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Influence of Application of Blended Learning for Sustainable Development in Rivers State Owned Universities

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Abstract

This paper examines the Influence of Application of Blended Learning for sustainable Development in Rivers State owned Universities. Three objective, three research questions and three hypotheses were posed to guide the study. The population for the study was 1,396 students from Rivers State University and Ignatius Ajuru university of Education. The sample for this study consists of 30 percent of the total population making a total of 419 drawn from the institutions under study. The sampling technique used for this study was simple random sampling techniques as all the respondents were given equal opportunity. Data for the study were collected by means of questionnaire titled "Influence of Application of Blended Learning for sustainable Development in Rivers State Universities (IABLSDQ). The IABLSDQ adopted a modified four-point Likert scale of Very High Extent to Very Low Extent. Cronbach Alpha was used for the reliability test which yielded reliability co-efficient of 0.83. Four Hundred and nineteen (419) copies of questionnaire were distributed, and 408 were retrieved for analysis. Mean and Standard Deviation were used to answer the research questions, while z-test was used to test the hypotheses. Based on the findings, it was revealed that flipped classroom method provides better resource materials for learning about sustainable development. It was concluded that the implementation of blended learning presents a transformative opportunity for fostering sustainable development in universities. It was recommended that Universities should prioritize upgrading their technological infrastructure to support blended learning. Regular training, workshops and certification courses can equip users with the necessary skills to effectively utilize digital tools and platforms.

Keywords: Blended Learning, Sustainable development, Flipped classroom, Learning management system, Computer-Based Training (CBT)

Introduction

Technology is the branch of knowledge that deals with the creation and use of technical means and their interaction with life, society and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science. Blended learning systems can take many forms, such as flipped classrooms, learning management system, hybrid courses, and mixed-mode learning, but all these involve the integration of digital learning components with face-to-face instruction. Blended learning can contribute to each of these dimensions by

enhancing educational access, quality, equity improving learning outcomes, employability and reducing the environmental impacts of educational activities (Ramalingam, Yunus & amp; Hashim 2022). Blended learning can contribute to building sustainable development by increasing access to education (Caird & amp; Roy, 2019). Blended learning, which allows students to access educational resources and interact with teachers and peers online, can help bridge this gap by providing access to a wider range of educational opportunities (Chen, 2022). Blended learning can contribute to building sustainable development by fostering collaboration and community- building among students. Blended learning can contribute to building sustainable communities by reducing education's environmental impact.

Blended learning supports this by providing learners with access to educational content anytime and anywhere, thus accommodating diverse learning styles and schedules. This accessibility is crucial in regions with limited educational infrastructure, enabling equitable access to quality education and bridging the digital divide. Blended learning plays a significant role in reducing the environmental impact of education. Blended learning is a term used to represent both teaching and learning processes that combine online learning with in-class learning. Blended learning is a learning encounter in which face to face or the traditional teacher-learner instruction is combined with technology mediated instruction, (Bupo, 2019; Lalima & Dangwal 2017, Noni, Abdullahi & Ismail, 2017). Blended learning may be in the form of a flipped classroom where students learn content online by watching video, lectures, usually at home and homework is done in class with teachers and students discussing and answering questions (Adirika & Ikwuka, 2020). Blended learning has various models which include rotation model, flex model, self-blend model and enriched-virtual model. The integration of technology into educational system has brought blended learning to the limelight as it is gaining popularity among students.

Blended learning as an educational approach combining online digital media with traditional classroom methods has emerged as a pivotal strategy for achieving sustainable development goals. This model integrates the strengths of both face-to-face instruction and digital resources, creating a flexible and adaptive learning environment. Garrison and Kanuka (2020) Blended learning fosters higher-order thinking skills by encouraging active and collaborative learning. Blended learning facilitates the integration of sustainability concepts into various disciplines. Allen and Seaman (2019) Institutions that adopt blended learning report improved student engagement and satisfaction, underscoring its potential to foster a deep understanding of

sustainability issues. Blended learning not only enhances the learning experience but also promotes the efficient use of resources, contributing to sustainable development.

Sustainable development in Rivers State universities is essential for fostering long-term growth and enhancing the quality of education in the region. It involves creating an educational ecosystem that balances economic, social, and environmental considerations to meet the needs of present and future generations. Universities can equip students with the skills and knowledge needed to address the complex challenges of the 21st century, thereby contributing to the overall development of Rivers State. Sustainable development in higher education involves creating an ecosystem that balances economic, social, and environmental goals to meet current and future needs. Integrating technology in education through blended learning can significantly contribute to this balance by promoting efficient use of resources, reducing environmental impacts, and fostering innovation. Blended learning and sustainable development can propel universities towards becoming hubs of innovation and resilience. Universities in Rivers State cannot only enhance educational outcomes but also contribute to the broader goals of sustainable development. This alignment will prepare students to tackle the multifaceted challenges of the modern world, ensuring that higher education serves as a catalyst for long-term societal progress and environmental sustainability. This implies that, there is need to examine the Influence of Application of Blended Learning for sustainable Development in Rivers State Universities with references to students from Rivers State University and Ignatius Ajuru university of Education

Blended learning is a powerful tool for advancing sustainable development. Its flexibility, environmental benefits, support for lifelong, inclusive education, economic advantages, adaptability, and promotion of global collaboration make it an effective strategy for building a sustainable future. Blended learning not only enhances the quality of education but also aligns with the principles of sustainability, ensuring that educational practices contribute positively to the long-term well-being of individuals and societies. Blended learning also supports sustainable development by fostering inclusive education. It provides opportunities for marginalized groups, including individuals with disabilities, to participate in the learning process. Blended learning adaptability to various educational contexts is another critical factor in its contribution to sustainable development. It can be customized to suit different levels of education, from primary to tertiary, and tailored to various cultural and socio-economic settings. This versatility ensures that blended learning can effectively address the unique challenges and

opportunities in diverse communities, promoting localized sustainable development initiatives Boelens, De Wever, and Voet, 2017). Blended learning encourages the development of a global learning community. Through online platforms, students and educators can connect with peers and experts worldwide, facilitating the exchange of knowledge and best practices in sustainability Bonk and Graham (2006), asserts that, the collaborative nature of blended learning promotes cultural understanding and cooperation, essential elements for achieving sustainable development goals. Flipped Classroom for Sustainable Development

The flipped classroom, where traditional lecture and homework elements are reversed, offers significant potential for improving sustainable development in education. Flipped classroom engage students with instructional content at home via videos or online resources and utilizing classroom time for interactive and application-based learning. The flipped classroom promotes active learning and critical thinking skills. According to Bishop and Verleger (2019), the flipped classroom model enhances student engagement and learning outcomes by allowing for more personalized instruction and collaborative activities during class time, which are essential for fostering the skills needed for sustainable development.

Learning Management System (LMS) for Sustainable Development is a digital platform that helps teachers and instructors deliver online learning content. It can provide a variety of tools, such as course creation, student enrolment, progress tracking, and grading. The use of Learning Management Systems (LMS) plays a crucial role in improving sustainable development by providing an efficient and scalable platform for delivering education and training. LMS platforms enhance sustainable development by fostering inclusive and equitable access to education. They provide opportunities for learners in remote or underserved areas to access high-quality educational content and engage in collaborative learning experiences, bridging the digital divide. LMS features such as discussion forums, virtual classrooms, and assessment tools support interactive and adaptive learning, catering to diverse learning needs and preferences. This inclusive approach ensures that more individuals can acquire the skills and knowledge necessary for sustainable economic growth and social development. Graf and List (2015), posits that, LMS platforms not only improve the efficiency and effectiveness of the learning process, but also contribute to building a knowledgeable and skilled workforce equipped to address the challenges of sustainable development.

Computer-Based Training for Sustainable Development Computer-Based Training (CBT) significantly enhances sustainable development by providing a flexible, scalable, and

environmentally friendly approach to education and skill development. CBT allows learners to access educational content at their own pace and convenience, eliminating the need for physical classrooms and reducing the associated carbon footprint.

Ghirardini (2011), opined that Computer-Based Training (CBT) not only reduces the environmental impact but also lowers the cost of training by cutting down on travel, accommodation, and material expenses, making education more accessible and affordable. Computer-Based Training (CBT) supports sustainable development by fostering continuous learning and skill acquisition, which are essential for adapting to the evolving demands of the modern workforce. (Johnson, Hornik, Salas 2008), Computer-Based Training (CBT) enhances learning outcomes and retention rates, which are critical for building a knowledgeable and skilled workforce capable of driving sustainable development initiatives

Statement of the Problem

Blended learning, which combines traditional face-to-face instruction with online educational activities. However, its implementation faced several challenges. Many universities in Rivers State lack the necessary technological infrastructure, such as reliable internet connectivity, modern computer labs, and sufficient digital resources to effectively support blended learning. This infrastructural deficit hampers the seamless integration of online and offline educational components, thereby limiting students access to comprehensive learning experiences.

There is a significant gap in digital literacy among students in universities. Many educators and students are not sufficiently trained in using digital tools and platforms, which can lead to inefficiencies and frustrations in the learning process. This gap in digital literacy also affects the quality of online content delivery and engagement, making it difficult to achieve the intended educational outcomes of blended learning. Lastly, the socio-economic challenges faced by many students in Rivers State exacerbate the problems of blended learning. Students from low-income backgrounds may lack access to personal computers, smartphones, or stable internet connections at home, creating a digital divide that hinders equal participation in blended learning programs. This disparity can lead to unequal learning opportunities and outcomes, undermining the goal of using blended learning to promote sustainable development. The current study therefore sought to fill the existing research gap and also provide a better understanding through the empirical evidence of Influence of Application of Blended Learning for sustainable Development in Rivers State owned Universities

Aim and Objectives of the Study

The main aim of this study was to examine the Influence of Application of Blended Learning for sustainable Development in Rivers State owned Universities. Specifically, the study seeks to:

1. Ascertain the extent to which Flipped classroom influences sustainable development in Rivers State owned Universities.
2 Ascertain the extent to which Learning Management System influences sustainable development in Rivers State owned Universities.
3 Ascertain the extent to which Computer-Based Training influences sustainable development in Rivers State owned Universities.

Research Questions

The following research questions were guided this study:

1. To what extent does Flipped classroom influence sustainable development in Rivers State owned Universities?
2. To what extent does Learning Management System influence sustainable development in Rivers State owned Universities?
3 To what extent does Computer-Based Training influence sustainable development in Rivers State owned Universities?

Hypotheses

The following hypotheses was formulated and tested at 0.05 level of significance to guide this study:

1. There is no significant difference in the mean ratings of education students in Rivers State owned Universities on the extent to which Flipped classroom influence sustainable development
2. There is no significant difference in the mean ratings of education students in Rivers State owned Universities on the extent to which the use of Learning Management system influence sustainable development.
3. There is no significant difference in the mean ratings of Education Students in Rivers State Universities on the extent to which the use of Computer-Based Training influence sustainable development.

Methodology

The study adopted a descriptive survey research design which sought to collect data on the opinions of the participants with a view to analyzing the Influence of Application of Blended Learning for sustainable Development in Rivers State owned Universities.

The population for the study was 1,396 (One thousand three hundred and ninety-six) final year students in Rivers State education Universities. Simple random sampling technique was used to sample 419 final year education students for the study. The instrument used for conducting the study was a self-structured questionnaire titled 'Influence of Application of Blended Learning for Sustainable Development in Rivers State owned Universities Questionnaire (ABLSDQ)' designed by the researcher on a 4-point scale of Very High Extent (VHE), High Extent (HE), Low extent (LE) and Very Low Extent (VLE) weighted 4,3,2 and 1 respectively. The face and content validation of the instrument was established by three experts, two in Department of Educational Management and one in Measurement and Evaluation. Cronbach alpha was used to determine the reliability of the instrument. This yielded a high reliability coefficient of 0.83, 0.84 and 0.85 for Parts A and B respectively. 419 copies of the questionnaire were distributed by the researcher together with two research assistants, who were briefed on how approach the students in filling the copies of the questionnaire. 408 copies of questionnaire were properly filled and returned, representing 95% returns. The research questions were analzed using mean and standard deviation. The mean responses on the research questions were adjudged on the following basis of any mean score that falls below 2.50 will be taken as disagreement and any mean score of 2.50 or above will be taken to indicate agreement. The statistical tool used for the hypotheses testing was the z-test statistical tool and decisions for the hypotheses were made according to the decision rule of z-test.

Results

Research Question 1: To what extent does Flipped classroom influence sustainable development in Rivers State owned Universities?

Table 1: Mean Ratings on the extent to which the application of Flipped classroom influences sustainable development in Rivers State owned Universities (N = 408)

S/N	Item Statements	IAUE = 154			RSU = 254	
		X	SD	Remarks	X	SD
1.	Flipped classroom approach encourages active participation in sustainable development discussions	3.22	0.81	High Extent	3.04	1.01
2.	Flip allowing students to learn at their	3.15	0.98	High Extent	2.78	1.11

	own pace					
3.	Flipped classroom method provides better resources and materials for learning about sustainable development	3.45	0.88	High Extent	2.57	0.96
4.	Flipped classroom setup improves your critical thinking skills related to sustainable development issues	3.47	0.71	High Extent	3.09	0.94
5.	flipped classroom model promotes collaborative learning and teamwork on sustainable development projects	3.01	1.10	High Extent	3.00	0.95
	Total	**16.3**	**4.48**		**14.48**	**4.97**
	Grand Mean & SD =	**3.26**	**0.89**		**2.89**	**0.99**

Source: Researchers Field Survey, (2024)

Table 1 which was for research question one showed that, all the items were on high extent. The respondents agreed that flipped classroom method provides better resources and materials for learning about sustainable development. flipped classroom setup improves students critical thinking skills related to sustainable development issues. The confirmation was made with a grand mean of 3.26 and standard deviation of 0.89 for IAUE while that of RSU were 2.98 and 0.99 for mean and standard deviation.

Research Question 2: To what extent does the use of Learning Management System influence sustainable development in Rivers State Universities?

Table 2: Mean Ratings on the extent to which the application of Learning Management System influences sustainable development in Rivers State owned Universities (N = 408)

S/N	Item Statements	IAUE = 154			RSU = 254	
		X	**SD**	**Remarks**	**X**	**SD**
6.	LMS supports interactive and engaging learning experiences about sustainable development.	3.54	0.59	High Extent	2.93	1.10
7.	LMS facilitates effective collaboration and communication on sustainable development projects.	3.07	1.03	High Extent	3.42	0.85
8.	Learning Management System (LMS) enhances students understanding of sustainable development concepts.	3.52	0.73	V. High Extent	3.54	0.94

9.	Learning management systems helps lecturers to monitor students' performance	3.49	0.82	High Extent	3.65	0.77
10.	LMS provides better access to resources and materials related to sustainable development	3.25	0.68	High Extent	3.07	1.03
Total		**16.9**	**3.85**		**16.6**	**4.69**
Grand Mean & SD	**=**	**3.37**	**0.77**		**3.32**	**0.93**

Source: Field Survey, (2024)

Table 2 which was for research question two showed that all the items were on high extent. The respondents agreed that LMS supports interactive and engaging learning experiences about sustainable development. The confirmation was made with a grand mean of 3.37 and 0.77 while standard deviation of 3.32 and 0.93 for both IAUE and RSU.

Research Question 3: To what extent does the use of Computer-Based Training influence sustainable development in Rivers State owned Universities?

Table 3: Mean Ratings on the extent to which the application of Computer-Based Training influences sustainable development in Rivers State owned Universities (N = 408)

S/N	**Item Statements**	**IAUE = 154**			**RSU = 254**	
		X	**SD**	**Remarks**	**X**	**SD**
11.	CBT gives students greater control of their academics	2.34	0.94	Low extent	3.36	1.02
12.	CBT makes it easier for students to get good grades	3.48	0.69	High Extent	3.11	1.03
13.	CBT facilitates collaboration and communication with peers and instructors on sustainable development projects	3.33	0.82	High Extent	2.61	1.09
14.	CBT promotes self-paced learning and helps students to better grasp sustainable development topics	3.60	0.83	V. High Extent	3.28	0.85
15.	CBT provides better access to up-to-date information and resources related to sustainable development.	3.60	0.72	V. High Extent	3.08	1.01
Total		**16.4**	**4.00**		**15.4**	**5.00**
Grand Mean & SD	**=**	**3.27**	**0.8**		**3.09**	**1.00**

Source: Field Survey, (2024)

Table 3 which was for research question three showed that, four items were on high extent, while one item was on low extent. The respondents agreed that CBT makes it easier for students to get good grades. CBT promotes self-paced learning and helps students to better grasp sustainable development topics. The confirmation was made with a grand mean of 3.27 and 3.09 while standard deviation of 0.8 and 1.00 for both IAUE and RSU.

Test of Hypotheses

Hypothesis 1: There is no significant difference in the mean ratings of IAUE and RSU Education students on the extent to which Flipped classroom influences sustainable development in Rivers State Universities

Table 4: **z-test Analysis of Difference in the Mean Ratings of IAUE and RSU students of faculty of education on the extent to which Flipped classroom influenced sustainable development in Rivers State owned Universities.**

Respondents	N	x	SD	Std Decision	Error	df	p	z-cal	z-crit
IAUE	154	3.26	0.89						
				0.008		406	0.05	0.41	1.96
Ho RSU Failed to reject	254	2.89	0.99						

Source: Field Survey, (2024)

The data on table 4 revealed that, the calculated z-test value of IAUE and RSU mean were 3.26 (IAUE) 2.89 (RSU) respectively, while the critical t value was 1.96 at degree of freedom of 406 at 0.05 significance level. Therefore, the null hypothesis was accepted.

Hypothesis 2: There is no significant difference in the mean ratings of IAUE and RSU Education students on the extent to which Learning Management system influence sustainable development in Rivers State owned Universities.

Table 5: **z-test Analysis of Difference in the Mean Ratings of IAUE and RSU students of faculty of education on the extent to which Learning Management system for sustainable development in Rivers State owned Universities**

Respondents	N	x	SD	Std Decision	Error	df	p	z-cal	z-crit
IAUE	154	3.37	0.77						
				0.007		406	0.05	0.62	1.96

Ho

RSU
Failed to Reject 254 3.32 0.93

Source: Field Survey, (2024)

The data in table 5 revealed that the calculated z-test value of IAUE and RSU mean scores were 3.37 (IAUE) 3.32 (RSU) respectively, while the critical t value was 1.96 at degree of freedom of 406 at 0.05 significance level. Therefore, the null hypothesis was Accepted.

Hypothesis 3: There is no significant difference in the mean ratings of IAUE and RSU Education students on the extent to which Computer-Based Training influences for sustainable development in Rivers State owned Universities.

Table 6: z-test Analysis of Difference in the Mean Ratings of IAUE and RSU students of faculty of education on the extent to which Computer-Based Training influence sustainable development in Rivers State owned Universities

Respondents	N	x	SD	Std Error	df	p	z-cal	z-crit
				Decision				
IAUE	154	3.27	0.8					
				0.009	406	0.05	0.30	1.96
Ho								
RSU	254	3.09	1.00					
Failed to Reject								

Source: Field Survey, (2024)

The data in table 6 revealed that the calculated z-test value of IAUE and RSU mean scores were 3.27 (IAUE) 3.09 (RSU) respectively, while the critical t value was 1.96 at degree of freedom of 406 at 0.05 significance level. Therefore, the null hypothesis was accepted.

Discussion of Findings

The findings revealed that flipped classroom method provides better resources and materials for learning about sustainable development. Flipped classroom setup improves students critical thinking skills related to sustainable development issues. This finding is in consonance with Ugwulashi (2011) stated that, Flipping a classroom is not a new phenomenon. Lecturers engage in some sort of curriculum flipping right now. Flipping a classroom is an instructional strategy and a type of blended learning that reverses the traditional educational arrangement by delivering instructional content outside of the classroom and moves activities, including those that may have traditionally been considered homework into the classroom.

The findings revealed that, learning management systems supports interactive and engaging learning experiences about sustainable development. This finding is in Agreement with the view of Goh, Hong, and Gunawan, (2014), who depicted that Learning management systems were designed to facilitate online learning, and now instructors are embracing and appreciating knowledge sharing in the classroom that is educating and preparing adult learners to complete their college education irrespective of where they are Located. In agreement with the view of Adzharuddin and Ling (2013), opined that Learning Management Systems (LMS) are now installed in the majority of higher education institutions. Learning Management Systems (LMS) is one part of the process.

The findings revealed that CBT makes it easier for students to get good grades. CBT promotes self-paced learning and helps you to better grasp sustainable development topics. The finding is in agreement with the view of Owusu et.al., 2010; Thomas, 2001opined that Computer-assisted learning improves the use of the computer as an auxiliary tool in learning, such as writing homework, accessing information using the Internet, and making calculations using various software. In line with the view of Kausar, Choudhry, and Gujjar; 2018; Soe, Koki, and Chang, 2017) opined that, computer- assisted instruction is a teaching method in which the computer is used as an environment in which learning occurs, which strengthens the teaching process and student motivation, which the students' can benefit from according to his/her own learning speed, and which is formed by the combination of self-learning principles with computer technology.

Conclusion

It was concluded that flipped classroom method provides better resources and materials for learning about sustainable development. flipped classroom setup improves your critical thinking skills related to sustainable development issues.

Finally, it was concluded that the implementation of blended learning presents a transformative opportunity for fostering sustainable development in universities, particularly within Rivers State. Blended learning ability to integrate traditional face-to-face instruction with innovative online educational methodologies can enhance the quality of education by making learning more accessible, flexible, and engaging. However, realizing the full potential of blended learning requires addressing critical challenges such as inadequate technological infrastructure, gaps in digital literacy, and socio-economic disparities among students. Overcoming these obstacles demands a collaborative effort from government, educational institutions, and

stakeholders to invest in necessary resources, provide comprehensive training, and ensure equitable access to technology

Recommendations

1. Universities should prioritize upgrading their technological infrastructure to support blended learning.
2. Management of Universities should organize Regular training workshops and certification courses to provide the necessary skills to effectively utilize digital tools and platforms.
3. Institutions should implement policies that promote access to blended learning for sustainable development of Rivers State Universities.

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