



## Effect of Mobile Learning Applications on Senior Secondary School Students' Academic Achievement in Word Processing in Bayelsa State, Nigeria.

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### Abstract

The study investigated the effect of mobile learning applications on senior secondary school students' academic achievement in word processing in Bayelsa State, Nigeria. Two research questions guided the study while three null hypotheses were tested at .05 level of significance. Quasi experimental research design was adopted for the study. The population for the study was 1076 Senior Secondary School 11 (SS 11) word processing students from 30 secondary schools. Purposive random sampling technique was used to draw a sample size of 336 SS 11 students. The instrument used for data collection was Word Processing Achievement Test (WPAT) which was developed by the researchers and validated by three research experts. Kuder-Richardson 20 (K-20) formula was used to estimate the reliability of the instrument and a reliability index of .83 was obtained. Mean and standard deviation were used for answering the research questions while Analysis of Covariance was used to test the null hypotheses. The findings of the study revealed that students who were taught word processing by using mobile learning applications recorded increased achievement than their counterparts who were taught with using lecture teaching method. The test of hypotheses also showed that the mean difference in achievement was significant, in favour of the students in the experimental group. Based on the findings, the study recommended among others that mobile learning applications should be made accessible to all students, regardless of their socioeconomic background. This may involve providing devices, internet access, or other resources to those who might not otherwise have access to mobile learning tools.

**Keywords:** Mobile Learning Applications, Academic Achievement, Word Processing

### Introduction

The progress of any country relies primarily on the available educational system. Secondary education plays a crucial role in imparting necessary skills to young individuals for academic excellence and national development (Agusiobo and Etukokwu, 2017). In order to achieve the objectives of secondary education in the 21st century, it is essential to incorporate science and technology into classroom activities. Adeniyi (2015) emphasized that the teaching methods employed by educators significantly impact students' learning outcomes. Teaching and learning are fundamental aspects of education, with teachers employing various approaches and methods to facilitate active learning.

Currently, the learning approach in Nigerian education largely relies on traditional chalk-and-talk methods. Aladejana in Bamidele and Yoade (2017) stated that teaching still adheres to the outdated conservative model, where teachers are seen as knowledge holders and students as



passive recipients. According to Abimbola (2013), the Nigerian educational system offers limited opportunities for self-instruction as students are consistently taught by teachers in school or coaching classes. The Federal Republic of Nigeria (FRN) (2013) stipulated that senior secondary schools, including the focus of this study, should provide a comprehensive curriculum aimed at enhancing students' knowledge, particularly in science-related subjects such as mathematics, physics, chemistry, biology, and word processing.

Word processing refers to the creation, editing, formatting, and manipulation of text-based documents using software specifically designed for this purpose. Word processing software has become an essential tool for businesses, educational institutions, and individuals for creating and managing written documents, such as letters, reports, essays, resumes, and more (Khudair, 2016). It has largely replaced manual typewriters and has greatly improved the efficiency of document creation and editing. According to Johnson (2019), word processing software often includes accessibility features like text-to-speech, screen readers, and voice recognition. Word processing software, like Microsoft Word or Google Docs, allows teachers to create and edit documents with ease. This is beneficial for creating lesson plans, worksheets, assignments, and other instructional materials. Teachers can tailor these materials to their teaching methods, making them more engaging and effective.

Teaching method refers to the strategies and principles that educators employ to achieve desired learning outcomes in students (Daluba, 2013). The choices made by teachers in their teaching methods are of utmost importance as they significantly influence the subject matter being taught and the characteristics displayed by the learners. According to Daluba (2013), for a teaching method to be deemed effective and suitable, it must align with the learners' characteristics and the nature of the learning activities to be undertaken. The predominant teaching approach employed by teachers in Nigeria, particularly in Bayelsa State, is the lecture method. This method relies heavily on textbooks as the primary instructional tool and takes place within the classroom setting, hence the need for technology integration to boost students' academic success.

The widespread integration of technology in the daily lives has sparked a greater interest in utilizing it for educational purposes. However, when it comes to practical subjects like data processing, an appropriate teaching method is essential. Eze, Ekon, and Obidile (2020), pointed out that the advancements in computer technology have led to the proliferation of various educational videos and multimedia resources, significantly transforming students' preferred learning methods in 21st-century classrooms. The outbreak of the COVID-19 pandemic has brought about unprecedented challenges in the field of education, necessitating innovative solutions to ensure the continuity of learning. In Bayelsa State, Nigeria, the closure of schools and the implementation of remote learning became a critical response to maintain educational progress in these trying times. Amid this backdrop, the use of mobile learning applications emerged as a valuable tool in the academic journey of senior secondary school students, particularly in the domain of word processing.

Mobile learning applications, often referred to as m-learning apps, are software applications designed for mobile devices such as smartphones and tablets that facilitate learning and educational activities. They provide users with the flexibility to access educational content and resources anytime and anywhere, making learning more accessible and convenient. McQuiggan, McQuiggan, Sabourin and Kosturko (2015) defined mobile learning as instant and optionally accessible, anywhere and anytime learning, which helps us create our knowledge, satisfy our curiosity, collaborate with others and enrich our experiences. Mobile learning applications have



become increasingly popular in classrooms, offering a wide range of activities and benefits for both students and teachers (Olalere and Soyemi, 2022).

An example of a mobile learning application is Duolingo, which offers interactive language lessons through gamification, incorporating features like progress tracking, voice recognition, and adaptive learning to cater to user needs. The components of mobile learning apps include user-friendly interfaces, multimedia content, assessment tools, and offline accessibility; these apps can be used effectively by aligning content with learners' goals, fostering consistent usage, and integrating engaging and adaptive features. Mobile learning applications offer a versatile set of tools for enhancing the classroom experience, catering to various learning styles and preferences while promoting engagement and interactivity in the learning process. There are various researches that mobile learning increased academic achievement (Çelik, 2012; Oberer and Erkollar, 2013). Ozan (2013) came with a conclusion that mobile learning is more permanent for learning. A study conducted by Olalere and Soyemi (2022), showed that mobile learning applications have significant effect on students' academic achievement.

Academic achievement pertains to an individual's level of success in academic subjects within a school environment. Ricarda (2015) offered a definition of academic achievement as the result of educational output, representing the degree to which a person has attained specific objectives that were the primary focus of educational activities conducted in a school setting. Ademola (2013) described academic achievement as an indication of a student's advancement in fulfilling specific tasks within a particular subject or field of study following a learning experience. According to Demir and Akpınar (2018), mobile learning may promote students' academic achievement. Historically, there have been significant gender disparities in academic achievement.

Gender is a complex concept that encompasses a wide array of societal, cultural, and personal dimensions concerning identity, roles, and expectations. It differs from biological sex, which is rooted in physiological and genetic traits. Gender is essentially a social construct that defines the roles, behaviours, attributes, and emotional characteristics associated with individuals perceived as male or female (Ojo, 2015). The issue of gender and its effect on the academic achievement of students, particularly in the field of word processing, remains an unresolved question. While some researchers such as Eze, et al. (2020) and Ukeh, et al. (2020) have suggested that male students tend to outperform their female peers in science-related subjects, others argued that achievement is influenced by a variety of factors, such as socioeconomic background and teaching methods, rather than being solely dependent on gender. Therefore, the question of how gender plays a role in students' performance in word processing in secondary schools warrants further investigation.

In an era characterized by the rapid proliferation of digital technologies, mobile learning applications have emerged as transformative tools in the educational landscape. These applications, often accessible through smart-phones and tablets, provide students with the flexibility to engage with educational content anytime and anywhere. While the integration of mobile learning applications has garnered substantial attention in the context of modern education, their effects on academic achievement among senior secondary school students, particularly in specialized subjects such as word processing, remain an intriguing area of investigation. It is based on the above background that the present study investigated the effect of mobile learning applications on senior secondary school students' academic achievement in word processing in Bayelsa State.

## Statement of the Problem

The inconsistent academic achievement of secondary school students in word processing which is an aspect of computer studies, as noted by the researcher, has been attributed to an inappropriate teaching approach. In Nigeria, particularly in the Bayelsa State, the predominant teaching method employed by computer educators is traditional lecture-based instruction, with textbooks as the primary teaching resource. This approach has been prevalent, and there has been limited effort to introduce a significant change that would facilitate more effective learning for computer students. Many teachers appear comfortable with the lecture method, even though student interest in word processing appears to be waning, as indicated by the declining examination results in 2018, 2019 and 2020 from the West African Examination Council (WAEC).

Recognizing the need for a fundamental shift in the way lessons are delivered, the researcher acknowledges the importance of adopting a more effective teaching methodology. Some innovative teaching methods have been suggested, including Computer Assisted Instruction, Multimedia, and the use of mobile learning applications, among others. However, in the contemporary educational landscape, the integration of technology, particularly mobile learning applications, has become increasingly prevalent. These applications offer the potential to revolutionize teaching and learning, making education more accessible and engaging. However, their effect on senior secondary school students' academic achievement, specifically in the context of word processing, remains a subject of concern and exploration.

## Purpose of the Study

The purpose of the study was to investigate the effect of mobile learning applications on senior secondary school students' academic achievement in word processing in Bayelsa State. The study specifically investigated the:

1. effect of mobile learning applications on SS II students' academic achievement when taught word processing and those taught the same topic using lecture method;
2. influence of gender (male and female) on SS II students' academic achievement when taught word processing using mobile learning applications.

## Research Questions

The following research questions guided the study:

1. What are the mean achievement scores and standard deviations of SS II students' academic achievement when taught word processing using mobile learning applications and those taught the same topic using lecture method?
2. What are the mean achievement scores and standard deviations of male and female SS II students' academic achievement when taught word processing using mobile learning applications?

## Hypotheses

The following null hypotheses were tested at .05 level of significance:

**H<sub>01</sub>:** There is no significant difference between the mean achievement scores and standard deviations of SS II students' academic achievement when taught word processing using mobile learning applications and those taught the same topic using lecture method in both pre-test and post-test.

**H<sub>02</sub>:** There is no significant difference between the mean achievement scores and standard deviations of male and female SS II students' academic achievement when taught word processing using mobile learning applications.

**H<sub>03</sub>:** There is no significant interaction effect of gender and methods on students' academic achievement in word processing.

## Research Method

This study adopted a quasi-experimental research approach, which is defined by Dodo in Uba (2014) as a design where the treatment variable is intentionally altered, but the groups are not made equivalent before the independent variable manipulation. Quasi-experimental designs are a suitable choice when researchers cannot randomly select subjects and assign them to treatment groups without causing disruptions to the educational programmes of the schools under investigation. The specific quasi-experimental design chosen for this study is the non-equivalent control group, which involves working with two separate groups. The population for the study was 1076 Senior Secondary School 11 (SS 11) word processing students. Purposive random sampling technique was used to draw a sample size of 336 SS 11 students. It comprised 189 SS II students in the experimental group (78 males and 111 females) and 147 SS II students in the control group. The instrument used for data collection was Word Processing Achievement Test (WPAT) which was developed by the researchers and validated by three research experts. Kuder-Richardson 20 (K-20) formula was used to estimate the reliability of the instrument and a reliability index of .83 was obtained. A two-week training session was organized in the sampled schools by the researchers to enhance the capacity of regular computer studies teachers in utilizing advanced digital tools and technologies for teaching. The training focused on integrating computer-based applications, troubleshooting basic ICT challenges, and adopting innovative teaching strategies to improve students' engagement and learning outcomes in computer studies.

The teachers for the experimental group used mobile learning applications while the teachers for the control group used the lecture method. The treatment spanned a six-week period, and the educational sessions followed the regular school timetable. Each week, there was one 80-minute double period and one 40-minute single period dedicated to teaching word processing. These time slots were utilized to instruct the students over four weeks, with each topic taught for one week. To address research questions, mean and standard deviation were employed, and Analysis of Covariance (ANCOVA) was used to test the null hypotheses. ANCOVA was chosen because intact classes were utilized, and it was not possible to ensure initial uniformity. The null hypothesis was only rejected if the probability value was less than or equal to the significance level of .05 ( $P \leq .05$ ); otherwise, it was retained.

## Data Analysis and Results

**Research Question 1:** What are the mean achievement scores and standard deviations of SS II students' academic achievement when taught word processing using mobile learning applications and those taught the same topic using lecture method?



**Table 1: Mean achievement scores and standard deviations of students taught word processing using mobile learning applications and those taught using lecture method**

Groups	Number	Pre-test		Post-test		Mean Gain
		Mean ( $\bar{x}$ )	Standard Deviation ( $s$ )	Mean ( $\bar{x}$ )	Standard Deviation ( $s$ )	
Experimental	189	41.66	4.98	46.59	5.38	4.93
Control	147	38.96	4.11	42.45	5.06	3.49
<b>Mean Diff.</b>						<b>1.44</b>

Table 1 shows that students who taught word processing using mobile learning applications had pre-WPAT and post-WPAT scores of 41.66 and 46.59, respectively, along with standard deviations of 4.98 and 5.38. Meanwhile, students taught using the lecture method had pre-WPAT and post-WPAT scores of 38.96 and 42.45, with standard deviations of 4.11 and 5.06. The experimental group had a mean gain of 4.93, while the control group had a mean gain of 3.49, resulting in a mean difference of 1.44. This disparity reflects the difference in mean achievement scores between the experimental and control groups. The analysis signifies that learning indeed occurred, as both groups achieved higher mean scores in both the pretests and posttests. However, students taught word processing with mobile learning applications outperformed those taught using the lecture method in terms of academic achievement.

**Research Question 2:** What are the mean achievement scores and standard deviations of male and female SS II students' academic achievement when taught word processing using mobile learning applications?

**Table 2: Mean achievement scores and standard deviations of male and female students taught word processing using mobile learning applications**

Groups	Number	Pre-test		Post-test		Mean Gain
		Mean ( $\bar{x}$ )	Standard Deviation ( $s$ )	Mean ( $\bar{x}$ )	Standard Deviation ( $s$ )	
Male	78	39.56	4.11	44.09	4.83	4.53
Female	111	35.73	4.05	39.03	4.26	3.30
<b>Mean Diff.</b>						<b>1.23</b>

Table 2 shows that male students taught word processing using mobile learning applications had pre-test and post-test on WPAT scores of 39.56 and 44.09, respectively, with standard deviations of 4.11 and 4.83 respectively. Meanwhile, female students taught the same topic using mobile learning applications, had pre-WPAT and post-WPAT scores of 35.73 and 39.03, with standard deviations of 4.05 and 4.26 respectively. The data in Table 2 signifies that male students achieved a higher mean score than their female peers in mobile application learning, as indicated by a gain in mean score of 4.53 for males compared to a 3.30 gain for females. This results in a mean difference of 1.23 in favour of male students. In conclusion, the findings suggest that male

students, when taught word processing with mobile learning applications, outperformed their female counterparts in terms of academic achievement.

### Hypotheses

**Ho<sub>1</sub>:** There is no significant difference between the mean achievement scores and standard deviations of SS II students' academic achievement when taught word processing using mobile learning applications and those taught the same topic using lecture method in both pre-test and post-test.

**Table 3: Analysis of Covariance on the mean achievement scores of students taught word processing using mobile learning applications and those taught using lecture method**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	285.72	2	142.86	10.43	.000	Rejected
Intercept	211.09	1	211.09	20.49	.000	
GROUP	309.33	1	309.33	9.46	.000	
Error	8306.58	334	24.87			
Total	9112.72	336				
Corrected Total	8967.11	335				

The analysis of covariance (ANCOVA) results in Table 3 indicate a significant difference in the mean achievement scores of SS II students taught word processing using mobile learning applications compared to those taught using the lecture method. The F-value for the group effect is 9.46, with a significance level of 0.000 ( $p < 0.05$ ), leading to the rejection of the null hypothesis (Ho<sub>1</sub>). This shows that the instructional method (mobile learning applications versus lecture method) significantly influenced students' academic achievement scores. The corrected model also highlights an overall significant effect, with an F-value of 10.43 and p-value of 0.000, supporting the finding of meaningful differences between the groups.

**Ho<sub>2</sub>:** There is no significant difference between the mean achievement scores and standard deviations of male and female SS II students' academic achievement when taught word processing using mobile learning applications.

**Table 4: Analysis of Covariance on the mean achievement scores of male and female students taught word processing using mobile learning applications**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	273.82	2	136.91	8.09	.000	Rejected
Intercept	145.89	1	89.06	6.55	.000	
Pretest	201.45	1	98.68			
Gender	107.68	1	101.45	7.08	.000	
Error	7026.98	187				
Total	7755.82	189				
Corrected Total	7691.68	188				

The analysis of covariance (ANCOVA) results in Table 4 reveal a significant difference in the mean achievement scores of male and female SS II students taught word processing using mobile learning applications, as indicated by the F-value of 7.08 and a significance level of 0.000 ( $p < 0.05$ ). The null hypothesis ( $H_02$ ), stating that there is no significant difference, is therefore rejected. This implies that gender significantly influenced students' academic achievement scores in word processing when mobile learning applications were utilized. The corrected model further shows a significant overall effect, with an F-value of 8.09 and p-value of 0.000, reinforcing the presence of meaningful differences in achievement.

**$H_03$ :** There is no significant interaction effect of gender and methods on students' academic achievement in word processing.

**Table 5: Analysis of Covariance on the interaction effect of gender and method on students' achievement in word processing**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	307.10	2	128.91	8.96	.000	
Intercept	136.79	1	136.79	6.11	.000	
Method*Gender	101.68	1	101.68	8.46	.000	Rejected
Error	5571.12	334	16.68			
Total	6116.12	336				
Corrected Total	5943.61	335				

The analysis of covariance results in Table 5 show that the interaction effect of gender and method on students' academic achievement in word processing is statistically significant, as indicated by a p-value of .000 for Method\*Gender. This means the null hypothesis ( $H_03$ ) stating no significant interaction effect is rejected. The significant interaction suggests that the combined influence of gender and method affects students' achievement differently. Therefore, both gender and the instructional method should be considered in designing interventions to improve students' performance in word processing.



## Discussion of Findings

The findings showed that students taught word processing with mobile learning applications outperformed those taught using the lecture method in terms of academic achievement. Further finding showed that the null hypothesis was rejected which suggests that there is a significant difference between the mean scores of students who were taught word processing through the mobile learning applications and those who were taught using the lecture method. The findings of the study align with the assertions of Demir and Akpınar (2018) as well as Olalere and Soyemi (2022), who highlighted the effectiveness of mobile learning in enhancing students' academic achievement. These researchers emphasized that mobile learning provides flexible, interactive, and engaging platforms that facilitate better understanding and retention of concepts. Their studies further underscore how mobile technology bridges the gap between traditional and modern learning approaches, thereby fostering improved performance. This corroborates the current study's evidence that mobile learning serves as a valuable tool in advancing educational outcomes.

Furthermore, Liaw, Huang, and Chen (2007) agree with the statement that mobile learning applications enhance students' academic achievement. They found that integrating mobile learning tools into instruction significantly improves students' learning outcomes compared to traditional lecture methods. Furthermore, the study highlighted that gender differences could influence performance, with male students often demonstrating higher achievement levels in technology-driven learning environments.

## Conclusion

The results of this study highlight the significant effect of mobile learning applications on the academic achievement of senior secondary school students in word processing in Bayelsa State, Nigeria. The findings underscored a clear advantage for students who were exposed to word processing through mobile learning applications compared to those who received traditional lecture-based instruction. These findings emphasized the potential benefits of incorporating mobile learning applications into the educational process, not only for enhancing academic achievement but also for addressing gender-specific learning needs. As technology continues to evolve, educators and policymakers should consider these results when designing and implementing educational strategies that can better cater to the diverse needs of students in the digital age.

## Recommendations

Based on the findings, the following recommendations were proffered:

1. Mobile learning applications should be made accessible to all students, regardless of their socioeconomic background. This may involve providing devices, internet access, or other resources to those who might not otherwise have access to mobile learning tools.
2. Bayelsa State government should ensure that the curriculum and learning materials are free from gender biases and stereotypes. Promote inclusive and diverse perspectives in the content.



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