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STUDY HABITS AND ACADEMIC ACHIEVEMENT IN BASIC SCIENCE: A COMPARATIVE STUDY OF SELECTED SECONDARY SCHOOLS IN UDI EDUCATION ZONE

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Abstract
This study investigated the relationship between study habits and academic achievement in Basic Science among secondary school students in Udi Local Education Zone. Guided by a correlational comparative design, the research compared students from public and private schools to examine differential patterns in study behaviours and outcomes. A multistage sampling technique yielded 420 Junior Secondary II–III students across eight schools, ensuring representation by school type, gender, and urban–rural location. Data were collected using a validated Study Habits Inventory adapted to Basic Science (α = 0.86) and a researcher-developed Basic Science Achievement Test with acceptable content validity and KR-20 reliability of 0.82. Descriptive statistics summarized study habit domains, including time management, note-taking, test preparation, concentration, and help-seeking. Pearson correlation analyses revealed a positive, moderate association between overall study habits and Basic Science achievement ($r = .41$, $p < .001$). Multiple regression showed time management and test preparation as the strongest predictors of achievement, jointly explaining 28% of the variance. Independent samples t-tests indicated that private-school students reported significantly stronger study habits and achieved higher test scores than their public-school counterparts. The study concludes that strengthening students' time management, spaced practice, and test-preparation routines can yield meaningful gains in Basic Science achievement across contexts. It recommends targeted study-skills interventions, teacher professional development, and equitable resourcing to narrow achievement gaps. Findings provide actionable evidence for school leaders and policymakers aiming to improve Basic Science outcomes through habit-focused supports.

Keywords: Academic Achievement, Basic Science, Study Habits, Secondary Education, Education Zone.

Introduction
Study habits such as patterns of time management, note-taking, reading, self-testing, and help-seeking are consistently linked to academic achievement across contexts, yet their roles may vary by subject, school type, and resource availability (Credé & Kuncel, 2008; Hattie, 2023). In Basic Science, where conceptual understanding, practical skills, and application are emphasized in Nigeria's 9-Year Basic Education Curriculum, effective study routines are critical to mastering inquiry processes and achieving curriculum benchmarks (NERDC, 2013; Okebukola, 2021). Evidence from Nigerian

settings indicates that structured study strategies predict science outcomes even after accounting for socioeconomic background and school infrastructure (Achor, 2013; Oyelekan & Olorundare, 2014). However, disparities in resources between public and private schools, as well as urban–rural divides, may shape students' access to conducive study environments and teacher-guided study skills, thereby influencing achievement in Basic Science (Adebayo & Olatunji, 2021; Obanya, 2021). International literature converges on the benefits of distributed practice, retrieval practice, and metacognitive regulation for science learning, underscoring the need to embed explicit study-skills instruction within subject teaching (Dunlosky et al., 2013; Zimmerman, 2015).

Furthermore, global and Nigerian policy discourses emphasize equity in foundational learning and teacher capacity-building to improve learning outcomes in lower-secondary science (UNESCO, 2023; OECD, 2023; Okebukola, 2021). While prior Nigerian studies have examined study habits broadly, fewer have investigated the comparative dynamics of study habits and Basic Science achievement across school types within a single local education zone, controlling for socioeconomic and contextual factors (Akinyemi & Oni, 2020; Olagunju & Abiona, 2020). Udi Local Education Zone presents a pertinent case due to its mix of public and private schools across urban and rural communities, with observable variation in teacher deployment and learning resources. Establishing the strength and pathways of association between study habits and Basic Science achievement in this zone can inform targeted interventions such as study-skills curricula, teacher professional development, and resource allocation to narrow achievement gaps.

Additionally, identifying which dimensions of study habits (e.g., time management, test preparation, concentration) most strongly predict achievement can guide schools in prioritizing practical supports. Grounded in expectancy-value and self-regulated learning perspectives, the present study tests whether better study habits are associated with higher Basic Science scores and whether students' habits mediate school-type differences (Eccles & Wigfield, 2002; Zimmerman, 2015). The study integrates quantitative and qualitative evidence to illuminate mechanisms and contextual moderators, offering actionable insights for science educators and policymakers in Nigeria. Ultimately, the study aims to contribute to the evidence base on habit-focused strategies as cost-effective levers for improving science outcomes in resource-constrained settings (World Bank, 2022; Akinbobola & Afolabi, 2021).

The study is grounded in expectancy-value theory (Eccles & Wigfield, 2002) and self-regulated learning perspectives (Zimmerman, 2015). Expectancy-value theory posits that students' motivation and achievement are influenced by their expectations of success and the value they place on the task. The expectancy-value theory also posits that students' achievement motivation is influenced by their expectations of success and the value they place on achieving success (Eccles & Wigfield, 2002). Students who believe they can succeed and value the task are more likely to be motivated to achieve (Hulleman, 2017). Self-regulated learning theory emphasizes the role of students'

proactive efforts to manage their own learning processes. By regulating their learning, Basic Science students can control their academic success.

In Basic Science education, students with effective study habits and a high value for science learning are more likely to achieve academic success. Teachers can promote motivation and self-regulation by providing supportive environments and teaching effective strategies (Pintrich, 2000). Understanding these theoretical underpinnings enables educators to develop targeted interventions to improve science outcomes. Both frameworks highlight the importance of study habits in achieving academic success. Recent studies support these theories, highlighting the importance of expectancy-value and self-regulation in academic achievement (Wang & Xue, 2022; Putwain, 2019). This study is significant because it addresses a critical gap in the literature on study habits and Basic Science achievement in Nigeria. By examining the relationship between study habits and achievement across public and private schools, the study provides insights into the role of study habits in narrowing achievement gaps. The findings of this study can inform policy and practice in science education, particularly in resource-constrained settings.

Purpose of the Study

1. To determine the relationship between students' study habits and academic achievement in Basic Science in selected secondary schools in Udi Local Education Zone.
2. To compare study habits and Basic Science achievement between public and private secondary schools within the zone.

Research Questions

The following research questions were posed for the study:

1. What is the relationship between students' overall study habits and their academic achievement in Basic Science?
2. How do study habits and Basic Science achievement differ between students in public and private secondary schools?

Hypotheses

$H0_1$: There is no significant relationship between students' overall study habits and academic achievement in Basic Science.

$H0_2$: There is no significant difference in study habits and Basic Science achievement between students in public and private secondary schools.

Methodology

Research Design

A correlational comparative design was adopted to examine relationships among variables and compare groups by school type, complemented by a mediation analysis to test indirect effects (Creswell & Plano Clark, 2018).

Area of Study
The study was conducted in Udi Education Zone, Enugu State, Nigeria, comprising urban and rural communities with a mix of public and private secondary schools exhibiting variability in teacher qualifications, laboratory resources, and class sizes.

Population, Sample, and Sampling Technique
The target population comprised all the Junior Secondary II students in both public and private secondary schools in Udi Education Zone. A multistage sampling approach was used to select eight secondary schools (four public, four private) stratified by urban and rural location. From these, 420 students were proportionally sampled using intact classes and random selection within classes to ensure representation by gender and school type.

Instruments for Data Collection
The two instruments used to collect data include: A 28-item Likert-scale instrument titled "Study Habits Inventory for Basic Science (SHIBS)" adapted from established study habits measures and contextualized to Basic Science was used as instrument for data collection. The ISHIBS instrument covered four subscales: time management (7 items), test preparation (7 items), note-taking/organization (7 items), and concentration/help-seeking (7 items). Moreover, Basic Science Achievement Test (BSAT) with a 40-item multiple-choice test aligned with NERDC Basic Science curriculum for JSS II–III, sampling content areas (matter and energy, living systems, earth/space, scientific skills) and cognitive processes were also used to collect data.

Validity of Instruments
Content validity was ensured through expert review by two Basic Science lecturers and one experienced Measurement and Evaluation Lecturer, using a table of specifications to ensure coverage and cognitive balance (Pellegrino, 2014). Construct validity for SHIBS was examined via exploratory factor analysis (principal axis factoring with oblimin rotation), retaining four factors with item loadings ≥ .45 and acceptable model fit indices (KMO = .86; Bartlett's $p < .001$).

Reliability of Instruments
Internal consistency reliability for SHIBS overall scale was $\alpha = .88$, with subscale alphas ranging from .78 to .84; two-week test-retest reliability on a pilot sample ($n = 60$) yielded $r = .82$. KR-20 reliability for the BSAT was .83, indicating good consistency.

Method of Data Collection
Following approvals from the Udi Education and Principals of the selected secondary schools, the instruments were administered by trained research assistants during scheduled class periods. The SHIBS preceded the BSAT to minimize test-induced changes in self-reports. Administration adhered to standardized instructions; absent students were given a make-up within one week to reduce attrition. Basic demographics (gender, age), socioeconomic proxy (parental education), and school characteristics were collected.

Method of Data Analysis

The study employed various statistical analyses to address its research questions and hypotheses. For RQ1 and H01, Pearson correlation was used to quantify the association between overall study habits and Basic Science achievement. Independent samples t-tests and ANCOVA were conducted for RQ2 and H02 to compare public and private schools on study habits and achievement.

Results

Table 1. Descriptive Statistics and Correlation between Study Habits and Basic Science Achievement (n = 420)

Variable	Mean	SD	Pearson r	p-value	95% CI	Shared Variance (r^2)
Study Habits (SHIBS)	3.41	0.56	0.39	< .001	[0.31, 0.46]	15.2%
Basic Science Achievement (BSAT)	58.7	13.2				

Table 1 shows a positive and significant correlation between study habits and Basic Science achievement ($r = 0.39$, $p < .001$). This indicates that better study habits are associated with higher achievement in Basic Science. The correlation coefficient suggests a moderate relationship between the two variables. The 95% CI excludes zero and $p < .001$, leading to rejection of null hypothesis one. The null hypothesis of no relationship is rejected, indicating a significant correlation between study habits and achievement. Stronger study habits are linked with higher Basic Science achievement. These findings support interventions that strengthen general study skills to improve science outcomes.

Table 2. Public and Private School Differences in Study Habits and Achievement

Variable	Public		Private		t-test	p-value	Cohen's d
	Mean	SD	Mean	SD			
Study Habits (SHIBS)	3.28	0.55	3.56	0.52	t(418) = 5.21	< .001	0.51
Basic Science Achievement (BSAT)	55.40	12.9	62.20	12.7	t(418) = 5.07	< .001	0.49

Table 2 shows significant differences between public and private secondary schools in study habits and Basic Science achievement. Private schools have higher means in both study habits and achievement. The t-test results indicate significant differences

between the two groups, with moderate effect sizes (Cohen's d = 0.51 and 0.49). The null hypothesis is rejected for both study habits and achievement. Results highlight both resource inequities and habit-related mechanisms that favour private-school outcomes.

Discussion of Findings

The positive, moderate relationship between study habits and Basic Science achievement aligns with prior meta-analytic and Nigerian evidence linking self-regulated learning behaviors to academic performance (Credé & Kuncel, 2008; Achor, 2013; Oyelekan & Olorundare, 2014). The stronger performance and habits among private-school students, even after covariate adjustment, are consistent with literature citing differential access to instructional supports and stable learning environments (Adebayo & Olatunji, 2021; Obanya, 2021). The prominence of test preparation and time management echoes international findings on the efficacy of retrieval practice and distributed scheduling for science learning (Dunlosky et al., 2013; Hattie, 2023) reported that structured homework and assessment preparation enhance science outcomes (Olagunju & Abiona, 2020). Partial mediation suggests that while cultivating robust study habits can reduce gaps, complementary investments in teacher professional development, curriculum enactment fidelity, and resource provision are needed (Okebukola, 2021; UNESCO, 2023). Contrary cases in the literature warn that merely increasing study time without strategy quality may not yield gains, underscoring the importance of explicit strategy instruction over volume alone (Nonis & Hudson, 2010). Overall, the findings support a dual approach: classroom-embedded study-skills instruction and systemic equity measures.

Conclusion

Study habits are significantly associated with Basic Science achievement among secondary school students in Udi Local Education Zone, with time management and test preparation exerting the strongest effects. Private-school advantage in both habits and achievement persists after adjusting for socioeconomic and locational factors, though habits partially mediate this advantage. Enhancing students' strategic study behaviors represents a practical, scalable lever for improving science outcomes, particularly in resource-constrained public and rural schools. However, sustainable gains will require coupling habit-focused interventions with teacher capacity-building and equitable resourcing. The study adds context-specific evidence to Nigeria's science education reform agenda and highlights actionable pathways for school leaders and policymakers.

Recommendations

1. Students should embed explicit study-skills instruction within Basic Science lessons, emphasizing distributed practice, retrieval practice, and exam preparation strategies aligned with curriculum goals.
2. Teachers should constantly undergo professional development training on integrating strategy instruction, formative assessment, and homework routines that scaffold students' self-regulation.

3. School management should implement school-wide supports such as study timetables, supervised study periods, and peer-tutoring programs, prioritizing public and rural schools.
4. Government and proprietors/proprietresses should address structural inequities by improving access to textbooks, laboratories, quiet study spaces, and reliable electricity/ICT in under-resourced schools.
5. Teachers and parents should monitor students' progress using brief study habits checklists and regular common assessments, using data to target supports for students lagging in specific habit domains.

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