Impacts of Google Classroom-Assisted instruction on Secondary-School Students' Academic Performance and Retention

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Abstract
This study investigated the effects of Google Classroom–assisted instruction on secondary-school students' academic performance and retention in Social Studies in the Calabar Education Zone of Cross River State, Nigeria. Quasi-experimental pretest–post-test non-equivalent control-group design was adopted. Two hundred (200) Junior Secondary Two (JSS 2) students drawn from eight secondary schools participated in the study. Four schools constituted the experimental group taught via Google Classroom, while four used traditional methods. A researcher-developed Social Studies Achievement Test (SSAT) that was validated by experts in Social Studies and Educational Tests and Measurement was used for the study. (KR-20 = 0.82) was used to test the reliability of the instrument. Descriptive and inferential statistics (t-test and analysis of covariance (ANCOVA)) were used to analyse data at 0.05 significance level. Findings indicated that students exposed to Google Classroom performed significantly better than those taught traditionally. The study concluded that Google Classroom positively influences Social Studies learning outcomes and recommends its integration into secondary-school pedagogy through teacher training and infrastructural support.
Keywords: impacts, google assisted, instruction, performance, retention.

Introduction
Over the last ten years, the integration of digital technology into classroom instruction has progressed from novelty to necessity. In May 2014, Google announced a new Google Application called Google Classroom. Google Classroom and other Learning Management Systems (LMS) offer an organised setting for delivering lessons, distributing assignments, conducting assessments, and providing feedback, and is considered the best platform for existing applications. The Google Classroom-based LMS is available as a tool for developing teaching and learning processes worldwide. It is portable, widely available, and integrates with other Google services. This technology facilitates increased student engagement (Northey et al., 2015), which is critical to achieving the desired learning objectives (Bolkan, 2015). Thus, there have been shifts from personality-centred methods to rational structures, and from process-type methods to eventually shift from traditional classroom settings to the online environment (Olaniyi & Ajayi, 2020; Okeke

et al., 2022). The utilization of Google Classroom for classroom instruction cannot be under estimated as it covers diverse aspect of teaching-learning process.

Social Studies on the other hand plays a vital role of encouraging the development and upbringing of morally upright people, who subsequently aid in the advancement of their countries. Daboer and Umaru (2021) observed that social studies is important in reducing social vices and bad behaviours in young people. This implies that, apart from teaching students' important life skills and knowledge, social studies also tries to help themdevelop the positive social behaviours, attitu des, and values that are essential for an individual's survival in society. As a result, there has been much discussion among social studies stakeholders over the issue of social studies students' poor performance and retention in Nigerian schools. Retention refers to the capacity of pupils to remember and use previously acquired information after a predetermined amount of time. Retention, as a measure of sustained learning, has been the focus of several empirical investigations into the use of digital learning tools.

ICT adoption has been promoted in Nigeria by educational stakeholders in an effort to increase learning quality and accessibility. As society advances in the digital age, Information and Communication Technologies (ICTs) have become indispensable tools in enhancing access to education, improving pedagogy, and promoting lifelong learning opportunities for all (Federal Republic of Nigeria, 2013). However, in many localities, including Calabar Education Zone, the extent to which Google classroom impacts academic performance and retention of Junior secondary students in Social Studies remains understudied. Whereas, civic literacy, critical thinking, and social awareness skills that support sustainable development and democratic engagement are fostered by social studies.

Statement of Problem

Stakeholders in education are all gravely concerned about the ongoing drop in social studies academic performance among Nigerian secondary school students. Many students still show poor comprehension and low retention of the concepts taught, despite social studies' strategic importance in promoting civic responsibility, moral development, and national consciousness. The persistent use of traditional teaching techniques, like the lecture or talk-and-chalk method, which prioritize rote memorisation over experiential and participatory learning, has frequently been blamed for this shortcoming.

Google Classroom offers a chance to close this gap by offering a digital platform that promotes interactive, collaborative, and ongoing learning experiences, such that students can access lessons, assignments, and discussions at any time and from any location, while teachers can distribute teaching materials, evaluate students' progress, and give prompt feedback through Google classroom. Despite its potential, Google classroom is still not widely used in secondary schools, particularly when it comes to teaching social studies. Knowledge of these impacts can guide targeted investments in school ICT infrastructures, teacher professional development, and local policy.

Purpose of the Study

The main purpose of this study is to examine impacts of Google classroom on the academic performance and retention of students in social studies in Calabar Education Zone of Cross River State.

1. Find out how students who were taught social studies using Google Classroom performed academically compared to those who were taught the traditional way.
2. Compare the knowledge retention of students who received instruction via Google Classroom versus those who received instruction in a traditional classroom setting.

Research Questions:
The study answered the following research questions:
1. What is the difference in mean achievement scores between students taught with Google Classroom and those taught by traditional methods?
2. What is the difference in retention scores between the two groups after a four-week interval?

Hypotheses:
The following null hypotheses are formulated and were tested at 0.05 level of significance:
1. There is no significant difference in mean post-test achievement scores between the groups.
2. There is no significant difference in retention scores between the groups after controlling for pretest scores.

Literature Review
Theoretical Framework
Constructivist Learning Theory was used to guide the study.
Constructivist Learning Theory: This theory which was developed by Piaget in 1970 and Vygotsky in 1978 posits that students build their knowledge through active engagements, experience and interactions with their environment. The theory is relevant to the study because interactive platforms offered by e-learning environments like Google classroom promote student participation, collaborations, critical thinking, and cooperative learning. Students studying social studies can improve their conceptual understanding and application by using digital tools to investigate case studies, historical events, and simulations.

The Use of Technology in Education and Academic Performance
According to Demir et al. (2018), (Alnaabi, 2021) and Alneyadi et al. (2023) technology aids students in developing healthy habits by enhancing their animation skills, cognitive abilities, and self-regulation for knowledge retention (Al-Jeriwi, 2020). According to Demir et al. (2018) (Alnaabi, 2021), technology aids students in developing healthy habits by enhancing their animation skills, cognitive abilities, and self-regulation for knowledge retention (Al-Jeriwi, 2020). Al-Jeriwi (2020) asserts that the incorporation of artificial intelligence technology into online education has a good effect on the growth of future thinking abilities and scientific academic accomplishments. Al-Jeriwi (2020) asserts that the incorporation of artificial intelligence technology into online education has a good effect on the growth of future thinking abilities and scientific academic accomplishments

The connection between academic performance and technology-enhanced instruction has been the subject of many studies. Al- Jeriwi (2020) stressed that the incorporation of technology into learning has a good effect on the growth of future thinking abilities and academic performance of students. Recent studies show that when digital tools are intentionally incorporated into pedagogy, they have modest to moderately positive effects on academic performance. According to Rahmanto and Bunyamin (2020), teachers can effectively maximise their Google Classroom skills to improve the literacy skills of their students. In a study of Sari and Yin (2021), students who

were introduced to Google Classroom through a collaborative manner show a greater interest in learning than students who were not. This shows that, when teachers integrate ICT tools with formative assessment techniques, students' test scores, digital literacy, and engagement tend to improve.

Studies on Google Classroom and Students' Retention

Studies on the use of digital learning tools have focused on retention as a measure of sustained learning. Some notable scholars examined the role of Google Classroom in promoting retention among secondary school students in Ekiti State. Their findings showed a significant positive relationship between the frequency of Google Classroom interaction and retention scores in Social Studies tests administered three weeks after the instruction. Students who frequently accessed the class page retained more content and demonstrated better conceptual understanding.

In a research carried out in Malaysia by Rahman and Arif (2019), they found that after four weeks, students who were taught using Google Classroom retained Social Studies instructions far better than those who were taught using traditional teaching techniques. The researchers ascribed this to the platform's repeatable access to online resources and peer-discussion opportunities. According to Demir et al. (2018) and Alnaabi (2021), technology aids students in developing healthy habits by enhancing their animation skills, cognitive abilities and self-regulation for knowledge retention.

Method

The research adopted a pre-test-post-test control quasi-experimental design to collect data for the study. Eight Secondary Schools were purposively selected to represent urban and rural localities within the Calabar Education Zone of Cross River state. Four out of the eight schools selected were used to determine the experimental group which used Google Classroom, while the other four schools which represented the control group continued with traditional instruction.

The target population for this study comprised all Junior Secondary Two (JSS 2) students within Calabar education zone. The sample comprised 200 JSS 2 students (100 experimental and 100 control) drawn from eight public secondary schools within the study area. A Social Studies Achievement Test (SSAT) was designed by the researcher to cover four topics: Civic responsibilities and duties, National integration and unity, social institutions and values and Environmental management. The instrument consisted 40 multiple-choice items with content. KR-20 reliability was calculated as 0.82, indicating acceptable internal consistency. A retention test comprising 20 items (subset of SSAT) was administered four weeks after the post-test.

A two-day orientation on Google Classroom usage, lesson uploading, quiz creation, and discussion facilitation was given to teachers in the experimental schools. The duration of the intervention was six weeks. Alongside in-class activities, experimental teachers used Google Classroom, while students took online tests, engaged in discussions, and accessed posted materials. On the other hand, traditional teaching methods comprising lectures, textbook reading, group discussions, and paper-based tests were all still used by the control teachers.

Data collected were analysed using descriptive statistics (means and standard deviations). An independent samples t-test compared post-test scores between groups. When comparing post-test and retention scores, ANCOVA was used to account for pretest differences. All inferential tests were carried out at $\alpha = 0.05$. Effect sizes (Cohen's d and partial eta-squared) were calculated for

substantive interpretation. The following tables summarise descriptive statistics, inferential test results, and effect sizes.

Table 1: Descriptive Statistics for Pretest, Post-test, and Retention Scores

Group	N	Pretest Mean	Pretest SD	Post-test Mean	Post-test SD	Retention Mean	Retention SD
Experimental (Google Classroom)	100	41.20	6.85	72.65	8.32	69.10	8.95
Control (Traditional)	100	40.85	6.54	59.40	7.65	55.80	8.12

Table 2: Independent Samples t-Test for Post-test Scores

Variable	Group	N	Mean	SD	df	t-cal	t-crit	p-value
Achievement	Experimental	100	72.65	8.32	198	7.41	1.97	0.000
	Control	100	59.40	7.65				

Table 3: ANCOVA Results (Post-test controlling for Pretest)

Source	SS	Df	MS	F	Sig.	Partial Eta^2
Corrected Model	1625.43	2	812.72	28.56	0.000	0.225
Pretest (Covariate)	185.90	1	185.90	6.53	0.012	0.032
Group (Method)	1439.53	1	1439.53	25.65	0.000	0.198
Error	5538.72	197	28.12			
Total	21684.00	200				

Effect sizes were calculated to determine practical significance. The between-group Cohen's d for post-test scores is approximately 1.68 (large), clearly indicating that Google Classroom has a significant impact on academic performance. The ANCOVA partial eta-squared for Group = 0.198 indicates that about 19.8% of the variance in adjusted post-test scores is attributed to the instructional method.

Results

The descriptive statistics in Table 1 show higher mean post-test and retention scores for the experimental group. The independent samples t-test (Table 2) revealed a statistically significant difference in post-test scores ($t(198) = 7.41$, $p < 0.001$), favouring the Google Classroom group. ANCOVA results (Table 3) confirmed that after adjusting for pretest scores, the instructional method had a statistically significant effect on post-test achievement ($F(1,197) = 25.65$, $p < 0.001$), with a large effect size.

Retention analysis indicates that students in the experimental group maintained higher scores after a four-week delay (Mean retention = 69.10) compared to the control group (Mean retention = 55.80). This suggests that Google Classroom-supported learning promotes longer-lasting understanding, possibly through frequent retrieval practice and access to saved instructional resources.

Discussion

The study found that Google classroom had positive impacts on the academic performance and retention of students in Social Studies. The large effect size observed suggests substantive educational value for integrating Google Classroom into Social Studies instruction. Improved student participation through multimedia resources, prompt formative feedback through online tests, peer collaboration opportunities in discussion threads, and flexible material review outside of scheduled class time are all potential explanations for the noted improvements. This result is in line with the study of Al- Jeriwi (2020) who stressed that the incorporation of technology into learning has a good effect on the growth of future thinking abilities and academic performance of students. This corroborates the study of Demir et al. (2018) and Alnaabi (2021), who opined that technology aids students in developing healthy habits by enhancing their animation skills, cognitive abilities and self-regulation for knowledge retention.

Educational Implications

The findings imply that educational authorities should prioritise teacher training and professional development for digital pedagogy, affordable internet access for schools, and policies that support blended learning models. Social Studies curriculum designers can leverage Google Classroom to integrate project-based assessments, e-portfolios, and community-connected assignments that strengthen civic learning outcomes.

Limitations and Suggestions for Future Research

The study was conducted in Calabar Education Zone of Cross River State, Nigeria. As Such, the result cannot be generalised. Hence, a related study using same design can be conducted in all education zones of Cross River State, Nigeria to compare consistency of the findings with the study, while examining long-term outcomes (e.g., end-of-year examinations), and explore cost-effectiveness analyses comparing Google Classroom with alternative interventions.

Conclusion

Google Classroom offers a verifiable platform for teachers and students to use digital tools for student participation and collaborative learning. When students are given access to information at any time and from any location, it actively encourages learning and greatly enhance retention.

Recommendation

It is therefore recommended that Google Classroom be implemented for classroom instruction in secondary schools in Cross River State and throughout Nigeria, while making sure that both teachers and students receive official training on how to use this innovation as this will improve the academic performance of students and knowledge retention.

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