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The use of learning management system (LMS) moodle in the midst of covid-19 pandemic: Students' perspective

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Abstract

This study reports on students' acceptance of Learning Management System (LMS) Moodle as e-Learning system at the University of Education, Winneba. The participants of the study were 392 undergraduate students purposively selected from the Department of Integrated Science Education. Technology Acceptance Model (TAM) instrument which has four factors; Perceived Usefulness, Perceived Ease of Use, the Behavioural Intention, and the Actual Use was the main instrument employed to collect the data. Findings from the descriptive analyses of data collected revealed a considerable high acceptance of the LMS Moodle by students. Although challenges like internet connectivity and lack of prompt feedback from lecturers were reported, students found the LMS Moodle as convenient and user-friendly. To promote effective teaching and learning in future, virtual learning should be integrated into the normal traditional classroom.

1. Introduction

The outbreak of Covid-19 in 2020 across the globe has caused lockdown of most countries borders and public institutions including schools. The lockdown was done to limit the spread of the infection across countries and also cities. Restricting human movements to help prevent the spread of the infection were lessons drawn from previous pandemic outbreaks. In 2009, the city of Oita, Japan successfully decreased the number of infected students during the peaking of the H1N1 Flu pandemic (Kawano & Kakehashi, 2015). Davis, et al. (2015) revealed that closure of schools in UK interrupted the course of infection of the Swine Flu outbreak in 2009. The closure of schools and public institutions reduced the spread and also bought time for research and production of vaccines. Closure of schools could be national, regional and local in response to infection rates. Over 107 countries implemented national school closure in relation to Covid-19, affecting 862million children and young people (UNESCO, 2020). Although closing down of schools may help curb the spread of Covid-19, the challenges and consequences it has brought is numerous. School closure does not only affect students, teachers, and families, but have far-reaching economic and societal consequences, (Lindzon, 2020).

Some economic and social challenges and consequences identified are interrupted learning of children, poor nutrition among children, confusion and stress for teachers, parents unprepared for distance and home schooling, challenges creating, maintaining and improving distance learning, gaps in childcare by working mothers, high economic costs, unintended strain on health-care systems, rise in school dropout rates,

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increased exposure to violence of children and sexual exploitation of female girls, social isolation and challenges measuring and validating learning (UNESCO, 2019). These challenges and consequences made governments all over the world to worry about the extent of the devastation of this outbreak on their economy and education. Education, the core of development, needs to be sustained to ensure future economic growth. Therefore it is imperative that teaching and learning must continue in the midst of Covid-19 and school closure.

For teaching and learning to go on, the Government of Ghana through the Ministry of Education charged all levels of educational institutions including the Universities to roll out various e-Learning programmes. The University of Education, Winneba introduced the Learning Management System (LMS) Moodle as a replacement to the traditional face-to-face classroom. Moodle is an acronym for Modular Object-Oriented Dynamic Learning Environment. The LMS is a course management system through the internet. The Moodle is free and has no licensing cost attached (Brandle, 2005; Su, 2006) and runs on the major platforms of Windows, Mac OS X, Linux and Unix (Wu, 2008). The rolling out of the LMS to all students was to ensure smooth continuation of academic work, to bring the 2019/2020 academic year to a successful end. The rolling out of the Moodle was also to help achieve the objective of the introduction of Information and Communication Technology for Accelerated Development (ICT4AD) policy. The ICT4AD policy statement sets out the road map for the development of Ghana's information society and economy and provides a basis for facilitating the socio-economic development of the country in the emerging information, knowledge and technological age to be dominated by information and knowledge based economy. Hence to transform Ghana into an information and knowledge-driven ICT literate nation. To help achieve this policy one of the policy objectives is to promote and improve educational system within which ICTs are widely deployed to facilitate the delivery of educational services at all levels of the educational system. The enactment of the ICT4AD policy in the University of Education, Winneba in particular was to promote and encourage distance education including electronic distance education and virtual learning, focusing on tertiary level education and training in all fields and disciplines to broaden access to educational and training resources and services to a larger section of the society (Republic of Ghana, 2003).

The LMS Moodle developed by the University of Education, Winneba powered by the IT service Directorate has been in used since 2018 by the Institute for Distance and e-Learning (IDeL) of University of Education, Winneba. The LMS Moodle offers students the opportunity to access lessons, assignments, comments, wikis, forums, chats, workshop and quizzes among others with ease anywhere and anytime. The system enables students to interact and communicate freely anytime with lecturers, submit assignments and take quizzes. The assignments and quizzes are graded and feedback sent to students which can be accessed online. Similarly, lecturers support students to learn by providing them with learning resources, relevant links and monitoring their progress regularly. These features on the Moodle enables participants to learn through interaction, promoting student centered, problem-solving and social constructivist approach to learning (Westermann, 2014; Saghafi et al., 2014; Gonzàles-Gómez et al., 2016).

2. Literature

The LMS Moodle is a form of e-Learning that involves the use of technological tools. This helps learners to study anytime and anywhere, hence extending the classroom to the web. The term e-Learning according to Maltz, Deblois and The EDUCAUSE Current Issues Committee (2005) is applied in different perspectives, including distributed learning, online-distance learning, as well as hybrid learning. The Organization for Economic Co-Operation and Development (OECD) (2016, 2005) also define e-Learning as the use of information and communication technologies (ICT) in diverse processes of education to support and enhance learning in institutions of higher education, and includes the usage of information and communication technology (ICT) to improve students' traditional learning experiences and these technologies will act as a catalyst if a similar change process occurs. E-learning is also defined as a method of teaching and learning that fully or partially signifies the educational model used, based on the use of

electronic media and devices as tools for enhancing availability of training, communication, and interaction, and that helps in accepting novel ways of comprehending and establishing learning (Krishnan & Hussin, 2017; Rhema, 2013). According to Wentling, et al. (2000) e-Learning depends on computers and networks to provide information and instruction to individuals globally. Similar views are shared by other researchers (Lee, et al., 2009; Liu & Wang, 2009; (Rissa, 2014; Welsh, et al. 2003). The adoption of LMS Moodle by the University of Education, Winneba to all its students to ensure effective teaching and learning in the face of covid-19 pandemic in the 2019/2020 academic year could have varying levels of effectiveness.

The adoption of e-learning may provide the institutions as well as learners the flexibility of time and place for lecture delivery and enhance easy access to a lot of information. It also promotes relations between learners and lecturers by the use of discussion forums hence eliminating the fear of facing each other as they express their opinions. Wagner, Hassanein, and Head (2008) noted that e-Learning makes available extra prospects for interactivity between students and teachers during content delivery. Additionally, e-learning can establish community spirit among the learners, create independent learners, build strong relationships among the learners and instructors, and improve problem-solving skills (Salloum et al., 2019). LMS Moodle is cost effective. There is no need for many lecture halls to accommodate large number of students and also students travelling from their residences and keeping to the protocols to attend lectures amidst the covid-19 pandemic. The LMS Moodle accommodates the study pace of each student as they can repeat lessons and activities many times as needed. Twigg (2002) described the e-learning approach as centred on the learner as well as its design as involving a system that is interactive, repetitious, self-paced, and customizable. Similar views are expressed by Khalid, (2014) and Hussein, (2015). According to Tao, Yeh, and Sun (2006), this new environment for learning that is centred on electronic networks has allowed learners in universities to receive individualized support and also to have learning schedules that is more suitable to them as well as separate from other learners. Again, it allow leaners more control and responsibility over their learning by providing opportunities to learn anytime, anywhere (Tselios et al., 2011). The LMS Moodle may ease lecturers work load as learning materials uploaded on the Moodle by a lecturer will be assessed by all students. The advantages outlined above can be summed up by Khan (2005) as the environments for e-learning are tolerant, so they are a good way of offering equal access to the information world irrespective of the locations of the users, their ages as well as their ethnic origins, and races. Similar views are expressed by Bernard et al., 2014, Chigeza & Halbert, 2014, Israel, 2015, Northey et al., 2015 and Potter, 2015 in their studies identified that the use of web-based technologies in offering opportunities for out-of-class learning independent of time, place and pace.

In spite of the listed advantages, a successful e-Learning requires self-motivation and time management to be apt to task placed on the Moodle. The use of traditional lecture method could be more effective in terms of clarifying, explaining and interpreting concepts as students and lectures interact face-to-face. More so students may not have the needed skills to express their opinions hence affecting the communicating skills adversely. Again assessing students using the LMS Moodle maybe challenging as students' actual performance could not be guaranteed should students engage in activities such as cheating which could be difficult to be controlled by the Moodle. According to Salloum et al. (2019) e-learning is less trustworthy than traditional learning in terms of peer feedback and collaborative activities assessment. LMS Moodle may probably deteriorate institutions' socialization role and also the role of instructors as the directors of the process of education. Again not all discipline can promote effective teaching and learning using the LMS Moodle. The LMS does not offer the same degree of effectiveness of ease of teaching and learning of some disciplines. For instance discipline that include practical work cannot be properly study through e-Learning. Students found themselves better equipped for solving general science problems during face-to-face classroom and laboratory activities Gonzàles-Gómez et al. (2016). In addition, Saghafi et al. (2014) argued that both the face-to-face and web-based learning environments have their respective uses but also their limitations. According to them face-to-face support hands-on skills training, while the e-learning turns out to be better suited for constructive discussion. Hence, e-learning could be more appropriate in social

science and humanities than the fields of science. There could also be difficulty in accessing the platform. This happens when there are many users logged on the platform, the servers are unable to manage information properly when there are many users on the platform. This may bring about unanticipated costs both in time and money disadvantages (Akkoyunlu & Soylu, 2006; Almosa, 2002; Collins et al., 1997; Hameed et al., 2008; Klein & Ware, 2003; Lewis, 2000; Marc, 2002; Scott et al., 1999).

The implementation of the LMS Moodle is in its early stages in the University of Education, Winneba. Usually, new system may fail due to the unacceptability of it users because they may not see any benefits from using the system or the system may be difficult to access and use. This study used Technology Acceptance Model (TAM) to measure the student's acceptance of LMS Moodle as e-Learning system in the University of Education, Winneba. The TAM developed by Al-Maroof and Al-Emran in 2018, evolved from the original TAM developed by Davis (1989). Davis (1989) defined Perceived usefulness (PU) as the degree to which a person believes that using a particular system would enhance his or her job performance and Perceived ease-of-use (PEOU) as the degree to which a person believes that using a particular system would be free from effort. It is one of the various theories of technology to appreciate the perception of students. Behavioural Intention (BI) refers to an individual's intention to perform a behaviour and is a function of Attitude and Perceived Usefulness (Davis et al., 1989). According to Davis et al. (1989), Actual Use (AU) of a particular system is defined as a behavioural response, measured by the individual's action. The relationships between the mentioned constructs are presented in figure 1.TAM describes that a person's behavioural intention to use E-learning is determined by perceived usefulness and perceived ease of use (Mahdizadeh et al., 2008). Perceived usefulness (PU) and perceived ease of use (PEOU) are considered predictors for Behavioural Intention (BI) and Actual Use (AU) and that the predictors PU and PEOU are the most influential elements of the model (Toland et al., 2014). TAM in educational technology acceptance has proved its effectiveness as compared with the other theoretical models (Al-Qaysi, et al., (2018). The TAM model has become a robust model that is appropriate for predicting the acceptance of several technologies (Al-Busaidi, 2013; Al-Emran et al., 2018). TAM have been successfully adopted to study technology acceptance and usage by many scholars (Al-Emran et al., 2016; Al-Maroof & Al-Emran, 2018; Almarabeh, 2014; Salloum, et al., 2019; Tagoe, 2012) since it provides a solid background for the effectiveness of a new technology. Gamble in 2017 used TAM to exploring EFL University students' acceptance of e-learning and Al-Maroof and Al-Emran in 2018 used TAM to explore students' acceptance of google classroom using PLS-SEM approach. The purpose of the study was to measure the student's acceptance of LMS Moodle as e-Learning system in the University of Education, Winneba. The study also sought to identify some limitations using LMS Moodle as a learning system in the University of Education, Winneba.

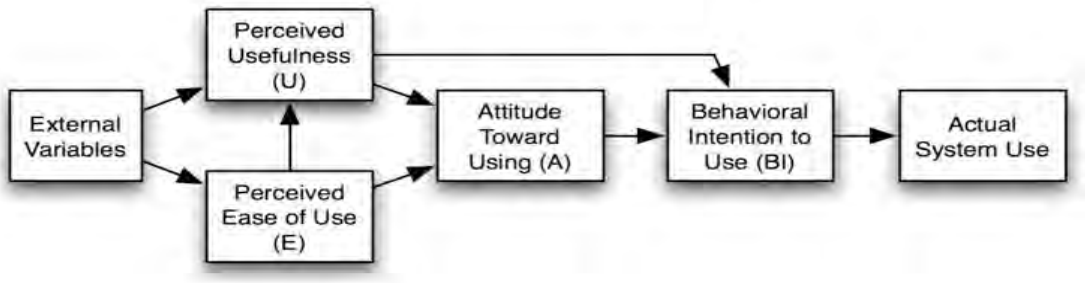

Figure 1. Original Technology Acceptance Model (TAM)

3. Methodology

3.1. Research Model/Design

This study employed a descriptive survey methodology and was carried out at the University of Education, Winneba in Ghana. Descriptive survey design seeks to explain people's perceptions and behaviour on the basis of information obtained at a point in time (Fraenkel & Wallen, 2009). However, it is limited because the results consist of self-reporting data based solely on what people say they believe or like or dislike (Thomas et al., 2005). Despite this disadvantage it elicits a good number of responses from numerous people at a time and provides a meaningful picture of events. In this case, the survey design provided the researcher an opportunity to identify the perceived.

3.2. Data Collecting Tools

The instrument for the study was an online questionnaire consisting of three sections. The main advantage of the questionnaire is that it can be administered to a large number of respondents at the same time, and can be mailed when necessary (Jack & Norman, 2003). Section A of the questionnaire gathers demographic information on students. The section B is to measure the student's acceptance of LMS Moodle as e-Learning system in the University of Education, Winneba using TAM. Technology Acceptance Model (TAM) developed by Al-Maroof & Al-Emran in 2018 to measure students' acceptance of E-learning in Oman was adapted for this study. The TAM instrument consists of 18 items distributed among 4 factors. These factors include: the Perceived Usefulness (PU) which had seven items, Perceived Ease of Use (PEOU) had six items, the Behavioural Intention (BI) had three items, and the Actual Use (AU) had two items. All the items were measured using a four-point likert-type scale ranged from Strongly Disagree = 1, Disagree = 2, Agree = 3 to Strongly Agree = 4. The section C of the questionnaire contained open ended question that elicited information on challenges faced by students using the LMS as e-Learning system.

3.3. Sampling or Study Group

The sample of the study consist of 392 undergraduate students from the Department of Integrated Science Education who enrolled on the LMS platform for the second semester of 2019/2020 academic year. The students from Department of Integrated Science Education were purposively selected because the researchers were teaching selected courses at the Department. The courses are Energy and energy transformation (level 100), Carbohydrates, proteins and lipids (level 200) and The Reproductive system (level 300).

3.4. Data Analysis

Descriptive analysis was employed for section A and B. To determine the acceptance of the LMS Moodle by students, respondents were asked to indicate the intensity of their responses to each item on a four-point Likert scale. The responses were organised into frequency counts, percentage frequency and mean score. The responses from section C was summarised and presented in frequency counts and percentage frequency.

3.5. Validity and Reliability

The face validity of the instrument was enhanced by senior science educators and professors in the faculty of Science Education in the University of Education, Winneba. They reviewed the wording and clarity of the items with respect to the factors of the TAM. They were satisfied the items addressed the factors of the TAM. The adapted TAM instruments was pilot tested and the Cronbach Alpha value for the instrument calculated was 0.8. According to Fraenkel and Wallen (2009) a reliability figure should be at 0 .7 and preferably higher and therefore, 0.8 is a good value. Therefore the instrument is highly reliable.

Table 1.
Cronbach's alpha values for the factors

Factors	Number of Items	Cronbach's alpha
Perceived Usefulness (PU)	7	.817
Perceived Ease of Use (PEOU)	6	.873
Behavioural Intention (BI)	3	.833
Actual Use (AU)	2	.735

3.6. Research Procedures

The questionnaire was uploaded on the LMS Moodle for integrated science students taking Energy and energy transformation (level 100), Carbohydrates, proteins and lipids (level 200) and The Reproductive system (level 300) as a course to respond to.

4. Findings and Discussions

The demographic information of respondents, their responses on LMS Moodle Acceptance and limitations using the LMS are presented here. Table 2 shows the demographic information of the respondents.

Table 2: Demographic Information of Respondents

Item	Variables	Frequency	Percentage
Gender	Male	305	77.8
	Female	87	22.2
Device used	Smart phones	256	65.3
	Computers	107	27.3
	Other device	29	7.4
Year of study	Level 100	183	46.7
	Level 200	127	32.4
	Level 300	82	20.9
Experience with LMS	Less than 3 months	254	64.8
	More than 3 months	128	32.6
	More than 1 year	10	2.6
Preferred mode of delivery	Face-to-face	128	32.6
	LMS	29	7.4
	Hybrid (face-to-face and LMS)	235	60.0

N= 392

A total of 392 participated in the study with most of them being male (77.8%). More than half of the students (65.3%) used their smart phones in accessing the LMS. In terms of year of study, most of them were in level 100 (46.7%) followed by level 200 (32.4%) and level 300 (20.9%). The results also show that 64.8% had less than three months experience with the LMS in their education. The results indicate that majority of the students (60.0%) preferred the hybrid (face-to-face and LMS) mode of teaching and learning, followed by face-to-face (32.6%) which is the traditional mode of teaching and learning then LMS (7.4%) respectively.

Table 3.
Frequency and Percentage Distribution of Student Responses on LMS Moodle Acceptance.

Factor	Item	Strongly agree		Agree		Disagree		Strongly Disagree		Mean
		F	%	F	%	F	%	F	%	
Perceived usefulness PU	LMS enhances my efficiency.	176	44.90	151	38.52	29	7.40	36	9.18	3.19
	LMS enhances my learning productivity.	165	42.09	132	33.67	49	12.50	46	11.73	3.06
	LMS enables me to accomplish tasks more quickly.	132	33.67	177	45.15	51	13.01	32	8.16	3.04
	LMS improves my performance.	154	39.29	176	44.9	38	9.69	24	6.12	3.17
	LMS saves my time.	14	3.57	17	4.34	274	69.9	87	22.19	1.89
	LMS doesn't have any distinctive useful features.	163	41.58	154	39.29	24	6.12	51	13.01	3.09
	LMS is not applicable to all academic courses	266	67.86	107	27.3	11	2.81	8	2.04	1.80
Perceived ease of use (PEOU)	LMS is easy to use.	194	49.49	103	26.28	42	10.71	53	13.52	3.12
	LMS enables me to access the course material.	302	77.04	58	14.80	19	4.85	13	3.32	3.66
	LMS is convenient and user-friendly.	269	68.62	47	11.99	43	10.97	33	8.42	3.41
	LMS allows me to submit my assignments	316	80.61	51	13.01	13	3.32	12	3.06	3.71
	LMS requires no training.	196	50.00	127	32.40	23	5.87	46	11.73	3.21
	LMS makes it easier to avoid future academic difficulties	152	38.78	139	35.46	58	14.80	43	10.97	3.02
Behavioural intention to use (BI)	I intend to increase my use of the LMS	156	39.80	146	37.24	33	8.42	57	14.54	3.02
	It is worth to recommend LMS for other students.	146	37.24	154	39.29	49	12.50	43	10.97	3.03
	I'm interested to use the LMS more frequently in the future.	147	35.08	175	41.77	55	13.13	42	10.02	3.02
Actual use (AU)	I use the LMS on daily basis.	168	42.86	136	34.69	47	11.99	41	10.46	3.01
	I use the LMS frequently	174	44.39	138	35.20	33	8.42	47	11.99	3.12

N= 392

The percentage responses of the students to measure their acceptance of LMS Moodle as e-Learning system is presented in Table 3.

From Table 4, most of the respondents 327 (83.42%) admit that the LMS enhances their efficiency and learning productivity 297 (75.76%). Again, students positively affirm that LMS enable them to accomplish more task quickly 309 (78.82%) and improves their performance 330 (84.199%). About 62 (16.08%) agreed that LMS save them time while 330 (84.19%) disagreed to the statement. Also, 62 (16.08%) disagreed that the LMS is not applicable to all academic courses however, 373 (95.16%) of the respondents agreed to the statement. The average mean score (2.75) indicates that the use of LMS Moodle for teaching and learning is perceived as useful.

In terms of Perceived ease of use, most students 297 (75.77%), positively affirm that the LMS is easy to use, enables them to access the course material 360 (91.84%) and very convenient and user-friendly 316 (80.61%). Again students 367 (75.77%) agreed that the LMS also allows them to submit their assignments, 323 (82.4%) requires no training and 291 (74.24%) makes it easier to avoid future academic difficulties.

With the mean score ranging between 3.02 and 3.71, indicate that students agree to the factor 'Perceived ease of use' of the LMS Moodle.

On Behavioural intention to use (BI), more students 302 (77.04%) intend to increase their use of the LMS, however 90 (22.96%) of them declined. Similarly, students 322 (77.57%) agreed to use the LMS more frequently in the future and 300 (76.53%) also recommended for other students. The average mean (3.02) suggest that students intend to adapt the use of LMS in their future learning.

On Actual Use, majority of students 304 (77.55%) agreed to using the LMS on daily basis although 88 (22.45%) disagreed to this. More so, respondents 312 (79.59%) agreed to use of the LMS frequently while 80 (20.44%) disagreed. The average mean (3.06) also suggest that students actually want to use the LMS in their learning.

The section C of the questionnaire asked the undergraduate students to identify limitations of LMS course delivery. The responses were categorized into the following themes/categories and presented in Table 4.

Table 4.
Limitations of LMS course delivery identified by respondents

Themes/categories	**Yes**		**No**	
	F	**%**	**F**	**%**
Challenges with connectivity	364	92.8	28	7.2
Difficulty in accessing LMS due to locality	247	63.0	145	37.0
Lack of immediate feedback from lecturers	329	83.9	63	16.1

N= 392

Below are samples of responses that participants provided as limitations encountered using the of LMS course delivery Moodle:

"I mostly use my phone to download course material, to take quizzes and to search for information from the internet since I do not have a computer of my own. But when it comes to working and submitting my assignments I visits nearby private internet café which cost me a lot of money and time".

"Because of my locality I have to travel some distance to assess the internet café and when I log on to the LMS navigating the system was easy and friendly".

"Also there is lack of immediate feedback from lecturer on our performance, it takes weeks before I get responses on our performance".

"I had connectivity problems when taking quizzes. It seems the system could not handle many users at a time".

"Because we went online we could not complete all our science practical for the semester in the laboratory".

"The use of the chat, discussion forum was not regular".

The results of study show the acceptance of LMS by the students of the Department of Integrated Science Education at University of Education, Winneba. With respect to Perceived Use (PU) most of the student admits that the LMS enhanced their efficiency, learning productivity, and improved their performance. This response by students could be that they had to do a lot of reading, and find information mostly on their own from sources such as the internet and textbooks with the guide and links provided by the lecturers as they research and read wide they are better informed on the concepts taught therefore students become active

learners and critical thinkers. However, students disagreed 330 (84.19%) that the LMS save them time. This results support other findings of Almosa, 2002; Akkoyunlu & Soylu, 2006; Collins et al. 1997; Hameed et al, 2008; Klein & Ware, 2003; Lewis, (2000); Marc, 2002; Scott et al. 1999); which reveal that this may bring about unanticipated costs both in time and money disadvantages. Again, students agreed 373 (95.16%) that the LMS is not applicable to all academic courses. This finding was as a result of the nature of their programme. The B.Sc. Integrated Science Education is a programme comprising theory and practical work. Students again identified this statement as a limitation *'Because we went online we could not complete all our science practical for the semester in the laboratory'.* Affirming Gonzàles-Gómez et al. (2016) and Saghafi et al. (2014) findings that face-to-face support hands-on skills training.

The average mean score of 2.75 indicates that the use of LMS Moodle for teaching and learning was perceived as useful. This finding is consistent with Henderson's (2005) study conducted on the role of computer and Internet access in business students' acceptance of e-learning technology. Students also responded that it is easy to access course materials, submit assignments. In fact the LMS is very convenient and easy to use. These reaction could be because majority (65.3%) of the students uses their smartphones in assessing the LMS everywhere and anytime as far as they are connected to a network. This finding agrees with the study conducted by Arthur-Nyarkoa and Kariuki (2019) at the College of Distance Education, University of Cape Coast. Hence, there is the likelihood that students who have a higher level of access to digital devices such as computer, smartphones, tablets and the Internet would respond positively to e-Learning delivery and the opposite is equally probable Arthur-Nyarkoa,& Kariuki (2019). The results also showed that most of the students (64.8%) had less than three month experience with the LMS but they indicated they required no training this may be student taking Information and Communication Technologies (ICT) as general and mandatory course as part of their 4-year degree programme. It can be concluded that students have acquire basic skills in ICT. By using ICT the teacher's role is being transformed from a traditional profession to an intermediate supporter towards the facilitation of the students to conquer knowledge (Kalogiannakis 2010). Therefore, e-Learning has the potential to transform people, knowledge, skills and performance.

Out of the 392 students who participated in the study, 60.0% of them preferred the hybrid (face-to-face and LMS) mode of teaching and learning, to face-to-face (32.6%) and LMS (7.4%). This finding comes as no surprise as the integrated science programme has both practical and theoretical aspect. This finding support Singh (2003) who argues that while fully-online involves a single mode of delivery, blended learning combines multiple delivery media that are designed to complement each other and promote learning and application-learned behaviours. Again, mixed mode, web-supplemented and web-dependent hold more promise than fully online (Buzzette-More, 2008; Tagoe, 2013). Consequently, students will be able to undertake their practical lessons in the laboratory and theory lessons online.

On Behavioural intention to use (BI), most students 302 (77.04%) intend to increase their use of the LMS, however 90 (22.96%) of the students declined. Similarly, 322 (77.57%) students agreed to use the LMS more frequently in the future and also 300 (76.53%) recommend for other students. The average mean (3.02) suggest that students intend to adapt the use of LMS in their future learning. Because the respondents are undergraduate students hence may consider using online for their postgraduate programme in the near future without necessarily vacating their job post. With these intention students will ensure to stay abreast of current technology to promote teaching and learning. On the whole students' behavioural intention to use the LMS Moodle was high and similar to the findings of Henderson (2005).

On Actual Use, majority of students 304 (77.55%) agreed to use the LMS on daily basis and 312 (79.59%) respondents agreed to use of the LMS frequently. The average mean (3.02) also suggested that students actually want to use the LMS in their learning. The positive response on the use of LMS can be attributed to easy internet access with their phones and computers at home and private internet cafés. This is similar to the findings of Arthur-Nyarkoa & Kariuki (2019) in their study reporting 78.4% have access to

smartphones, 65.2% have access to computers and 93.0% of their respondents have access to internet connectivity. According to Lee, et al., 2009, Liu & Wang, 2009, Rissa, 2014; Welsh, et al. 2003 and Wentling et al. 2000, the e-learning depends on computers and networks, but it is likely it will progress into systems comprising of a variety of channels such as wireless and satellite, and technologies such as cellular phones.

5. Conclusion and Suggestions

This study focused on measuring students' acceptance of LMS Moodle as e-Learning system in the University of Education, Winneba using Technology Acceptance Model (TAM). The students' responded positively in all the four factors of the TAM with an average mean score of 3.2, which is considered relatively high. This show that students were pleased with the Learning Management System (LMS) Moodle to ensure effective teaching and learning however, student preferred the hybrid mode of teaching and learning where students will be able to undertake their practical lessons in the laboratory and theory lessons online wherever they find themselves. It is therefore timely to integrate the LMS Moodle into the teaching and learning of all courses at the University of Education, Winneba.

Based on the research findings the following suggestions were made to improve upon the acceptance of LMS Moodle as e-Learning system of teaching and learning by students at the University of Education, Winneba:

1. Special arrangements should be made with telecommunication providers to improve the speed, strength and bandwidth of the internet connectivity for students to access the LMS Moodle everywhere across Ghana.

2. Much efforts should be made by lecturers to give immediate feedback to students on their performance.

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