The Role of Study Practices in Physics Performance at Secondary School Level

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Abstract: This study examined how specific study practices are associated with in physics achievement among secondary school students in Zambia using a descriptive correlational design. Specifically, this study looked into the domains of time management, note-taking, review practices, and use of learning resources for their influences on physics performance. Data were obtained from 133 Grade 10 –12 learners using a structured, field-tested questionnaire on study habits, and physics test scores of pupils. Descriptive statistics, Spearman correlation analysis, and cross-domain correlations were used to analyse the data. Results shows that learners have a moderate level of time management (M = 3.18), note-taking (M = 3.07), and review practices (M = 3.03) but utilised few learning resources (M = 2.38). The majority or 73% of the pupils obtained unsatisfactory performance ratings. The Spearman correlation analysis revealed a non-significant relationship between study habits and physics performance. However, it also indicates a moderate positive relationship among the domains of study habits themselves. This imply that pupils merely engage in surface-level study habits which do not meaningfully enhance their learning in physics. Higher-level study strategies are recommended, aside from improved access to more learning resources and a guided study programme, to help learners acquire mastery of physics concepts.

Keywords: *Correlation, Study Practice, Academic Performance, Physics.*

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I. INTRODUCTION

Physics remains one of the challenging subjects that secondary school learners face, and this is evidenced across sub-Saharan Africa by the consistent reports of poor pass rates recorded in national examinations (Taslidere, 2020). Physics performance has continued to fall in secondary schools in Zambia (Gwanda & Chibesa, 2025), with learners particularly struggling in areas that require conceptual understanding, mathematical reasoning, and application of scientific principles (Chirwa, 2025; Rabia et al., 2017). While there are various causes leading to personal differences in academic performance, researchers have increasingly focused on study habits as potential contributors to academic achievement, given that the study habits influence learning effectiveness and academic outcomes. According to Lawrence, 2014, study habits are defined by consistent and effective approaches geared towards learning and retaining information; these determine academic success. Learners' behaviours, strategies, and routines constituting their study habits support learning, including management of study time, note-taking, revision techniques, and usage of learning resources (Bibi et al., 2020; Capuno et al., 2019; Rafiq, 2021). Crede & Kuncel (2008) emphasize that study habit goes beyond time management to including the frequency of studying sessions.

Despite the established relevance of study habits, recent literature shows mixed findings on their relationship with academic performance. Several studies have reported that effective study strategies correlate positively with improved performance in science subjects (Bibi et al., 2020; Dipali M et al., 2023; Ebele & Olofu, 2017; Jafari et al., 2019). Others postulate that learners may have study habits in form but not substance, hence yielding limited academic benefits (Biggs & Tang, 2011; Setia & Ranjan, 2022). In physics, performance is influenced by various factors: apart from study behaviours, learners are also influenced by resource availability, teacher effectiveness, learner motivation, and the nature of instructional approaches taken(Gwanda & Chibesa, 2025; Okeke & Ukoh, 2020; Taslidere, 2020).

The present study aimed at examining how specific study practices are associated with in physics achievement among secondary school students in Zambia. It looked at which habits, if any, in the domains of time management,

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note-taking, review practices, and use of learning resources significantly impact performance. Furthermore, the study also examined the internal relationship among study habit components for an understanding of how learning behaviours interact.

The study was, therefore, timely in view of the sustained low performance in physics coupled with the current emphasis on the use of evidence-based strategies to enhance science education in Zambia. Such an understanding of the nature of the association between specific study practices and physics performance could guide educators, curriculum planners, and policymakers in designing targeted interventions aimed at supporting learners.

A. *Research Objective*

To examine how specific study practices are associated with in physics achievement among secondary school students in Zambia.

B. *Research Questions*

- What is the nature of the association between specific study practices and academic performance in physics among secondary school students?
- Which specific study practice (time management, note-taking, review practices, and learning resource use) are most strongly correlated with academic performance in physics?
- How do different study practices impact the academic performance of students in physics across various performance levels?

C. *Hypothesis*

$\boldsymbol{H_0}$**:** There is no significant association between specific study practices and academic performance in physics among secondary school students in Zambia.

II. LITERATURE REVIEW

The relationship between study habits and academic performance has been extensively studied across different educational contexts. According to Lawrence (2014), study habits are a significant predictor of academic achievement, as they influence how students engage with and retain information. Tus (2020) emphasizes that good study habits such as proper time management and active class participation positively correlate with academic success. Rabia et al. (2017) found a positive correlation between study habits and academic performance, emphasizing the role of consistent study routines and effective time management. Similarly, the findings of Okeke & Ukoh (2020), indicate a small but significant correlation between study habits and academic performance (r = 0.216, R = 0.203, R^2=0.041, n=750, p < 0.01), which translate to poor level of prediction and a poor level of shared variance between the dependent variable and independent variable.

In the context of physics, the importance of study habits is even more pronounced due to the subject's complexity. Qayoom (2024) highlighted that students with better study habits, such as regular revision and active participation in class, tend to perform better in physics. Razia (2015) in his study revealed that socio-economic status and the type of school (private vs. government) significantly influence both study habits and academic performance.

Previous studies have also identified gender differences in study habits and academic performance. For instance, Khan (2016) and Taslidere (2020) found that female students often exhibit better study habits and higher academic performance compared to male students. However, other studies have reported no significant gender differences in study habits (Lawrence, 2014; Bhan & Gupta, 2010).

Bandura's Social Learning Theory (1977) gives a theoretical framework for appreciate how students develop study habits through observation, imitation, and reinforcement. This theory suggests that students who observe effective study strategies in their peers or teachers are more likely to adopt similar habits, leading to improved academic outcomes. Furthermore, self-efficacy, a key component of Bandura's theory, plays a crucial role in motivating students to engage in effective study practices (Bandura, 1986).

Despite the critical importance of physics in the secondary school curriculum and its relevance to future careers in STEM, a significant number of students continue to underperform in this subject, raising concerns about the underlying causes. One potential factor is students' study habits, which are often overlooked in discussions about academic performance. Although there is a wealth of research on study habits and academic performance in general, there is a lack of studies specifically focusing on physics. This study aimed to fill this gap by examining the correlation between study habits and academic performance in physics among secondary school students.

III. METHODOLOGY

This study used a descriptive correlational research design to examine the association between specific study practice and academic performance in physics among secondary school learners. The design was appropriate because it allowed the researcher to observe naturally occurring variables without manipulation, as well as measure the strength of association between study habits and academic performance.

The study population included 133 pupils who were enrolled at Mejocama Secondary School in Lusaka District, Zambia. The size of this population was manageable, and hence a census sampling approach was adopted, where all available pupils participated in the study. In this way, the method of sampling ensured full coverage of the target population, with no possibility of sampling error. While all pupils were included, stratification applied during data organisation ensured that there was fair representation

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across both gender and grade levels, including Grades 10, 11, and 12.

The two instruments that were used in the collection of data included the structured Study Habits Questionnaire and the official academic records of pupils' physics grades. The domains of the study habit investigated were time management, note-taking, review practices, and the use of learning resources. The instrument was subjected to expert review and was also piloted at a neighboring secondary school to ensure validity. The reliability test returned a Cronbach's alpha coefficient of 0.87, showing high internal consistency. Academic performance was obtained from the school's examination records, which were matched to each participant through the use of anonymous coding to maintain confidentiality.

Permission was sought from the school administration, and the questionnaires were administered during normal school hours. Pupils completed the questionnaires with the researcher present, allowing for the highest response rates and minimizing missing data. Academic grades were retrieved later and securely linked to the questionnaire responses.

Data analysis was done using the Statistical Package for Social Sciences Version 25. Descriptive statistics included means, standard deviations, frequencies, and percentages to summarize learners' study habits and physics performance. Spearman's Rank Correlation Coefficient, a non-parametric test suited for ordinal data, was calculated to establish the strength and direction of the association between each study habit domain and the academic performance. Besides, a correlation matrix analysis was completed to look into interrelations among the study habit variables. All tests of significance were interpreted at a 0.05 significance level.

IV. RESULTS

A. Gender and Grade of the Respondents

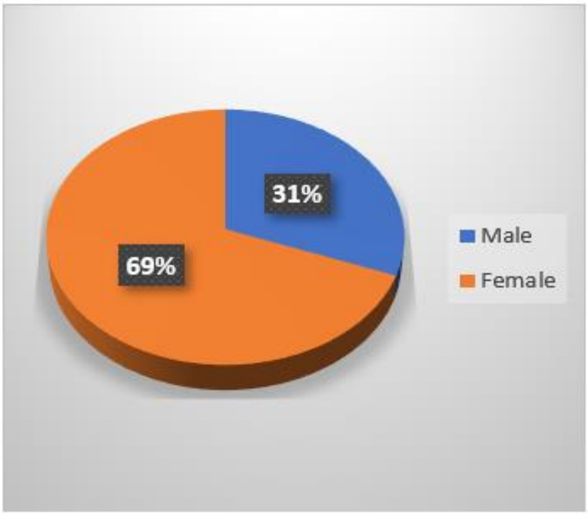

Fig 1: Gender of the Pupils

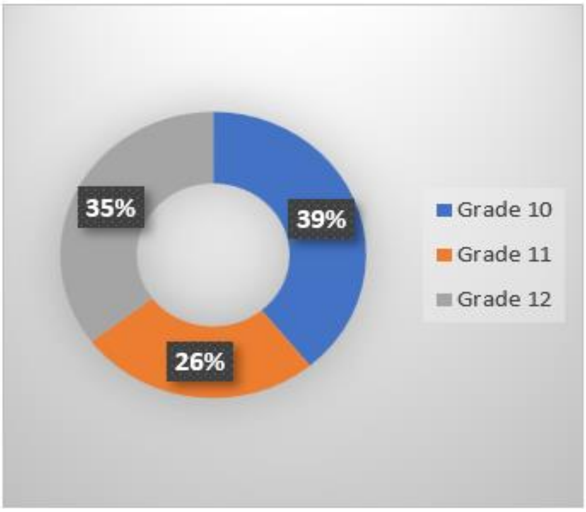

Fig 2: Grade Level of the Pupils

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The figure 1 and figure 2 shows the gender grade level of pupils who participated in the study and 41 (31%) were male while 92(69%) of the respondents were females. And 52(39%) representing grade 10, 47(35%) were grade 12 and 34(26%) were grade 11.

B. Time Spent on Studying Physics per Week

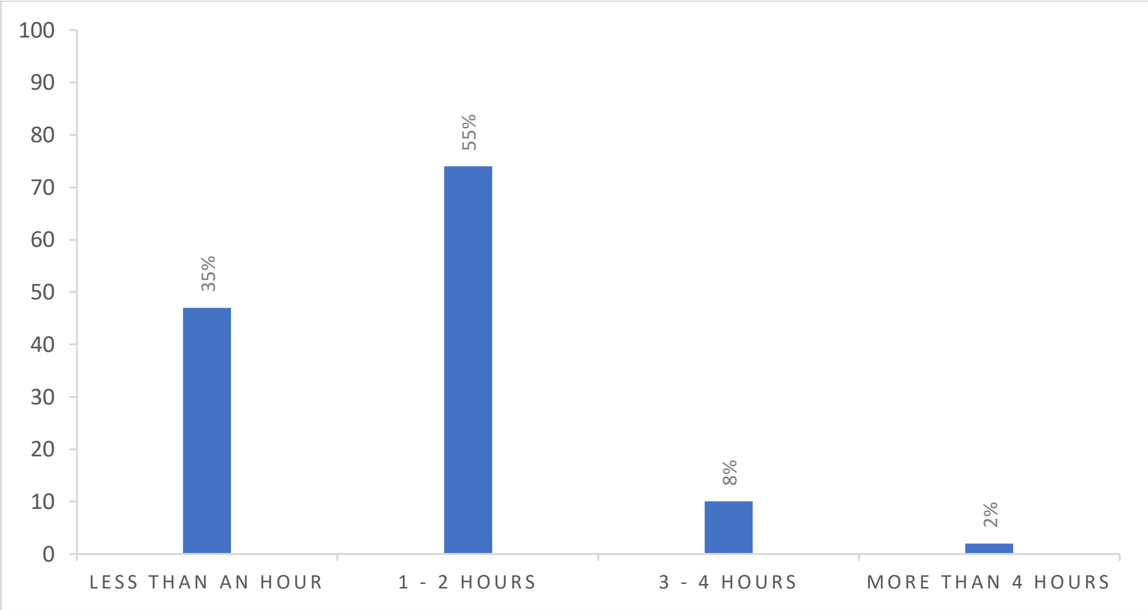

Fig 3: Time Spent on Studying Physics per Week

The figure 3 above shows the descriptive statistics of the time pupils take per week studying physics. 74(55%) pupils study physics about one to two hours, 47(35%) pupils study physics less than one hour, 10(8%) pupils study physics for about three to four hours and only 2(2%) pupils study physics for more than four hours in a week.

C. Physics Performance Grades

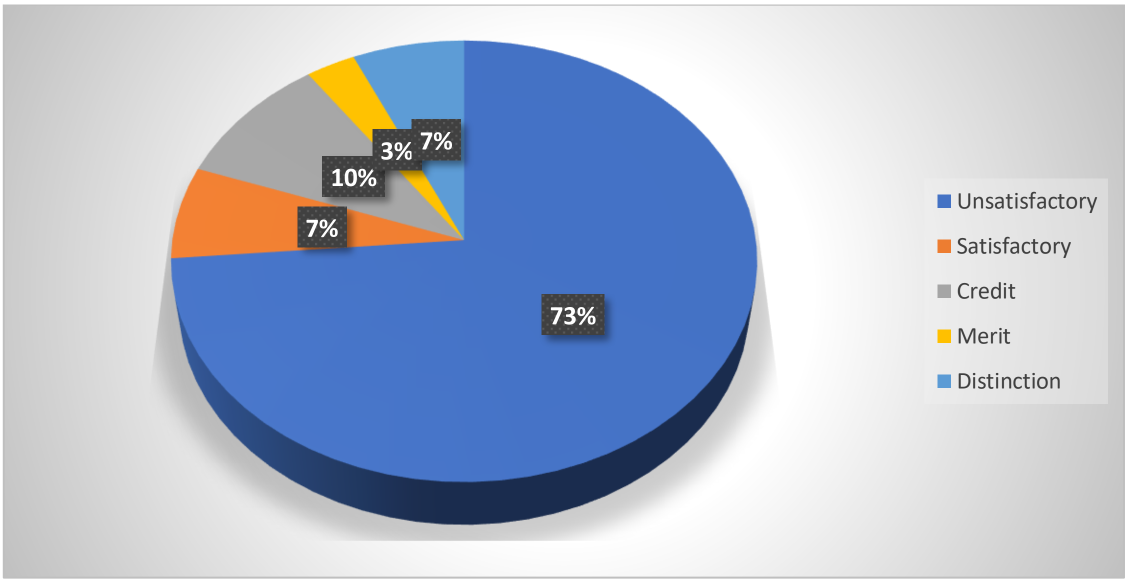

Fig 4: Physics Performance Grades

The physics results were analysed and 98(73%) pupils had unsatisfactory grades, 9(7%) pupils had satisfactory grades, 13(10%) pupils had credit grades, 4(3%) pupils had merit grades and 9(7%) pupils had distinctions.

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D. Association Between Study Practices and Physics Performance

To address Objective 1 and 2, a Spearman correlation analysis was conducted to examine the association between physics performance and each study practice.

Table 1: Relationship Between Study Practices and Physics Performance

Study Practice	Correlation with Physics Performance	Sig.	Interpretation
Time Management	r = -0.002	p = .986	No Significant relationship
Note-Taking	r = 0.107	p = .220	No Significant relationship
Review Practices	r = -0.086	p = .324	No Significant relationship
Learning Resources	r = 0.079	p = .367	No Significant relationship

Table 1 summarizes the relationship between study practices and academic performance and it can be seen that there exists a non-significant negative relationship (r = -.002) between time management and physics performance, a non significant relationship (r = 0.107) between Note- taking and physics performance, a non significant negative relationship (r = -0.086) between Review practice and physics performance and a non significant relationship (r = 0.079) between Use of learning resources and physics performance thus accepting the null hypothesis of not having a statistically significant relationship between the variables.

E. Correlation Among Study Practices

Table 2 Correlation Among Study Habits Domains

		Time Management	Note-Taking	Review Practices	Learning Resources
Time Management	r	1.000	.373**	.371**	.329**
	Sig.(2-tailed)		**.000**	**.000**	**.000**
Note-Taking	r	.373**	1.000	.318**	.241**
	Sig.(2-tailed)	**.000**		**.000**	**.005**
Review Practices	r	.371**	.318**	1.000	.406**
	Sig.(2-tailed)	**.000**	**.000**		**.000**
Learning Resources	r	.329**	.241**	.406**	1.000
	Sig.(2-tailed)	**.000**	**.005**	**.000**	

***. Correlation is significant at the 0.01 level (2-tailed).*

Although study practices did not correlate with physics performance, the study practices significantly correlated among themselves, as shown in the Table 2 above. The results show a moderate and significant ($p < 0.05$) association between time management and note-taking, r = .373; review practices, r = .371; and use of learning resources, r = .329.

F. Summary of Means and Standard Deviations for Study Practices

Table 3: Summary of Means and Standard Deviations for Study Practices

Study Habit Domain	Mean	SD	Interpretation
Time Management	3.18	1.11	Moderate
Note-Taking	3.07	1.34	Moderate
Review Practices	3.03	1.29	Moderate
Learning Resources	2.38	1.35	Low

The findings on the table above shows that learners exhibit moderate levels of study habits across Time Management (M = 3.18), Note-Taking (M = 3.07), Review Practice (M = 3.03) and the use of Learning Resources recorded low mean scores (M = 2.38).

V. DISCUSSION

This study investigates the association between study practices and academic performance in physics among secondary school students, in respect of the following four study practices: time management, note-taking, review practices and the use of learning resources. The results did not show any statistically significant relationship between any of the study practice variables and physics performance.

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Though there was a moderate correlation among the study practices themselves, this was not reflected in the pupils' academic performance. These findings are of interest since they also give insight when compared with international and regional literature.

The demographic distribution of the respondents indicated that most of the pupils who participated in the study were female (69%) and most studied physics for less than two hours per week. These limited study times could provide a contextual explanation for the generally observed low performance in physics, where 73% of the pupils obtained unsatisfactory grades. A similar trend has been observed in sub-Saharan Africa, where inadequate study time and access to support resources have contributed to poor performance among learners in science subjects (Gwanda & Chibesa, 2025).

The core finding of no statistical relationship between study practice and performance in physics aligns with the findings of Bhan & Gupta (2010), Lawrence (2014) and Tus et al., (2020). However, it runs contrary to a number of other studies such as those by Ebele & Olofu (2017), Goel (2014), Tus (2020) and Sakirudeen & Sanni (2017) which found that effective study habits positively impact academic performance. This discrepancy suggests that pupils in the current study may possess study habits or study practices that are average in form rather than in effectiveness. That is, while pupils may engage in study-related behaviours, they do not apply them in ways that deepen their understanding of physics concepts.

The mean scores for the use of learning resources were the lowest among the study practices, at $M = 2.38$, indicating that learners rarely use textbooks, digital materials, or library resources. This again supports the global concerns on underutilization of learning materials in STEM subjects, especially within low-resource school settings (Gwanda & Chibesa, 2025; Sakirudeen & Sanni, 2017). Scholars such as Abaniel (2021) and Assem et al., (2023) argue that effective resource utilization-especially textbooks, video simulations, and digital content-significantly enhances conceptual understanding in physics. Thus, while pupils may display a moderate level of time management and note-taking skills, their poor habit of using learning resources may explain why these study practices do not translate into improving their performance in physics.

The study also found significant positive associations among the study practices themselves, with a moderate association between time management and note-taking, $r = 0.373$; review practices, $r = 0.371$; and use of learning resources, $r = 0.329$. This internal consistency is in line with findings by Tus et al., (2020), who suggested that a learner who excels in one study skill tends to do well in other skills. However, as suggested by Modeste & Andala (2022), good study habits are translated into better academic performance only if they correspond with subject-specific learning demands. This may be particularly true for physics, given the critical nature of conceptual understanding, problem-solving, and mathematical competence.

These results indicate that the learning approaches of students might be superficial rather than deep learning strategies. For instance, students may take notes without reviewing them properly or make study schedules that are not strictly adhered to. This superficial engagement persists even though pupils often express positive attitudes toward academic success and recognize the importance of effective study habits, better conceptual understanding, and increased confidence (Chirwa, 2025).

This is an interpretation that is in line with Biggs' 2011 suggestion that superficial approaches to studying rarely lead to enhanced learning outcomes for intense subjects such as physics.

VI. CONCLUSION

This study concludes that although secondary school pupils demonstrate moderate study habits in areas such as time management, note-taking and review practices, these practices do not significantly predict their physics performance. The majority of learners spend minimal time studying physics and make limited use of learning resources, which may constrain their ability to develop conceptual understanding. Significant correlations among study habit domains indicate that learners tend to apply similar levels of effort across different study behaviours, but these behaviours may not be sufficiently structured or strategic to influence academic achievement in physics.

Overall, these results imply that improving performance in physics involves more than merely promoting study practices; it also requires enhancing the quality of study strategies and learning resources available and utilized, as well as the pedagogical support learners need to make sense of complex physics ideas.

VII. RECOMMENDATIONS

Based on the findings and supported by recent literature, the following recommendations are proposed:

- Schools should train learners in deep learning strategies such as problem-solving approaches, conceptual mapping, and structured review techniques, which research shows to be more effective for science subjects.
- The Ministry of Education and school administrations should provide updated physics textbooks, digital simulations and interactive learning materials. Studies from 2020–2024 consistently show that resource-rich environments significantly improve physics understanding.
- Schools should encourage structured study periods, particularly for science subjects, since minimal study time was a factor in the poor performance observed.
- Future studies should examine other predictors of physics performance such as attitude towards physics, teacher quality, classroom environment, and mathematical competence to build a more holistic understanding of performance determinants.

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