



Extent of Utilization of Learning Management System at Secondary Schools Level in Southeast Nigeria in the Post Covid-19 Era

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Abstract

This study examined the extent of utilization of the Learning Management System (LMS) in learning Science, Technology, Engineering, Arts and Mathematics (STEAM) subjects at Secondary Schools level in Southeast Nigeria in the Post Covid-19 Era. The study adopted a descriptive survey design. The population for this study is made up of all Senior Secondary School (SSS) students taking STEAM subjects in Southeast Nigeria. A total of 2110 students participated in the study. A structured online questionnaire design using Google Forms was used as an instrument for data collection and was shared with SSS students from all five Southeast States of Nigeria. The instrument was validated by three experts. The collected data were analysed using percentages, mean and standard deviation. It was found that the available LMSs with subscriptions for learning STEAM subjects among Secondary Schools in Southeast Nigeria in the post-COVID-19 Era are: Google Classroom, Moodle, Microsoft Team, Canvas, Blackboard, and Coursework. The LMSs without subscriptions in Schools include Segue, Interact, Atutor, WebCT, Desire2learn, and KWL. Also, the extent of utilization of LMS for learning STEAM subjects among secondary school students in Southeast Nigeria in the post COVID-19 Era is High; while the challenges militating against the utilization of LMS for learning of STEAM subjects among secondary schools in Southeast Nigeria in the post-COVID-19 Era include: high cost of mobile data/internet subscription, inadequate training for STEAMS teachers; poor electricity supply; poor technical support for Student while using LMS in schools among others. It was recommended that workshops, seminars and conferences should be organized for students and teachers to share their experiences with their colleagues regularly.

Keywords: Utilization; Learning Management System; STEAM subjects; Post Covid-19 Era

Introduction

The Corona Virus disease which started in China in the year 2019 took the world by surprise and caught people unprepared. It soon spread to other parts of the world, thus becoming a Pandemic which was code-named COVID-19 pandemic. The onset of this Pandemic raised a lot of arguments about its origin, causes, prevention, control and cure. The COVID-19 disease was characterized by high temperatures and difficulty in breathing which was fatal, particularly among the aged and other vulnerable groups. Initial efforts at its prevention and control included lockdowns, sanitization, social distancing and the use of face masks. The lockdowns restricted people's movements from one country to another and from one city/town to another (Yang, 2020). It also limited contacts among people including how close people could come to each other (social distancing), the

number of people that can gather in one place and precautions such as sanitization of hands and objects before and after any gathering were ensured as strategies to curb the spread of the virus (Dhawan, 2020). Other measures to control the Pandemic included the use of face masks to prevent the spread of the virus from the mouth and nose of an infected person to other people within close distance from such a person (Olaseni & Olaseni, 2020).

The above measures such as lockdowns, social distancing, sanitization and use of face masks had and still have implications for activities in the society such as worship, social gatherings, business activities and education (Bausch, 2020). Concerning education, many countries around the world shut down their schools without any form of teaching and learning in an attempt to enforce the lockdown policies aimed at curbing the



spread of the virus (Onyema et al., 2020; Samuel, 2020; Olaseni, & Olaseni, 2020). However, learners in most developed nations and some developing countries continue to learn by utilising various learning management systems (LMS) (Al-Nuaimi & Al-Emran, 2021; Bervell & Arkorful, 2020), such that Educators now use LMS, to: create, adopt, administer, distribute and manage all of the activities related to e-learning training as a complement to classroom teaching and learning of STEAM subjects/courses in secondary schools.

STEAM education is a method of teaching that employs Science, Technology, Engineering, the Arts, and Mathematics as entry points for assisting student inquiry, discussion, and critical thinking (Hadinugrahaningsih et al., 2017). Students who are exposed to STEAM education are more likely to take calculated risks, participate in experiential learning, persevere in problem-solving, value cooperation, and go through the creative process. These processes are facilitated through collaboration which LMS provides, yet not much is known about the utilization of these resources for teaching and learning of STEAM subjects in Southeast Nigeria.

Utilization refers to a concerted effort to put to use, especially to make profitable or effective use of time, tools, facilities and any other forms of materials. Utilization is the primary method by which asset performance is measured. Utilization is the act of using, exploiting, operating, consuming or employing service or materials for expected benefits and or rewards. Efforts to find practical or effective use of something are utilization (Elis, 2019). Examples include frequency and number of computer sessions, connect time, time spent using different system functions, number of records updated, and keystrokes or carriage return (Andrew and Withey, 2016).

Utilization of LMS tools in teaching and learning, according to Lederman (2020), is to develop and enhance teachers' practices and proficiency as a way of increasing the student's knowledge and skills. The LMS can monitor progress, track students' time on tasks, alert educators to emerging issues and provide a real-time appraisal of students' performance (Jokhan et al., 2019). It helps schools to maintain the integrity of their educational programmes by enabling educators to effectively and efficiently develop courses, deliver instruction, facilitate communication, foster collaboration between students, assess students' success and provide other learning resources for support.

Learning Management Systems are software or web-based applications that provide a central, integrated space for educational resources, including content resources, assessment tools, grading tools and administrative tools (Namada, 2021). They offer a portal through which students can access learning materials and see their assignments and grades and making administrative tasks such as tracking grades and attendance easier for educators and administrators. According to Marachi and Quill (2020) LMS has been widely used in Higher Education and for corporate training for some time and is now being integrated into K-12 (Primary and Secondary) education as well.

Studies have also revealed that the use of learning management systems in learning offers benefits to the learners such as real-time remote learning capabilities, students can access the online material at any time, time zone, location, and distance is no longer an issue (Morrison et al., 2021; Namada, 2021; Marachi & Quill, 2020). Increasing the options for diversifying learning experiences and enhancing learning, enables the teachers to communicate efficiently and meaningfully with the students, through announcements, notifications, discussions, wikis, feedback provision, emails, and glossaries. Others include issuing reports and tracking data from student activity, early identification of students in need of assistance, assessing learners via pre and post-tests, surveys, and exams, and providing feedback including grades, rubrics and assignment comments in differing digital formats (Kulshrestha & Kant, 2013). Furthermore, students also stand to gain the following benefits from using LMS. Students can also conveniently access his/her course material whenever they are free, when students are able to access materials on the internet, it is easier for the teachers to direct them to appropriate information based on their needs (Kerimbayev, Kultan, Abdykarimova & Akramova, 2017).

Despite these benefits of LMS for teaching and learning amidst global disruptions, there is no visible availability and utilisation of LMS for learning purposes in secondary schools, supported by the scarcity of literature on the availability and extent of utilisation of LMS for teaching purposes in Nigerian schools (Sarasa-Cabezuelo, 2021). Generally, studies on the extent of utilization of LMS for learning purposes have presented contradicting results since some show that the available LMS are being utilized to a great extent (Stockless, 2018), while some suggest that they are not being utilized or are rarely being

utilized for learning purposes (Veluvali & Suriseti, 2022).

In view of Cavus et al. (2021), it was suggested that the low utilization of LMS in teaching and learning at the secondary school level in developing countries such as Nigeria could be a result of inequality of access to the technology, cost of implementation of ICT, lack of ICT skill, and incessant power supply failure among others. Without adequate availability access or subscriptions and utilization of LMS in secondary schools, it will be very difficult to effectively and positively impact learners learning amidst global disruptions such as the COVID-19 pandemic. Besides, the pandemic has brought in a new normal, which is online remote learning, that is best facilitated through the use of LMS (Hew et al., 2020).

LMS is being used in many parts of the world for instructional purposes, it is not clear whether these tools have the needed subscriptions for access and use in teaching and learning. Also, the extent of utilization of the available LMS tools for learning purposes in secondary schools in Southeast Nigeria is not known. It is in this regard that the researcher wishes to examine the utilization of the LMS for learning STEAM subjects in Secondary Schools in Southeast Nigeria in the post-COVID-19 era.

Purpose of the Study

The general purpose of this study was to assess the extent of utilization of learning management system in learning STEAM subjects at Secondary Schools in Southeast Nigeria in the post-COVID-19 era. Specifically, this study determined:

1. availability of subscriptions for LMSs used in learning STEAM subjects at secondary schools in Southeast Nigeria in the post-COVID-19 Era
2. extent of utilization of LMS for learning STEAM subjects at secondary schools in Southeast Nigeria in the post-COVID-19 Era
3. challenges militating against the utilization of LMS for learning STEAM subjects at secondary schools in Southeast Nigeria in the post-COVID-19 Era
4. strategies for effective utilization of LMS for learning STEAM subjects at secondary

schools in Southeast Nigeria in the post-COVID-19 Era.

Methodology

The design of the study was a descriptive survey research design. The area of the study is Southeast Nigeria. Only public secondary schools in Southeast Nigeria. The population for this study was made up of all Senior Secondary School (SSS) students taking STEAM subjects in Southeast Nigeria. A total of 2110 students participated in the study. The instrument for data collection was a structured questionnaire Titled “LMS Utilization Questionnaire (LUQ)”. LUQ is a 34-item questionnaire which was structured into four clusters. Cluster 1 consists of 12 items on the availability of LMS subscription, rated “Available =2 and Not Available =1”; Cluster 2 consists of five items on the extent of utilization of the LMS, rated on a five-point Likert Scale; Cluster 3 consists of 10 items on the challenges militating against the utilization of LMS, rated on a five point Likert Scale and Cluster 4 consists of seven items on strategies for effective utilization of LMS for learning of STEAM subjects at Secondary School in Southeast Nigeria in the post COVID-19 Era also rated on a five-point Likert Scale. The instrument for data collection was validated by three lecturers from the Department of Computer and Robotics Education, University of Nigeria, Nsukka. The reliability of the instrument determined using Cronbach’s Alpha yielded an index of 0.83 for Cluster One, 0.91 for Cluster Two, 0.82 for Cluster Three, and 0.88 for Cluster Four. The overall reliability index stood at 0.93. Google Forms was used to collect the respondents’ responses. The data collected from the respondents was analysed using percentages, Mean and Standard Deviation to answer the research questions. For research question one, items with a percentage availability below 50% were considered not available while percentages rating above 50% were considered available. For decision on research questions two to four, real limits were used thus: Means ratings between 1.00-2.33 were considered Low Extent, 2.34-3.66 (Moderate Extent), 3.67-5.00 (High Extent) for items on research question two. While mean ratings between 1.00-2.33 = Disagreed; 2.34-3.66 = Somewhat Agreed; 3.67-5.00 = Agreed for items on research questions three and four.

Results

Table 1. Percentages on Availability of Subscriptions for LMSs Used in Learning of STEAM Subjects at Secondary Schools in Southeast Nigeria in the post COVID-19 Era

S/N	Items Statement	N	Available (%)	Not Available (%)
1	Google Classroom	2110	86.40	13.60
2	Moodle	2110	71.60	28.40
3	Microsoft Team	2110	55.10	44.90
4	Canvas	2110	54.70	45.00
5	Segue	2110	34.60	64.60
6	Interact	2110	45.70	53.90
7	Blackboard	2110	65.00	33.70
8	Coursework	2110	53.10	46.10
9	Atutor,	2110	31.30	67.90
10	WebCT	2110	43.60	56.00
11	Desire2learn	2110	46.10	53.30
12	KEWL	2110	33.30	66.70

Results in Table 1 show that the available LMSs with subscriptions which are used in learning of STEAM subjects among Secondary Schools in Southeast Nigeria in the post-COVID-19 Era are: Google Classroom (86.4%), Moodle (71.60%), Microsoft Team (55.10%), Canvas (54.70%), Blackboard (65.00%), and Coursework (53.10%); while the LMSs without subscriptions in school

include: Segue (34.60%), Interact (45.70%), Atutor (31.30%), WebCT (43.60%), Desire2learn (46.10%), and KEWL (33.30%). The above result indicates that six out of the 12 LMSs have subscriptions, while the remaining six do not have subscriptions. This result shows that there is fair availability of subscriptions for LMSs in Secondary Schools in Southeast Nigeria.

Table 2. Mean (\bar{x}) and Standard Deviation (SD) on the Extent of Utilization of LMS for Learning of STEAM subjects Among Secondary Schools in Southeast Nigeria in the Post COVID-19 Era

S/N	Item Statements	N	\bar{x}	SD	Remark
1	I use LMS (e.g. Google Classroom, Moodle, Canvas, etc.) in collaborating with my colleagues on some topics	2110	4.37	.91	High Extent
2	I use LMS (e.g. Google Classroom, Microsoft Team, Blackboard... etc.) to submit my assignment	2110	3.80	1.18	High Extent
3	I use LMS (e.g. Google Classroom, canvas, desire2learn, KEWL etc.) in writing examinations.	2110	3.77	1.18	High Extent
4	I use LMS (e.g. WebCT, Coursework, Google Classroom) to seek feedback from my teachers	2110	3.47	1.24	Moderate Extent
5	I use LMS (e.g. Moodle, Segue, Interact, Atutor etc) in personalized learning	2110	3.56	1.24	High Extent
Cluster2_mean		2110	3.79	.57	High Extent

Key: Means ratings between 1.00-2.33 (Low Extent), 2.34-3.66 (Moderate Extent), 3.67-5.00 (High Extent). and N = Number of Respondents).

Results in Table 2 showed that items 1, 2, 3, and 5 in the cluster had their mean ratings between 3.56-4.37, which means that these items were being utilized to High Extent; while item 4 had a mean of 3.47 which

means that it was utilized to a Moderate Extent. A cluster mean (\bar{x}) of 3.79 means that overall, LMSs were being utilized in the selected Schools to a High Extent.

Table 3. Mean (\bar{x}) and Standard Deviation (SD) on the Challenges Militating against Utilization of LMS for Learning of STEAM Subjects at Secondary Schools in Southeast Nigeria in the post-COVID-19 Era

S/N	Item Statements	N	\bar{x}	SD	Remark
1	The high cost of mobile data/internet subscription is affecting the implementation of LMS in schools	2110	4.27	1.19	Agree
2	Inadequate training for STEAM Education Teachers on use of LMS in schools	2110	3.83	1.21	Agree
3	Poor electricity supply affects the use of LMS in schools	2110	3.62	1.44	Agree
4	Poor technical support for students while using LMS in schools	2110	3.49	1.38	Somewhat Agree
5	Teacher's reluctance to adopt LMS technology in teaching due to their poor knowledge of the technology	2110	3.40	1.40	Somewhat Agree
6	Absent of policy on effective use of LMS for learning in Nigerian schools.	2110	3.43	1.44	Somewhat Agree
7	Most of the STEAM teachers are too busy to experiment with LMS tools.	2110	3.25	1.47	Somewhat Agree
8	Failure of STEAM teachers to share their experiences with colleagues on the use of LMS	2110	3.30	1.46	Somewhat Agree
9	Absent of training programme/workshop/seminar in schools on use of LMS for learning purposes.	2110	3.39	1.43	Somewhat Agree
10	Risk of losing my personal details to unauthorized users	2110	3.27	1.53	Somewhat Agree
Cluster3_Mean		2110	3.51	.69	Somewhat Agree

Key: Mean ratings between 1.00-2.33 = Disagreed; 2.34-3.66 = Somewhat Agreed; 3.67-5.00 = Agreed; and N = Number of Respondent)

Results in Table 3 showed that items 1, 2 and 3 had *mean* ratings between 3.62 and 4.27, which means that the respondents agreed that these items are challenges to the utilization of LMS in learning STEAM subjects in selected schools in the post-COVID-19 era. Items 4, 5, 6, 7, 8, 9 and 10 had *mean*

ratings between 3.27 to 3.49 which means that the respondents somewhat agreed that these items are challenges to the utilization of LMS in the learning of STEAM subjects in selected schools in post COVID-19 era. A cluster mean of 3.51 shows that overall, the utilisation of LMSs is fairly challenged.

Table 4. Mean (\bar{x}) and Standard Deviation (SD) on the Strategies for Effective Utilization of LMS for Learning of STEAM subjects at Secondary Schools in Southeast Nigeria in the post-COVID-19 Era

S/N	Item Statement	N	\bar{x}	SD	Remark
1	Students should be allowed to take a more active role in teaching and learning through the use of LMS in schools.	2110	4.42	1.04	Agree
2	Adequate electricity should be supplied in schools to enable students to use LMS for examinations and other purposes.	2110	3.83	1.33	Agree
3	Technical support while using LMS should be provided regularly and promptly.	2110	3.96	1.27	Agree
4	Policy on the use of LMS for teaching and learning purposes should be enacted and monitored.	2110	3.66	1.36	Agree
5	Schools should ensure that students can access LMS on any of their preferred devices (Laptop, Smart Phones etc.)	2110	3.89	1.29	Agree
6	Establish strict rules that all users of the LMS must adhere to.	2110	3.74	1.35	Agree
7	Identify LMS that is relevant to your learning	2110	3.64	1.41	Agree
Cluster4_Mean		2110	3.85	.754	Agree

Key: Mean ratings between 1.00-2.33 = Disagreed; 2.34-3.66 = Somewhat Agreed; 3.67-5.00 = Agreed; and N = Number of Respondent)

Results in Table 4 showed that all the items in the cluster had their *mean* ratings between 3.64 - 4.42, which means that the respondents used for this study agreed that these statements represent strategies for effective utilization of LMS for learning of STEAM subjects at Secondary Schools in Southeast Nigeria in the post Covid-19 Era.

Discussion of Results

This section discussed the result of the study based on research questions guiding the study.

Results from research question one showed that six out of the 12 LMSs have subscriptions, while the remaining six did not have subscriptions for learning STEAM subjects among Secondary Schools in Southeast Nigeria in the post COVID-19 Era. These available items were Google Classroom (86.4%), Moodle (71.60%), Microsoft Team (55.10%), Canvas (54.70%), Blackboard (65.00%), and Coursework (53.10%); while the LMSs without subscriptions in school include: Segue (34.60%), Interact (45.70%), Atutor (31.30%), WebCT (43.60%), Desire2learn (46.10%), and KEWL (33.30%). This result shows that LMS tools are available to a moderate extent. The availability of subscriptions to Google Classroom, Moodle and Microsoft Team is not surprising considering the effort of various Southeast school principals and Governors in ensuring that adequate funds and resources were tailored towards the use of e-learning in teaching during the pandemic. However, the low percentage ratings for KEWL, Segue, and WebCT could be a result of a lack of awareness of the availability of these LMS for teaching of STEAM subjects. These findings are in line with the findings of Obiakor et al. (2021), who stated that there are ICT facilities for teaching and learning purposes were available. However, this is in contrast to Dumbiri and Nwadiani (2020) who showed that LMS infrastructures are not adequate in the schools for teaching and learning.

Results from research question two in Table 2 showed the extent of utilization of LMS in the learning of STEAM subjects among secondary schools in Southeast Nigeria in the post-COVID-19 Era. Findings from this research question showed that the use of LMS such as Google Classroom, Moodle, Carvas etc. in collaborating with colleagues on some topics; in submitting assignments; in writing examinations and in personalized learning is to a high extent. However, the

use LMS such as WebCT, Coursework, Google Classroom etc. to seek feedback from teachers had *mean* values which shows that it was utilized to a low extent. Overall, the result showed that LMSs are been utilized to a High Extent in southeast Nigeria in the post-COVID-19 era. The high utilization of LMS in Southeast Nigeria could be related to the effort put in place by the government to provide training for staff and students during the pandemic to cope with the spread of COVID-19. This has positive implications for students and teachers considering the benefits of using such technology, hence they decide to continue using it even after the pandemic. Also, the free access to users have to LMS such as Google Classrooms and Moodle through their institutions could be another reason for the high utilization of LMS in Southeast Nigeria. This result agrees with the findings of Ziraba et al. (2020) who pointed out that LMS were been utilised to a High extent because LMS such as Moodle is free. In contrast, Chitanana (2018) cited the lack of training as the main reason behind the low utilization of the LMS.

Results from research question three showed that high cost of mobile data/internet subscription; inadequate training for computer education teachers; poor electricity supply, poor technical support for students while using LMS in schools; teachers' reluctance to adopt LMS technology; absence of policy on effective use of LMS; lack of time by most of the computer teachers to experiment with LMS tools; failure of computer teachers to share their experiences with their colleagues on use of LMS; Absence of training programmes/workshops/seminars in schools on use of LMS for learning purposes and risk of losing personal details to unauthorized users were considered the challenges militating against the utilization of learning of STEAM subjects among secondary schools in Southeast Nigeria in the post COVID-19 Era. This result agrees with Oswal (2019) who identified the high cost of implementation of ICT, resistance to change, lack of technical know-how, poor electricity supply, poor technical support for students while using LMS in schools, teachers' reluctance to adopt LMS technology, absence of policy on effective use of LMS as challenges to the utilization of LMS in schools.

The study identified strategies for effective utilization of LMS to include: allowing students to take a more active role in teaching and learning through the use of LMS in schools; adequate electricity supply in schools to enable students use LMS for examinations



and other purposes, prompt and regular technical support while using LMS, enactment and monitoring policy on the use of LMS for teaching and learning purposes, ensuring that students can access LMS on any of their preferable devices (Laptop, Smart Phones etc), establishment of strict rules all users of the LMS must adhere to and identification of LMS that is important for students learning. These findings agreed with Kant et al. (2021); Turnbull et al. (2020). Aldowah et al. (2017) recommended that: students should take a more active role in the teaching and learning process, games should be integrated into learning the course, Regular quizzes should be scheduled; ensure learners should be made to understand the full benefits of using the LMS tool. Also, Sinclair and Aho (2018) stated that there is a need for a constant power supply to boost the efficiency of technological equipment such as computers, mobile devices, etc.

Conclusion

Based on the findings of this study, it can be concluded that students in Southeast Nigeria have access to Google Classroom, Moodle, Microsoft Team, Canvas, Blackboard, and Coursework. However, there is low accessibility to Segue, Interact, Atutor, WebCT, Desire2learn, and KEWL. LMSs are being utilized in the Southeast Nigeria Senior Secondary Schools to a High Extent in the post-COVID-19 Era. The challenges militating against the utilization of LMS for learning of STEAM subjects among secondary schools in Southeast Nigeria in the post COVID-19 Era include the high cost of mobile data/internet subscription; inadequate training for computer education teachers; poor electricity supply; poor technical support for students while using LMS in schools; teachers reluctance to adopt LMS technology; absence of policy on effective use of LMS; most of the computer teachers are too busy to experiment with LMS tools; failure of computer teachers to share their experiences with colleagues on use of LMS, Absence of training programmes/workshops/seminars in schools on use of LMS for learning purposes and risk of losing personal details to unauthorized users.

Also, the strategies for adequate utilisation of LMS in teaching and learning STEAM subjects include: adequate electricity supply in schools to enable students to use LMS for examinations and other purposes, prompt and regular technical support while using LMS, enactment and monitoring policy on the use of LMS for teaching and learning purposes, ensuring that students can access LMS on any of their preferable devices

(Laptop, Smart Phones etc), the establishment of strict rules all users of the LMS must adhere to and identification of LMS that is important for students learning.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. Adequate electricity should be supplied in schools to enable students use LMS for examinations and other purposes.
2. Technical support while using LMS should be provided regularly and promptly.
3. Policy on the use of LMS for teaching and learning purposes should be enacted and monitored.
6. The government should set-up control mechanisms and do a follow-up on every policy enacted to ensure effective monitoring and implementation.

Limitations of the Study

The use of self-report measures is a limitation to this study because it might result in common method bias.

Suggestions for Further Studies

Based on the results of this study, the following are suggested for further study:

1. Similar studies should be carried out in other geopolitical zones of Nigeria to determine the availability, accessibility and extent of utilization of LMS tools in teaching and learning STEAM subjects.
2. Identification of the skills required for using Learning Management System tools in the teaching and learning at various levels of education in Nigeria.

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