

**Experiential Learning on Students' Performance and Interest in Spreadsheet Skills in Port
Harcourt Metropolis**

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Abstract

This study investigated the effect of experiential learning strategies on students' interest and academic performance in spreadsheet skills in private senior secondary school Port Harcourt Metropolis, Rivers State, Nigeria. The research was motivated by persistent reports of weak practical performance in spreadsheet-related tasks despite the inclusion of spreadsheet skills in the Business Studies and Computer Studies curricula. The study adopted a quasi-experimental design employing a pretest-posttest, nonrandomized control group approach, using intact classes due to the impracticality of random assignment. A sample of 120 Senior Secondary Two (SS2) students was purposively selected from two private secondary schools. Data were collected using two validated and reliable instruments: a 20-item Spreadsheet Interest Inventory (SII) on a 4-point Likert scale, and a 30-item multiple-choice Spreadsheet Performance Test (SPT) adapted from WAEC content, both yielding reliability coefficients of 0.83 and 0.82 respectively. A six-week intervention involved the experimental group engaging in structured, hands-on spreadsheet tasks with guided feedback and reflective discussion, while the control group received instruction primarily through teacher demonstration with limited individual practice. Data were analyzed

using mean, standard deviation, and Analysis of Covariance at the 0.05 level of significance. Findings revealed that students taught using the experiential learning strategy recorded a substantially higher mean interest gain and better academic performance than those taught using the discussion method. The study concluded that experiential learning is superior than discussion method for teaching spreadsheets and recommended that educators, curriculum planners and other education stakeholders should use practical, hands-on methods to teach spreadsheets and related computing topics. This method improves learning and creates more engaged and motivated students.

Keywords: Experiential learning, discussion method, spreadsheet skills, students' interest, academic performance.

Introduction

Education is widely regarded as an essential instrument for national development and economic advancement, as it cultivates social ideals, promotes equality, and integrates diverse abilities into society. High-quality education in technology skills acquisition, in particular, equips individuals with the requisite attitudes and abilities needed for social and economic progression. As Dambo, Godspower, and Kire (2019) assert, education provides individuals with the knowledge and skills necessary for informed decision-making in every facet of human endeavour, including business, thereby fostering job creation and promoting sustainable economic growth. In line with this, science, technology, and innovation are actively pursued to further the Sustainable Development Goals (Imaz & Sheinbaum, 2017; Jianlan, 2017). Consequently, societies that are serious about economic advancement accord top priority to the development of science and technology education.

As part of this broader effort to promote technology in education, the positive disruptive wave of technology adoption in classrooms has opened the way for educators to apply different teaching methods and scenarios to improve academic achievement. One of the methods is the experiential instructional technique. It is a way of improving the learners' knowledge, skills and attitudes simultaneously. Experiential teaching technique is the technique of associating real-life practices with learning through reflection (Roland, 2017). Roland (2017) further identifies five types of

experiential learning that teachers can utilize to offer students experience-based learning. They are active-based experiential learning, problem-based experiential learning, project-based experiential learning, service-based experiential learning, and internship-based experiential learning. In general, experiential learning strategy encourages the activities that students can reflect, gain knowledge and transfer what they have learned to the new situations in their daily life. The strategy is built on the assumption that mastery of basic skills allows the acquisition of more complex skills in the future. Thus, teaching-learning time may be extended beyond the classroom to include off-school learning activities and experiences, which are eventually reflected in the transfer of learning tasks into products and performances thus constituting the knowledge and skills constructed through the activities and experiences.

Although experiential learning holds significant potential, it is crucial to recognize that no singular instructional delivery technique is universally preferable for all types of content. Instructors must acknowledge that the utilized strategy can either augment or detract from learning outcomes. In this context, Gutek (2016) noted that the instruction of technology-related concepts in numerous educational institutions with substantial class sizes is predominantly governed by the lecture technique, which represents a significant challenge for the educational system, particularly in Nigeria. This pedagogical approach inhibits learners from independently acquiring knowledge, rendering them entirely reliant on the instructor as the primary source of information. Teachers must fully dedicate themselves to tackling these essential issues and the wider socioeconomic concerns facing schools, as the prosperity of any society ultimately relies on the outcomes of its educational system.

This issue is especially pronounced at the secondary school level. Oshemughen (2017) asserts that the instruction of technology-related concepts, such as spreadsheets, which is crucial in Nigerian secondary schools, is predominantly unsuccessful due to the government's low focus on providing adequate learning facilities, particularly in computer education. This neglect subsequently dissuades students from cultivating a robust interest in disciplines such as ICT, Computer Studies, or data Processing. He further asserts that evaluating the efficacy of instruction in the aforementioned disciplines within contemporary secondary education necessitates the implementation of suitable pedagogical methodologies in conjunction with functional facilities that guarantee quality control, efficiency, and enhanced student outcomes. Students' enthusiasm to

engage with specific concepts is frequently influenced by the pedagogical methods employed by their instructors, particularly at the secondary education level. Regrettably, numerous secondary school educators remain oblivious to this truth, a deficiency that may adversely affect student performance in this domain. Conversely, when learners are adequately motivated, their interest in the subject is stimulated, hence enhancing academic achievement.

Statement of the Problem

Information and Communication Technology (ICT) has become an essential element of contemporary education, commerce, and public administration. Among the several ICT competencies sought by modern employers, expertise in spreadsheet software like Microsoft Excel is one of the most commonly required, encompassing record-keeping, budgeting, statistical analysis, and decision assistance. In Nigeria, spreadsheet proficiency is integrated into the Business Studies and Computer Studies curricula at both the basic and senior secondary levels, and is a fundamental practical element of Office Technology and Management, Business Education, and Computer Science programs at the university level. Notwithstanding the curricular focus, reports from external examination bodies, informal feedback from ICT instructors, classroom observations and previous studies have indicated persistently weak practical performance in spreadsheet-related tasks among students and that numerous students finish their spreadsheet modules and scheme with insufficient procedural proficiency and inadequate conceptual comprehension of formulae, functions, and data management tools. This insufficiency in spreadsheet skill acquisition by students could attributed frequently asserted notion by educators and researchers that teaching methods adopted in teaching spreadsheet and other ICT-related skills are predominantly teacher-centered, relying on lectures and demonstrations, whereas students passively view screen projections instead of actively engaging with the software. Such methodologies are especially inappropriate for procedural and psychomotor abilities, such as spreadsheet use, which necessitate repetitive, guided, tactile practice for proficiency. It is therefore against this backdrop, that this study investigated the effect of experiential learning strategies in spreadsheet instruction on students' interest and academic performance in private secondary schools in Port Harcourt Metropolis, Rivers State.

Aim and Objective of the Study

The major aim of this study was to investigate the effect experiential learning strategies in spreadsheet instruction on students' interest and academic performance in private secondary schools in Port Harcourt Metropolis, Rivers State. Specifically, the study sought to:

1. examine effect between experiential learning strategy and discussion method on students mean interest scores in spreadsheet.
2. determine the effect of experiential learning strategy and discussion method on the students' mean performance scores in spreadsheet.

Research Questions

The following research questions were posed to be answered in the study:

1. What is the effect between experiential learning strategy and discussion method on students mean interest scores in spreadsheet?
2. What is the effect of experiential learning strategy and discussion method on the students mean performance scores in spreadsheet?

Hypotheses

The following null hypotheses were formulated by the researcher to guide the study:

1. There is no significant difference in the effect between experiential learning strategy and discussion teaching method on the students mean interest scores.
2. There is no significant difference in the performance of students taught using experiential learning and those taught using discussion method.

Material and Method

The study adopted quasi-experimental design, using pretest-posttest nonrandomized control. Nworgu, as cited in Abeng and Ikutal (2017), opined that quasi-experimental design is a type of experimental design in which random assignment of participants to experimental and control groups is not feasible. The justification for this design decision is the absence of an opportunity for randomization. Consequently, intact classes were utilized for the study. This study was carried out in Port Harcourt metropolis. The population for this study comprised students in all the 743 fully accredited private senior secondary schools in Port Harcourt Metropolis (Estimated Total number of private secondary schools in Port Harcourt and Obio-Akpor LGAs as at September 2024 as recorded by webometrics 2024 supplied by Office of the Director Zonal Secondary Schools Mobilization, Allocation and Commission Ministry of Education Rivers State Nigeria).

The sample of this study consisted of one hundred and twenty (120) senior secondary two (SS2) students from two selected private secondary schools in Port Harcourt Metropolis. Purposive sampling technique was utilized to select the sample for this study from the entire population. The choice of the purposive sampling techniques was to enable the researcher to select schools that meet the following criteria; (a) they are co-educational; since gender is a moderating variable (b) they must have boarding facilities; since most classes held during the afternoon prep, (c) they have at least one professional computer studies teacher with either a B.Ed or B.Sc (Ed) qualification in Computer Science (d) they have well-equipped and functional ICT labs with adequate internet access. Also, selected schools for this study were random assigned into experimental and control groups (one intact class) for the experimental group ($n = 57$) and (one intact class) for the control group ($n = 63$). The instruments for data collection were and Spreadsheet Interest Inventory (SII) and Spreadsheet Performance Test (SPT). The SII consisted of 20 items to assess the interest of the students in spreadsheet when taught using experiential learning strategy and discussion teaching method. The instrument was designed on a 4-point modified Likert-type response scale. SPT was made up of was thirty (30) items, encompassing thirty (30) multiple choice questions in worksheet navigation, formulas, functions, formatting, and basic charting. The SII and SPT were used as both pre-test and post-test however the items were put in a different sequence. The content of the SPT was adapted from West African Examination Council (WAEC) where content and face validity had been ascertained, the researcher however presented the treatment packages to three experts: one each from Educational Technology, Business Education and Measurement and Evaluation to ascertain its validity for the study. The instruments were submitted to reliability test using Cronbach Alpha and Kuder-Richardson formula 21 (KR-21), which yielded a reliability value of 0.83 and 0.82 respectively. The intervention/treatment spanned six weeks. In week one, both groups completed the pre-test instruments (SPT and SII) to establish baseline equivalence. From weeks two to five, the experimental group received instruction through experiential strategies, in which each lesson began with a brief orientation followed by students individually and in pairs working through structured, realistic spreadsheet tasks at computer workstations, with the teacher circulating to provide guided feedback; each session concluded with a short reflective discussion in which students compared approaches and outcomes. The control group covered identical topical content across the same period, but instruction was delivered primarily through

teacher demonstration on a projector, with students taking notes and observing, and only limited, time-constrained opportunity for individual practice. In week six, both groups completed the post-test administration of the SPT and SII. The data collected were analyzed using mean, standard deviation and analysis covariance (ANCOVA). The mean and standard deviation were used to answer the research questions, while Analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance, with the pretest scores entered as covariate.

Results

Research Question 1: What is the effect between experiential learning strategy and discussion method on students mean interest scores in spreadsheet?

Table 1: Effect of experiential learning strategy and discussion method on students mean interest scores in spreadsheet

Methods		Pre interest	Post interest	Interest Mean Gain
Experiential Learning	Mean	52.02	62.90	10.89
	N	63	63	
	Std. Deviation	12.46	8.21	
Discussion Method	Mean	55.86	56.25	.3860
	N	57	57	
	Std. Deviation	9.57	6.49	

Table 1 showed that both experiential learning strategy and discussion method have effect on the interest of students in spreadsheet. However experiential learning strategy has more effect with mean gain of 10.89 while discussion method with mean gain of 0.3860. This implies experiential learning strategy is superior to discussion method on the interest of students in spreadsheet.

Research Question 2: What is the effect of experiential learning strategy and discussion method on the students mean performance scores in spreadsheet?

Table 2: Effect of experiential learning strategy and discussion method on the students mean performance scores in spreadsheet

Methods		Pretest	Posttest	Mean Gain
Experiential Learning	Mean	29.48	84.29	54.81
	N	63	63	63
	Std. Deviation	9.47	8.37	13.39
Discussion Method	Mean	29.30	61.84	32.54
	N	57	57	57
	Std. Deviation	7.64	12.09	14.30

Table 2 showed that both experiential learning strategy and discussion method have effect on the performance of students in spreadsheet. However experiential learning strategy has more effect with mean gain of 54.81 while discussion method with mean gain of 32.54. This implies experiential learning strategy is superior to discussion method on the performance of students in spreadsheet.

Hypothesis 1: There is no significant difference in the effect between experiential learning strategy and discussion teaching method on the students mean interest scores.

Table 3 ANCOVA result of students' interest mean scores based on strategy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1892.338 ^a	2	946.169	18.535	.000	.241
Intercept	11689.367	1	11689.367	228.986	.000	.662
Pre interest	565.336	1	565.336	11.075	.001	.086
Methods	1595.992	1	1595.992	31.264	.000	.211
Error	5972.654	117	51.048			
Total	436153.000	120				
Corrected Total	7864.992	119				

Table 3 shows that there is significant difference in the effect between experiential learning strategy and discussion teaching method on the students mean interest scores ($F(1, 117) = 31.264$; $P < 0.05$; partial eta square = 0.211). Therefore, hypothesis is rejected.

Hypothesis 2: There is no significant difference in the performance of students taught using experiential learning and those taught using discussion method.

Table 4: Analysis of Covariance of students' performance taught using experiential learning and those taught using discussion method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	15115.109 ^a	2	7557.554	70.835	.000	.548
Intercept	53114.916	1	53114.916	497.832	.000	.810
Pretest	41.420	1	41.420	.388	.534	.003
Methods	15088.442	1	15088.442	141.420	.000	.547
Error	12483.016	117	106.692			
Total	678075.000	120				
Corrected Total	27598.125	119				

Table 4 shows that there is a significant difference between students taught using experiential learning and those taught using discussion method ($F(1, 117) = 141.420$; $P < 0.05$; partial eta square = 0.547). Therefore, hypothesis is rejected.

Discussion of Findings

The results from the first research question demonstrated that the experiential learning method markedly increased students' interest and engagement in spreadsheets. The first hypothesis likewise confirmed that there was a significant difference. The findings from the results demonstrated students' interest in the experiential learning method. The findings demonstrated that the implementation of an experiential learning technique markedly affected students' engagement in spreadsheets. This corroborates the findings of Yapici, Akbayin, Koehler, and Mishra (2015), who noted a statistically significant increase in students' interest in the Internet. The student-

centred methodology of experiential learning amplifies student involvement by activating cognitive processes.

The study's findings on research question two revealed that students' performance in spreadsheets showed that the mean scores for the experiential learning strategy was higher than those of the discussion method. Hypothesis two stated that the comparison of students' average scores on the posttest demonstrated a substantial difference between the experiential learning strategy and the discussion method. The results demonstrated that experiential learning was effective. Experiential learning tactics benefit students by enriching course content and augmenting knowledge through practical application, while promoting effective critical thinking and data-driven conclusions from research. Experiential learning strategies improve student engagement by promoting a deeper conceptual understanding compared to passive methods. The study confirmed the findings of Monaliza and Morgan (2019) that a significant discrepancy existed in academic performance between students taught through experiential learning techniques and those instructed via traditional methods. The execution of an experiential learning technique enabled learners to link choices with results, energized students for active participation, and offered chances for reflection on conceptual problems. This method prompted students to shift from regarding information as a mere assemblage of facts to understanding it as a tool for self-exploration and concurrent contribution, therefore facilitating their examination of data processing ideas and the application of acquired knowledge to practical situations.

Conclusion

This study found that experiential learning is superior than discussion method for teaching spreadsheets. Experiential learning increased students' interest in the subject, with hands-on, practice-based learning activities exhibiting much higher levels of curiosity and engagement than conversation. Student-centered approaches that emphasize active cognitive processes over passive information transmission are advantageous. The study also found that experiential learning students performed better in spreadsheets than discussion students. This suggests that learning by doing, where students actively participate in the lesson, make decisions, see the results of their actions, and reflect on their experiences, improves conceptual comprehension, critical thinking, and data-driven decision-making. The statistics show that experiential learning transfers knowledge and affects students' knowledge attitudes. The experiential method moved students

from mechanical memorization to true self-inquiry and considerably contributed to their learning process. This improvement helped students comprehend subject foundations and apply their knowledge to real-world scenarios. These findings indicate that experiential learning improves students' spreadsheet interest and performance in a pedagogically valid and empirically verified manner.

Recommendation

Based on the findings, the following recommendations were made:

1. Educators, curriculum planners and other education stakeholders should use practical, hands-on methods to teach spreadsheets and related computing topics. This method improves learning and creates more engaged and motivated students.
2. Governments at all levels and proprietors of private educational institutions should equip the schools with computer and ICT gadgets needed for conducting experiential learning in schools.

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