

# Impact of Problem-Based Learning and Multimedia Tools on English Writing Proficiency of University Undergraduates in Nigeria

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## ABSTRACT

The study sought to investigate the impact of problem-based learning and multimedia tools on the English writing proficiency of university undergraduates in Nigeria. The sample was made up of 200 undergraduates in tertiary institutions in the Southwest. A quota sampling technique was used to select 10 students from five Departments in the Faculty/School of Technology and Engineering in each of the four state-owned universities in the Southwest. The study employed a quasi-experimental research design involving undergraduate students from selected Nigerian universities in Southwest Nigeria. Data were collected through pre-tests, and post-tests to assess changes in students' writing abilities and perceptions of the effectiveness of PBL and multimedia tools. Three research questions raised to guide the study were answered descriptively using mean and standard deviation. Three research hypotheses formulated for the study were tested using inferential statistics. Based on the data analysis, the t-test analysis for the study revealed that there was a significant difference between the mean performance scores of students taught English language proficiency using PBL and Multimedia tools methods. Since students taught using the PBL method had higher mean score ratings ( $\bar{X} = 22.69, SD = 3.546$ ) than those exposed to the Multimedia tools method ( $\bar{X} = 16.98, SD = 5.816$ ), then students in the PBL group performed better than their counterparts in the Multimedia tools group. Also, the Analysis of Variance (ANOVA) test for the study revealed that the introduction of PBL and multimedia tools has a positive effect on students' retention of English writing skills to a great extent ( $F = 57.239, P = 0.000$ ) with Scheffe Post-Hoc Analysis yielding ( $\bar{X} = 33.42$  and  $\bar{X} = 34.65$ ) respectively against conventional method ( $\bar{X} = 27.78$ ). Lastly, the Analysis of Covariance (ANCOVA) test for the study revealed that gender differences existed in students' performance ( $F_{cal}(2.56), P > 0.05$ ) as the female students' performance ( $\bar{X} = 35.40, \bar{X} = 33.80$ ) was marginally higher than those of the male students ( $\bar{X} = 34.88, \bar{X} = 29.75$ ) taught using PBL and Multimedia tools strategies respectively. The study recommended that universities should incorporate PBL and multimedia-based teaching strategies into the English language curriculum to enhance students' writing proficiency and engagement and ensure that lecturers incorporate the strategies in their classroom interaction with the students.

**Keywords:** English Writing Proficiency; Problem-Based Learning; Multimedia Tools; Undergraduates

## INTRODUCTION

In Nigeria, English functions as the official language and the principal medium of teaching at all educational tiers. Mastery of English, especially in writing, is essential for undergraduates since it greatly impacts their academic achievement and future career prospects. Many Nigerian students encounter difficulties in cultivating proficient writing abilities, typically due to conventional teaching techniques that restrict student participation and engagement in the educational process.

The amalgamation of Problem-Based Learning (PBL) and multimedia tools has been investigated to improve English writing proficiency among university freshmen in Nigeria. Nigerian universities' conventional teaching

techniques frequently prioritise rote memorisation and teacher-centred instruction, potentially hindering the development of students' writing skills. Conversely, PBL provides a student-centred methodology that fosters active learning, critical thinking, and cooperation, which may enhance writing performance.

Problem-Based Learning (PBL) has arisen as a student-centric pedagogical method that promotes active engagement through problem-solving and teamwork. Research demonstrates that Project-Based Learning (PBL) can improve writing ability by offering students the opportunity to participate in significant projects, thereby enhancing their content development, organisation, vocabulary, grammar, and mechanical precision (Aliyu et al., 2020). The integration of multimedia resources into writing teaching provides supplementary advantages.

Multimedia Instructional Approaches (MIA) have demonstrated efficacy in enhancing students' writing ability through the provision of varied and interactive learning experiences. Research has shown that MIA can improve student involvement and comprehension, resulting in superior writing outputs (Olowoyeye et al., 2023). The 21st-century education necessitates skills, methodologies, and resources that learners can utilise post-education (Weeks, 2019). The PBI is designed to provide students with effective and articulate language skills applicable to real-world situations. A meta-analysis of empirical research undertaken in real-world tertiary education classrooms globally confirms that PBI significantly enhances students' competencies (Dochy et al 2003). Staff and students demonstrating ownership and dedication to PBL in their pedagogical approaches have engaged in experimentation and achieved proficiency in PBL skills.

Notwithstanding these benefits, the incorporation of PBL and multimedia tools in Nigerian colleges is still constrained. Investigating the synergistic effects of these methodologies on the English writing skills of Nigerian undergraduates may yield significant insights into successful pedagogical strategies that confront current issues in writing education.

## Statement of the Problem

Proficiency in English writing is an essential ability for academic and professional achievement, particularly in multilingual environments like Nigeria, where English functions as the principal language of instruction. Many university freshmen encounter difficulties in writing due to inadequate exposure to good teaching methods and limited interaction with engaging learning environments. Conventional lecture-based pedagogies frequently do not provide students with the essential critical thinking and writing competencies needed for academic achievement.

Problem-Based Learning (PBL) is an educational methodology that promotes active engagement via authentic problem-solving, teamwork, and autonomous investigation (Hmelo-Silver, 2004). In contrast to conventional teaching techniques, PBL encourages learners to investigate, evaluate, and integrate knowledge, which is crucial for cultivating writing skills including organisation, coherence, and argumentation (Barrows, 2002). Studies indicate that PBL can markedly enhance students' cognitive engagement and their capacity to produce relevant written material (Schmidt et al., 2011).

The use of multimedia tools—such as digital storytelling, online writing platforms, and interactive software—has been recognised as a revolutionary method for improving writing skills. Research indicates that multimedia enhances engagement, delivers immediate feedback, and caters to various learning styles, thereby enhancing writing fluency, vocabulary, and grammatical precision (Mayer, 2009; Mohamad et al., 2018). The visual and interactive components of multimedia materials enhance the attraction and accessibility of learning for students with varying competence levels (Al-Jarf, 2015).

Despite global progress in educational technology and creative teaching methods, there is a paucity of empirical research regarding the synergistic benefits of project-based learning and multimedia tools on English writing skills among Nigerian university students. This study aims to address this gap by examining the impact of these instructional strategies on students' writing performance regarding content creation, structure, coherence, and grammatical accuracy. This study seeks to provide a more effective instructional framework for enhancing English writing proficiency through the integration of PBL and multimedia resources, thereby equipping students for academic success and professional communication.

This study seeks to address pertinent questions, including:

1. Will teaching by using Problem-Based Learning and Multimedia tools strategies enhance students' performance in English writing proficiency?
2. Will the introduction of Problem-Based Learning and Multimedia tools strategies have any effect on students' retention in English writing proficiency?
3. Will there be any significant difference in the mean performance score of male and female students taught using Problem-Based Learning and Multimedia tools strategies?

## Hypotheses

The following hypotheses were formulated for the study.

H<sub>01</sub>: There is no significant difference in the mean scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools strategies, and those taught using the conventional method.

H<sub>02</sub>: There is no significant difference between the retention mean score of students taught English language proficiency using Problem-Based Learning and Multimedia tools strategies, and those taught using the conventional method

H<sub>03</sub>: There is no significant between the posttest mean scores of male and female students taught using Problem-Based Learning and Multimedia tools strategies.

## LITERATURE REVIEW

### Problem-Based Learning and Multimedia Tools on Students' Performance in English Writing Proficiency

Problem-based learning (PBL) and multimedia tools are acknowledged as excellent pedagogical practices that improve students' English writing skills. Project-Based Learning (PBL) promotes active learning by motivating students to participate in problem-solving, teamwork, and autonomous inquiry, thereby enhancing their capacity to produce coherent and well-organised texts (Barrows, 2002; Hmelo-Silver, 2004). Research indicates that students instructed through Project-Based Learning have enhanced critical thinking abilities, organisation, coherence, and argumentative skills in writing (Schmidt et al., 2011).

Multimedia tools, including digital storytelling, interactive writing software, and online collaboration platforms, offer students prompt feedback, promoting self-correction and rewriting, essential for writing development (Mayer, 2009). Research indicates that incorporating multimedia into writing education enhances students' motivation, engagement, and language competency by catering to diverse learning styles (Mohamad et al., 2018). Al-Jarf (2015) contends that multimedia technologies substantially improve vocabulary acquisition, grammatical precision, and overall writing fluency.

### Problem-Based Learning and Multimedia Tools on Students' Retention in English Language

The retention of acquired concepts is essential for sustained proficiency in English writing. Research has demonstrated that PBL improves information retention when students participate in significant and contextualised learning activities (Schmidt et al., 2011). Utilising authentic writing scenarios in Project-Based Learning enhances comprehension and application of writing conventions, resulting in sustained retention of writing abilities.

Multimedia tools enhance retention by offering interactive and interesting educational experiences. Studies indicate that students receiving multimedia-enhanced writing training have superior recall and application of writing approaches relative to those instructed via conventional means (Mayer, 2009). Digital learning

platforms enable learners to review content, access additional resources, and practice writing at their speed, thereby reinforcing their skills and improving retention (Mohamad et al., 2018).

### **Gender Differences in the Performance of Students**

Gender disparities in academic achievement have been a topic of discourse in educational research. Certain research indicates that female students generally excel in language-related disciplines owing to superior verbal fluency and language processing abilities (Mohamad et al., 2018). In contrast, male students may demonstrate a predilection for technology-based learning, rendering multimedia technologies more efficacious for their engagement and educational results (Al-Jarf, 2015).

Schmidt et al. (2011) conducted a study comparing the performance of male and female students instructed by PBL and multimedia tools, revealing no significant gender-based disparities in learning results. The study indicated that females exhibited greater consistency in textual coherence, whereas males excelled in the innovative use of multimedia resources. This indicates that the incorporation of PBL and multimedia resources offers a balanced methodology that advantages both genders, mitigating learning gaps and guaranteeing equitable possibilities for academic achievement.

The amalgamation of Project-Based Learning and multimedia resources in English writing teaching provides substantial advantages in improving students' performance, retention, and engagement. Project-based learning cultivates critical thinking and problem-solving abilities, whereas multimedia tools facilitate interactive and individualised educational experiences. Research substantiates the efficacy of these tactics in promoting sustained writing proficiency, with no gender discrepancies in educational outcomes. The results highlight the necessity for broader use of PBL and multimedia methodologies in Nigerian higher education to enhance students' English writing skills.

### **Empirical Review**

Aliyu et al. (2020) conducted a study examining the impact of a PBL method on the writing performance of Nigerian students. The quasi-experimental study encompassed 18 second-year students participating in an English composition course at a college in northern Nigeria. During a 12-week duration, students participated in project-based learning activities that necessitated collaborative resolution of real-world issues through writing assignments. The results indicated substantial enhancements in multiple aspects of writing, encompassing content, organisation, vocabulary, syntax, and mechanical precision. The researcher determined that PBL offers a student-centric methodology that can proficiently enhance undergraduates' writing abilities. Aliyu et al. (2020) investigated the experiences and perspectives of Nigerian students on Problem-Based Learning (PBL) in an English as a Second Language (ESL) writing course. The research engaged a consistent cohort of 18 second-year students and employed questionnaires, semi-structured interviews, and reflective journals for data collection. The findings revealed that students had favourable experiences with PBL, valuing the ill-structured issues, facilitation, and problem-solving methodologies. Furthermore, students said that project-based learning (PBL) enhanced their writing proficiency and other linguistic competencies. The research emphasised the capacity of PBL to improve writing education in ESL environments.

The exploration of multimedia teaching methods has been conducted to enhance English writing proficiency. Olowoyeye et al. (2023) investigated the impact of a multimedia instructional method on the English writing proficiency of pre-service technical educators in southern Nigeria. The quasi-experimental study evaluated the performance of students instructed via multimedia technologies against those educated through traditional techniques. The results indicated that the multimedia instructional method effectively improved students' writing skills, showing no significant disparity between male and female students. The authors advocated for the incorporation of multimedia technology in English language education to enhance students' academic achievement.

These studies indicate that integrating PBL and multimedia tools into English writing education can enhance the writing proficiency of Nigerian university undergraduates. By promoting active learning, critical thinking,



collaboration, and engagement via real-world problem-solving and multimedia tools, instructors may cultivate a more effective and enriching environment for enhancing writing abilities.

## METHODOLOGY

The study employed a quasi-experimental research design involving undergraduate students from selected Nigerian universities in Southwest Nigeria. Data were collected through pre-tests, and post-tests to assess changes in students' writing abilities and perceptions of the effectiveness of PBL and multimedia tools. The sample for the study consisted of two hundred (200) undergraduate students. A quota sampling technique was used to select ten (10) students from five Departments in the Faculty/School of Technology and Engineering in each of the four state-owned universities in the Southwest. The ten students were from the five departments on the premise that they have taken English language courses under the General Studies Programme of the tertiary institutions at their 100 level. The instruments used for the study consisted of English Writing Proficiency Tests (EWPT), An Instructional Manual for Teachers (IMT), and a Multimedia Instructional Software Package was employed. Data collected were analyzed using descriptive analysis of Mean and standard deviation to answer the research questions raised to guide the study, while the hypotheses were tested using the inferential statistics *t*-test, Analysis of Variance (ANOVA), and Analysis of Variance (ANCOVA) as 0.05 level of significance using SPSS version 26.

## RESULTS

### Research Question 1

Will teaching by using Problem-Based Learning and Multimedia tools strategies enhance students' performance in English writing proficiency?

Table 1: Effects of Problem-Based Learning and Multimedia tools strategies on students' performance in English writing proficiency

Instructional Strategies	N	Pretest		Posttest		Mean Difference
		Mean	SD	Mean	SD	
Problem-Based Learning	70	26.23	4.976	30.57	5.679	4.34
Multimedia tools	70	27.53	6.796	33.72	4.263	6.19
Conventional	60	29.07	4.584	29.43	5.676	0.36

Table 1 presents the effects of Problem-Based Learning and Multimedia tools strategies on students' performance in English writing proficiency before and after treatment. The result shows that students in the Problem-Based Learning, Multimedia tools and conventional groups had mean scores of (26.23), (27.53) and (29.07) respectively and measures of variability of (4.976), (6.796) and (4.584) respectively before treatment. This confirms the homogeneity of the samples. On exposure to treatment, students in the Multimedia tools group had the highest mean score of (33.72), followed by those exposed to the Problem-Based Learning strategy (mean = 30.57) while students in the conventional group had the lowest mean score of 29.43 with attendant standard deviation values of (4.263), (5.679) and (5.676) respectively. The differences between the mean scores before and after treatment also show the effects of the experimental strategies on students' performance in English writing proficiency. The mean difference among Problem-Based Learning, Multimedia tools and conventional groups are (4.34), (6.19) and (0.36) respectively. This implies that the use of the experimental strategies had an effect on students' performance in English writing proficiency. Hence, teaching by using Problem-Based Learning and Multimedia tools strategies enhances students' performance in English writing proficiency.

### Research Question 2

Will the introduction of Problem-Based Learning and Multimedia tools strategies have any effect on students' retention in English writing proficiency?

Table 2: Retention Mean Scores of Students in the Experimental and Conventional groups

Groups	N	Mean	SD	Variance
Problem Based Learning	70	34.27	4.279	18.250
Multimedia tools	70	31.53	5.254	32.173
Conventional	60	28.03	5.451	31.216

Table 2 revealed that students exposed to Problem-Based Learning instructional strategies had the highest retention mean score of (34.27, SD = 4.279). Students in the Multimedia tools group obtained a retention mean score of (31.53, SD = 5.254) while the least was obtained by the students in the conventional group (Mean = 28.03, SD = 5.451). Therefore, the introduction of Problem-Based Learning and Multimedia tools methods have an effect on students' retention in English writing proficiency.

### Research Question 3

Will there be any significant difference in the mean performance score of male and female students taught using Problem-Based Learning and Multimedia tools strategies?

Table 3: Responses to the difference in the mean performance score of male and female students taught using Problem-Based Learning and Multimedia tools strategies

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Problem-Based Learning	Male	30	34.88	1.694	.379
	Female	40	35.40	1.776	.562
Multimedia tools	Male	30	29.75	2.381	.532
	Female	40	33.80	2.860	.904

Table 3 shows the mean performance scores of male and female students taught English writing proficiency using Problem-Based Learning and Multimedia tools strategies. The result revealed that female students in the group of students taught English writing proficiency using Problem-Based Learning had higher mean performance scores (35.40) than male students with a mean of (34.88) with a mean difference of (0.52). Also, in the group of students taught English writing proficiency using Multimedia tools, female students had higher mean performance scores (33.80) than their male counterparts with a mean of (29.75) with a mean difference of (4.05). This relatively implies that the performance of female students was higher than that of the male students taught using Problem-Based Learning and Multimedia tools strategies.

### Hypotheses Testing

#### Hypothesis 1

There is no significant difference in the mean performance scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools strategies in the pre-test and post-test.

Table 4a: t-test analysis of difference in the mean performance scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools strategies in the pre-test

Method	N	Mean	SD	Df	t <sub>(cal)</sub>	t <sub>(tab)</sub>	Decision
Problem-Based Learning	70	10.31	3.769	138	0.274	1.98	NS
Multimedia tools	70	11.06	3.898				

$P < 0.05$  level of significance

NS = Not Significant

From Table 4a above, the mean score of the respondents taught English language proficiency using the Problem-Based Learning method (10.31) is less than the mean score of the respondents taught English language proficiency using the Multimedia tools method (11.06) with a mean difference of (0.75). The measure of variability (standard deviation) has a difference of (0.129). The t-test analysis shows that the

calculated value (0.274) is lesser than the table value (1.98) at a 0.05 level of significance. This implies that there was no significant difference in the mean score of the pre-test scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools methods. This implies that there was no difference in the previous knowledge of the respondents taught using Problem-Based Learning and Multimedia tools method on the areas of English language proficiency where they were tested.

Table 4b: t-test analysis of the difference in the mean performance scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools methods in the post-test

Method	N	Mean	SD	df	t <sub>(cal)</sub>	t <sub>(tab)</sub>	Decision
Problem-Based Learning	70	22.69	3.546	138	2.555	1.98	S
Multimedia tools	70	16.98	5.816				

$P < 0.05$  level of significance

S = Significant

From table 4b above, the mean score performance of the respondents taught using the Problem-Based Learning method (22.69) is more than the mean score of the respondents taught using the Multimedia tools method (16.98) with a mean difference of (5.71). The measure of variability (standard deviation) has a difference of (2.27). The t-test analysis shows that the calculated value (2.555) is higher than the table value (1.98) at a 0.05 level of significance. This implies that there is a significant difference between the mean performance scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools methods. Since students taught using the Problem-Based Learning method had higher mean score rating than those exposed to the Multimedia tools method, then students in the Problem-Based Learning group performed better than their counterparts in the Multimedia tools group, albeit marginal. Hence, the null hypothesis was not upheld.

## Hypothesis 2

There is no significant difference between the retention mean score of students taught English language proficiency using Problem-Based Learning and Multimedia tools strategies, and those taught using conventional method.

Table 5: One-way Analysis of Variance (ANOVA) of Retention Mean Scores of Students taught English language proficiency using Problem - Based Learning and Multimedia tools strategies, and those taught using conventional method

Source	SS	Df	MS	F	P
Between Groups	1608.133	2	804.067	57.239	0.000
Within Groups	2486.417	198	14.048		
Total	4094.550	200			

Table 5 shows the Analysis of Variance (ANOVA) of Retention Mean Scores of Students in the Experimental and Control groups. The table revealed that the significant value (.00) is less than the significant level (0.05). We agree that there is a significant difference somewhere among the mean scores of dependent variables for the three groups. Hence, the null hypothesis is rejected. This implies that there was a significant difference between the retention mean scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools strategies, and those taught using conventional methods. To determine the sources of significant difference, the Scheffe Post-Hoc test was applied. The result is shown in Table 6 below;

Table 6: Scheffe Post-Hoc Analysis of Retention Mean Scores of Experimental and Control Groups.

Group	Control	Problem-Based Learning	Multimedia tools	Mean	N
Control	0.784	-5.523*	-6.547*	27.78	60
Problem-Based Learning	5.513*	0.754	-1.423	33.42	70
Multimedia tools	6.747*	1.413	0.774	34.65	70

Table 6 shows that there was a significant difference between the retention mean scores of students exposed to the Problem-Based Learning strategy and those in the control group in favour of Problem-Based Learning. Similarly, there was a significant difference between the retention mean scores of students exposed to Multimedia tools strategy and those in the control group in favour of Multimedia tools. There is also a significant difference between the mean scores of students exposed to Multimedia tools strategy and Problem-Based Learning strategy in favour of Multimedia tools. Hence, it must be noted that there was a significant difference between the retention mean scores of students in the experimental and control groups.

### Hypothesis 3

There is no significant between the posttest mean scores of male and female students taught English language proficiency using Problem-Based Learning, Multimedia tools and conventional strategies.

Table 7: Analysis of Covariance (ANCOVA) Summary of Post-test Mean scores of male and female students in each of the experimental and control groups.

Source	SS	Df	MS	F	P
Corrected Model	406.116 <sup>a</sup>	2	203.271	7.122	0.001
Intercept	2985.736	1	2985.536	104.575	0.000
Covariate(Pre-test)	406.280	1	406.280	14.217	0.000
Gender	73.561	1	73.560	2.563	0.100
Error	5060.942	197	28.478		
Total	181123.210	200			
Corrected Total	5466.728				

a.  $R^2 = 0.73$  (Adjusted  $R^2 = 0.065$ )

b. Computed using  $\alpha = 0.05$

Table 7 showed that the F-value,  $F_{cal}(2.56)$ , with a P value  $P > 0.05$  alpha level obtained for both males and females involved in the study was not significant at 0.05 level of significance. The null hypothesis was therefore not rejected. Hence, there was no significant difference between the post-test mean scores of male and female students in each of the experimental and control groups.

## DISCUSSION OF FINDINGS

The descriptive analysis of the study revealed that the use of the Problem-Based Learning and Multimedia tools strategies affected students' performance in English writing proficiency. The hypothesis formulated revealed that there was no significant difference in the mean score of the pre-test scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools methods. This implies that there was no difference in the previous knowledge of the respondents taught using Problem-Based Learning and Multimedia tools method on the areas of English language proficiency where they were tested. However, there was a significant difference between the mean performance scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools methods. Since students taught using the Problem-Based Learning method had higher mean score ratings than those exposed to the Multimedia tools method, then students in the Problem-Based Learning group performed better than their counterparts in the Multimedia tools group, albeit marginal. The findings of the study supported the position of Mayer (2009) who posited that students exposed to multimedia-enriched writing instruction exhibit better recall and application of writing techniques compared to those taught through traditional methods.

Also, the descriptive analysis of the study revealed that the introduction of Problem-Based Learning and Multimedia tools methods affect students' retention in English writing proficiency. The hypothesis formulated revealed that there was a significant difference between the retention mean scores of students taught English language proficiency using Problem-Based Learning and Multimedia tools strategies, and those taught using conventional method. To determine the sources of significant difference, the Scheffe Post-Hoc test was



conducted. It was revealed that there was a significant difference between the retention mean scores of students exposed to the Problem-Based Learning strategy and those in the control group in favour of Problem-Based Learning. Similarly, there was a significant difference between the retention mean scores of students exposed to Multimedia tools strategy and those in the control group in favour of Multimedia tools. There is also a significant difference between the mean scores of students exposed to Multimedia tools strategy and Problem-Based Learning strategy in favour of Multimedia tools. The findings corroborate the submission of Schmidt et al. (2011) who submitted that students taught using PBL demonstrate improved critical thinking skills, organization, coherence, and argumentation in writing. Also, Al-Jarf (2015) asserted that multimedia tools significantly enhance vocabulary acquisition, grammar accuracy, and overall writing fluency.

Lastly, the descriptive analysis of the study revealed that the performance of female students was marginally higher than those of the male students taught using Problem-Based Learning and Multimedia tools strategies. The hypothesis formulated for the study revealed that there was no significant difference between the post-test mean scores of male and female students in each of the experimental groups (Problem-Based Learning and Multimedia tools) and control groups. The findings corroborate the position of Schmidt et al. (2011) conducted a study comparing the performance of male and female students taught using PBL and multimedia tools and found no significant gender-based differences in learning outcomes. However, the findings are at variance with the observation of Al-Jarf (2015) opined that male students may exhibit a preference for technology-driven learning, making multimedia tools more effective for their engagement and learning outcomes.

## CONCLUSION

The research investigated the influence of Problem-Based Learning (PBL) and multimedia resources on the English writing skills of university undergraduates in Nigeria. The results demonstrate that instruction utilising PBL and multimedia resources markedly improves students' performance in English writing competency by promoting critical thinking, creativity, and engagement. The interactive and student-focused characteristics of these tactics enhance organisation, coherence, and general writing proficiency. The implementation of PBL and multimedia resources positively influences students' recall of English writing skills. Engagement in practical writing situations and interactive educational experiences improves long-term information retention and application. Although slight gender disparities are present in student performance, the study revealed no substantial disparity in the average performance scores of male and female students. This indicates that both genders derive equivalent advantages from the incorporation of PBL and multimedia resources in English writing education.

The findings endorse the efficacy of these novel instructional strategies in enhancing English writing skills among university undergraduates in Nigeria. Transitioning from conventional rote learning to interactive and problem-solving methodologies enhances students' writing competencies essential for academic and professional achievement.

## RECOMMENDATIONS

Based on the study findings, the following recommendations are proposed:

- i. Universities should incorporate PBL and multimedia-based teaching strategies into the English language curriculum to enhance students' writing proficiency and engagement.
- ii. Regular workshops and training programs should be conducted for lecturers and educators to familiarize them with PBL methodologies and the effective use of multimedia tools in teaching English writing.
- iii. Higher education institutions should invest in digital learning platforms, interactive software, and multimedia tools to provide students with modern learning environments that foster writing proficiency.
- iv. Group-based writing projects and problem-solving activities should be encouraged to enhance teamwork, peer learning, and real-world application of writing skills.
- v. Since both male and female students benefit equally from PBL and multimedia tools, educators should ensure an inclusive approach that caters to diverse learning preferences.

- vi. Additional studies should be conducted to explore the long-term effects of PBL and multimedia tools on students' writing proficiency across different disciplines and educational levels.

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