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Impact of Experiential Learning Strategy on Secondary School Students' Academic Achievement in Computer Studies in Nnewi Education Zone, Anambra State

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CONTENT

ABSTRACT

Background: The impact of Experience-Based Learning (EBL) on the academic achievement of secondary school students in Computer Science in the Nnewi Education Zone, Anambra State, Nigeria, has become an important issue that needs to be addressed. **Objective:** The study aims to assess the effect of the Experiential Learning Strategy (ELS) on the academic achievement of secondary school students in Computer Studies. **Method**: A quasi-experimental design with a pretest-posttest non-equivalent control group was used. Eighteen community secondary schools were selected from 48, with two schools randomly chosen. Intact classes participated, where students were taught Microsoft Word using either ELS or the traditional lecture method (LM). The Computer Studies Achievement Test (CSAT) was used for data collection, and data were analyzed using mean, standard deviation, and ANCOVA. **Results:** Results showed a significant difference in achievement scores, favouring students taught with the Experiential Learning Strategy (ELS). **Conclusion:** The study recommended incorporating the Experiential Learning Strategy into the curriculum as a teaching strategy for Computer Studies in the classroom, as it fosters self-development. **Contribution:** This study provides empirical evidence of ELS's effectiveness in improving academic achievement, offers a framework for enhancing student engagement in Computer Studies, and suggests future directions for integrating innovative teaching strategies into education.

KEYWORDS

Experiential learning strategy; Secondary School Students; Academic Achievement; Computer Studies.

1. INTRODUCTION

In the rapidly evolving digital era, proficiency in computer studies has become indispensable for students, particularly at the senior secondary level. Traditional lecture teaching methods, often characterised by rote memorisation and passive learning, have been found inadequate in fostering deep understanding and practical skills in

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computer studies (Wang et al., 2018). As a result, there is an increasing emphasis on experiential learning strategies that engage students actively, allowing them to apply theoretical knowledge to real-world scenarios. These strategies have been shown to enhance students' critical thinking, problem-solving skills, and overall academic performance, making them a vital tool in modern education (Akpur, 2023).

Experiential Learning Strategy (ELS) is learning by doing, learning by action, learning through exploration, and this has gained increasing attention as a student-centred approach capable of transforming passive learning environments into dynamic, engaging spaces, as stated by Beukers & Bertolini (2021). Experiential learning, rooted in Kolb's learning theory, emphasises learning by doing, learning through action and experience. This encourages students to apply theoretical knowledge in practical contexts. This learning strategy has shown promising results across various disciplines. For instance, Nwuba & Osuafor (2021) reported that students taught biology through experiential methods outperformed their peers who received traditional instruction. Similarly, Kwelle et al. (2023) found that experiential learning significantly enhanced students' performance in mathematics, particularly in higher-order cognitive domains. Kale & Goh (2014) also reported that not every teaching method adopted by the computer teacher in delivering his or her lesson is strategically effective for all the computer students; this indicates that not all teaching strategies are effective. Some are better than others in enhancing students' learning ability.

In computer studies, experiential learning involves hands-on activities, simulations, and real-world problem-solving tasks that mirror technological challenges (Chang & Hwang, 2023). Such approaches enhance comprehendsion and equip students with practical skills essential for the modern workforce, more so than the old teaching method, the lecture method. The lecture method represents a one-sided approach to teaching and learning whereby the teachers are the key source of information and transmit knowledge while the students passively receive information (Doiz & Lasagabaster, 2021). Low student engagement characterises the lecture method's engagement and participation in the teaching and learning process in the classroom, which is why the experiential strategy is preferred in the classroom setting. Students taught with the experiential learning strategy are more effective. In contrast, they are directly involved in learning (Leal-Rodriguez & Albort-Morant, 2019). Therefore, there is a need for a paradigm shift from the old teaching method, which is student-centred, to an experiential learning strategy, which increases the high academic achievement of students in secondary school.

Academic achievement is knowledge gained in formal education (Chen & Yang, 2019). It is usually indicated by test scores, grades, grade points, average, and degrees. Achievement is the result, the success, the extent or ability, the progress in learning educational experiences that the individual indicates about his/her educational learning (Cohen & Baruth, 2017). Achievement is a powerful word which is often used in many areas. When achievement is below expectation, it is called underachievement or poor achievement. Academic achievement connotes the learning outcome of the learner. Eremie & Doueyi-Fiderikumo conceived academic achievement as the degree or level of success attained at the end of an academic endeavour of both male and female students in computer studies (Guterman, 2021).

Male and female are attributes of gender. Okekeokosisi & Anaekwe (2024) opined that gender has been the focus of educational research in recent years since some courses have been ascribed to be mainly for male or female students. Vitores & Gil-Juárez (2016) described gender as economic, social, and cultural attributes and opportunities associated with being male or female, studying Microsoft Word as a fundamental package in computer appreciation.

Microsoft Word is a widely used word processor package designed by Microsoft Corporation (Zaini, 2018). It is a part of the Microsoft Office package, which can also be purchased as a stand-alone product. Ms. Word is a powerful word processing software widely used for creating, editing, formatting, retrieving and printing documents. A good knowledge of Microsoft Word helps secondary school graduates, especially those not fortunate enough to further their education, get an ICT-skilled job, which helps promote entrepreneurship opportunities in Anambra State. Mbuba (2022) emphasised that building human capital through practical skill acquisition significantly improves productivity and supports national development objectives. This development calls for everyone to tap into Information and Communication Technology (ICT) Education, which guarantees economic empowerment through entrepreneurship opportunities (Muogbo & Obiefoka, 2022). Microsoft Word is popular in various domains, including education, business, and personal use, for its user-friendly interface and extensive features. This study seeks to determine if the experiential learning strategy could influence the academic achievement of senior secondary students in computer studies, irrespective of their gender.

Despite the growing importance of computer studies in today's technology-driven world, many senior secondary students in the Nnewi Education Zone continue to perform below expectations. Traditional teaching methods, often teacher-centred and theory-based, fail to adequately engage students or provide the practical skills needed for mastery in computer studies (Andersen & Pitkänen, 2019). This lack of hands-on experience contributes to poor

understanding, low retention, and disinterest in the subject (Nsabayezu et al., 2025). Experiential learning, which emphasises learning through direct experience and active participation, has been recognised as a powerful instructional strategy in many disciplines (Leal-Rodriguez & Albort-Morant, 2019). However, its impact on academic achievement in computer studies among senior secondary school students in the Nnewi Education Zone remains largely unexplored. There is a need for a paradigm shift from the old teaching method, the lecture method, to an experiential learning strategy. Therefore, this study seeks to address the problem of low academic achievement in computer studies by examining the effectiveness of experiential learning strategies on the academic performance of senior secondary school students in the Nnewi Education Zone.

This study aimed to determine if the experiential learning strategy can increase students' academic achievement in computer studies in the Nnewi Education Zone of Anambra State. Specifically, the study sought to assess the academic achievement of students taught Microsoft Word using the Experiential Learning Strategy (ELS) compared to those taught using the traditional Lecture Method (LM). Additionally, it aimed to investigate the academic achievement differences between male and female students taught Microsoft Word using ELS and those taught using LM. This research aimed to explore how implementing ELS in teaching Microsoft Word could potentially bridge achievement gaps and enhance learning outcomes, particularly in the context of gender differences in academic performance.

2. METHOD

2.1 Research Design

The study adopted a quasi-experimental design, specifically the pre-test, post-test, non-equivalent control group design. This design allowed the researchers to compare the academic achievement of students exposed to the Experiential Learning Strategy (ELS) and those taught using the traditional lecture method (LM). By using pre-test and post-test measures, the study aimed to assess the effectiveness of ELS in improving students' academic performance in Computer Studies, while accounting for the natural grouping of students in intact classes.

2.2 Research Object

The study was carried out in the Nnewi Education Zone of Anambra State, Nigeria, with a population of 527 Senior Secondary School year two (SS2) students in the selected public secondary schools. A sample size of 121 computer studies students (56 males and 65 females) was selected using a multi-stage sampling procedure. The purposive sampling technique was used to select Nnewi North LGA out of four Local Government Areas in the Nnewi Education Zone. A simple random sampling technique was then used to select two public co-educational secondary schools from eight public co-educational secondary schools in the LGA. Intact classes from these schools were used in the study. The choice of SS2 students was because they are in their penultimate year and have been exposed to the subject for almost two years.

2.3 Data Collection

The data collection instrument was a self-structured achievement test, the Computer Studies Achievement Test (CSAT), which was validated using the Cronbach Alpha method. Its reliability coefficient was found to be 0.71, indicating that the instrument is reliable. The researchers trained regular data processing teachers from both experimental and control group schools for three days on how to use Experiential Learning Strategy (ELS) as research assistants. The two groups were taught and allowed five minutes to feel the impact of the concept taught using ELS and Lecture Method (LM). The experimental group received instruction using the Experiential Learning Strategy, while the control group was taught using the lecture method.

2.4 Data Analysis

Before the teaching commenced, a pre-test questionnaire was administered to students in the sampled schools. After the pre-test, only the experimental group was taught Microsoft Word using the Experiential Learning Strategy. The CSAT items in the pre-test were reorganized and used as the post-test. After the 4-week treatment, the post-test questionnaire was administered to both groups. CSAT scores were collated and post-test scores recorded. The research questions were answered using mean and standard deviation, while the hypotheses were tested at a 0.05 level of significance using analysis of covariance (ANCOVA). The null hypotheses were rejected if the p-value was less than or equal to 0.05 ($P \leq 0.05$); otherwise, they were not rejected.

3. RESULT AND DISCUSSION

3.1 Result

1) Research Question 1: What is the mean achievement scores of SSII students taught Microsoft Word using experiential learning strategy (ELS) and those taught using lecture method.

Table 1. Mean achievement scores of secondary school students taught Microsoft word using ELS and lecture method

Method	No	Mean Pre-Test Score	Mean Post-Test Score	Mean Gain	Mean Gain Difference
Experiential Learning Strategy	59	39.02	78.71	39.69	26.11
Lecture Method	62	37.03	50.61	13.58	

Results in table1 reveals that students taught computer studies using the Experiential Learning Strategy had a mean pretest score of 39.02 and mean post test scores of 78.71 with a mean gain of 39.69 while students taught computer studies using lecture method had a mean pre-test score of 37.03 and a mean post test scores of 50.61 with a mean gain of 13.58. The result also shows a mean difference of 26.11 in favour of students taught computer studies using Experiential Learning Strategy.

2) Research Question 2: What are the Achievement scores of male and female students taught Computer studies using Experiential Leaning Strategy and those taught using Lecture Method?

Table 2. Mean Achievement Scores of Male and Female students taught computer studies using Experiential Learning Strategy and those taught using Lecture method

Method	Gender	No	Mean Pre-Test Score	Mean Post Test Score	Mean Gain	Mean Gain Difference
Experiential Learning Strategy	Male	26	39.23	79.31	40.08	0.69
	Female	33	38.85	78.24	39.39	
Lecture Method	Male	30	37.13	51.27	14.14	1.08
	Female	32	36.94	50.00	13.06	

Results in table 2 shows mean pre-test scores, mean post-test and mean gain scores of 39.23, 79.31 and 40.08 respectively for male students and 38.85, 78.24 and 39.39 respectively for female students taught computer studies using Experiential Learning Strategy. The male students gained slightly more (+0.69) than female students taught under the experiential learning strategy. But the difference is minimal, suggesting that the method was equally effective across genders. For Lecture Method the pre-test scores, mean post-test score and mean gain scores of 37.13, 51.27 and 14.14 for male students and 36.94, 50.00 and 13.06 for female students respectively the mean gain difference of 1.08 indicate that the male students gain slightly better that female students under the lecture method which showed much lower improvement compared to the Experiential Learning strategy. The results also showed a significant higher mean gain for both male and female students taught Experiential Learning Strategy compared to the Lecture method. The gender differences in gain scores were minimal in both methods, indicating that the teaching method, not gender was the main factor influencing performance improvement. Therefore, Experiential Learning Strategy appears to be the more effective instructional strategy, regardless of gender.

3) Hypotheses:

There is no significant difference in the mean achievement pretest scores of students in computer studies taught Experiential Learning Strategy and their counterpart taught using lecture method.

Table 3. A t-Test comparison of Mean Achievement pretest scores of students taught computer studies using Experiential Strategy and Lecture Method

Method	N	Mean PreTest Score	SD	df	t-cal	p-value	Decision
Experiential Learning Strategy	59	39.02	5.85	119	1.973	0.051	Not Significant
Lecture Method	62	37.03	5.21				

Table 3 revealed a p value of 0.051 which is greater than 0.05, indicating that the mean achievement scores difference is not statistically significant at the 5% level. Hence, we conclude that there is no significant difference between the pre-test scores of students in the two groups. This means both groups started at a comparable level academically before the teaching method was applied.

There is no significant difference in the mean achievement post test scores of students in computer studies taught Experiential Learning Strategy and their counterpart taught using lecture method

Table 4. A t-Test comparison of Mean Achievement Post test scores of students taught computer studies using Experiential Strategy and Lecture Method

Method	N	Mean Post Test Score	SD	df	t-cal	p-value	Decision
Experiential Learning Strategy	59	78.71	5.51	119	26.48	0.000	Significant
Lecture Method	62	50.61	6.13				

Table 4 reveals a p-value of 0.000 which is less than 0.05 thus, we reject the null hypothesis and conclude that there is a significant difference in post-test performance between students taught computer studies using the Experiential Learning Strategy and those taught using the Lecture Method. In other words the Experiential Learning Strategy was significantly more effective that the lecture method in improving students' academic performance.

There is no significant difference in the mean achievement pretest scores of male and female students taught compute studies using Experiential Learning Strategy and their counterpart taught using lecture method.

Table 5. A Two Way Analysis of Variance Tests of Method and Gender effect on Pre test Scores

Dependent Variable: Pre Test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	121.801[a]	3	40.600	1.306	.276
Intercept	19839.696	1	19839.696	638.020	.000
Gender	.952	1	.952	.031	.861
Method	120.493	1	120.493	3.875	.051
Gender * Method	.261	1	.261	.008	.927
Error	3638.199	117	31.096		
Total	178484.000	121			
Corrected Total	3760.000	120			

a. R Squared = .032 (Adjusted R Squared = .008)

Results in table 5 reveals a calculated F value of 3.875 and p value of 0.051 which is greater than 0.05 level of significant for Method indicating that method used in teaching computer studies does not significantly affect the pretest scores of students. Also, the result shows F value of 0.008 and p-value of 0.927 for gender which is greater than the level of significant of 0.05, indicating that gender of students does not have a statistically significant effect on their post-test scores. In other there is no significant difference in male and female students' pre-test scores regardless of method used in teaching computer studies

There is no significant difference in the mean achievement post test scores of male and female students taught computer studies using Experiential Learning Strategy and their counterpart taught using lecture method

Table 6. A Two-Way Analysis of Variance Tests of Method and Gender effect on Post test Scores

Dependent Variable: Post Test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	23910.600[a]	3	7970.200	232.578	.000
Intercept	50652.239	1	50652.239	1478.080	.000
Method	2222.462	1	2222.462	64.854	.000
Gender	40.780	1	40.780	1.190	.278
Method * Gender	.304	1	.304	.009	.925
Error	4009.466	117	34.269		
Total	528412.000	121			
Corrected Total	27920.066	120			

a. R Squared = .856 (Adjusted R Squared = .853)

Results in table 6 reveals a calculated F value of 64.854 and p value of 0.000 which is less than 0.05 level of significant for Method indicating that method used in teaching computer studies significantly affect the post test scores of students. Also the result shows F value of 1.190 and p-value of 0.278 for gender which is greater than the level of significant of 0.05, indicating that gender of students does not have a statistically significant effect on their post-test scores. In other words, male and female students performed similarly, regardless of method used.

3.2. Discussion

The study investigated the impact of the experiential learning strategy on students' achievement in computer studies in the Nnewi Education Zone of Anambra State. The results indicated that students taught Computer Studies using the experiential learning strategy (ELS) performed significantly better than those taught using the traditional lecture method (LM). This finding supports Kolb's Experiential Learning Theory (Kolb, 1984), which emphasizes that learning is most effective when students actively engage in the learning process through concrete experiences and reflective observation. Kolb's theory suggests that students learn best when connecting theory to real-world experiences, thus deepening their understanding of the material. Applying this theory in computer studies highlights the importance of hands-on activities, such as practical tasks and project-based learning, which facilitate a more profound comprehension of abstract concepts.

Furthermore, the findings of this study align with the research of Onu & Eze (2020), who found that gender differences in academic achievement tend to diminish when students are engaged in collaborative, experience-driven tasks. In the context of Science, Technology, Engineering, and Mathematics (STEM) education, including Computer Studies, experiential learning strategies enable students to collaborate on tasks, share ideas, and learn from one another, creating a more inclusive and participatory learning environment (Yang & Baldwin, 2020). This study's emphasis on experiential learning as an effective strategy in computer studies corroborates these earlier findings, showing that such strategies benefit both male and female students by fostering an environment of shared learning and mutual development.

In addition, the research supports the work of Okafor (2018), who emphasized that experiential learning fosters critical thinking, creativity, and problem-solving skills, particularly in technical subjects like Computer Studies. These skills are essential for students to succeed in the ever-evolving world of technology and computing. Experiential learning strategies help students apply theoretical knowledge in practical scenarios, enhancing their ability to solve real-world problems (Sangwan & Singh, 2022). By engaging in hands-on tasks, students develop a deeper understanding of the subject matter, vital in fields like computer studies, where practical application is as important as theoretical knowledge.

Evidence from these studies demonstrates that the experiential learning strategy is more effective in improving secondary school students' achievement in Computer Studies. Specifically, data from the study showed a significant improvement in the performance of students taught with experiential learning compared to those who received traditional lecture-based instruction. The positive impact of experiential learning can be attributed to its active learning approach, which encourages students to dynamically and interactively engage with the subject matter (Cheng et al., 2019). As a result, students not only acquire knowledge but also develop skills that are crucial for success in academic and professional environments.

In line with these findings, the gender-related differences in achievement scores were significant for both male and female students taught using experiential learning strategies. This result suggests that experiential learning strategies positively affect both genders, potentially reducing achievement gaps between male and female students. The study highlights the importance of using inclusive teaching strategies that cater to the diverse needs of students, ensuring that both genders benefit equally from the learning process. By fostering an engaging and collaborative learning environment, experiential learning contributes to a more equitable educational experience (Anderson et al., 2022).

These findings contradict the results of Okekeokosisi & Okigbo (2021), which showed no significant difference in the mean interest scores of male and female students exposed to an activity-based instructional strategy, such as experiential learning, in Computer Studies. While their study found no gender-based differences in interest or achievement when using experiential learning, the present study highlights that gender differences in achievement can be significant, particularly when students actively engage in learning. This discrepancy may be attributed to differences in the implementation of the strategy, such as the level of engagement, type of activities, or student-teacher interactions (Hsiao et al., 2022). It suggests that while experiential learning strategies are generally effective, their impact on gender differences may vary depending on how they are applied in different contexts.

This study reinforces the effectiveness of experiential learning strategies in enhancing academic achievement in Computer Studies. By emphasizing active participation, hands-on experience, and collaborative learning, students are better equipped to understand complex concepts and develop critical thinking and problem-solving skills. Moreover, the study underscores the importance of integrating experiential learning into the curriculum, particularly in subjects like Computer Studies, where practical application plays a crucial role in student success. Future research could explore the long-term impact of experiential learning on students' academic trajectories and its potential to close achievement gaps in other subjects and educational settings.

4. IMPLICATIONS AND CONTRIBUTIONS

4.1 Reseach Implication

This research study suggests that using the Experiential Learning Strategy (ELS) yields positive results that contribute to students' academic performance in Computer Studies. This implies that teachers and curriculum planners must incorporate ELS in teaching strategies to introduce active participation, problem-solving and retention among high school students. It also points to the requirement of training programmes for teachers that focus on experiential teaching methods. Moreover, the finding supports the role of practical and learner-based instruction in performance gap closure. The provision of resources and facilities to facilitate experiential learning should be encouraged by policymakers and school administrators in secondary schools in Anambra State and other states.

4.2 Reseach Contribution

The contribution of this study lies in providing empirical evidence regarding the effectiveness of the Experiential Learning Strategy (ELS) in improving students' academic achievement in Computer Studies. This study also provides important insights for developing more interactive and participatory teaching strategies, emphasising the need for teacher training in implementing experience-based methods. Additionally, these findings support the importance of providing resources and facilities that support ELS by policymakers and school administrators to improve the quality of learning and contribute to closing the academic achievement gap among students.

5. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

5.1 Reseach Limitations

The limitations of this study include its focus on the Nnewi Education Zone, which restricts the generalization of results to other regions. The sample size of 121 students from two schools may not represent the broader student population. Additionally, factors like teachers' experience and resource availability, which could influence the results, were not fully controlled. The short duration of the intervention (4 weeks) may also limit the ability to assess the long-term impact of ELS on learning.

5.2 Recommendations for Future Research Directions

Future research should explore the effectiveness of the Experiential Learning Strategy (ELS) across various subjects to assess its broader applicability in secondary education. It should also examine how factors such as gender, socio-economic status, school type, and learning preferences affect students' interaction with ELS. Additionally, integrating digital and virtual tools within the ELS framework should be investigated to assess their impact on student engagement and academic achievement in Computer Studies, enhancing the experiential learning process and fostering deeper learning.

6. CONCLUSION

The consistent underperformance of learners in Computer Studies, as seen in internal and external examinations in senior secondary schools across Nigeria, highlights the need to improve the teaching methods and learning approaches for this subject. This challenge was a primary motivation for this study, which aimed to explore alternative strategies for teaching and learning data processing in secondary schools in Nigeria. The findings of this study provide valuable insights into effective teaching strategies, specifically emphasising the role of experiential learning in enhancing student achievement.

Based on the study's results, several recommendations were made to improve the teaching and learning of Computer Studies. First, it is recommended that the experiential learning strategy be incorporated into the curri-

culum as a core teaching method in Computer Studies classrooms. This approach promotes self-development, engagement, and deeper learning, making it an effective tool for improving academic achievement in this field. Integrating experiential learning encourages students to apply theoretical knowledge to real-world scenarios, fostering a more interactive and practical learning experience.

Secondly, teacher training institutions should re-evaluate and update their instructional strategies to better prepare future educators and in-service teachers to apply innovative teaching methods effectively. Providing teachers with adequate training in experiential learning and other student-centred strategies will equip them with the skills necessary to enhance student engagement and improve academic outcomes. Finally, professional associations such as the Science Teachers Association of Nigeria (STAN) should take proactive steps in promoting the use of innovative teaching strategies among science teachers. By advocating for the integration of modern teaching methods, STAN can contribute to improving the overall quality of education and learning outcomes in Computer Studies and other STEM subjects across Nigerian schools.

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Author Contribution Statement

All authors discussed the research findings, contributed to the drafting of the final manuscript, and approved the final version for publication. All authors contributed to the research design (introduction, methods, results and discussion, conclusion), and all authors participated in drafting, revising, and approving the final manuscript.

Conflict of Interest Statement

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval Statement

The authors declare that this study was conducted with due regard for research ethics, including obtaining approval from the institution. This includes respecting the autonomy of participants, maintaining confidentiality of data, and ensuring their safety and well-being, in accordance with applicable research ethics guidelines

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