

## INFLUENCE OF BLENDED LEARNING APPLICATION ON SUSTAINABLE DEVELOPMENT IN RIVERS STATE UNIVERSITIES

Ibifaka Samuel WOKOMA

Department of Educational Management, Faculty of Education, Ignatius Ajuru University of Education, Port Harcourt, Nigeria.

[ccu4real123@gmail.com](mailto:ccu4real123@gmail.com)

**ABSTRACT:** This paper examines the Influence of blended learning application on sustainable development in Rivers State universities. Three objectives, 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 per cent of the total population, making a total of 419 drawn from the institutions under study. The sampling technique used for this study was a simple random sampling technique, as all the respondents were given equal opportunity. Data for the study were collected using a questionnaire titled “Influence of Application of Blended Learning for Sustainable Development in Rivers State Universities (IABLSAQ). The IABLSAQ adopted a modified four-point Likert scale of Very High Extent to Very Low Extent. Cronbach's Alpha was used for the reliability test, which yielded reliability coefficient of 0.83. Four hundred and nineteen (419) copies of the questionnaire were distributed, and 408 were retrieved for analysis. Mean and Standard Deviation were used to answer the research questions, while the 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 prioritise 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, Application, Sustainable Development

Reference to this paper should be made as follows:

Wokoma, I. S. (2025). Influence of blended learning application on sustainable development in Rivers State universities. *International Journal of Leadership, Quality Education and African Development*, 2(3), 418-428.

Copyright © 2025 IJLQEAD

## 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 et al., 2022). Blended learning can contribute to building sustainable development by increasing access to education (Caird & 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 et al., 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 solving 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 education 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. 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) added that institutions that adopt blended learning report improved student engagement and satisfaction, underscoring its potential to foster a deep understanding of sustainability issues. Blended learning do 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 there is need to examine 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 does not only enhance 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's 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 et al., 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. According to Bonk and Graham (2006), the collaborative nature of blended learning promotes cultural understanding and cooperation, essential elements for achieving sustainable development goals.

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. 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) 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) opined 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 (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). Computer-Based Training (CBT) do 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 et al., 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, holds promise for advancing sustainable development in universities across Rivers State. However, its implementation faces 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 the influence of blended learning application for sustainable development in Rivers State Universities.

### **Aim and Objectives of the Study**

The main aim of this study was to examine the influence of blended learning application for sustainable development in Rivers State Universities. Specifically, the study seeks to determine:

- Ascertain the extent to which Flipped classroom influences sustainable development in Rivers State Universities?
- Ascertain the extent to which Learning Management System influences sustainable development in Rivers State Universities?
- Ascertain the extent to which Computer-Based Training influences sustainable development in Rivers State Universities?

## Research Questions

The following research questions were guide this study:

- To what extent does Flipped classroom influences sustainable development in Rivers State Universities?
- To what extent does Learning Management System influences sustainable development in Rivers State Universities?
- To what extent does Computer-Based Training influences sustainable development in Rivers State Universities?

## Hypotheses

The following hypotheses was formulated and tested at a 0.05 level of significance:

- There is no significant difference in the mean ratings of Education Students in Rivers State Universities on the extent to which Flipped classroom influences sustainable development in Rivers State Universities.
- There is no significant difference in the mean ratings of Education Students in Rivers State Universities on the extent to which the use of Learning Management system influences sustainable development in Rivers State Universities.
- 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 influences sustainable development in Rivers State Universities.

## METHODS

The study adopted a descriptive survey research design which sought to collect data on the opinions of the participants with a view to analyzed Influence of Application of Blended Learning for sustainable Development in Rivers State Universities in Rivers State Universities. The population for the study was 1,396 (One thousand three hundred and ninety six) final year students in Rivers State Universities. Simple random sampling technique was used to sample 419 final year students for the study. The instrument used for conducting the study was questionnaire titled 'Influence of Application of Blended Learning for sustainable Development in Rivers State Universities Questionnaire (BLSDQ)' designed by the researchers 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 researchers together with 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 answered 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 the Flipped classroom influence sustainable development in Rivers State Universities?

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

S/N	Item Statements	IAUE = 154			RSU = 254		
		Mean	SD	Remarks	Mean	SD	Remarks
1	The flipped classroom approach encourages active participation in sustainable development discussions	3.22	0.81	High Extent	3.04	1.01	High Extent
2	Flip allows students to learn at their own pace	3.15	0.98	High Extent	2.78	1.11	High Extent
3	The flipped classroom method provides better resources and materials for learning about sustainable development	3.45	0.88	High Extent	2.57	0.96	High Extent
4	The flipped classroom setup improves your critical thinking skills related to sustainable development issues	3.47	0.71	High Extent	3.09	0.94	High Extent
5	The flipped classroom model promotes collaborative learning and teamwork on sustainable development projects	3.01	1.10	High Extent	3.00	0.95	High Extent
<b>Grand Mean &amp; SD</b>		<b>3.26</b>	<b>0.89</b>	<b>High Extent</b>	<b>2.89</b>	<b>0.99</b>	<b>High Extent</b>

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

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

Table 2: Mean ratings on the extent to which the application of the learning management system influences sustainable development in Rivers State Universities

S/N	Item Statements	IAUE = 154			RSU=254		
		Mean	SD	Remarks	Mean	SD	Remarks
6	LMS supports interactive and engaging learning experiences about sustainable development.	3.54	0.59	Very High Extent	2.93	1.10	High Extent
7	LMS facilitates effective collaboration and communication on sustainable development projects.	3.07	1.03	High Extent	3.42	0.85	High Extent
8	Learning Management System (LMS) enhances your understanding of sustainable development concepts.	3.52	0.73	Very High Extent	3.54	0.94	Very High Extent
9	Learning management systems help lecturers to monitor students' performance	3.49	0.82	High Extent	3.65	0.77	Very High Extent
10	LMS provides better access to resources and materials related to sustainable development	3.25	0.68	High Extent	3.07	1.03	High Extent
<b>Grand Mean &amp; SD</b>		<b>3.37</b>	<b>0.77</b>		<b>3.32</b>	<b>0.93</b>	<b>High Extent</b>

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 Universities?

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

S/N	Item Statements	IAUE = 154			RSU = 254		
		$\bar{x}$	SD	Remarks	$\bar{x}$	SD	Remarks
11	CBT gives students greater control over their academics	2.34	0.94	Low extent	3.36	1.02	High Extent
12	CBT makes it easier for students to get good grades.	3.48	0.69	High Extent	3.11	1.03	High Extent
13	CBT facilitates collaboration and communication with peers and instructors on sustainable development projects.	3.33	0.82	High Extent	2.61	1.09	High Extent
14	CBT promotes self-paced learning and helps you to better grasp sustainable development topics	3.60	0.83	Very High Extent	3.28	0.85	High Extent
15	CBT provides better access to up-to-date information and resources related to sustainable development.	3.60	0.72	Very High Extent	3.08	1.01	High Extent
<b>Grand Mean &amp; SD</b>		<b>3.27</b>	<b>0.8</b>		<b>3.09</b>	<b>1.00</b>	<b>High Extent</b>

Table 3 which was for research question three showed that four items were high extent, while one item were on low extent. The respondents agreed 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 confirmation was made with a grand mean of 3.27 and 0.8 while standard deviation of 3.08 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 the Flipped classroom for sustainable development in Rivers State Universities

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

Respondents	N	$\bar{x}$	SD	Std. Error	Df.	p-value	z-cal	z-crit	Decision
IAUE	154	3.26	0.89	0.008	406	0.05	0.41	1.96	H <sub>0</sub> Accepted
RSU	254	2.89	0.99						

The data in table 4 revealed that the calculated z-test value of IAUE and RSU mean were 3.26 (IAUE) and 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 the Learning Management system for sustainable development in Rivers State Universities.

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

Respondents	N	$\bar{x}$	SD	Std. Error	Df.	p-value	z-cal	z-crit	Decision
IAUE	154	3.37	0.77	0.007	406	0.05	0.62	1.96	H <sub>0</sub> Accepted
RSU	254	3.32	0.93						

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 sustainable development in Rivers State Universities.

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

Respondents	N	$\bar{x}$	SD	Std. Error	Df.	p-value	z-cal	z-crit	Decision
IAUE	154	3.27	0.8	0.009	406	0.05	0.30	1.96	H <sub>0</sub> Accepted
RSU	254	3.09	1.00						



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 of the study revealed that the flipped classroom model provides enhanced access to resources and instructional materials, which supports deeper learning about sustainable development. This instructional strategy improves students' critical thinking skills by shifting the acquisition of foundational knowledge outside the classroom, while dedicating classroom time to problem-solving, discussion, and active learning tasks. This approach encourages learners to engage more deeply with sustainability issues and apply concepts in practical contexts.

These findings are consistent with Ugwulashi (2011), who observed that flipped classrooms are not a new concept in education. Many instructors already engage in informal curriculum flipping, whereby lectures are assigned as pre-class activities and classroom sessions are repurposed for active engagement. Flipping the classroom is a form of **blended learning** that reverses traditional teaching methods by delivering instructional content outside of the classroom and shifting homework-like activities into interactive classroom environments.

Furthermore, the study found that Learning Management Systems (LMS) play a crucial role in supporting interactive and engaging learning experiences related to sustainable development. LMS platforms allow students to access course materials flexibly and engage in collaborative online activities, which enriches their learning experience and promotes sustained interest in complex global issues.

This is in agreement with Goh et al. (2014), who reported that LMS platforms facilitate online learning and foster a culture of knowledge sharing among instructors and learners, regardless of their physical location. Similarly, Adzharuddin and Ling (2013) affirmed that LMS technologies have been widely adopted in higher education institutions and are essential tools in supporting digital learning strategies and sustainable education initiatives.

Additionally, the findings highlighted that Computer-Based Testing (CBT) facilitates better academic performance by allowing self-paced learning and providing immediate feedback. Students reported that CBT made it easier for them to understand and retain concepts related to sustainable development, enhancing their academic outcomes.

These findings align with Owusu et al. (2010) and Thomas (2001), who emphasized that computer-assisted learning enhances students' ability to complete tasks such as assignments, information retrieval, and computational work using digital tools. Likewise, Kausar et al. (2018) and Soe et al. (2017) noted that Computer-Assisted Instruction (CAI) integrates self-learning principles with digital technologies, thereby strengthening instructional delivery, increasing learner motivation, and allowing students to progress at their individual pace. This method effectively supports students in mastering complex subject matter such as sustainable development.

## CONCLUSION

It was concluded that the flipped classroom method provides better resources and materials for learning about sustainable development. A 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's 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, realising 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

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

## REFERENCES

- Adirika, A. O., & Ikwuka, I. (2020). The adoption of blended learning in Nigerian higher education institutions. *International Journal of Education and Development*, 5(3), 101-115.
- Adzharuddin, N. A., & Ling, L. H. (2013). Learning Management System (LMS) among university students: Does it work? *International Journal of e-Education, e-Business, e-Management and e-Learning*, 3(3), 248-252.
- Allen, I. E. & Seaman, J. (2019). Changing course: Ten years of tracking online education in the United States. Sloan Consortium.
- Bishop, J. L. & Verleger, M. A. (2013). The flipped classroom: A survey of the research. *ASEE National Conference Proceedings*, Atlanta, GA.
- Boelens, R., De Wever, B. & Voet, M. (2017). Four key challenges to the design of blended learning: A systematic literature review. *Educational Research Review*, 22(7), 1-18.
- Bonk, C. J. & Graham, C. R. (2006). *The Handbook of Blended Learning: Global Perspectives, Local Designs*. Pfeiffer.
- Bupo, G. O. (2019). Effect of blended learning approach on business education students' academic achievement in financial accounting in universities in Rivers State, Nigeria. *Journal of the Nigerian Academy of Education*, 3(2), 79-85.
- Caird, S., & Roy, R. (2019). Blended learning and sustainable development. *Encyclopedia of Sustainability in Higher Education*, Springer, 107-116.
- Chen, R. (2022). Effects of deliberate practice on blended learning sustainability: A community of inquiry perspective. *Sustainability*, 14(3), 1785.
- Garrison, D. R., & Kanuka, H. (2020). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7(2), 95-105.

- Ghirardini, B. (2011). E-learning methodologies: A guide for designing and developing e-learning courses. *Food and Agriculture Organisation of the United Nations*.
- Goh, P. S., et al. (2014). ICT and Learning Management Systems in Higher Education. *Journal of Educational Research*, 4(2), 33-45.
- Graf, S., & List, B. (2015). Blended learning: A review of the research. *Educational Technology and Society*, 18(4), 73-86.
- Johnson, S. D., Hornik, S., & Salas, E. (2008). An empirical examination of factors contributing to the success of CBT. *Journal of Educational Technology Systems*, 36(2), 163-176.
- Kausar, R., Awan, R., & Iqbal, H. (2018). The impact of computer-assisted instruction on students' academic achievement and motivation. *Bulletin of Education and Research*, 40(1), 33-48.
- Lage, M. J., Platt, G. J., & Treglia, M. (2000). Inverting the classroom: A gateway to creating an inclusive learning environment. *The Journal of Economic Education*, 31(1), 30-43.
- Lalima, O., & Dangwal, K. L. (2017). Blended learning: An innovative approach. *Universal Journal of Educational Research*, 5(1), 129-136.
- Noni, A. L., Abdullahi, A. A., & Ismail, R. (2017). Blended learning and academic performance in Nigerian universities. *International Journal of Educational Research*, 2(1), 45-57.
- Owusu, K. A., Monney, K. A., Appiah, J. Y., & Wilmot, E. M. (2010). Effects of computer-assisted instruction on performance in physics among senior high school students in Ghana. *Journal of Computers in Education*, 1(1), 57-67.
- Ramalingam, S., Yunus, M. M., & Hashim, H. (2022). Blended learning strategies for sustainable English as a second language education: a systematic review. *Sustainability*, 14(13), 8051.
- Soe, N. N., Nwe, K. S., & Moe, M. M. (2017). Computer-Assisted Instruction in education: A review. *International Journal of Scientific and Technology Research*, 6(9), 206-211.
- Thomas, R. M. (2001). *Recent theories of human development*. Sage Publications.
- Ugwulashi, C. S. (2011). Curriculum flipping: A strategy for effective delivery in tertiary education. *Journal of Educational Studies and Research*, 7(2), 44-52.