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Effect of Study Skills and Senior Secondary Schools Students' Academic Performance in Biology in Abak Local Government Area, Akwa Ibom State, Nigeria

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Abstract
This study centered on Study Skills and Senior Secondary Schools Students' Academic Performance in Biology in Abak Local Government Area of Akwa Ibom State. Three research questions and three corresponding hypotheses were formulated. The expost-facto research design was used for the study. The study was conducted in Abak Local Government Area. The population consisted of three thousand four hundred and eighty-three students from eleven public secondary schools during the 2024/2025 academic session in Abak Local Government Area of Akwa Ibom State. A structured questionnaire was used to obtain data and students' academic performance scores was obtained from the Biology Performance Test (BPT);The instruments were duly validated and subjected to kuder-Richardson-21 (KR-21) formula was obtained which stood a reliability index value of 0.97 for time management skill, 0.90 for concentration skill, 0.90 for note-taking skill and 0.80 for BPT. To test the hypotheses, independent t-test analysis was employed. The findings revealed that there is significant difference in students' academic performance in Biology based on students' time management skill, concentration skill, and note-taking skill. It has been recommended that study skills should be emphasized to students, including how it affects the learning outcomes in secondary school to enhance students' academic performance.

Key words: Study Skills, Time management skill, Concentration skill, Note-taking skill, Academic Performance, and Biology

Introduction

Biology as one of the science subjects is concerned with the study of living things including their functioning, structure, growth, evolution, distribution, identification and taxonomy. It is central to many science related courses including medicine, biochemistry, pharmacy, nursing science and agriculture. Being a science of life, Biology is one of the core science subject taught in the senior secondary schools. Hence, it occupies a very important position in the secondary school curriculum (Duru, Uko, & Utibe, 2024).

The academic landscape is continuously evolving, and the ability of students to adapt to these changes is a significant factor influencing their academic performance. In subjects such as Biology, which is inherently complex and multifaceted, effective study skills are paramount for success (Duru, Uko, & Utibe, 2023). Study skills refer to a collection of techniques and strategies that students employ to facilitate learning and improve academic performance. These skills are essential for effective learning, as they enable students to process, retain, and apply information in meaningful ways. The development of study skills is critical across various educational levels and disciplines, especially in complex subjects such

as Biology, where understanding intricate concepts and extensive information is necessary for success. In recent years, an increasing number of educational psychologists and researchers have emphasized the impact of tailored study skills on student outcomes, particularly in science subjects where understanding conceptual frameworks is critical (Duru, Uko, & Utibe, 2024; Schunk & Zimmerman, 2016; Tsai *et al*., 2021).

Biology, as a discipline, requires not only memorization of factual knowledge but also the ability to apply concepts in various contexts. This complexity can often overwhelm students, leading to anxiety and poor academic performance (Marsh *et al*., 2020). Effective study strategies such as spaced repetition, self-testing, summarization, and elaborative interrogation can significantly enhance comprehension, contributing to higher academic performance (Duru, Uko, & Utibe, 2024). As such, universities and colleges are increasingly focusing on integrating skills-based programs within their curricula to prepare students for the demanding nature of their fields (Atabang, 2024). Moreover, the transition to remote and hybrid learning models in response to the global pandemic has redefined the way students engage with their subjects and apply study strategies. Such changes have underscored the necessity for effective study skills to facilitate learning in less traditional environments (Pérez *et al*., 2023). The remote learning paradigm has further amplified the importance of self-regulated learning strategies, which empower students to take control of their educational processes and thereby improve their academic outcomes (Pintrich, 2016).

Research shows that students who actively employ effective study skills not only perform better academically but also exhibit greater motivation and satisfaction within their educational experiences (Niemann *et al*., 2019). This connection between study strategies and student outcomes becomes especially relevant in Biology courses, where students often face intensive volumes of material and rigorous assessments (Xie & Huang, 2020). Understanding the interplay between students' study skills and their performance in Biology is vital for developing educational interventions that enhance learning and engagement.

The academic success of students is often influenced by various factors, among which study skills play a critical role. Study skills encompass a range of strategies and techniques that students employ to enhance their learning processes and improve their academic outcomes. In the context of Biology, a subject characterized by complex concepts and a vast amount of information, the application of effective study skills becomes even more paramount. Students' ability to assimilate, retain, and apply biological knowledge is not solely dependent on their intellect but significantly influenced by their study habits and strategies. Study skills encompass a range of techniques and strategies that facilitate learning and retention, making them essential tools for students navigating challenging coursework (Hattie & Donoghue, 2016).

Research has consistently shown that students who actively engage in effective study practices tend to achieve better academic performance compared to their peers who do not (Hattie & Donoghue, 2016). This is particularly relevant in the field of Biology, where understanding intricate systems—such as cellular mechanisms, ecological relationships, and genetic principles—requires more than rote memorization. Effective study skills, such as

summarization, self-testing, and elaborative interrogation, are essential for enabling students to grasp and retain complex biological concepts (Van Duzer & Aizawa, 2021).

The increasing complexity of Biology curricula, coupled with the demands of higher education, has prompted educators to emphasize the importance of developing robust study skills among students. The transition to more interactive and inquiry-based learning environments further necessitates that students take an active role in their education by employing effective study habits (Van Duzer & Aizawa, 2021). This shift highlights the need for students to utilize strategies that promote self-regulation and critical thinking, which are essential for success in scientific disciplines.

In recent years, the educational landscape has also been transformed by the advent of technology and remote learning, particularly in the wake of the COVID-19 pandemic. These changes have exposed students to new learning modalities, requiring them to adapt their study skills to different formats and environments (Pérez *et al*., 2023). Consequently, students must not only master content but also develop the ability to self-regulate their learning in diverse contexts, of their study skills and academic performance even more critical. In the context of this study, time management skill, concentration skill and note-taking study skill would be considered germane for the study.

Time Management study skills begin with the ability to manage time efficiently. This includes setting specific goals, creating study schedules, and prioritizing tasks. Time management helps students allocate sufficient time for study sessions, assignments, and revision, ensuring that they can cover all necessary material without undue stress. Time management is a critical study skill that enables students to allocate their time effectively to meet academic demands. Poor time management can lead to stress and diminished academic performance (Eisenhower & Wickham, 2016). Students who develop effective time management skills can prioritize tasks, set goals, and create schedules that enhance productivity (Macan *et al*., 2016).

Recent research emphasizes the importance of self-regulated learning strategies in time management (Zhou *et al.,* 2022), arguing that structured planning and goal-setting can substantially boost a student's academic performance. Moreover, technological tools such as digital calendars and productivity apps have shown to facilitate better time management practices among students (Wang *et al*., 2019).

Concentration is vital for learning, as it significantly affects information processing and retention. Concentration skills enable students to focus on relevant academic materials while minimizing distractions (Vohs *et al*., 2019). Research has shown that mindfulness and meditation practices can improve concentration and cognitive performance, providing a framework for better academic outcomes (Zeidan *et al*., 2019).

Moreover, a conducive study environment plays a significant role in enhancing concentration. Factors such as noise level, lighting, and ergonomics influence a student's ability to concentrate effectively (Matarazzo *et al*., 2021). Strategies like the Pomodoro Technique and breaks have also been identified as effective means to sustain concentration over extended periods (Meyer *et al*., 2020).

Note-taking is an essential study skill that facilitates effective learning by allowing students to capture and organize information (Di Vesta & Gray, 2016). The Cornell method and mapping techniques have been widely studied and shown to improve retention and understanding (Friedman *et al*., 2018). Additionally, typing versus handwriting notes has been a debated topic, with research indicating that handwritten notes can lead to better conceptual understanding due to the deeper processing involved (Mueller & Oppenheimer, 2014).Various note-taking methods, such as the Cornell method, mind mapping, and outlining, help students capture key ideas and concepts, making it easier to review and study later.

New approaches, such as digital note-taking applications, have emerged as valuable tools; they often incorporate multimedia elements, which can enhance comprehension (Linderholm & Schraw, 2017). Furthermore, integrating active listening with note-taking practices assists students in synthesizing information effectively (Kiewra, 2021).

The importance of study skills cannot be overstated. Research indicates that students who actively employ effective study strategies tend to perform better academically and experience higher levels of satisfaction with their educational experiences (Niemann *et al*., 2019). Moreover, study skills contribute to the development of self-regulated learning, equipping students with the ability to take control of their educational processes and adapt to various learning environments (Pintrich, 2016).

In the context of Biology education, where students are often confronted with vast amounts of information, the application of study skills may lead to improved comprehension and retention of complex topics such as cellular processes, genetics, and ecosystems. By honing their study skills, students can navigate the challenges of Biology coursework more effectively, resulting in enhanced academic performance and a deeper appreciation for the subject (Duru, Uko, & Utibe, 2023). Given the vital role that study skills play in academic performance, this study aims to assess the effect of study skills and students' academic performance in Biology. By examining the specific study strategies that differentiates with higher performance outcomes, this research seeks to provide valuable insights that can inform educational practices and enhance the learning experiences of students in Biology courses. Understanding this difference is crucial for developing targeted interventions that empower students to improve their study skills, ultimately leading to greater academic success.

Statement of the Problem

The issue of poor study skills has been a reoccurring issue among so many students in various institution of learning. This has led to massive failure, examination malpractices, frustration, school dropout, and truancy to mention a few. This has been an issue of immense concern to the teacher, counselors, concerned authorities and the parents. A good number of efforts have been introduced by government so as to tackle the issue of poor study skills but yield no fruitful result. Although, contributions have been made to educational sectors by government through introduction of State and Federal scholarship for students, increment of manpower, introduction of functioning guidance and counseling section and scholarship for

teachers to further their education which will in turn boost quality of education. Yet all these efforts have not really yielded much to tackle the issue of study skills among the students.

Most of the secondary school students have insufficient study methods. They engaged most often after school hour in leisure activities such as watching movies, playing games, keeping company with friends instead of individual private studying for better understanding. When a student fails to possesses competencies of organizing his or her time, effective studying of course materials and not meeting academic requirement and successful completion of course and programme, then such will not be successful academically because there is wrong approach to study skills. It is therefore necessary for students who will soon be graduating from secondary school and looking forth to tertiary institution to be fully acquainted with varieties of study skills. It was against this background that the study attempts to investigate the effects of study skills and students' academic performance in Biology.

Purpose of the Study

The purpose of this study is to investigate the effect of study skills and senior secondary schools students' academic performance in Biology in secondary schools in Abak L.G.A. specifically; this study is designed to achieve the following objectives:

1. To determine the difference in students' academic performance in Biology in secondary schools based on time management skills.
2. To determine the difference in students' academic performance in Biology in secondary schools based on concentration skill.
3. To determine the difference in students' academic performance in Biology in secondary schools with respect to note-taking skill.

Research Questions

Specifically, the following research questions were raised to guide the study:

1. What difference does time management skill make in students' academic performance in Biology?
2. To what extent does concentration skill differentiate students' academic performance in Biology?
3. What difference does note-taking skill make in students' academic performance in Biology?

Null Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significance difference in the academic performance of students in secondary schools in Biology based on time management skills.
2. There is no significance difference in the academic performance of students in secondary schools in Biology based on concentration skills.
3. There is no significance difference in the academic performance of students in secondary schools in Biology with respect to note-taking skills.

Significance of the Study

The study is significant as it will benefit the following: students, counselors, teachers and parents.

The study will benefit the students in that; it gives them good hints and techniques for their studies. The study is useful to the student as it helps in creating better understanding of good study skills which will lead to the attainment of their pre-planned goals. This study will be of much significance to the counselors as it helps them to guide and enlighten the students towards early identification and appropriate study skills. It creates an avenue for the counseling personnel to counsel effectively on time management and development of realistic programs for the students.

The teachers who are considered the key educators will benefit from this study as this will assist them in addressing the issue of examination malpractice and mass failure among students. Likewise, the acquisition of this knowledge will assist teachers on how to implement the curriculum objectives. The parents, government and the society at large will also benefit from the study because the result from the study will create awareness about simple and common study skills suitable for the students. This study can also be used by failure to bring about positive changes and impressive performances in school.

Methodology

This study is an ex-post facto design conducted in Abak Local Government Area of Akwa Ibom State. The population consists of all the senior secondary school one (SS1) students in eleven (11) public secondary schools in Abak Local Government Area of Akwa Ibom State estimated at 3483 in the senior secondary one (SS1) in 2024/2025 academic session, see appendix E. The sample will comprise of 115 male and 110 female students in the senior secondary one (SS1) drawn randomly from the five (5) schools out of eleven (11) schools in Abak Local Government Area of Akwa Ibom State, Nigeria. Simple random sampling techniques were employed to obtain the sample size of the study. 45 students were randomly selected each from the five (5) schools making a total number of 225 students in the schools.

As researcher developed instruments titled “Study Skills Questionnaire (SSQ), (independent sub-variables are time management skill, concentration skill, note-taking skill), and Biology Performance Test (BPT) was used to collect data on students’ Academic Performance in Biology (dependent variable). A structured questionnaire was used to obtain data and students’ academic performance scores was obtained from the Biology Performance Test (BPT);The instruments were duly validated and subjected to kuder-Richardson-21 (KR-21) formula was obtained which stood a reliability index value of 0.97 for time management skill, 0.90 for concentration skill, 0.90 for note-taking skill and 0.80 for BPT. To test the hypotheses, independent t-test analysis was employed.

The data obtained from the respondent were organized and presented in Tables. Independent t-test analysis was used to assess the statistical significance of the mean score of Performance Test on Biology Students by each independent sub-variable of the research

hypotheses of time management skill, concentration skill, and note-taking skill. The significant level of 0.05 was the basis for accepting or rejecting the formulated hypotheses.

Results

The summary of results used in answering the research questions and testing the null hypotheses formulated to guide the study, are presented and interpreted in this subsection

Research Question 1: What difference does time management skill make in students' academic performance in Biology?

In order to answer research question one, mean statistic was used and the result is presented in Table 1.

Table 1: Mean statistics of the difference in academic performance of students in Biology based on time management skill

Time Management	n	Mean	SD	Mean Difference
Effective	127	19.40	3.95	
				4.93
Ineffective	87	14.47	3.53	

The result in Table 1 indicates that there is a great difference in students' academic performance in Biology based on time management skill.

Research Question 2: To what extent do concentration skills differentiate students' academic performance?

In order to answer research question two, mean statistics was used and the result is presented in Table 2.

Table 2: Mean statistics of the difference in academic performance of students in Biology based on concentration skill

Concentration Skill	n	Mean	SD	Mean Difference
Effective	121	20.27	3.87513	
				5.96
Ineffective	93	14.43	4.11249	

The result in Table 2 indicates that there is a great difference in students' academic performance in Biology based on concentration skill

Research Question 3: What difference does note-taking skill make in students' academic performance in Biology?

In order to answer research question three, mean statistics was used and the result is presented in Table 3.

Table 3: Mean statistics of the difference in academic performance of students in Biology with respect to note-taking skill

Note-taking Skill	n	Mean	SD	Mean Difference
Effective	115	13.49	9.82	
				5.11
Ineffective	99	18.76	4.42	

The result in Table 3 indicates that there is a great difference in students' academic performance in Biology with respect to Note-taking skill.

Testing Hypotheses

Null Hypothesis 1: There is no significant difference in the academic performance of students in secondary schools in Biology based on time management skill.

Independent t-test was used in order to test hypothesis one as shown on Table 4.

Table 4: Independent t-test analysis of the difference in students' academic performance in Biology based on time management skill

Time Management	n	Mean	SD	crit.t	cal-t	Decision
Effective	127	19.40	3.95	1.96	9.36	Significant
Ineffective	87	14.47	3.53			

Significant at p<.05, N = 214, df = 212

In Table 4, the critical t-value of 1.96 is less than the calculated t-value of 9.36 at 0.05 alpha level and degree of freedom of 212. This result therefore means that the null hypothesis is rejected which implies that there is a significance difference in students' academic performance in Biology based on time management skill.

Null Hypothesis 2: There is no significant difference in the academic performance of students in secondary schools in Biology based on concentration skill.

Independent t-test was used in order to test hypothesis 2 as shown on Table 5.

Table 5: Independent t-test analysis of the difference in students' academic performance in Biology based on concentration skill

Concentration Skill	n	Mean	SD	crit.t	cal-t	Decision at P<.05
Effective	121	20.27	3.87513	1.96	10.861	Significant
Ineffective	93	14.31	4.11249			

Significant at p<.05, N = 214, df = 212

In Table 5, the critical t-value of 1.96 is less than the calculated t-value of 10.861 at 0.05 alpha levels and degree of freedom of 212. This result therefore means that the null hypothesis is rejected which implies that there is a significance difference in students' academic performance in Biology based on concentration skill.

Null Hypothesis 3: There is no significant difference in the academic performance of students in secondary schools in Biology with respect to Note-taking skill.

Independent t-test was used in order to test hypothesis 3 as shown on Table 6.

Table 6: Independent t-test analysis of the difference in students' academic performance in Biology with respect to Note-taking skill.

Note-taking Skill	n	Mean	SD	crit.t	cal-t	Decision at P<.05
Effective	115	13.65	9.82	1.96	4.78	Significant
Ineffective	99	18.76	4.42			

Significant at p<.05, N = 214, df = 212

In Table 6, the critical t-value of 1.96 is less than the calculated t-value of 4.78 at 0.05 alpha level and degree of freedom of 212. This result therefore means that the null hypothesis is rejected which implies that there is a significance difference in students' academic performance in Biology with respect to Note-taking skill.

Discussion of Findings

Three hypotheses were formulated to guide the investigation into the role of time management skill, concentration skill, and note-taking study skill to the academic performance of secondary school one students in Biology. The findings based on the results of the hypothesis tested and discussed.

Findings in research question one revealed that time management skill of students in their studies have a positive impact on students' performance. This is in agreement with the work of Eisenhower and Wickham (2016) that effective time management practices and rightful utilization of time is a key to efficient and effective study.

The findings in research question two showed that there is a difference in students' academic performance in Biology based on concentration skill. This result is in support with Matarazzo *et al*., (2021) that many students have difficulty in concentrating during hours of study. The findings in research question four showed that there is a positive impact on students' performance based on note-taking skill. This is in support with the findings of Kiewra (2021) that effective study behavior begins with effective methods of taking notes during lessons. Taking notes properly is a very significant part of learning because it helps the students remember information presented in a class.

Conclusion

In conclusion, evidence from results shows that study skills are the third pillar of education besides cognition and personality therefore these are equally important for the achievement of academic goals. It is the need of the hour that students must grasp proper study skills because those students who do not know how and when to study will not be able to compete with others. Good study habits, concentration, committed class behavior and better time management skills play significant positive role in the development of study skills. Whereas spending more time in the social activities causes low academic achievement. Mostly low achieving students waste their precious time in different social activities rather than studies which in turn increase their academic and learning problems.

Implications of the Findings

Findings of the study are equally important for teachers, students and parents. Effective study skills are important for learning as well as contributing significantly towards academic performance of students. These can be learned at any time however, early age is more important for developing these skills. Low academic performers/achievers need more attention than high performers/achievers.

Recommendations

1. There should be counselors and study skills counseling programs in every school.
2. The counselors should be knowledgeable on different study skills/technique.
3. There is need to include study skills into the curriculum of the schools .
4. Importance of study skills should be emphasized to the students, including how it affects the learning outcomes.
5. There is need for more research on the relationship between study skills and learning outcomes among students.

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