is obvious that if university teaching staff or lecturers effectively use the LMS as a tool for curriculum design and instructional design, the vast majority of students would participate and interacte with their peers during the teaching learning process resulting to an improvement in their performance. Nevertheless, they are some students who would continue to work alone and perform poorly because they do not know how to adequately use the LMS (especially Moodle platform) in the teaching learning process in so long as they are in school [11]. The question emerging is do lecturers use innovative digital education tool (LMS) in a way that students can interact, think critically and acquire skills to solve real life problems?

1.1. Background to the Study

The way lecturers use the LMS to relate to the students play a critical role in determining whether students' achievement deteriorate or improve. The need therefore arises to traced back to the events marking the adoption of LMS in state universities in developing countries and Africa in particular. According to African Union's Continental Education Strategy for Africa [3] and African Union's Policy on Open Educational Resources [2] Africa has incorporated the LMS in African's 21st Century education endeavors. Cameroon like most African countries has given much importance to LMS in order to improve the quality of education. For example, researchers [8] state that, the Cameroon's Ministry of Higher Education (MINESUP) embraced the LMS for several reasons: To improve accessibility to educational resources, prevent interruption of educational processes by natural pandemic like the COVID-19, modernize the educational system to attain the 2030 National Development Strategy, enhance flexibility so that students can learn at their own pace and access course materials anytime and anywhere. In The University of Bamenda (UBa) like other higher institution of learning in Cameroon, LMS specifically Moodle platform is adopted to facilitate teaching and learning in various aspects, including providing teachers with opportunities for integrating different instructional methods [10]. This implies that, for students to be engaged in interactive activities that would improve their performance, lecturers in the University of Bamenda must effectively use the LMS to organize and deliver course materials, assignments, and assessments, as well as track student progress and performance.

Unfortunately, some students and staff in The University of Bamenda are facing challenges in the management of online personal information and academic records [11]. This is worsened by the fact that, the teacher-student ratio of 21.95: 1 for The University of Bamenda is still slightly below the international average according to the National Centre for Education Statistics of 18: 1 [24]. Poor academic achievement of students has also been related to students' inability to use the platform to do quizzes (66.7%), tests (68.9%) and to submit assignments (57.8%), [10]. Thus, the critical role that LMS plays in students learning emphasizes the importance of identifying the challenges that teachers and students encounter when using LMS in a learning environment.

Research strongly supports technical, administrative, pedagogical and financial challenges that teachers and students in Cameroon schools face which prohibits their effective use of the LMS to improve students' performance. Technically, while some researchers [1] clearly state that, a stable and fast internet connection is essential for accessing and using LMS; others [7] advocate for regular update and maintenance to prevent technical issues and ensure the permanent functioning of the LMS. Also, research evidence [16] reiterates clear institutional policies and guidelines as administrative conditions for effective implementation of LMS. Whereas, previous studies state that pedagogical conditions for any useful LMS will require well designed courses with content and instructors must be familiar with the LMS [13, 15]. Financially, research findings [7] advocate for the allocation of sufficient funds for LMS implementation, maintenance and support for essential long-term success. From the aforementioned discussions, it is worthy to note that, for effective teaching to take place, a good tool like LMS must be utilized by the

teacher. This view of course is supported by the fact that 48.9% students' grade in a course is rarely less than 50% when Moodle platform is used [10]. This means that LMS is one of the essential predictors of students' engagement or interaction and performance in any given course among other factors. However, students differ in the amount of interactive teaching via LMS that they may require to improve their academic performance in a course.

1.2. Statement of the Problem

From the foregoing discussions, it has been observed that lecturers and students are unable to effectively use the LMS as a tool for course content delivery, management of online class transactions; tracking and reporting of learner progress; assessment of learning outcomes; reporting of achievement of completion of learning tasks; and student records management. The presence of technical, administrative, pedagogical and financial challenges severely hampered the use of LMS activities. In other words, using the LMS as a tool to increase students' engagement may be difficult since the teacher-student ratio is slightly below the international average. Without the ability to use LMS such as Moodle platform well, opportunities for teaching effectiveness and improved students' performance inevitably will be lost. This leads one to wonder whether using the LMS like Moodle platform can lead to improved students' achievement.

Specifically, the objectives of this study are:

1) Evaluate the effects of the Learning Management System (Moodle platform) on students' academic achievement in The University of Bamenda.
2) Identify the major challenges associated with the Learning Management System and its effect on students' academic achievement.
3) Analyse strategies that can improve the use of the Learning Management System in The University of Bamenda.

1.2.1. Research Questions

How does the Learning Management System affect students' academic achievement in The University of Bamenda?

What are the effects of the major challenges associated with the Learning Management System on students' academic achievement in The University of Bamenda?

Which strategies can improve the use of the Learning Management System in The University of Bamenda?

1.2.2. Research Hypotheses

Ho: Learning Management System has no statistically significant effect on students' academic achievement in the University of Bamenda.

Ha: Learning Management System has a statistically significant effect on students' academic achievement in the University of Bamenda.

2. Literature Review

Learning Management System (LMS) are generally thought of as a web-based digital device that allows instructors and students to share didactic materials, make class announcement, submit and return course assignments, and communicate with each other online [5]. Some common feactures for the effective use of the LMS include: course creation and management; students' engagement and interaction; creation and management of assessments as well as tracking of students' grades and progress [6]. It is worthy to note that Learning Management System has varied modes (traditional modes, online modes, hybrid modes, mobile and microlearning modes, and other modes) which can be adopted by any higher institution of learning. The traditional modes include face-to-face and blended Learning [1] while online modes of LMS include asynchronous and synchronous. According to research [19], asynchronous online learning gives students access to course materials and complete assignments at their own pace, without real-time instructor interaction while; synchronous online learning presents as real time online classes, where students interact with instructors and peers through video conferencing, live chats, or virtual whiteboards [14]. The hybrid modes of LMS range from flipped classroom and personalized learning [4, 16]. The LMS of the University of Bamenda has the latitude to adopt any of the above modes to measure students' academic achievement. Academic achievement is defined as the performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university [22].

Theoretically, connectivism supposes that, the student learning occurs outside of an individual, such as through social media, online networks, blogs or information databases. The theory states that, the knowledge existing beyond the individual is as a result of connections and the way information flows [21, 9]. To corroborate the theory of connectivism, the theory of diffusion for innovation places a lot of emphasizes on how learners, as part of a social system, adopt a new idea, behavior, or product [18]. According to this theory learning occurs when the learner perceives the idea, behavior, or product as new or innovative. Roger's theory promoted the concept of constructivism and social learning where learning occurs through social interactions, discussion, and collaborations with peers and instructors [25].

Empirically, research findings [6] indicated that most online LMS improved students' academic achievement because they incorporate a LMS content software tool that enables the creation, storage, use and reuse of the subject matter content. However, findings showed no remarkable improvements in the students' academic achievements and e-learning competence when students used online learning [12]. These previous findings [12] are supported by a study where major challenges such as communication, technological competency, and access to hardware for taking online classes, absenteeism, and drop-outs decreased the academic performance of both

Jordan and UK students who used the LMS during teaching learning process [26].

In another study, researchers [5] have examined the the influence of learning management system (LMS) platform on students' academic performance in The University of Bamenda in 2020/2021 academic year. The data for the study were obtained from primary sources using self-administered questionnaire. From a total population of all the students who studied through the LMS, they used a sample of 452 students selected from twelve (12) establishments of The University of Bamenda. Their ordinary least square regression technique findings revealed that the LMS platform has a significant influence on student's academic performance. However, variables like system quality and service quality have a negative significant influence on students' academic performance. Similarly, researchers [20] have used a survey design and investigated the effectiveness of online learning on students learning outcomes. Their findings revealed that online learning provides students greater flexibility and convenience, allowing them to study at their own pace and in their own time. They concluded that, online learning improved students' engagement, communication, and academic achievement and providing a more personalized learning experience. Basically, previous studies have explained that effective use of LMS increases students'personalised learning experiences [17], engagement and academic achievement [13, 15].

Yet, it can be deduced from these reviews that literature in The University of Bamenda addressing this concern is scanty. This study intends to fill this gap. Moreover, previous studies have used a wide range of methodologies and instruments such as questionnaires, interviews, classroom observations, etc. and have obtained mixed results. Pertinently, a mixed method approach combining quantitative and qualitarive data analysis collected from both students and staff was employed in this study to generate deeper and broader insight.

3. Methodology

The study utitized the cross-sectional survey research design. The design involved gathering data from the sample of the teaching staff and students of The University of Bamenda at a single point in time. This design was found appropriate since it is used in exploratory studies to allow the researcher gather, summarize, present and interpret the data for the purpose of clarification. The study was conducted in the sole public university in Mezam Division, in the North West Region of Cameroon. The location and specifically, The University of Bamenda was choose due to it adoption of the moodle learning management system and the use of training workshops to develop the skills of its teaching staff on the use of LMS in designing courses and managing students' academic records.

The University of Bamenda is purely Anglo-Saxon university where instructions are delivered strictly in English language. The university went operational from 2011 as the second English-Speaking University in Cameroon after the University of Buea. It began with the Higher Teachers Training College and the Higher Technical Teachers Training College, but today it has up to 12 establishments: six schools (The College of Technology, The Higher Institute of Commerce and Management, The Higher Institute of Transport and Logistics, The Higher Teachers' Training College, The Higher Technical Teachers' Training College and National Higher Polytechnic Institute) and six faculties (Faculty of Arts, Faculty of Law and Political Science, Faculty of Economics and Management Science, Faculty of Education, Faculty of Health Science and Faculty of Science). From the 12 establishments, the total population of the study was made up of 21, 273 students and 1,217 academic staff. The study's participants were drawn from 7,343 third year undergraduate students of College of Technology, Faculty of Education, Faculty of Science and Higher Institute of Commerce and Management and 399 staff members from these establishments in the university. A sample size of 300 students and 100 staff member was arrived at using the Krejcie and Morgan 1970 table.

The study employed a simple random probability sampling technique, to select 4 out of 12 establishments; as well as to select 75 students from each establishment.

Two sets of questionnaires were used to collect data for the study. Face and content validity were measured when ten students and staff outside the study area judged whether the content of the students and teacher questionnaires seem appropriate and relevant to assess the intented construct. All misconceptions and ambiguous questions/statements identified by the students and staff were amended. With regards to the student questionnaire a Cronbach's Alpha reliability of 0.87 was obtained. For the teacher questionnaire a Cronbach's Alpha reliability of 0.88 was obtained which made the instrument consistent. Ethically, a concern forms titled 'Authorization for Data Collection' Ref. No 060/2024/UBa/D/FED/VD-RC/HOS-RC of 4th June, 2024 was obtained from the Faculty of Education in The University of Bamenda. This authorization was presented to the respondents as such, respondents were not forced to participate in the study rather they willfully participated. A total of 400 questionnaires were retrieved from the respondents giving a retrieval percentage of 100. The data collected was analyzed using descriptive and inferential statistics. The research questions were presented using frequency distribution tables and hypotheses were tested with Analysis of variance (ANOVA) statistical technique at 0.05 alpha level.

4. Presentation of Findings

This section presents the findings of the statistical analysis according to the research questions and hypotheses.

4.1. Research Question 1

How does the Learning Management System affect stu-

dents' academic achievement in The University of Bamenda?

Table 1. *Students Responses on the Effect of the LMS on Students' Academic Achievement.*

	SA + A		D + SD		Mean	Std.
	Freq.	%	Freq.	%		
All the courses studied in UBa are linked to the UBa LMS	204	68.0%	96	32.0%	2.84	.871
Lecturers disseminate all course materials on the LMS	145	48.3%	155	51.7%	2.49	.920
It is easier accessing course material on the LMS	161	53.7%	139	46.3%	2.55	.926
Lecturers effectively monitor students' attendance in online class from beginning to the end	132	44.0%	168	56.0%	2.42	.963
I easily attend more of my classes on LMS	83	27.7%	217	72.3%	2.04	.930
Course outlines are strictly followed and covered	133	44.3%	167	55.7%	2.33	1.009
There is timely feedback from lecturers	144	48.0%	156	52.0%	2.47	.983
MRS	143	47%	157	57%	2.45	0.943

The findings in table 1 revealed that 204 (68.0%) of the students agreed that all courses studied at UBa are linked to the LMS while, 161 (53.7%) of students agreed that it is easier accessing course material on the LMS. Interesting, majority 155 (51.7%) of the students and 168 (56.0%) of students disagreed that lecturers disseminate all course materials on the LMS and that lecturers effectively monitor students' attendance in online class from beginning to the end. Furthermore, majority 217 (72.3%) and 167 (55.7%) of the students disagreed that, they easily attend more of their classes online and that the course outlines are strictly followed and covered. Majority 156 (52.0%) of the students disagreed that there is timely feedback from lecturers. Generally, only 143 of the students agreed that, the LMS is an essential tool for improving their achievement as opposed to 157 of the students who disagreed.

Table 2. *Student Responses on the Use of LMS as Tool to Improve Students' Academic Achievement.*

		Positive Responses		Negative Responses		Mean	Std.
	N	SA+A	%	D+SD	%		
All exams result in UBa are processed and published on the online platform	300	269	89.7%	31	10.3%	3.46	.819
It is easier for me to achieve and graduate	300	164	54.7%	136	45.3%	2.62	.986
The information on my student's transcripts is consistent	300	186	62.0%	114	38.0%	2.69	.857
I can easily monitor my academic progress using the platform	300	249	83.3%	50	16.7%	3.17	.814
My academic records are properly reported	300	191	63.7%	109	36.3%	2.83	.930
My academic records on the platform are managed rapidly	300	148	49.3%	151	50.7%	2.59	2.044
The directives on the use of the platform are straight and precise	300	226	75.3%	74	24.7%	2.92	.841
Multiple Response Set	300	205	69%	95	31%	2.89	1.042

The findings in table 2 indicated that, 89.7% of students expressed satisfaction with the processing and publication of exam results on the online platform. Similarly, 83.3% of students reported that, they can easily monitor their academic progress

using the platform. These high percentages reflect a positive perception of the academic support systems in place at UBa. However, the data also reveals areas of concern. For instance, only 54.7% of students found it easy to achieve and graduate, indicating a significant proportion of students who may be facing challenges in their academic journey. Additionally, the management of academic records on the platform received a mixed response, with 49.3% expressing satisfaction and 50.7% reporting dissatisfaction. This suggests a need for improvement in the management of academic records to enhance student satisfaction. Generally, the mean and standard deviation values provide further insights into the data. The mean scores for most items range from 2.59 to 3.46, indicating a generally positive perception among students. However, the standard deviation values vary, suggesting that the levels of consensus among students regarding their academic achievement at UBa differs. In conclusion, while the majority of students express satisfaction with certain aspects of academic achievement at UBa, there are areas that require attention and improvement. Addressing concerns related to graduation ease, academic record management, and clarity of directives on platform usage can contribute to a more positive and consistent student experience.

Table 3. *Staff Responses on the Effect of the LMS on Students' Academic Achievement.*

		Positive Response		Negative Response			
	N	**Agree**	**%**	**Disagree**	**%**	**Mean**	**Std.**
All the courses study in UBa are linked to the UBa LMS	100	57	57.0%	43	43.0%	2.68	.827
Lecturers disseminate all course materials on the LMS.	100	69	69.0%	31	31.0%	2.77	.679
It is cheaper accessing course material on the LMS.	100	53	53.0%	47	47.0%	2.69	.761
Lecturers effectively monitor students' attendance in online class from beginning to the end.	100	43	43.0%	57	57.0%	2.57	.902
Many more students attend classes online	100	51	51.0%	49	49.0%	2.48	.822
Course coverage rate with the LMS is high.	100	52	52.0%	48	48.0%	2.58	.855
Timely feedback from students on LMS eases lectures.	100	70	70.0%	30	30.0%	2.82	.744
Multiple Response Set (MRS)	100	57	57%	43	43%	2.66	.798

The findings in table 3 indicated that, 57 (57.0%) of the lecturers agreed that all courses studied at UBa are linked to the LMS while, 69 (69.0%) of them agreed that they disseminate all course materials on the LMS. 53 (53.0%) of lecturers agreed that it is easier accessing course material on the LMS. Interesting, a handful 43 (43.0%) of lecturers agreed that they effectively monitor students' attendance in online class from beginning to the end. However, majority 51 (51.0%) and 52 (52.0%) of the lecturers agreed that, many more students attend classes online and that they registered a high rate of course coverage with the LMS. Majority 70 (70.0%) of the lecturers agreed that timely feedback from students on LMS eases lectures. Generally, majority 57% of the lecturers agreed that the LMS is an essential tool for improving the academic achievement of their students as opposed to 43% of them who disagreed.

Table 4. *Staff Responses on the Use of LMS as Tool to Improve Students' Academic Achievement.*

		Positive Response		Negative Response			
	N	**Agree**	**%**	**Disagree**	**%**	**Mean**	**Std.**
Course Material/content is easily supervised by the authority.	100	77	77.0%	23	23.0%	3.12	.808
Academic progress of students is easily monitor.	100	80	80.0%	20	20.0%	3.04	.852
All course contents in the students' program of study are covered in time.	100	48	48.0%	52	52.0%	2.42	.781
There is a standardize formula to calculate students' Grade Point per	100	93	93.0%	7	7.0%	3.53	.658

		Positive Response		Negative Response			
	N	Agree	%	Disagree	%	Mean	Std.
course.							
Many more student earn higher degree class.	100	74	74.0%	26	26.0%	2.86	.667
Processes leading to the award of end of course certificates are facilitated.	100	72	72.0%	28	28.0%	2.88	.769
Many more ex-students of UBa gain admissions into other universities upon graduations from UBa	100	73	73.0%	27	27.0%	2.92	.706
Multiple Response Set (MRS)	100	74	74%	26	26%	2.97	0.749

The findings in table 4 revealed that, 77% of lecturers expressed satisfaction that the course material/content is easily supervised by the authority. This indicates a high level of confidence in the oversight of course materials, which is crucial for ensuring the quality and relevance of academic content. Additionally, 80% of lecturers agreed that the academic progress of students is easily monitored, suggesting that there is effective tracking and evaluation of students' performance to support their academic development. Moreover, the findings highlighted that there is a standardized formula to calculate students' Grade Point per course, with 93% of lecturers expressing a positive response. This high percentage reflects a robust and consistent approach to grading, which is essential for maintaining academic standards and fairness in assessment. However, the findings also revealed areas of concern related to students' academic achievement. For example, only 48% of lecturers agreed that all course contents in the students' program of study are covered in time, indicating a significant challenge in timely curriculum delivery. This finding suggests that there may be issues with course scheduling or resource allocation that could affect students' learning experiences. Furthermore, the mean and standard deviation associated with this aspect are relatively low, indicating a strong consensus among lecturers regarding the delay in covering course contents.

4.2. Research Question 2

What are the effects of the major challenges associated with the Learning Management System on students' academic achievement in The University of Bamenda?

Table 5. *Students Responses on the Effects of the Major Challenges Associated with LMS on Students' Academic Achievement.*

		Positive Responses		Negative Responses			
	N	SA+A	%	D+SD	%	Mean	Std.
Illegal payment for free services because of delay in resolving my complaints.	300	166	55.5%	133	44.5%	2.62	1.007
I miss LMS classes because of inadequate finances for hardware and data bundle.	300	203	67.7%	97	32.3%	2.87	1.050
Inadequate training of students on how to use LMS.	300	197	65.7%	103	34.3%	2.86	1.036
Difficult to graduate because of inconsistency on my transcript.	300	189	63.0%	111	37.0%	2.79	.961
Inability to reset my password by myself makes me unable to register my courses on time.	300	173	57.7%	127	42.3%	2.75	1.018
Inability to register above 36 credit values makes me to add an extra year in my studies.	300	216	72.0%	84	28.0%	3.06	0.950
Delay in correcting my CA or Exam marks on the platform makes it difficult for me to validate some courses.	300	260	86.7%	40	13.3%	3.35	0.858
Multiple Response Set	300	201	67%	99	33%	2.9	0.983

The results in table 5 showed that, 67.7% of students agreed that they miss LMS classes due to inadequate finances for

hardware and data bundles. This suggests that financial limitations can hinder students' access to online resources and impact their academic achievements. Additionally, 65.7% of students expressed concerns about inadequate training on how to use the LMS, indicating that a lack of guidance and support in utilizing the online platform may pose challenges for students in managing their learning effectively. Furthermore, the results pinpointed issues related to administrative inconsistencies, with 63.0% of students expressing difficulties in graduating due to inconsistencies on their transcripts. This finding suggests that discrepancies or errors in the management system can have a detrimental impact on students' performance and overall academic achievement. Moreover, the results also highlighted concerns about illegal payments for free services due to delays in resolving complaints, with 55.5% of students reporting this issue. This indicates that administrative inefficiencies and delays in addressing student concerns can lead to financial burdens and potentially affect students' academic performance and thus achievement. Additionally, 57.7% of respondents agreed that the inability to reset their password independently make them unable to register for courses on time. Similarly, 72.0% of respondents agreed that the inability to register for more than 36 credit values results in an extra year being added to their studies. Furthermore, a staggering 86.7% of respondents agreed that delays in correcting their continuous assessment or exam marks on the learning management system make it difficult for them to validate certain courses.

Table 6. *Staff Responses on the Effects of the Major Challenges Associated with LMS on Students' Academic Achievement.*

		Positive response		Negative response			
	N	**Agree**	**%**	**Disagree**	**%**	**Mean**	**Std.**
Disrespect of tasks' deadlines by users	100	82	82.0%	18	18.0%	3.24	.866
Inadequate finances for hardware/data bundle for tasks.	100	93	93.0%	7	7.0%	3.36	.644
Inadequate training of lecturers/students on the use of LMS	100	75	75.0%	25	25.0%	2.87	.939
Inconsistency in content of important report like transcript and certificates.	100	78	78.0%	22	22.0%	2.93	.856
Frequent/unannounced withdrawal of some functionalities from users' account	100	76	76.0%	24	24.0%	3.21	.924
The too elaborate procedures in implementing treated students' complaints.	100	73	73.0%	27	27.0%	2.97	1.000
Inability to select a group (repeating students) of students for a particular update.	100	77	77.0%	23	23.0%	3.10	.916
Multiple Response Set (MRS)	100	80	80%	20	20%	3.09	0.877

The results in table 6 indicated that, majority 82% of the lecturers agreed that one of the major challenges is the disrespect of tasks deadlines by users, indicating a significant concern regarding the timely completion of academic tasks within the online learning management system. This high percentage suggests that the lack of adherence to deadlines may have a negative effect on students' academic achievement. Another prominent challenge is the inadequate finances for hardware/data bundle for tasks, with 93% of lecturers agreeing that this is a significant issue. This finding highlights the financial barriers that staff and students may face in accessing and utilizing online learning management systems, potentially affecting their academic achievement. Additionally, the high mean and low standard deviation associated with this challenge indicate a strong consensus among lecturers regarding its severity. Furthermore, lecturers also expressed concerns about the inadequate training of lecturers and students on the use of LMS, with 75% agreeing that this poses a major challenge. This indicates that, the lack of proper training and support for utilizing LMS may hinder effective online LMS and subsequently affect students' academic achievement. The relatively lower mean and higher standard deviation for this challenge suggest some variability in lecturers' perceptions, but still point to a significant issue that needs to be addressed.

4.3. Research Question 3

Which strategies can improve the use of the Learning Management System in The University of Bamenda?

Table 7. Student Responses on the Strategies to Improve the Use of LMS.

		Positive Responses		Negative Responses			
	N	SA+A	%	D+SD	%	Mean	Std.
Train more workers on how to use the learning management system to attain to students.	300	278	92.7%	22	7.3%	3.53	.729
Provide free internet connection around the campus and increase the bandwidth of the www.ubastudent_online.cm	300	264	88.0%	36	12.0%	3.53	.909
Install solar panel for energy supply around the campus for students/staff	300	259	86.3%	41	13.7%	3.46	.912
Faculties/Schools orientations should be followed by departmental orientations on the use of the learning management system	300	271	90.3%	29	9.7%	3.50	.761
No charges for viewing of results once the platform charge has been paid by a student	300	258	86.0%	42	14.0%	3.48	.938
Multiple Response Set	300	268	90%	32	10%	3.51	0.841

The results in table 7 revealed that, strategies such as training more workers on how to use the online learning management system, providing free internet connection around the campus, and installing solar panels for energy supply received positive responses ranging from 86.3% to 92.7%. The mean scores for these strategies also fall within the range of 3.46 to 3.53, indicating a high level of satisfaction. Additionally, the standard deviation values for these strategies are relatively low, suggesting a higher level of consensus among students. To address the challenges identified in the negative responses, it is crucial to focus on strategies that received lower satisfaction percentages. For instance, the strategy of no charges for viewing results once the platform charge has been paid by a student received a satisfaction percentage of 86.0%, with a standard deviation of 0.938. This indicates a lower level of consensus among students regarding this particular strategy. Similarly, the strategy of faculties/schools orientations followed by departmental orientations on the use of the platform received a satisfaction percentage of 90.3% and a standard deviation of 0.761. These strategies may require further attention and improvement to enhance students' satisfaction and address the identified challenges. Overall, the results indicated the importance of addressing challenges related to internet connectivity, energy supply, and platform usage to improve academic support systems at UBa.

Table 8. Staff Responses on the Strategies to Improve the Use of LMS.

		Positive Response		Negative Response			
	N	Agree	%	Disagree	%	Mean	Std.
Increase trainings of workers/students on how to use the online.	100	92	92.0%	8	8.0%	3.67	.711
Provide free internet connection around the campus and increase the bandwidth of the www.ubastudent_online.cm.	100	92	92.0%	8	8.0%	3.68	.709
Install solar panel for energy supply around the campus for students/staff.	100	86	86.0%	14	14.0%	3.52	.858
Faculties/Schools orientations should be followed by departmental orientations on the use of the platform.	100	90	90.0%	10	10.0%	3.45	.809
No charges for viewing of results once the platform charge has been paid by a student.	100	88	88.0%	12	12.0%	3.60	.829
Multiple Response Set (MRS)	100	90	90%	10	10%	3.58	0.783

The results in table 8 indicated that 100% of the respondents agreed to various proposed strategies. The highest level of agreement was observed for the provision of free internet connection around the campus and increasing the bandwidth of the online platform, with 92% of staff agreeing with this strategy. This indicates a strong desire among lecturers for improved access to online resources, highlighting the importance of reliable internet connectivity for their academic activities. Furthermore, the installation of solar panels for energy supply around the campus also received a high level of support, with 86% of lecturers expressing agreement. This suggests that, staff recognize the potential benefits of sustainable energy solutions in enhancing their access to online LMS and other electronic resources. Additionally, the mean and standard deviation associated with these strategies indicate a relatively high level of consensus among lecturers, reflecting a strong overall agreement with the proposed solutions.

4.4. Research Hypotheses

Ho_1: Learning Management System has no statistically significant effect on students' academic achievement in the University of Bamenda.

Table 9. *Regression Model Summary for LMS and Students Academic Achievement (Students' Responses).*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.304[a]	.092	.089	3.719

Predictors: (Constant), UBa Learning Management Systems

Table 9 presents a model summary of the regression analysis. The R value of 0.304, suggest a moderate positive correlation between the predictor variable (UBA LMS) and the outcome being measured. The R Square value of 0.092 implies that approximately 9.2% of the variance in the student achievement can be explained by the LMS. The Adjusted R Square of 0.089 accounts for the number of predictors in the model, reinforcing the notion that while the LMS contributes to understanding the outcome, it does not account for a large portion of the variance. The standard error of the estimate is 3.719, which indicates the average distance that the observed values fall from the regression line, suggesting some variability in predictions. Overall, while there is some predictive power of the LMS on the outcome, it suggests that other factors may also play a significant role.

Table 10. *Regression Coefficients for LMS and Students Academic Achievement (Students' Responses).*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.163	.952		15.920	.000
	UBa LMS	.298	.054	.304	5.507	.000

a. Dependent Variable: Academic Achievement

The results in table 10 reveals that the UBa LMS has a positive and significant effect on academic achievement. The unstandardized coefficient for the LMS is 0.298, indicating that for each unit increase in the LMS usage, academic achievement is expected to increase by approximately 0.298 units, holding every other thing constant. The standardized coefficient (Beta) of 0.304 suggests a moderate effect size, implying that the LMS is a meaningful predictor of academic achievement. The t-value of 5.507 and the associated p-value of .000 further confirm the statistical significance of this relationship, indicating that the influence of the LMS on academic achievement is not due to random chance.

Table 11. *ANOVA Table of LMS and Students Academic Achievement (Students' Responses).*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	419.525	1	419.525	30.329	.000[b]
	Residual	4122.061	298	13.832		
	Total	4541.587	299			

a. Dependent Variable: academic achievement

b. Predictors: (Constant), Uba Learning Management Systems

The findings in table 11 indicates that the regression model significantly predicts students' academic achievement, as evidenced by the F-statistic of 30.329 with a p-value of .000. Based on these results the null hypothesis was rejected while the alternative hypothesis was retained. Therefore, it can be concluded that there are significant effects of the Learning Management Systems on students' academic achievement in The University of Bamenda.

Table 12. *Regression Model Summary for LMS and Students Academic Achievement (Teachers' Responses).*

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.304[a]	.092	.089	3.719

a. Predictors: (Constant), Learning Management system

The results in table 12 shows that a positive relationship (R = 0.304[a]) exists between UBa learning management system and students' academic achievement. This means that an improvement in the learning management system of UBa will also lead to increase in the academic achievement of students. Furthermore, R-Square for the whole model is 0.092, with an adjusted R-Square of 0.089. This means that 9.2% of the variations in students' academic achievement in the University of Bamenda can be accounted for by the UBa learning management system.

Table 13. *Regression Coefficients for LMS and Students Academic Achievement (Teachers' Responses).*

		Unstandardized Coefficients		Standardized Coefficients		
Model		**B**	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	15.163	.952		15.920	.000
	Learning Management system	.298	.054	.304	5.507	.000

Dependent Variable: Academic Achievement

From the results in table 13, the regression equation is given by *(Academic achievement = 15.163+ 0.298 x UBa Learning Management system).* This implies that, when students of the University of Bamenda increase their use of LMS, their academic achievement is at 15.163. When the use of learning management system increases by one unit, their academic achievement increases by 0.298. This increase is significant at the 0.001 level of significance as shown by a p-value of 0.000.

Table 14. ANOVA Table of LMS and Students Academic Achievement (Teachers' Responses).

ANOVA[a]						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	419.525	1	419.525	30.329	.000[b]
	Residual	4122.061	298	13.832		
	Total	4541.587	299			

a. Dependent Variable: Academic Achievement

b. Predictors: (Constant), UBa Learning Management system

Table 14 shows that the F-value at a degree of freedom 299 = 30.329 with p = 0.000, p<0.05. This indicates that the test is significant at 0.01 level of significance. Hence the null hypothesis (H0) was rejected while the alternative hypothesis (Ha) was accepted. Therefore, it can be concluded there is a significant effect of the learning management system on students' academic achievement in the University of Bamenda.

5. Discussion of the Findings

From research question one, while just a handful of the students agreed that using the LMS as a tool improved their academic achievement, a significant majority of the teachers agreed that using the LMS as a tool improved the academic achievement of their students in the University of Bamenda. In line with the findings tables 1 and 3 show that when the LMS is effectively being used students tend to have access to course materials online, many more students attend online classes, the rate of course coverage tend to be high and teachers tend to be receiving timely feedback from students. This eventually causes students academic achievement to improve. These findings are in congruence with those of the United Arab Emirates [20] in which the researchers found a positive effect of effective use of LMS on students' academic achievement.

These findings are strongly supported by tables 2 and 4 which show that the improvement in students' academic achievement were as a result of the effective use of LMS to store course content, process, publish, monitor, track and evaluate students' performance and progress. This implies that when students and teachers are fully engaged in pedagogic activities in the LMS, students experience improved learning. These findings fall in line with the study of other researchers [6] which assert that the effective use of the LMS fosters students' engagement, management and tracking of students' grades and progress.

For research question two, a significant majority of students and lecturers state that financial and administrative challenges really hinder the effective use of LMS during teaching-learning process. In consonance with the finding, tables 5 and 6 show that illegal payments for free services due to delays in resolving complaints and inadequate training of leacturer and students on the use of LMS are crucial challenges faced by students and lecturers in the university of Bamenda. This implies that financial and administrative challenges are real issues that affect students' achievement. Research findings [5, 12, 26] also note that financial and administrative challenges negatively affect students' academic performance.

For research question three, a significant majority of students and lecturers propose some financial and administrative strategies that could improve the effective use of LMS during teaching-learning process. In conformity with the findings, tables 7 and 8 assert that strategies to improve students' achievements include: no charges for viewing results, free internet connection around the campus, installing solar panels for energy supply, training more lecturers and students on how to use LMS and orientations on the use of the platform. These strategies according to research studies [1, 7, 13, 15, 17] explain the positive effects of the use of LMS on students' achievements.

Results from the research hypothesis stipulate that, there exist a positive and significant effects of LMS on students' academic achievements from the students and lecturers' standpoint. This is specifically in line with the findings in tables 9, 10, 11, 12, 13 and 14. One explanation that has been demonstrated as to why such a positive effect is significant in The University of Bamenda, is that students and teachers generally experience increase engagement and interaction which eventually improve students' achievement. Findings [9, 18, 21] also agree with this explanation by saying that learning occurs through social interaction and discussions. These results are also consistent with those of other researchers [17] which show that effective use of LMS increases students' engagement and academic achievement.

Implications for Policy and Practice

From the literature review and the findings of the study it has been realised that educational community must use digital education tools. The best tool to use according to recent study in innovative teaching tools [11] to improve students' aca-

demic achievement is LMS (Moodle platform). Therefore, from students' perspectives for learning to be effective in universities, the LMS must be part of the curriculum and teachers and students need to be properly trained on how to use LMS in teaching learning process depending on the learning objectives, activities and outcomes of the course in question. From the lecturers' perspectives, in the process of using the LMS as a tool, the content uploaded and the questions as well as tasks assigned to students should be those that will allow them to identify new ideas (by engaging in personalised learning), implementing them (by engaging in classroom interactions and discussions) and integrating them (by solving a real-life problem within the community). The findings showed that, when students are actively involved in the learning process their academic achievement improves. Therefore, students should be given the opportunity to engage in action research tasks where lecturers would supervise, monitor and improve their own instructional practices.

Although the use of the LMS as a tool fosters students' academic achievement, it is not devoid of some challenges, some of which are: Using the LMS as a tool at times make it difficult for students to register a pass grade in some courses. The reason being that, during the teaching learning process some students refuse to respect the deadlines for tasks submission (See table 5). On the side of lecturer, using the LMS with students can turn negative. This occurs in situations where lecturers delay in correcting students' continuous assessment or exam marks on the LMS (See table 6). It is worthy to note that, deadlines are clearly indicated in the departmental and faculties/schools' calendar of activities. Similarly, lecturers clearly state the deadlines for instructional activities bearing in mind the needs and interest of the learners. Therefore, students and lecturers should endeavour to respect the deadlines for submission of assignment, provision of feedback, submission and correction of complaints via the LMS. From the teaching experiences it can be observed that, poor internet connection and access to online resources hinder the effective implementation of LMS thus, increasing students'failure rate when the LMS is used as a tool for teaching and learning. This means that to enhance students' achievement, administrators in universities should adopt the strategy of providing free internet connection around the campus and increasing the bandwidth of the online platform.

6. Conclusion

The LMS is a very important tool for the improvement of students' academic achievement in higher education institutions of learning in Cameroon in general and The University of Bamenda in particular. This is because using innovative tools (like Moodle Platform) in teaching is implementing student-centred approach or engaging the students during the teaching learning process and; any lecturer who fails to engage the students, has failed to teach effectively. Thus, the study concludes that, increasing the use of LMS as a teaching tool provides an opportunity for students to actively get engaged in class discussions, interactions and their academic achievement is being improved upon. Based on the findings, the deterioration in students' academic achievement at the level of universities is being attributed to the inability of students and lecturers to effectively use the LMS as an innovative teaching tool and the poor connectivity around the campus. Everything being equal, if lecturers, students and university hierarchy can acknowledge the importance of LMS as a tool and method that helps lecturers to engage students in learning and solve problems; they will be amazed by the improvement in students' academic achievement. Some of the students evidently will acquire inquiry skills, collaborative skills and problem-solving skills to tackle societal issues.

Based on the foregoing discussions, the study recommends that a user-friendly manual for specific tasks on the online LMS should be provided to all concerned stakeholders. The electrical power supply and internet provider companies are encouraged to review the importance of their services and they should regularly provide these services to their customers.

Abbreviations

LMS	Learning Management System
MINESUP	Ministry of Higher Education
UBa	University of Bamenda

Author Contributions

Nubonyin Hilda Fokong: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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