Gender Dynamics and Infrastructural Challenges on the Implementation of Blended Learning in Higher Education

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ABSTRACT

This study examines the impact of gender dynamics and infrastructural challenges on the implementation of blended learning in higher education, focusing on students at Chukwuemeka Odumegwu Ojukwu University, Nigeria. The research employs a descriptive survey design with a stratified random sample of 100 students to assess the influence of blended learning on academic performance across gender groups. Findings reveal that while both male and female students benefit from blended learning, male students demonstrate marginally higher engagement and academic performance. Additionally, infrastructural challenges, including inadequate ICT resources and unreliable internet connectivity, hinder the effective implementation of blended learning, particularly in rural areas. The study identifies a preference for offline over online learning modalities due to these limitations, emphasizing the need for targeted infrastructural investments and gender-sensitive policies to enhance inclusivity. Recommendations include providing digital tools for female students and improving ICT infrastructure to bridge the digital divide and maximize the potential of blended learning. These findings contribute to the discourse on equitable and sustainable educational practices in developing contexts.

INTRODUCTION

Blended learning, often referred to as hybrid learning, integrates traditional face-to-face teaching methods with online educational technologies, creating a dynamic and flexible approach to education (Ojaleye & Awofala, 2018). This model offers a balance between synchronous (real-time) and asynchronous (self-paced) activities, allowing learners to access content at their convenience while still benefiting from structured, instructor-led sessions (Dhawan, 2020). Generally, blended learning has gained popularity due to its potential to improve student engagement, foster critical thinking, and enhance academic performance (Morah et al., 2022). According to Tian (2023), one of the key advantages of blended learning is its adaptability to diverse learning styles. Students can engage with multimedia resources, participate in online discussions, and revisit recorded lectures to reinforce understanding. Research indicates that this approach not only improves learning outcomes but also cultivates self-directed learning skills essential for lifelong learning (Pelgrum, 2006). Despite its benefits, the successful implementation of blended learning requires adequate ICT infrastructure, well-trained educators, and supportive institutional policies (Park, 2021).

Globally, learning presents an opportunity to address some of the limitations of traditional education systems. The COVID-19 pandemic accelerated this shift, forcing universities to explore online and hybrid learning solutions to ensure continuity in education (Hashim & Hamidon, 2022). A study on the implementation of blended learning in a higher education institution in Albania found that students' satisfaction with online components had a significant impact on their overall learning experience, even more so than their satisfaction with face-to-face elements (Prifti, 2020). This suggests that the effective integration of digital resources and

online activities can be a crucial factor in the success of blended learning initiatives. By leveraging technology, it is possible to expand access to quality education, particularly in remote and underserved areas. In Nigeria, the transition to blended learning in the universities is fraught with challenges, including gender disparities and infrastructural deficits, which hinder its full potential. The adoption of blended learning is gradually gaining momentum as institutions seek innovative ways to improve access and quality in higher education (Igboeli et al., 2021). The implementation of blended learning in Nigeria is still in its infancy, with many institutions grappling with systemic and structural barriers. A significant challenge lies in the lack of ICT infrastructure necessary to support blended learning (Igboeli et al., 2021). Many universities face issues such as inadequate internet connectivity, inconsistent power supply, and limited access to digital tools and resources Aheto-Domi et al., 2021).These limitations disproportionately affect students and faculty in rural and underprivileged areas, widening the digital divide and undermining the inclusivity of blended learning initiatives. For many universities, these challenges are compounded by limited financial resources and inadequate government support for education. According to a study, budgetary allocations to education in Nigeria fall far below the United Nations Educational, Scientific and Cultural Organization (UNESCO) recommended benchmark of 26%(“Comparative Study of Education Funding in Nigeria,” 2021). This chronic underfunding hampers the ability of institutions to invest in the technology and infrastructure needed to support blended learning. The impact of infrastructural challenges is particularly pronounced in rural and underserved areas, where students often struggle to access basic educational resources. This digital divide not only limits the reach of blended learning but also perpetuates inequalities in educational opportunities and outcomes (Joaquin et al., 2020, Nwogbo, et al., 2023).

The integration of blended learning requires a paradigm shift in teaching practices and curriculum design. Educators must be equipped with the skills to effectively utilize digital tools and create engaging online content. Educational leaders need to develop their skills and awareness around the use of digital tools (Anthony & Ifeanyi, 2019). However, professional development opportunities for faculty members in Nigerian universities remain limited, further impeding the adoption of blended learning (Anthony & Ifeanyi, 2019). Despite these challenges, blended learning holds significant promise for transforming higher education in Nigeria. By addressing existing barriers and leveraging its potential, universities can create more equitable and effective learning environments that cater to the diverse needs of their student populations.

Gender inequality is a global issue which champions the marginalisation of women at all levels (Ofozoba, 2020).Gender disparities play a critical role in shaping access to and engagement with educational technologies. In many developing countries, including Nigeria, cultural, economic, and social factors influence the extent to which male and female students can utilize digital learning tools. Studies have shown that women often face greater barriers to accessing technology due to limited financial resources, societal norms, and lower levels of digital literacy (Ofozoba, 2020). In the context of blended learning, these disparities can lead to unequal participation and performance. For instance, female students may have less access to personal computers and reliable internet connections, which are essential for engaging with online components of blended learning (*Inequalities in Digital Proficiency: Bridging the Divide*, 2015). Additionally, women are more likely to bear the burden of domestic responsibilities, further limiting their time and ability to participate in educational activities (Aditya & Permadi, 2020).

Addressing gender disparities in educational technology is crucial for ensuring the success of blended learning initiatives (Aditya & Permadi, 2020). This requires the implementation of gender-sensitive policies, such as providing scholarships for female students to acquire digital tools and offering training programs to enhance digital literacy among women. By promoting gender equity in access to technology, universities can create more inclusive learning environments that empower all students to succeed. English education plays a crucial role in preparing students to communicate effectively in an increasingly interconnected world. Traditionally, English language instruction has been delivered primarily through face-to-face classroom settings, with limited integration of technology (Ofozoba et al., 2024). However, according to Obadara, (2021) the emergence of technology has created an aspect of learning known as “blended learning.” which has opened new avenues for enhancing English language teaching and learning. Blended learning offers a dynamic learning environment that combines the benefits of traditional instruction with the flexibility and interactivity of online learning (Beri, 2019, Orji et al., 2024).

Previous studies have explored the efficacy of blended learning in various educational contexts, demonstrating its potential to improve students' outcomes, including academic performance (Ilorah et al., 2018; Alsalhi et al., 2021; Nayak et al., 2024). Njock et al (2024) explores how gender dynamics influence engagement and performance in blended learning environments, revealing that gender roles and expectations can affect access to technology and participation. In their survey, female learners may face additional socio-cultural barriers, such as limited time due to domestic responsibilities, impacting their ability to engage fully in blended learning. The findings suggest that tailored support, such as flexible scheduling and gender-sensitive instructional design, can mitigate disparities and enhance equity. Overall, their study underscores the need for inclusive policies to address gender-specific challenges in blended learning. The study of Wiepcke et al (2018) reveals that Korean firms exhibit a significant gender pay gap, with around 36% directly attributed to discrimination rather than differences in qualifications. Married women face additional wage penalties, while men often benefit from marriage premiums. Despite comparable or higher education levels, women remain underrepresented in senior positions, underscoring the inadequacy of current gender equality policies in addressing systemic wage disparities and workplace discrimination. In their survey, Hassan and Shukri (2017) conclude that digital storytelling significantly boosts female student engagement, enhances learning outcomes, and promotes creativity by merging multimedia tools with traditional teaching. It also supports diverse learners and improves digital literacy, though successful implementation requires adequate training and time. Overall, it is an effective, modern educational strategy.

However, benefits such as increased student's engagement, enhanced learning retention, and improved critical thinking skills are linked to blended learning. Based on the foregoing, this study investigates the influence of blended learning, gender and infrastructural challenges hindering Blended Learning on academic performance of English education students at Chukwuemeka Odumegwu Ojukwu University. The scope of this study is on the influence of gender differences and infrastructural challenges on blended learning and how it affects academic performance among Male and Female English education students of Arts and Social Science Education Department, Faculty of Education, Chukwuemeka Odumegwu Ojukwu University. The study will involve English education students enrolled at Arts and Social Science Education department, faculty of Education in Chukwuemeka Odumegwu Ojukwu University, who are adapting to the use of blended learning environments as part of their coursework. The primary focus will be on assessing the influence of blended learning on academic performance of English Education students at Chukwuemeka Odumegwu Ojukwu University.

Research Questions and Objectives

This study aims to investigate the impact of gender dynamics and infrastructural challenges on the implementation of blended learning at Chukwuemeka Odumegwu Ojukwu University. The research addresses the following questions:

1. How does the blended learning approach influence gender differences among students of English Education in Chukwuemeka Odumegwu Ojukwu University?

2. How do infrastructural and technological differences in Igbariam, Anambra State, affect the implementation and effectiveness of blended learning for English Education students at Chukwuemeka Odumegwu Ojukwu University?

The objectives of this study are:

1. Assess the influence of the blended learning approach on gender differences among students of English Education Students in Chukwuemeka Odumegwu Ojukwu University.

2. To examine infrastructural and technological differences in Igbariam, Anambra State, affect the implementation and effectiveness of blended learning for English Education students at Chukwuemeka Odumegwu Ojukwu University.

METHODOLOGY

Research Design

A research design is the setup of parameters for data collecting and analysis with the goal of balancing relevance with the study's objective. It is the conceptual structure that guides research. To evaluate the impact of blended learning on the academic performance of English education students at Chukwuemeka Odumegwu Ojukwu University, this study used a descriptive survey approach. A descriptive survey is a technique for gathering data that involves interviewing or distributing a questionnaire to a sample of people. Since the researcher's sole goal was to report on the impact of blended learning on English education students' academic performance without changing any variables, the descriptive survey approach was appropriate for this study.

Population of the study

The population for the study consists of 220 students of the department of Arts and Social Science Education, COOU. This comprised 61 (100 level), 32(200 level), 75(300 level), 52(400 level) students of English option.

Number of English Education Students

S/N	Level of Study	Number of Students
1.	100L	61
2.	200L	32
3.	300L	75
4.	400L	52
	Total	**220**

Source: Arts and Social Science Education department (2024)

Sample and Sampling Technique

A study’s sample size is the total number of participants. For this study, one hundred individuals were chosen using a stratified random sample technique. One hundred respondents were chosen using the stratified random sampling technique. By selecting random samples from each stratum, stratified random sampling separates a population into discrete strata according to attributes, guaranteeing precise and representative analysis (Sharma, 2017). In this instance, 25 individuals from each study level were used to determine the sample size distribution from the preceding table.

Instruments for Data Collection

Questionnaires were used to collect data for the study. The questionnaire was chosen since it saves time. The approach can be used with various subjects who can read and write on their own. A questionnaire is a meticulously crafted tool for gathering information in line with the study questions. The researcher created questionnaires to get information from students about how blended learning affected English education students' academic performance at Chukwuemeka Odumegwu Ojukwu University. “Questionnaire on Influence of Blended Learning on Academic Performance” (QIBLAP) is the name of the survey tool. The study employed a closed-end questionnaire. A 4-point rating scales ranging from VHE (Very high extent), HE (High extent), LE (Low extent), and VLE (Very low extent) was used in the questionnaire. The study is correlational, and the Spearman’s Rank Order technique was used with the aid of Statistical Package for Social Sciences (SPSS) as data analysis method.

Validation of the Instruments

The instrument’s initial draft underwent face validation to guarantee its validity. The supervisor and two measurement and evaluation specialists from Chukwuemeka Odumegwu Ojukwu University in Anambra State completed it. These professionals were asked to evaluate the tool critically, focusing on the statement's clarity

and content relevancy. Additionally, they were asked to advise the researcher on the rating scale's suitability. These experts' feedback was considered when the study instrument was finally modified.

Reliability of the Instruments

To determine reliability of the instrument, the researcher conducted a trial on representative sample of 10 female and 10 male students from Madonna University, Nigeria. The Cronbach Alpha Statistical analysis was used to determine a reliability of 0.79.

Method of Data Collection

Secondary and primary data were utilised for this study. Secondary data was collected from journals, while primary data was sourced through the instrument of questionnaires.

Method of Data Analysis

Data that were collected from the field were coded and entered for analysis using the statistical package for social sciences (SPSS) computer software for windows programme to enable analysis. Quantitative data were analysed using descriptive statistical tools (mean and standard deviation).

RESULTS/FINDINGS

Research Question 1: The influence of blended learning approach on gender difference of students of English Education in Chukwuemeka Odumegwu Ojukwu University.

Table 1: Mean and standard deviation showing influence of blended learning between Male and Female English education students.

S/No	Item	Mean	Std. dev	Decision
5	Males engage better in classes	2.59	.93306	HE
6	Females engage better in classes	2.40	1.08	HE
7	Males do better in examinations	2.49	.97954	HE
8	Females do better in examinations	2.37	1.06	HE
	Grand Total	**2.46**		**HE**

VLE 1.0-1.99, LE= 2.0-2.49, HE= 2.50-3.49, VHE= 3.5-4.0

Table 4.2 includes whether Males engage better in classes have a mean score of 2.59 with a standard deviation of 0.93306, indicating a relatively high mean and low variability in responses. This suggests that male students are perceived to engage better in classes. The item is categorised as High Effectiveness (HE). Whether Female engage better in classes" has a mean score of 2.40 with a standard deviation of 1.08, indicating a slightly lower mean compared to males, but still within the HE category. However, the higher standard deviation suggests more variability in responses among female students regarding their engagement in classes. Whether Males do better in examinations has a mean score of 2.49 with a standard deviation of 0.97954, indicating a relatively high mean and low variability in responses. This suggests that male students are perceived to perform better in examinations. The item is categorised as HE. However, whether Females do better in examinations" has a mean score of 2.37 with a standard deviation of 1.06, indicating a slightly lower mean compared to males, but still within the HE category. However, the higher standard deviation suggests more variability in responses among female students regarding their performance in examinations. The grand total mean score is 2.46, indicating an overall perception of high effectiveness in the influence of blended learning on academic performance between male and female English education students.

Research Question 2: The infrastructural and technological differences in Igbariam, Anambra State, as it affects the implementation and effectiveness of blended learning for English Education students at Chukwuemeka Odumegwu Ojukwu University.

Table 2: Mean and standard deviation the effect of infrastructural and technological differences of blended learning for English Education students.

S/N	Item	Mean	Std. dev	Decision
9	Adoption onsite more than online classes	1.27	.58353	VLE
10	Adoption of online more than offline classes	1.76	.97566	VLE
11	Sharing materials online more than offline	1.57	.97706	VLE
12	Sharing materials offline more than online	1.92	.58480	VLE
	Grand Total	**1.63**		**VLE**

VLE 1.0-1.99, LE= 2.0-2.49, HE= 2.50-3.49, VHE= 3.5-4.0

Table 4.3; Adoption onsite more than online classes has a mean score of 1.27 with a standard deviation of 0.58353, indicating a low mean and low variability in responses. This suggests a preference for onsite classes over online classes for adoption. The item is categorized as Very Low Effectiveness (VLE). Adoption of online more than offline classes has a mean score of 1.76 with a standard deviation of 0.97566, indicating a higher mean compared to the previous item, but still within the VLE category. The higher standard deviation suggests more variability in responses regarding the preference for online classes over offline ones. Sharing materials online more than offline has a mean score of 1.57 with a standard deviation of 0.97706, indicating a relatively low mean and low variability in responses. This suggests a preference for sharing materials online over offline methods. The item is categorised as VLE. Sharing materials offline more than online" has a mean score of 1.92 with a standard deviation of 0.58480, indicating a higher mean compared to sharing materials online, but still within the VLE category. The lower standard deviation suggests less variability in responses regarding the preference for offline sharing of materials. The grand total mean score is 1.63, indicating an overall perception of very low effectiveness in the strategies for the implementation of blended learning to enhance the academic performance of English Education students.

DISCUSSION

The Influence of Blended Learning Approach on Gender Differences

The influence of blended learning approach was examined in a comparative analysis between male and female English Education students at Chukwuemeka Odumegwu Ojukwu University in Anambra State. Findings indicated that both genders demonstrated strong engagement in classes and achieved notable performance in examinations under the blended learning model. Male students were observed to marginally outperform their female counterparts in both engagement and examination outcomes due to factors like domestic commitments. However, overall, blended learning showcased a positive influence on the academic performance of both male and female students. In support of this finding, Ilo et al (2022) revealed in their study that physics students using a blended learning approach, male students performed better than female students. On the contrary, earlier study of Alsalhi et al (2021) found out that the influence of blended learning between male and female of mathematics students was average.

The effect of infrastructural and technological differences of blended learning for English Education students

The result of this study provides recommendations for implementing blended learning to improve the academic performance of English Education students at Chukwuemeka Odumegwu Ojukwu University in Anambra State. It indicates a prevailing preference for onsite classes over online ones and for offline sharing of materials as opposed to online methods. Institutions, policies and socioeconomic conditions contribute to infrastructural deficits. Educational institutions in the Global South lack the resources, governance frameworks, or trained personnel to implement blended learning effectively. Slow or fragmented policymaking can delay infrastructure investments (e.g., broadband expansion, electricity access), perpetuating deficits. National digital education policies often ignore local realities (e.g., rural connectivity gaps, device affordability), rendering them ineffective. Elite private institutions may adopt blended learning seamlessly, while public schools

struggle, reinforcing inequities. Without redistributive funding mechanisms, infrastructural investments tend to favour urban/privileged areas, leaving marginalized communities behind. Blended learning assumes access to devices and data, but poverty restricts participation, excluding poorer students. Families relying on daily wages may prioritize survival over ed-tech expenses, making 'flexible' learning a privilege. Sociocultural norms and rural-urban divides limit girls' and rural learners' access to technology. However, infrastructural gaps worsen existing inequalities (e.g., disabled learners, indigenous languages).

These findings highlight the necessity for additional investigation and careful deliberation when integrating blended learning techniques to enhance academic outcomes. The identified preferences underscore the importance of understanding the specific needs and preferences of students in the implementation process. Institutions should tailor blended learning approaches to accommodate these preferences effectively, ensuring a more seamless and impactful learning experience. By acknowledging and addressing these preferences, educators can optimize the implementation of blended learning strategies to better support the academic success of English Education students. In support of this finding, early study conducted by Obadara (2021). Results indicated that students exposed to blended learning experienced improved academic performance from pre-test to post-test, matching or surpassing the performance of those in the non-blended learning group. Zeqiri et al., (2020) in a similar finding revealed significant influence of blended learning on both students' performance and satisfaction. Specifically, factors related to course management and interactions were found to positively affect student satisfaction and performance. Consequently, interaction exhibited a stronger influence on both satisfaction and performance outcomes derived from blended learning

CONCLUSION

The study explored the influence of blended learning on academic performance in a gender comparative analysis, indicating strong engagement and notable performance in examinations for both male and female students. While male students were observed to marginally outperform their female counterparts, overall, blended learning showcased a positive influence on the academic performance of both genders. Considering these findings, recommendations were made for the implementation of blended learning strategies to enhance academic performance, emphasising the importance of understanding and accommodating students' preferences and needs. By tailoring blended learning approaches to align with these preferences, institutions can optimise the implementation of blended learning strategies, ensuring a more effective and impactful learning experience for English Education students at Chukwuemeka Odumegwu Ojukwu University in Anambra State.

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