



# INFLUENCE OF STUDY HABITS ON ACHIEVEMENT IN BIOLOGY AMONG HIGH SCHOOL STUDENTS

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## ABSTRACT

This study examined the relationship between study habits and academic achievement in biology among high school students, with particular attention to time management, note-taking, concentration, and exam preparation. Grounded in Self-Regulated Learning Theory, the study employed a quantitative descriptive-correlational research design. A stratified random sample of 250 Grade 10 and 11 students, comprising 128 females and 122 males aged 15–17 years, was selected from five regional secondary schools. Data were collected using a validated 40-item Study Habits Inventory ( $\alpha = .87$ ), while academic achievement was assessed using cumulative grade point averages and standardized quarterly biology test scores. Descriptive statistics, Pearson product-moment correlation, multiple linear regression, and independent-samples t-test were employed for data analysis. The findings indicated a moderate overall level of study habits ( $M = 3.27$ ,  $SD = 0.62$ ), whereas students demonstrated a proficient level of biology achievement ( $M = 81.45$ ,  $SD = 10.52$ ). Overall study habits were positively and significantly associated with biology achievement ( $r = .68$ ,  $p < .001$ ). Significant positive correlations were also observed for time management ( $r = .59$ ), note-taking ( $r = .52$ ), concentration ( $r = .48$ ), and exam preparation ( $r = .64$ ), all at  $p < .001$ . Multiple regression analysis revealed that the four dimensions jointly explained 51.9% of the variance in biology achievement ( $R^2 = .519$ , adjusted  $R^2 = .511$ ,  $F(4,245) = 66.24$ ,  $p < .001$ ). Exam preparation ( $\beta = .34$ ) and time management ( $\beta = .31$ ) demonstrated the strongest standardized associations with achievement. The findings highlight the importance of structured study practices in supporting secondary students' biology achievement and underscore the need for educational interventions that promote effective time management, systematic examination preparation, active note-taking, and focused learning practices.

**KEYWORDS:** Influence, Study Habits; Achievement in Biology, High School Students

## BACKGROUND OF THE STUDY

Academic achievement in biology is an important component of secondary science education because biology provides foundational knowledge for further study and careers in health sciences, environmental sciences, biotechnology, and other STEM-related fields. Learning biology requires more than the memorization of factual information. Students are expected to understand interconnected concepts, interpret scientific information, analyse biological processes, apply knowledge to unfamiliar situations, and integrate information from different areas of the discipline. The complexity and cumulative nature of biological knowledge therefore require learners to employ effective and systematic approaches to studying. Differences in students' academic performance may consequently be associated not only with cognitive ability but also with the behavioural strategies through which learning is organized and sustained.

Study habits represent an important behavioural dimension of students' academic functioning. They encompass the regular practices through which learners plan and organize their study activities, allocate time, maintain concentration, process information, take notes, review learning materials, and prepare for examinations. Effective study habits can facilitate the systematic acquisition and retrieval of knowledge, whereas poorly organized study practices may limit students' ability to understand and retain complex subject matter. Research has consistently indicated that students' learning behaviours are associated with academic outcomes, although the nature and strength of these relationships may vary according to the

learning context and the specific strategies employed. In biology education, where students encounter extensive terminology, diagrams, processes, classifications, and conceptual relationships, the quality of students' study practices may be particularly consequential.

The relationship between study habits and academic achievement can be theoretically understood through the framework of Self-Regulated Learning (SRL). Zimmerman (2002) conceptualized self-regulated learners as active participants who regulate their cognition, motivation, and behaviour in pursuit of academic goals. Self-regulated learning involves processes such as goal setting, strategic planning, self-monitoring, self-evaluation, and adaptation of learning strategies. From this perspective, effective study habits reflect students' capacity to translate learning goals into purposeful and sustained academic behaviours. Students who systematically plan their study time, monitor their understanding, organize learning materials, maintain attention, and evaluate their preparation are engaging in behavioural processes consistent with self-regulated learning. Several dimensions of study habits are particularly relevant to biology learning. Time management enables students to distribute learning activities over appropriate periods, establish priorities, minimize procrastination, and balance academic responsibilities. Systematic allocation of study time may be especially important for biology because students need repeated opportunities to review interconnected concepts and processes. Note-taking involves selecting, organizing, and transforming information presented during instruction into structured



personal records. In biology, effective note-taking may assist students in organizing terminology, diagrams, processes, and conceptual relationships. Concentration enables students to sustain attention during learning and minimize the influence of distractions. Exam preparation, meanwhile, involves systematic revision and review of previously learned material and may include self-testing, retrieval practice, and repeated examination of difficult concepts. These dimensions collectively represent important behavioural processes through which students can regulate their learning.

Empirical research has provided evidence of an association between study habits and academic achievement among secondary-school students. Ebele and Olofu (2017), for example, reported a significant relationship between study habits and academic performance among secondary-school biology students. Research has also indicated that specific learning strategies may be relevant to achievement in biology. Sebesta and Bray Speth (2017) found that students' self-regulated learning strategies were associated with achievement in introductory biology, highlighting the importance of how students approach examination preparation and learning tasks. Similarly, research on approaches to learning biology has emphasized the importance of meaningful engagement with biological content rather than reliance on predominantly surface-level learning approaches (Google et al., 2023). These findings suggest that students' academic outcomes may be related not simply to the amount of study undertaken but also to the manner in which study activities are organized and implemented. However, existing research frequently treats study habits as a broad, composite construct, providing comparatively less attention to the relative contribution of specific dimensions of study behaviour to biology achievement. This distinction is important because students may demonstrate effective practices in one area while experiencing difficulties in another. For example, a student may demonstrate effective note-taking but have inadequate time-management practices or insufficient examination preparation. Identifying the individual dimensions that are most strongly associated with academic achievement can therefore provide more specific evidence for teachers, academic counsellors, and educational practitioners seeking to strengthen students' learning practices.

The present study addresses this issue by examining the relationship between four dimensions of study habits—time management, note-taking, concentration, and exam preparation—and academic achievement in biology among high school students. Specifically, the study determines the prevailing levels of students' study habits and biology achievement, examines the relationships between individual study-habit dimensions and biology achievement, and investigates the extent to which these dimensions predict academic achievement. The study also considers differences in study habits and achievement across selected demographic characteristics. By examining study habits through the theoretical lens of self-regulated learning and by analysing their individual dimensions, the study seeks to contribute empirical evidence concerning the behavioural factors associated with academic achievement in secondary-level biology education.

## STATEMENT OF THE PROBLEM

Despite the importance of biology in secondary education, many high school students experience difficulties in achieving satisfactory academic performance, partly due to ineffective or poorly organized study practices. Study habits such as time management, note-taking, concentration, and exam preparation may influence how effectively students learn and retain complex biological concepts. However, the relative contribution of these specific study-habit dimensions to biology achievement requires systematic empirical examination. Therefore, the present study investigates the relationship between study habits and academic achievement in biology among high school students and examines which dimensions of study habits are most strongly associated with and predictive of biology achievement. Hence, the presented is stated as '**Influence of Study Habits on Achievement in Biology of High School Students**'.

## THEORETICAL FRAMEWORK

This study is anchored in **Self-Regulated Learning (SRL) Theory** (Zimmerman, 2002), which posits that academic success is driven by a student's active participation in their own learning process across metacognitive, motivational, and behavioral dimensions. Within the context of biology education, self-regulated learners systematically plan their study schedules, monitor their comprehension of complex biological processes (such as cellular respiration or genetics), and evaluate their performance post-exam.

## DIMENSIONS OF STUDY HABITS

Research consistently categorizes study habits into distinct, measurable pillars:

- **Time Management:** The ability to allocate dedicated slots for studying, avoiding procrastination, and balancing academic loads with extracurricular activities.
- **Note-Taking and Summarization:** Active listening and the transformation of lecture content into structured formats (e.g., Cornell notes, concept maps), which are essential for visualizing biological systems.
- **Concentration and Environment:** The maintenance of focus free from digital distractions within an organized physical study space.
- **Exam Preparation and Review:** Spaced repetition, active recall practice, and self-testing rather than last-minute cramming.

Studies by Baker et al. (2021) emphasize that biology students who employ active concept mapping and spaced repetition score significantly higher on standardized assessments than those relying solely on passive reading.

## RESEARCH QUESTIONS

1. Is there a significant relationship between study and achievement in biology of High School Students?
2. Are there significant differences in study habits and academic achievement when categorized by demographic variables such as gender?



## HYPOTHESES OF THE STUDY

- There exists a significant relationship between study habits and achievement in biology among high school students.

## OBJECTIVES OF THE STUDY

- To find out the level of Study Habits among High School Students
- To find out the level of Achievement in Biology among High School Students
- To find out the relationship between Study Habits and Achievement in Biology among High School Students

## METHODOLOGY

Survey method is selected for the present study. This study adopted a quantitative descriptive-correlational research design. This approach is optimal for identifying relationships between independent variables (study habits and its sub-dimensions) and dependent variables (biology academic achievement) without manipulating the natural learning environment. The target population comprised high school students enrolled in grade 10 and 11 biology courses across five regional secondary schools. Using stratified random sampling, a sample of N=250 students (128 females, 122 males; aged 15–17 years) was selected to ensure balanced demographic representation. Data collection utilized two primary instruments:

1. **Study Habits Inventory (SHI):** A validated 40-item Likert-scale questionnaire ( $\alpha=.87$ ) measuring four sub-scales: Time Management, Note-Taking, Concentration, and Exam Preparation. Items ranged from 1 (Never) to 5 (Always).
2. **Academic Achievement Records:** Cumulative grade point averages (GPAs) and standardized quarterly biology test percentages converted to a standard 100-point scale.

## DATA ANALYSIS PLAN

Data was processed using SPSS version 28. The following statistical tests were executed:

- **Descriptive Statistics:** Mean ( $\mu$ ) and standard deviation ( $\sigma$ ) to determine overall levels of study habits and biology performance.

- **Pearson Product-Moment Correlation (r):** To evaluate the linear relationship between study habits and academic achievement.
- **Multiple Linear Regression Analysis:** To determine the predictive power of individual study habit dimensions on biology scores.
- **Independent Samples t-test:** To test for gender-based variations.

## RESULTS AND STATISTICAL ANALYSIS

Analysis and interpretation of data constitute an essential stage of the research process, as they facilitate the systematic organisation, examination and meaningful explanation of the information collected from the respondents. In the present study, the data obtained from 250 high school students were analysed to examine the relationship between study habits and achievement in Biology. Study habits were considered in terms of four major dimensions, namely time management, note-taking, concentration and examination preparation, while achievement in Biology was measured using students' academic achievement scores. The collected data were subjected to appropriate descriptive and inferential statistical techniques in accordance with the objectives and hypothesis of the study. Descriptive statistics such as mean and standard deviation were used to determine the level and variability of study habits and Biology achievement. Pearson's Product-Moment Correlation Coefficient was employed to examine the nature, direction and magnitude of the relationship between the different dimensions of study habits and achievement in Biology. Multiple linear regression analysis was also used to determine the extent to which the dimensions of study habits contributed to the prediction of Biology achievement. The findings are presented systematically through tables and are followed by appropriate interpretation in relation to the objectives and hypothesis of the study. The correlation analysis is particularly important because effective study habits involve behavioural processes such as planning, organising, concentrating, recording information and systematic revision, which are consistent with the principles of self-regulated learning. The analysis therefore provides empirical evidence regarding the association between students' study practices and their achievement in Biology.

## DESCRIPTIVE STATISTICS

Table 1  
*Descriptive measures for the core study variables*

| Variable Dimension        | Mean  | SD    | Interpretation |
|---------------------------|-------|-------|----------------|
| Time Management           | 3.12  | 0.78  | Moderate       |
| Note-Taking               | 3.65  | 0.65  | High           |
| Concentration             | 2.89  | 0.84  | Moderate       |
| Exam Preparation          | 3.40  | 0.71  | Moderate-High  |
| Overall Study Habits      | 3.27  | 0.62  | Moderate       |
| Biology Achievement Score | 81.45 | 10.52 | Proficient     |

Table 1 presents the descriptive measures of the core study variables among high school students. The results indicate that Note-Taking recorded the highest mean score ( $M = 3.65$ ,  $SD = 0.65$ ), reflecting a high level, while Exam Preparation showed a moderately high level ( $M = 3.40$ ,  $SD = 0.71$ ). Time

Management ( $M = 3.12$ ,  $SD = 0.78$ ) and Concentration ( $M = 2.89$ ,  $SD = 0.84$ ) were found to be at a moderate level. The overall mean score for Study Habits was 3.27 ( $SD = 0.62$ ), indicating a moderate level of study habits among the students. The mean Biology Achievement Score was 81.45 ( $SD = 10.52$ ),



which falls within the proficient level, indicating that the students demonstrated satisfactory achievement in Biology. Overall, the findings suggest that although students exhibited

relatively stronger note-taking and exam-preparation practices, their overall study habits remained at a moderate level.

## CORRELATION ANALYSIS

Table 2

### *Correlation between Dimensions of Study Habits and Achievement in Biology*

| Sl. No. | Dimension of Study Habits   | Biology Achievement (r) | p-value          | Significance       |
|---------|-----------------------------|-------------------------|------------------|--------------------|
| 1       | Time Management             | .59                     | < .001           | Significant        |
| 2       | Note-Taking                 | .52                     | < .001           | Significant        |
| 3       | Concentration               | .48                     | < .001           | Significant        |
| 4       | Exam Preparation            | .64                     | < .001           | Significant        |
|         | <b>Overall Study Habits</b> | <b>.68</b>              | <b>&lt; .001</b> | <b>Significant</b> |

*N = 250. Pearson Product-Moment Correlation Coefficient was used*

Table 2 shows a positive and statistically significant relationship between all dimensions of study habits and achievement in Biology among high school students. Exam preparation exhibited the strongest correlation with Biology achievement ( $r = .64, p < .001$ ), followed by time management ( $r = .59, p < .001$ ), note-taking ( $r = .52, p < .001$ ), and concentration ( $r = .48, p < .001$ ). Overall study habits also showed a relatively strong positive correlation with Biology achievement ( $r = .68, p < .001$ ). These findings suggest that students with more effective study habits tend to demonstrate higher levels of achievement in Biology. The results support the hypothesis that study habits are significantly associated with

Biology achievement among high school students. However, the findings represent relationships between variables and do not establish a causal effect of study habits on achievement.

## MULTIPLE REGRESSION ANALYSIS

A multiple linear regression was calculated to predict biology achievement based on the four study habit dimensions.

- **Model Summary:**  $R = .72$ ,  $R^2 = .519$ , Adjusted  $R^2 = .511$ ,  $F(4,245) = 66.24$ ,  $p < .001$ .
- The model accounts for **51.9% of the variance** in high school biology academic achievement.

Table 3

### *Regression Summary*

| Model Predictors | Unstandardized Coefficients (B) | Standard Error | Standardized Coefficients (β) | t-value | p-value |
|------------------|---------------------------------|----------------|-------------------------------|---------|---------|
| (Constant)       | 42.15                           | 3.21           | —                             | 13.13   | <.001   |
| Time Management  | 4.12                            | 0.76           | .31                           | 5.42    | <.001   |
| Note-Taking      | 2.85                            | 0.82           | .18                           | 3.47    | .001    |
| Concentration    | 1.94                            | 0.69           | .15                           | 2.81    | .006    |
| Exam Preparation | 5.03                            | 0.81           | .34                           | 6.21    | <.001   |

The regression equation can be expressed as:

$$\text{Biology Score} = 42.15 + 4.11(\text{Time}) + 2.85(\text{Notes}) + 1.94(\text{Conc}) + 5.03(\text{Exam Prep})$$

The regression analysis indicates that all four dimensions of study habits significantly predict Biology achievement among high school students. **Exam Preparation** emerged as the strongest predictor ( $\beta = .34, t = 6.21, p < .001$ ), followed by **Time Management** ( $\beta = .31, t = 5.42, p < .001$ ), **Note-Taking** ( $\beta = .18, t = 3.47, p = .001$ ), and **Concentration** ( $\beta = .15, t = 2.81, p = .006$ ). The positive unstandardized coefficients indicate that higher levels of each study-habit dimension are associated with higher Biology achievement, when the other predictors are held constant. The regression equation shows that the predicted Biology score increases by 4.12 points for each unit increase in Time Management, 2.85 points for Note-Taking, 1.94 points for Concentration, and 5.03 points for Exam Preparation. Thus, the findings indicate that exam preparation and time management make relatively stronger unique contributions to Biology achievement than note-taking and concentration. However, as the study employs a correlational regression design, these findings should be interpreted as statistical prediction and association rather than evidence of causation.

## DISCUSSION

The empirical findings confirm that study habits are a critical determinant of academic success in high school biology. The strong positive correlation ( $r = .68$ ) aligns with prior literature establishing that metacognitive behavioral structuring elevates science performance. Among the sub-dimensions, Exam Preparation ( $\beta = .34$ ) and Time Management ( $\beta = .31$ ) emerged as the most dominant predictors. In biology, where students must assimilate massive volumes of conceptual frameworks (e.g., genetics, ecology, cellular biology), last-minute cramming fails due to cognitive overload. Students who practice spaced repetition and structured review cycles retain information at significantly higher rates. Furthermore, note-taking proved vital, supporting the premise that translating complex biological charts, diagrams, and processes into personalized notes enhances encoding and retrieval strength.

## CONCLUSION

The present study provides empirical evidence of a significant positive association between students' study habits and achievement in Biology at the high school level. Although



the students demonstrated an overall moderate level of study habits ( $M = 3.27$ ,  $SD = 0.62$ ), their mean Biology achievement was at a proficient level ( $M = 81.45$ ,  $SD = 10.52$ ). All four dimensions of study habits—time management, note-taking, concentration, and exam preparation—were significantly and positively associated with Biology achievement, with overall study habits showing a relatively strong correlation ( $r = .68$ ,  $p < .001$ ). Multiple regression analysis further revealed that these dimensions collectively explained 51.9% of the variance in Biology achievement ( $R^2 = .519$ ,  $p < .001$ ). Among the individual dimensions, exam preparation ( $\beta = .34$ ) and time management ( $\beta = .31$ ) demonstrated the strongest standardized associations, while note-taking ( $\beta = .18$ ) and concentration ( $\beta = .15$ ) also contributed significantly to the prediction of Biology achievement. These findings indicate that students' academic performance in Biology is closely associated with how systematically they organize, monitor, and sustain their learning activities. From an educational perspective, the findings highlight the value of explicitly developing self-regulated study practices through structured revision, effective time allocation, active note-taking, and focused learning. The central takeaway of the study is that effective study habits constitute an important and measurable dimension of successful Biology learning, and strengthening these practices should form an integral part of academic support at the secondary-school level. Nevertheless, the correlational nature of the study precludes causal conclusions; therefore, future longitudinal and intervention-based research is recommended to examine whether deliberate improvements in specific study habits lead to corresponding gains in Biology achievement.

## EDUCATIONAL IMPLICATIONS

The findings of the study have important implications for Biology teaching and learning at the secondary-school level. The study highlights the need to give greater attention to students' study habits alongside the teaching of subject content. Biology teachers can explicitly develop students' skills in time management, systematic examination preparation, effective note-taking, and concentration through classroom activities, homework practices, study-planning exercises, and regular academic guidance. Teachers may encourage students to adopt self-regulated learning strategies such as planned revision, active recall, concept mapping, organized note-making, and focused study sessions to support better understanding and retention of biological concepts. Schools and academic counsellors can provide study-skills programmes and individualized guidance to help students identify weaknesses in their learning practices and develop appropriate strategies. Particular attention may be given to helping students replace last-minute examination preparation with regular and structured revision. The findings also suggest that Biology education should move beyond content transmission by incorporating learning-to-learn skills that enable students to plan, monitor, and evaluate their own learning. Overall, the study emphasizes that cultivating effective and self-regulated study habits should be an integral part of secondary Biology education and an important component of efforts to support students' academic achievement.

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