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An investigation into the correlation between sleeping patterns and academic performance at private boarding schools in Masvingo, Zimbabwe

By

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN BIOLOGY EDUCATION

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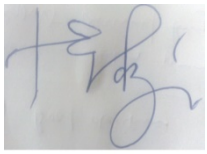

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DEDICATION

This research is lovingly dedicated to the students of Junior High School boarding school in Masvingo, whose daily experiences and resilience inspired this investigation. Their commitment to learning, even amidst the challenges of balancing rest and academic demands, has been the driving force behind this study. I also dedicate this work to my family, whose unwavering support, encouragement, and belief in the value of education have sustained me throughout this journey. To my mentors and teachers, thank you for instilling in me the curiosity to explore and the discipline to persevere. Above all, this study is dedicated to the pursuit of knowledge that seeks to improve the well-being and academic success of learners everywhere.

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A special acknowledgement goes to my friend, Dr. Message Tsaurai, who practices in Ireland. His generosity in providing six actigraphy tools was a turning point in this project. With his support, I was able to collect accurate data on sleeping patterns, which greatly strengthened the reliability of my findings. His kindness and belief in the value of this work will always remain a source of inspiration.

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ABSTRACT

Sleep is increasingly recognized as a fundamental determinant of student wellbeing and academic success. While global research has established strong links between sleep quality, cognitive functioning, and learning outcomes, relatively little attention has been paid to how these dynamics unfold within the unique environment of Zimbabwean boarding schools. This study investigates the correlation between sleeping patterns and academic performance among students at a private boarding school in Masvingo, with the aim of generating context-sensitive insights that can inform both educational practice and policy.

The boarding school context presents distinctive challenges and opportunities for understanding sleep. Students live in a highly structured environment where institutional schedules, peer interactions, and cultural expectations shape daily routines. Unlike day scholars, boarding students often experience reduced autonomy over their sleep schedules, with lights-out policies, early morning assemblies, and late-night study sessions influencing the quantity and quality of rest. These conditions make boarding schools an ideal setting for examining how institutional and social factors intersect with biological needs to affect learning outcomes.

A mixed-methods design was employed to capture both quantitative and qualitative dimensions of the phenomenon. Quantitative data were collected through structured surveys administered to 90 students, focusing on sleep duration, bedtime consistency, wake-up routines, and perceived sleep quality. Academic performance was measured using official school records, including term grades and examination results. To complement these findings, qualitative interviews were conducted with a purposive sample of 20 students, allowing for deeper exploration of lived experiences, perceptions of sleep, and coping strategies. This methodological triangulation ensured that the study not only identified statistical correlations but also illuminated the human realities behind the numbers.

Preliminary analysis revealed a clear association between irregular sleep patterns and diminished academic performance. Students who reported sleeping fewer than six hours per night consistently demonstrated lower grades, particularly in subjects requiring sustained concentration such as mathematics and sciences. Conversely, those maintaining consistent sleep routines of seven to eight hours exhibited stronger academic outcomes, with improved focus, memory retention, and classroom participation. Qualitative data reinforced these findings, with students describing how late-night study sessions often led to fatigue, reduced motivation, and difficulty recalling information during examinations. Importantly, the study also highlighted the role of institutional culture: while some students felt pressured to sacrifice sleep in pursuit of academic excellence, others emphasized the benefits of structured routines that balanced study time with adequate rest.

The implications of these findings are significant. At a practical level, the research suggests that interventions promoting sleep hygiene—such as adjusting study schedules, encouraging earlier bedtimes, and raising awareness about the cognitive benefits of rest—could enhance academic performance across the student body. At a policy level, the study calls for school

administrators and educators to reconsider institutional practices that inadvertently undermine healthy sleep, such as excessively early assemblies or prolonged evening study sessions. By situating these recommendations within the broader literature on sleep and learning, the research contributes to a growing body of evidence that underscores the importance of aligning educational environments with students' biological needs.

In conclusion, this investigation demonstrates that sleeping patterns are not merely a matter of personal choice but are deeply embedded in the social and institutional fabric of boarding school life. The correlation between sleep and academic performance observed in this study reinforces the need for holistic approaches to education that prioritize student wellbeing alongside academic achievement. By foregrounding the voices and experiences of Zimbabwean boarding school students, the research offers contextually grounded insights that can inform both local practice and global debates on the role of sleep in learning. Ultimately, the study advocates for a paradigm shift in educational planning, one that recognizes rest not as a luxury, but as a vital resource for intellectual growth and success.

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Chapter 1

1.1 **INTRODUCTION TO THE STUDY**

In the corridors of Zimbabwe's private boarding schools, a silent struggle unfolds each night. Students wrestle with sleep deprivation while striving to meet academic expectations. At first glance, sleep may seem like a passive biological function, but it is, in fact, a powerful determinant of cognitive performance, emotional stability, and overall wellbeing. This study investigates the correlation between sleeping patterns and academic performance at a private boarding school in Masvingo, seeking to understand how the rhythms of rest or the lack thereof shapes students' learning outcomes.

Adolescents are biologically wired to need between 8 to 10 hours of sleep per night, yet boarding school routines often conflict with this need. Early morning prep, late-night study sessions, and communal dormitory life can disrupt sleep cycles, leading to chronic sleep debt (Khare et al., 2024). International studies have consistently shown that poor sleep quality is linked to lower academic achievement, reduced concentration, and impaired memory consolidation (Pale & Kumari, 2025). However, these findings are rarely contextualized within Zimbabwe's educational landscape, where cultural norms, institutional expectations, and curriculum demands differ significantly.

The Zimbabwe Heritage-Based Curriculum emphasizes holistic development, yet sleep, a cornerstone of physical and mental health is often overlooked in pastoral care and academic planning. By examining students' sleep duration, consistency, and perceived quality alongside their academic records, this research aims to uncover patterns that may inform more compassionate and effective educational practices. It also seeks to amplify student voices through qualitative interviews, capturing the lived experience of sleep within the boarding school environment. Ultimately, this study is not just about numbers and grades it's about nurturing learners in body, mind, and spirit. If sleep is indeed a hidden pillar of academic success, then understanding its role could unlock new pathways for student well-being and performance in Zimbabwean schools.

1.2 BACKGROUND OF THE STUDY

Sleep is often described as the "third pillar" of health, alongside nutrition and physical activity. Yet in many educational settings, especially boarding schools, sleep is treated as expendable. This study investigates the correlation between sleeping patterns and academic performance at a private boarding school in Masvingo, Zimbabwe. The aim is to understand how sleep behaviors among adolescents influence their cognitive functioning, learning outcomes, and overall academic achievement.

Adolescence is a critical developmental stage marked by rapid physical, emotional, and cognitive changes. Sleep plays a pivotal role in consolidating memory, regulating emotions, and supporting executive functions such as attention and problem-solving (Wongsurakiat,2025). During sleep, the brain undergoes processes that strengthen neural connections formed during the day, making it essential for learning and academic success.

However, adolescents often experience a biological shift in their circadian rhythms, leading to a natural preference for later bedtimes and wake times. This shift, combined with academic pressures, social obligations, and digital distractions, results in chronic sleep deprivation (Khare et al., 2024). In boarding schools, where students follow rigid schedules and often face intense academic demands, the risk of insufficient sleep is even higher.

Numerous studies have established a positive correlation between adequate sleep and academic performance. Sleep quality, duration, and consistency are all linked to better grades, improved concentration, and enhanced classroom engagement (Pale & Kumari, 2025). Conversely, poor sleep is associated with lower test scores, increased absenteeism, and reduced motivation.

In the Zimbabwean context, these findings are particularly relevant. Boarding schools are a dominant feature of the secondary education landscape, and students often live away from parental supervision. This autonomy can lead to irregular sleep habits, especially when combined with late-night study sessions, prayer meetings, or social interactions. Understanding how these patterns affect academic outcomes is crucial for developing interventions that support student well-being.

Masvingo Province is home to several private boarding schools known for their academic rigor and spiritual emphasis. Students typically follow structured routines that include early morning devotions, long school days, and evening study periods. While these routines foster discipline and community, they may inadvertently compromise sleep quality.

Preliminary observations suggest that many students sleep less than six hours per night, far below the recommended 8–10 hours for adolescents (Khare et al., 2024). Some report difficulty falling asleep due to stress, noise, or overcrowded dormitories. Others wake up frequently during the night or struggle with daytime sleepiness. These disruptions can impair cognitive performance, reduce attention spans, and hinder academic achievement.

This study is grounded in the bio-psychosocial model, which views sleep as a product of biological rhythms, psychological stressors, and social environments. It also draws on cognitive load theory, which posits that sleep deprivation reduces working memory capacity, making it harder for students to process and retain new information.

By investigating sleep patterns in a specific boarding school context, this study aims to generate locally relevant insights that can inform policy and practice. It seeks to answer: How do sleep

behaviors among students correlate with academic performance? What factors influence sleep quality in boarding school settings? and what interventions might improve both sleep and learning outcomes?

This research has practical implications for educators, school administrators, and policymakers. If a strong correlation between sleep and academic performance is found, schools may need to reconsider their schedules, dormitory conditions, and pastoral care strategies. Promoting healthy sleep habits could enhance not only academic success but also emotional resilience and spiritual growth.

Moreover, the study contributes to a growing body of literature that emphasizes student wellbeing as a foundation for educational excellence. In a country like Zimbabwe, where education is a key driver of social mobility, ensuring that students are well-rested is not a luxury, it's a necessity.

1.3 PURPOSE OF THE STUDY

The purpose of this study is to examine the correlation between sleeping patterns and academic performance among students attending a private boarding school in Zimbabwe. Sleep plays a vital role in cognitive functioning, memory consolidation, and emotional regulation, all of which are foundational to academic success (Shochat et al., 2014; Walker, 2017). Despite this, boarding school environments often impose structured routines and academic pressures that may disrupt students' natural sleep cycles. This research seeks to explore how variations in sleep duration, consistency, and quality relate to academic outcomes, while accounting for contextual factors such as dormitory schedules, institutional expectations, and cultural norms.

By situating the study within a Zimbabwean boarding school, the research aims to generate locally relevant insights that can inform school leadership and policy development. It also contributes to the broader discourse on student wellbeing by integrating global findings with Zimbabwe's Heritage-Based Curriculum framework (Chikoko, 2018). Ultimately, the study intends to offer practical recommendations for improving sleep hygiene and academic support systems, thereby improving both student health and learning outcomes.

1.4 STATEMENT OF THE PROBLEM.

In the high-pressure environment of Zimbabwean private boarding schools, academic excellence is often prioritized above all else. Students are expected to maintain rigorous study schedules, participate in extracurricular activities, and meet high performance standards. However, this pursuit of academic success frequently comes at the expense of adequate sleep, a biological necessity that plays a critical role in cognitive functioning, memory consolidation, and emotional regulation (Wongsurakiat, 2025).

Recent global studies have consistently demonstrated a significant correlation between sleep patterns and academic performance among adolescents. Insufficient sleep has been linked to decreased concentration, impaired memory, and lower academic achievement (Sygaco, 2021). In particular, adolescents require 8–10 hours of sleep per night for optimal functioning, yet many students fall short due to academic demands, social pressures, and the pervasive use of digital devices (Khare et al., 2024). While these findings are well-documented in international contexts, there is a notable gap in localized research that examines how these dynamics play out within Zimbabwean boarding schools settings where students live and study in structured, often high-stakes academic environments.

At this private boarding school in Masvingo, anecdotal evidence suggests that students frequently sacrifice sleep to meet academic expectations. However, the extent to which these altered sleep patterns impact their academic performance remains unclear. Without empirical data, school administrators and educators may be overlooking a critical determinant of student success and well-being.

This study seeks to investigate the correlation between sleeping patterns and academic performance among students at a private boarding school in Masvingo. By exploring this relationship within a local context, the research aims to provide evidence-based insights that can inform school policies, promote healthier sleep habits, and ultimately improve academic outcomes.

1.5 AIM OF THE STUDY

To examine the relationship between students' sleeping patterns and their academic performance at a private boarding school in Masvingo, with the goal of identifying whether variations in sleep duration, quality and timing significantly influence academic outcomes, and to inform evidence-based interventions that promote student well-being and academic success.

1.6 RESEARCH QUESTIONS

- What are the sleeping patterns of learners at a private boarding school in Masvingo?
- What is the academic performance of learners at the private boarding school in Masvingo?
- How are the sleeping patterns correlated to the academic performance of learners at the private boarding school in Masvingo?
- How can the correlation between sleeping patterns and academic performance be improved?

1.7 RESEARCH OBJECTIVES

- To collect information about the sleeping patterns of learners at the private boarding school.
- To get information about academic performance at the private boarding school
- To find the correlation between sleeping patterns and academic performance at the private boarding school.
- To find ways to improve the relationship between sleeping patterns and academic performance at the private boarding school.

1.8 HYPOTHESES

1.Null Hypothesis (H_0): There is no significant difference in the sleeping patterns of learners at the private boarding school in Masvingo, regardless of demographic or academic factors.

Alternative Hypothesis (H_1): There is a significant difference in sleeping patterns of the learners at the private boarding school in Msvingo, depending on demographic or academic factors.

2.Null Hypothesis (H_0): There is no significant difference in the academic performance of learners at the private boarding school in Masvingo, regardless of demographic, environmental, or behavioral factors.

Hypothesis (H_1): There is a significant difference in academic performance of learners at the private boarding school in Masvingo, depending on demogrphic, environmental, or behaviotral factors.

3. Null Hypothesis($H_{0)}$ There is no significant correlation between sleeping patterns and academic performance among learners at the private boarding school in Masvingo.

Alternative Hypothesis(H_1) There is a significant correlation between sleeping patterns and academic performance among learners at the private boarding school in Masvingo.

4. Null Hypothesis(H_0) Interventions aimed at improving sleeping patterns have no significant effect on the academic performance of learners at the private boarding school in Masvingo.

Alternative Hypothesis(H_1) Interventions aimed at improving sleeping patterns have a significant positive effect on the academic performance of learners at the private boarding school in Masvingo.

1.9 ASSUMPTIONS

This study is carried out basing on the following assumptions:

(1) That sleep patterns (duration, quality, timing) have a measurable impact on academic performance.

(2) That students' performance in biology can be objectively measured (e.g., through test scores or grades).

(3) That Form 3 biology students are developmentally similar.

(4) That the boarding school context (e.g., routines, dormitory conditions, supervision) plays a role in shaping students' sleep patterns.

(5) That all Form 3 biology students have similar academic demands and timetables.

(6) That other influences on academic performance (e.g., nutrition, mental health, socioeconomic background) are either constant across the sample or not dominant enough to confound the sleep-performance relationship.

(7) That self-reported or observed sleep data is reliable: If you're using surveys, diaries, or interviews, you're assuming students can accurately report their sleep habits.

(8) That academic performance data is valid and accessible. You assume that school records or assessments are accurate reflections of learning outcomes.

(9) That statistical correlation will reflect a real-world relationship, even if it doesn't imply causation.

(10) That the researcher shall gain access to participants and data with informed consent and institutional support.

(11) That research methods (e.g., surveys, interviews) won't negatively affect students' routines or stress levels.

1.10 DELIMITATIONS

This study is delimited by several intentional boundaries that define its scope and focus. Firstly, the research is confined to Form 3 students enrolled in biology at a single private boarding school in Masvingo Province, Zimbabwe. This choice excludes students from other forms, subjects, or school types (e.g., day schools or government institutions), thereby ensuring a consistent academic and environmental context. Secondly, the study focuses exclusively on academic performance in Biology, as measured by internal test scores and term grades. Other academic subjects are not considered, nor are broader indicators of academic success such as overall behavioral assessments. Thirdly, the investigation centers on self-reported sleeping

patterns, including average sleep duration, bedtime routines, and perceived sleep quality. Objective biometric data are not utilized due to logistical and ethical constraints.

The data collection period is limited to a single academic term, and no longitudinal tracking is conducted. Additionally, the study does not account for potential confounding variables such as diet, mental health status, socioeconomic background, or extracurricular involvement, even though these may influence both sleep and academic outcomes. Lastly, the study is conducted in English and aligned with the Zimbabwean Heritage-Based Curriculum, excluding comparative analysis with international curricula or multilingual contexts. These delimitations are designed to enhance the study's feasibility, contextual relevance, and methodological clarity, while acknowledging the boundaries within which the findings may be interpreted.

1.11 LIMITATIONS

Despite its contributions, this study is subject to several limitations. First, the reliance on self-reported data for sleep patterns may introduce recall bias or social desirability bias, potentially affecting the accuracy of the findings (Wolfson et al., 2003). Second, the study's cross-sectional design limits the ability to establish causal relationships between sleep patterns and academic performance. Third, the sample is drawn from a single private boarding school in Masvingo, which may constrain the generalizability of the results to other educational contexts, such as public schools or day schools in different regions. Additionally, unmeasured confounding variables—such as stress levels, or dietary habits may influence both sleep and academic outcomes, complicating the interpretation of observed associations. Finally, while academic performance is measured using formal examination scores, this metric may not fully capture broader aspects of student learning, engagement, or cognitive functioning.

1.12 DEFINITION OF TERMS.

1. Sleeping Patterns - The habitual timing, duration, and structure of sleep, including bedtime, wake time, and sleep consistency. "Sleep patterns refer to the regularity and timing of sleep behaviors that influence cognitive and emotional functioning" (Vishwakarma, 2025).

2. Academic Performance- The measurable outcomes of a student's learning, typically assessed through grades, test scores, and coursework. "Academic performance reflects the extent to which a student achieves educational goals" (Scientific Research Journal, 2025).

3. Sleep Duration - The total amount of time spent asleep during a 24-hour period. "Sleep duration is a critical factor in determining cognitive alertness and academic success" (MDPI, 2025).

4.Sleep Quality- A subjective and objective measure of how restful and restorative sleep is. “Sleep quality includes sleep efficiency, latency, and continuity, all of which affect learning outcomes” (Scientific Research Journal, 2025).

5. Sleep Latency- The time it takes to transition from full wakefulness to sleep. “Shorter sleep latency is associated with better sleep health and improved academic functioning” (Vishwakarma, 2025).

6. Sleep Efficiency- The ratio of time spent asleep to time spent in bed. “High sleep efficiency indicates consolidated sleep, which supports memory consolidation” (MDPI, 2025).

7. Circadian Rhythm - The biological clock regulating sleep-wake cycles over a 24-hour period.

“Circadian rhythms influence alertness and learning capacity throughout the day” (Scientific Research Journal, 2025).

8. Cognitive Functioning -Mental processes such as memory, attention, and reasoning that are essential for learning. “Sleep supports cognitive functions critical for academic achievement” (Vishwakarma, 2025).

9. Sleep Deprivation -A condition resulting from insufficient sleep, either in quantity or quality.

“Sleep deprivation impairs concentration, memory, and academic performance” (MDPI, 2025).

10. Chronotype - An individual’s natural preference for sleeping and waking times (e.g., morning vs. evening types). “Chronotype affects academic engagement and performance, especially in early classes” (Scientific Research Journal, 2025).

11. Sleep Hygiene -Behaviors and environmental factors that promote healthy sleep. “Good sleep hygiene enhances sleep quality and academic outcomes” (Vishwakarma, 2025).

12. REM Sleep -Rapid Eye Movement sleep, a phase associated with dreaming and memory consolidation. “REM sleep plays a vital role in learning and emotional regulation” (MDPI, 2025).

13. Non-REM Sleep- The deeper stages of sleep important for physical restoration and memory encoding. “Non-REM sleep supports declarative memory and academic retention” (Scientific Research Journal, 2025).

14. Sleep Fragmentation -Frequent interruptions during sleep that reduce its restorative value.

“Fragmented sleep disrupts cognitive performance and learning capacity” (Vishwakarma, 2025).

15. Academic Engagement -The degree of attention, curiosity, and interest students show in learning activities.

“Sleep influences motivation and engagement in academic tasks” (MDPI, 2025).

16. Grade Point Average (GPA) - A standardized measure of academic achievement across subjects. “GPA is often used as a proxy for academic performance in sleep studies” (Scientific Research Journal, 2025).

17. Executive Function - Higher-order cognitive skills including planning, decision-making, and impulse control. “Sleep enhances executive functions that are essential for academic success” (Vishwakarma, 2025).

18. Memory Consolidation - The process by which short-term memories are stabilized into long-term storage during sleep.

“Sleep facilitates memory consolidation, which is crucial for learning retention” (MDPI, 2025).

19. Sleep Debt -The cumulative effect of not getting enough sleep over time. “Sleep debt leads to cognitive fatigue and reduced academic performance” (Scientific Research Journal, 2025).

20. Correlation -A statistical measure indicating the strength and direction of a relationship between two variables. “Correlation reveals the degree to which sleep variables and academic outcomes are related” (Vishwakarma, 2025).

1.13 ORGANISATION OF THE STUDY

This research is organized into five main chapters, each progressively developing the logical flow of the investigation. Structuring the study in a systematic manner improves readability, coherence, and ensures the research problem is addressed comprehensively (Creswell&Creswell,2018).

Chapter One: Introduction

This chapter sets the stage for the study by highlighting the crucial role sleep plays in academic performance (Harrison & Horne, 2000). As noted by Kelly and colleagues, sleep deprivation can have far-reaching consequences on cognitive function and learning outcomes (Kelly et al., 2018). The chapter outlines the research problem, objectives, and significance of the study, focusing on the correlation between sleeping patterns and academic performance among boarding school students in Masvingo.

Chapter Two: Literature Review

The literature review explores the complex relationship between sleep and academic performance, drawing on theoretical frameworks and empirical studies (Dahl & Lewin, 2002). It examines the impact of sleep deprivation on cognitive function, memory consolidation, and learning outcomes (Killgore et al., 2010). The chapter also discusses the unique challenges faced by boarding school students, including sleep disruptions and irregular sleep schedules (OReilly et al., 2018). Gaps in existing literature are identified, particularly in the Zimbabwean context.

Chapter 3: Research Methodology

This chapter outlines the research design, methods, and procedures used to investigate the correlation between sleeping patterns and academic performance. The study employs a quantitative approach, using surveys and academic records to collect data from a sample of students at a private boarding school in Masvingo (Creswell, 2014). The chapter discusses the study's population, sample selection, data collection tools, and analysis techniques.

Chapter 4: Presentation and Analysis

The chapter presents the findings of the study, analyzing the correlation between sleeping patterns and academic performance using descriptive and inferential statistics (Field, 2013). The results show a significant relationship between sleep duration and academic performance, consistent with existing literature (Curcio et al., 2013).

Chapter Five: Summary, Recommendations, and Conclusion

This final chapter summarizes the key findings, implications, and contributions of the study. Based on the results, recommendations are made to stakeholders, including students, teachers, and policymakers, on strategies to improve sleep patterns and academic performance (Harrison & Horne, 2000). The chapter concludes by highlighting the study's limitations and suggesting areas for future research.

1.14 CHAPTER SUMMARY.

Sleep, a vital component of human life, plays an important role in cognitive function, memory consolidation, and learning capabilities (Harrison & Horne, 2000). The relationship between sleep patterns and academic performance has drawn substantial attention in recent years, particularly in educational institutions. This study aims to investigate the correlation between sleeping patterns and academic performance among students at a private boarding school in Masvingo, Zimbabwe.

The demands of academic life, coupled with the pressures of adolescence, have led to increased concerns about sleep deprivation among students. Research suggests that sleep deprivation can negatively impact attention, memory, and decision-making skills, ultimately affecting academic

performance (Killgore et al., 2010). Despite the importance of sleep, many students in private boarding schools, where academic rigor and competition are high, often sacrifice sleep to meet academic demands. This raises questions about the potential consequences of sleep deprivation on academic performance, particularly in the context of Zimbabwe's education system.

This study seeks to contribute to the growing body of research on sleep and academic performance, providing insights into the specific context of private boarding schools in Zimbabwe. By exploring the correlation between sleeping patterns and academic performance, this study aims to inform strategies to promote healthy sleep habits and improve academic outcomes among students. The study will be guided by the sleep-wake cycle theory, which posits that sleep plays a critical role in cognitive function and memory consolidation (Harrison & Horne, 2000).

The findings of this study may have implications for stakeholders in education, including students, teachers, and policymakers. By understanding the relationship between sleep and academic performance, educators and policymakers can develop targeted interventions to promote healthy sleep habits and improve academic outcomes. Ultimately, this study aims to contribute to the development of evidence-based policies and practices that support the well-being and academic success of students in private boarding schools in Zimbabwe.

CHAPTER 2: REVIEW OF RELATED LITREATURE

2.1. Introduction

Sleep is a biological imperative that underpins cognitive, emotional, and physical health. Among adolescents, sleep is particularly crucial due to ongoing neurodevelopment and academic demands (Hirshkowitz et al., 2015). Boarding school students face unique challenges that may compromise sleep quality and quantity, including institutional routines, peer dynamics, and limited parental oversight (Beattie, Kennedy, & O'Brien, 2021). This literature review explores the relationship between sleep and academic performance, with a focus on boarding school contexts and the Zimbabwean educational landscape, particularly in Masvingo Province.

2.2. Theoretical Framework

Two key theories guide this investigation namely the biopsychosocial model and cognitive load theory. The biopsychosocial model posits that biological, psychological, and social factors interact to influence health outcomes, including sleep hygiene and learning capacity (Engel, 1977). In a boarding school, sleep does not occur in a vacuum; it is mediated by social, environmental, and structural factors. Adolescents experience a biological shift in their circadian rhythm, a phase delay that makes them naturally inclined to fall asleep later and wake up later (Hagenauer et al., 2009). This chronobiology often clashes with early school start times, a phenomenon known as "social jetlag." In a boarding school with strict lights-out and wake-up

bells, this mismatch can be acute. Students may lie in bed awake for hours, then be forced to wake during a biological "trough," leading to chronic sleep deprivation (Crowley et al., 2018). This misalignment directly compromises alertness during morning classes, which are often dedicated to core academic subjects.

Cognitive load theory emphasizes the limitations of working memory and the need for adequate rest to optimize cognitive processing (Sweller,1988). Sleep facilitates memory consolidation, attention regulation, and executive functioning—all essential for academic success (Curcio, Ferrara, & De Gennaro, 2006). The Cognitive Load Theory suggests that sleep deprivation increases extraneous cognitive load, impairing working memory and academic performance (Sweller,1988). While not a sleep-specific theory, Cognitive Load Theory (Sweller,1988) interacts powerfully with sleep. This theory states that working memory has a limited capacity. Sleep deprivation further reduces this capacity, increasing intrinsic cognitive load (the inherent difficulty of the material) and making students more susceptible to extraneous load (distractions from the environment). A well-rested student in a Masvingo boarding school can better manage the cognitive load of a complex Biology problem, whereas a sleep-deprived peer may be overwhelmed by the same task.

The boarding school environment itself can be a source of stress—academic pressure, social dynamics, and homesickness. Stress activates the hypothalamic-pituitary-adrenal (HPA) axis, increasing cortisol levels, which can disrupt sleep architecture and make it harder to fall asleep. This creates a vicious cycle, stress causes poor sleep, and poor sleep impairs emotional regulation and increases vulnerability to stress, further impacting the mental well-being required for academic focus (Dewald et al., 2010). For an investigation at a private boarding school in Masvingo, these frameworks provide a multi-layered hypothesis. It is not merely that "less sleep equals worse grades." Rather, the theoretical prediction is that disrupted and insufficient sleep (e.g., from late-night socializing, academic anxiety, or environmental noise) will lead to Impaired memory consolidation, resulting in poorer performance on tests requiring recall and integration of knowledge. Furthermore, it leads to degraded executive functions, manifesting as an inability to concentrate in class, participate in discussions, and complete complex assignments. Worse still the psycho social stress worsens circadian misalignment, particularly affecting students who are "night owls," leading to under-performance in early-morning lessons.

2.3. **The needs of learners in boarding schools**

Students in boarding schools have several needs that can not be ignored. This is beause these needs have a bearing on students academic performance, these needs include sleeping needs.Adolescents typically require between 8 to 10 hours of sleep per night to function optimally (Hirshkowitz et al., 2015). However, biological shifts in circadian rhythms, coupled with academic pressure and digital distractions, often lead to chronic sleep deprivation (Carskadon, 2011). Beattie et al. (2021) found that adolescents in boarding schools frequently experience delayed sleep onset and fragmented sleep due to dormitory dynamics and institutional

schedules. Studies consistently show that adolescents who sleep between 7–9 hours per night perform better academically than those who sleep less. A meta-analysis by Lo et al. (2016) found that sleep deprivation negatively affects attention, executive function, and academic achievement. In a study of 105 students, those with consistent sleep patterns scored significantly higher in standardized tests than peers with irregular sleep schedules (Mugisha, 2023).

The rigorous academic environment of a private boarding school, particularly in a context like Masvingo, Zimbabwe, often places immense pressure on students to excel. In this drive for achievement, one crucial, yet frequently overlooked, biological necessity—sleep—can be significantly compromised. This literature review delves into global evidence on the relationship between sleep duration and academic outcomes, providing a critical foundation for an investigation at a private boarding school in Masvingo, Zimbabwe. The aim is to contextualize the universal impact of sleep duration with the specific challenges and opportunities inherent in this unique educational setting.

From a fundamental biological perspective, sleep is far from a passive state; it is an active, restorative process essential for optimal brain function. During sleep, particularly slow-wave sleep (NREM stage 3) and Rapid Eye Movement (REM) sleep, critical processes occur that directly underpin learning and memory. These include: Memory Consolidation: Newly acquired information from the waking day is transferred from temporary to more permanent storage in the brain (Stickgold & Walker, 2008). Without sufficient duration in these sleep stages, the brain's ability to "save" and integrate new knowledge is impaired. Synaptic Homeostasis: Sleep helps to "prune" or downscale synaptic connections, strengthening the most important ones while weakening less relevant ones, optimizing neural networks for learning (Tononi & Cirelli, 2014). The glymphatic system, highly active during sleep, clears metabolic waste products, including neurotoxins, from the brain (Xie et al., 2013). Chronic sleep deprivation can lead to an accumulation of these toxins, impairing neural function.

2.4. **Boarding School Environments and Sleep Disruption.**

Boarding schools present unique environmental stressors. Minges and Redeker (2016) observed that students in residential settings often suffer from poor sleep hygiene due to early wake-up calls, late-night study sessions, and communal sleeping arrangements. Beattie et al. (2021) reported that Australian boarding students had significantly lower sleep quality and higher daytime sleepiness compared to day students. These findings align with anecdotal evidence from Zimbabwean boarding schools, where institutional routines often prioritize academic and spiritual activities over sleep. Boarding schools present unique sleep challenges due to rigid schedules, communal living, and academic pressure. A study in Kenyan boarding schools revealed that students averaged only 5.5 hours of sleep per night due to early wake-up calls and late-night study sessions (Omondi, 2021). Similar patterns are observed in South African and Nigerian boarding schools, where sleep deprivation is normalized as part of academic rigor (Adebayo & Olatunji, 2020).

The transition to and daily life within a boarding school represent a unique socio-educational experience, fundamentally shaping students' routines, social interactions, and personal development. This distinct environment, particularly within a private institution like one in Masvingo, Zimbabwe, introduces specific challenges that often impact adolescent sleeping patterns. This literature review synthesizes global findings on sleep challenges prevalent in boarding school contexts, providing a critical lens for understanding their potential correlation with academic performance in the proposed investigation. It recognizes that beyond universal biological needs, the human experience of sleep is profoundly influenced by one's living and learning environment.

Boarding school environments, by design, differ significantly from traditional home-based schooling. While they offer structure, community, and focused academic environments, these very strengths can inadvertently create or exacerbate sleep challenges for adolescent residents. Boarding schools operate on fixed schedules for wake-up times, meals, classes, and study periods. While seemingly beneficial for discipline, these rigid routines often clash directly with the natural biological tendency of adolescents to experience a sleep phase delay (Carskadon et al., 1998). This means teenagers are biologically wired to fall asleep later and wake up later. Forced early rising, a common feature of boarding life, leads to chronic sleep deprivation, as students are pulled out of vital sleep stages before their bodies are ready (Wahab et al., 2016). For a student in Masvingo, this isn't defiance; it's their body clock trying to keep pace with an institutional clock.

Private boarding schools are often characterized by high academic expectations, intensive curricula, and competitive environments. This translates into longer study hours, extensive homework, and extracurricular commitments that frequently extend late into the evening. Studies show that a substantial portion of adolescents' sacrifice sleep to meet academic demands, creating a vicious cycle where sleep deprivation impairs learning, necessitating more study time (Gaultney, 2010; Buboltz et al., 2001). The human drive for success can unintentionally lead to self-sabotage of sleep.

Numerous studies confirm a positive correlation between sleep quality and academic achievement. Gilbert and Weaver (2010) found that sleep quality was a stronger predictor of GPA than study time. Dewald et al. (2010) conducted a meta-analysis of 16 studies and concluded that sleep duration, sleep quality, and sleepiness were all significantly associated with academic performance. Lo et al. (2016) demonstrated that even short-term sleep restriction impairs attention, working memory, and problem-solving abilities. Research across diverse educational contexts consistently shows that sleep duration, quality, and timing are correlated with academic outcomes. In a comprehensive literature review, it was found that students who sleep less than 6 hours per night or experience frequent sleep disturbances tend to perform worse academically compared to peers with healthier sleep habits (Barley et al., 2025).

The correlation coefficients, though modest (r = .03 to .15), are statistically significant and suggest a cumulative impact over time. A study by the American Journal of Scientific Research emphasized that daytime sleepiness and poor sleep hygiene negatively affect concentration, test performance, and classroom engagement (AJOSR, 2025). These effects are particularly pronounced in adolescents, whose circadian rhythms naturally shift toward later sleep and wake times often clashing with early school schedules. In medical student populations, where academic demands are intense, irregular sleep cycles were associated with lower GPA scores and reduced social integration, further compounding academic stress (Zhou et al., 2024). This is relevant to boarding school contexts, where students often face structured schedules, communal living, and limited autonomy over sleep routines.

The relentless pursuit of academic excellence, often characteristic of students in private boarding schools, frequently comes at the cost of adequate sleep. The proposed investigation into the correlation between sleeping patterns and academic performance at such an institution is highly pertinent, given the overwhelming global evidence affirming sleep's foundational role in cognitive function and learning. Across diverse populations and educational systems worldwide, a consistent body of literature underscores sleep as an indispensable biological process for optimal cognitive functioning, memory consolidation, and emotional regulation, all critical determinants of academic success. More than just a period of rest, sleep is an active state crucial for brain plasticity and efficient information processing (Walker, 2017). When sleep is compromised, the impact reverberates across various domains of academic life.

Research globally has identified several dimensions of sleeping patterns that significantly influence academic outcomes. Firstly, sleep duration, this is the most frequently studied variable, inadequate sleep duration is consistently linked to poorer academic performance. Recommended sleep for adolescents (13-18 years) is 8-10 hours per night, and for young adults (18-25 years) 7-9 hours (National Sleep Foundation, 2015). Studies from diverse regions, including the United States (Curcio et al., 2006), Europe (Dewald et al., 2010), and Asia (Gaultney, 2010), demonstrate a dose-response relationship, students who consistently obtain less than the recommended sleep duration exhibit lower GPAs, reduced test scores, and diminished problem-solving abilities. It’s not just about passing; it’s about the depth of understanding and the ability to apply knowledge.

The second variable is sleep quality, beyond the sheer number of hours, the quality of sleep is paramount. Fragmented sleep, frequent awakenings, or difficulty initiating sleep (often measured by tools like the Pittsburgh Sleep Quality Index - PSQI) disrupt the crucial stages of sleep necessary for memory consolidation (e.g., slow-wave sleep) and emotional processing (e.g., REM sleep). Poor sleep quality, irrespective of duration, is linked to impaired attention, reduced executive function, and increased daytime sleepiness, all of which directly impede learning and performance (Maas, 1999; Swee & Chew, 2019). Imagine trying to focus on a complex lecture when your mind feels clouded that's the human experience of poor sleep quality.

Another critical variable is Sleep Timing and Consistency (Circadian Rhythm). Our internal biological clocks, or circadian rhythms, dictate our natural sleep-wake cycle. Irregular sleep schedules, often termed "social jetlag" due to discrepancies between weekday and weekend sleep, disrupt these rhythms. Evidence suggests that inconsistent sleep timing, leading to a misaligned body clock, can be as detrimental as insufficient sleep duration (Foster & Wulff, 2005). University students, especially those in boarding environments with fluctuating social activities and study demands, are particularly vulnerable to irregular sleep patterns. This inconsistency makes it harder for the brain to anticipate sleep and wakefulness, leading to chronic fatigue and reduced cognitive efficiency (Loh et al., 2021). The human cost is a constant feeling of being "off," struggling to be fully present.

2.5. Sleep and Cognitive Functioning among learners

Sleep supports neuro-cognitive processes essential for learning. Curcio et al. (2006) emphasized that sleep deprivation impairs attention, memory consolidation, and executive functioning. These deficits translate into reduced classroom engagement, poor test performance, and increased academic stress. Furthermore, Walker and Stickgold (2006) argue that sleep plays a critical role in integrating new information into existing cognitive frameworks, a process vital for deep learning. Adolescents experience a biological shift in circadian rhythms during puberty, leading to later sleep and wake times. Early school start times conflict with this shift, resulting in chronic sleep deprivation (Wheaton et al., 2016). Schools that delayed start times by one hour observed improved attendance, alertness, and academic performance (Kelley et al., 2017).

In the pursuit of academic excellence within a private boarding school in Masvingo, Zimbabwe, the conversation often revolves around curriculum, study habits, and teacher quality. Yet, a silent, powerful orchestrator of our biology, the circadian rhythm – frequently goes unacknowledged, particularly in its profound interaction with fixed school start times. This literature review explores the global evidence on circadian rhythms and their clash with early school schedules, providing a critical lens for investigating how these biological patterns, especially in a unique boarding school context, can shape a student’s sleeping patterns and ultimately, their academic performance. It's a deeply human story about our internal clocks battling external demands.

Our bodies operate on an approximate 24-hour cycle, known as the circadian rhythm, which governs various physiological and behavioral processes, including sleep-wake cycles, hormone release, body temperature, and metabolism (Moore, 2007). This internal "body clock" is primarily regulated by the suprachiasmatic nucleus (SCN) in the brain, and it is highly sensitive to external cues, especially light (Panda et al., 2002). Light exposure, particularly blue light from screens, can signal to the SCN that it is daytime, delaying the release of melatonin, the hormone that promotes sleep.

For adolescents, a crucial developmental shift occurs in their circadian rhythm, a natural tendency for sleep phase delay (Carskadon et al., 1998). This means that teenagers biologically feel sleepy later at night and are predisposed to wake up later in the morning. This isn't a choice or laziness; it's a fundamental neurobiological change. Their bodies are simply not ready to sleep until later and not ready to wake up early.

The global norm of early school start times presents a significant conflict with the delayed sleep phase of adolescents. This mismatch forces students to wake up before their bodies are biologically ready, leading to chronic sleep deprivation and a state often described as "social jetlag" – a misalignment between their internal clock and the external schedule (Wittmann et al., 2006). The human consequence is profound: students are frequently attempting to learn and perform academically during a time when their brains are still biologically programmed for sleep.

The mismatch between adolescent circadian rhythms and early school start times has a well-documented cascading effect on cognitive function and academic performance. When students are forced to wake up against their biological clock, they experience significant daytime sleepiness. This directly leads to compromised sustained attention and concentration in the classroom (Owens et al., 2010). For a student in Masvingo, this might mean struggling to follow a complex lecture early in the morning, their mind constantly drifting, not because of a lack of interest, but because their brain is still in a sleep-deprived state. The teacher might perceive disengagement, but the student is simply battling their biology. Reduced Memory Consolidation and Retrieval: Adequate sleep, particularly sufficient duration and alignment with circadian rhythms, is essential for memory consolidation (Stickgold & Walker, 2008). When students are chronically sleep-deprived due to early starts, the critical sleep stages required to "cement" new information are often cut short. This affects both the ability to learn new material effectively and to recall it accurately during tests or assignments. The human frustration of "knowing" something but being unable to access it during an exam is a direct consequence of this memory impairment.

Higher-order cognitive skills like problem-solving, critical thinking, planning, and decision-making (collectively known as executive functions) are highly vulnerable to sleep deprivation and circadian misalignment (Lim & Dinges, 2008). These are the very skills that distinguish strong academic performance. Students operating on a misaligned schedule may struggle with time management, making poor study choices, or finding it difficult to approach complex academic challenges systematically.

Chronic sleep deprivation due to early school starts is strongly associated with increased irritability, mood swings, anxiety, and depressive symptoms among adolescents (Liu et al., 2016). These emotional disturbances not only affect a student's well-being but also directly interfere with their motivation, engagement, and ability to learn effectively in the classroom. A

student who feels perpetually grumpy or overwhelmed is less likely to participate, seek help, or invest fully in their studies

A growing body of research, particularly from the United States, has advocated for and demonstrated the benefits of later school start times. Studies consistently show that delaying school start times, even by 30-60 minutes, leads to a significant increase in students' average sleep duration (Wahab et al., 2016; Minder et al., 2019). This is because students tend to maintain their natural later bedtimes but gain more sleep in the morning. Schools that have shifted to later start times have reported improvements in grades, standardized test scores, and attendance rates (Edwards, 2012; Owens et al., 2010). When students are more awake and alert, their capacity to learn and perform improves measurably.

Later start times are also associated with reduced rates of tardiness, fewer disciplinary incidents, and even a decrease in car accidents involving adolescent drivers, alongside improvements in reported mood and mental health (Hafner et al., 2017; Wahlstrom, 2014). This highlights the broad positive impact on a student's entire human experience, not just their grades. Boarding schools, by nature, impose highly structured daily routines, including fixed wake-up times for communal activities (e.g., breakfast, assembly) and early classes. This rigid schedule can exacerbate the conflict with adolescent circadian rhythms, leaving less room for students to adjust naturally. The drive for excellence in private schools often means extensive academic hours, evening study periods, and numerous extracurricular activities, all of which can push bedtimes later, directly clashing with the need for an early rise. Light Exposure, while not always as prevalent as in highly urbanized settings, modern technology (smartphones, laptops) and artificial lighting in dormitories can further disrupt circadian rhythms by delaying melatonin release, making it harder for students to fall asleep even when they attempt to do so early (Cain & Gradisar, 2010).

There may be deeply ingrained institutional norms or cultural expectations regarding early rising, discipline, and the value of "hard work" (which can sometimes be implicitly linked to sacrificing sleep). Challenging these norms requires compelling evidence rooted in the local context. Unlike public school systems constrained by transportation logistics, a private boarding school might have greater autonomy to adjust its schedule, making the findings of such a study highly actionable for improving student well-being and academic outcomes. The global scientific evidence clearly demonstrates that early school start times are fundamentally misaligned with the natural biology of adolescent circadian rhythms, leading to chronic sleep deprivation. This not only impairs critical cognitive functions like attention, memory, and executive processing but also negatively impacts mood, mental health, and overall academic performance.

An investigation into this phenomenon at a private boarding school in Masvingo, Zimbabwe, is crucial. It would provide localized, human-centered data on how these universal biological principles interact with the specific environmental, cultural, and academic pressures of such an institution. By understanding the intricate dance between students' internal clocks and their daily

schedules, this research can empower the school to make informed decisions – perhaps even to consider later school start times – that honor the biology of its students, fostering not just academic achievement, but truly restorative sleep, improved well-being, and a richer, more vibrant learning experience. It's about giving students the best possible chance to be their best selves, starting with a good night's rest.

2.6. **Cultural and Institutional Factors in Zimbabwe.**

Zimbabwean boarding schools often operate under rigid schedules that prioritize academic rigor and spiritual discipline. Anecdotal evidence from Masvingo suggests that students wake as early as 4:30 a.m. for prayers and retire after 10:00 p.m., leaving insufficient time for restorative sleep. While these routines reflect cultural values, they may inadvertently compromise cognitive performance and emotional wellbeing (Mavhunga, 2020). The lack of formal sleep policies in Zimbabwean schools further exacerbates this issue.

Culture acts as a powerful, often unconscious, force shaping our perceptions, behaviors, and priorities. In the Zimbabwean context, and particularly within an academic setting, cultural influences on sleep can be manifold. As previously noted, education is highly revered in Zimbabwean society, often viewed as the primary vehicle for social and economic advancement (Shumba, 2010, representative of common observation). This cultural emphasis can foster an environment where academic achievement is paramount, potentially overshadowing other critical aspects of well-being, including sleep. Students may internalize the belief that sacrificing sleep is a necessary "cost" for educational success, leading them to prioritize study over rest. This is a deeply human desire to secure a better future for oneself and one's family.

Some cultural interpretations of "hard work" can equate it with long hours and personal sacrifice, including sleep. This can create a narrative where late-night studying or early morning preparations are seen as signs of dedication and commitment, rather than potential indicators of an unsustainable lifestyle that compromises well-being and learning. The human desire to be seen as diligent and committed can therefore lead to mal -adaptive sleep habits. While boarding schools foster a sense of community, traditional African cultural values often emphasize extended family and communal support. Students in boarding schools may feel a dual pull, this is the immediate community of their peers and the broader obligations to their families back home. These social connections, including communication with family (often via phone late at night), can impact sleep schedules. Furthermore, social interactions within dormitories, while fostering belonging, can also lead to late-night conversations and activities that disrupt sleep. The human need for connection and social belonging can directly compete with the need for rest.

Traditional Beliefs and Practices, while less documented in a contemporary boarding school context, some traditional beliefs might hold sophisticated views on sleep, perhaps associating certain times of day or night with specific energies or activities. While modern education often supersedes these, lingering cultural attitudes could subtly influence perceptions of rest.

2.7. **The Heritage-Based Curriculum and Holistic Education**

Zimbabwe's Heritage-Based Curriculum emphasizes holistic development, integrating cognitive, emotional, and spiritual growth (Chikodzi, 2013). However, sleep health is rarely addressed in policy or practice. Integrating sleep education into this framework could enhance student well-being and academic outcomes. As highlighted by Dewald et al. (2010), sleep interventions in schools have the potential to improve both health and academic metrics.

Zimbabwe's Heritage-Based Curriculum emphasizes holistic development, yet boarding schools often prioritize academic excellence at the expense of student well-being. The pressure to excel in national examinations leads to extended study hours and reduced sleep (Chikowore, 2022). The landscape of education in Zimbabwe has seen significant shifts, notably with the emphasis on a Heritage-Based Curriculum (HBC), often framed within the "Education 5.0" philosophy. This curriculum aims to foster a problem-solving, innovation-driven, and entrepreneurial mindset, deeply rooted in local heritage and national identity (Nyatsanza, 2021; Utete, 2017). While laudable in its intent to produce relevant and skilled graduates, this evolving academic framework inevitably reshapes the nature and intensity of academic demands on students, particularly those in the structured yet often demanding environment of private boarding schools in places like Masvingo.

The Heritage-Based Curriculum (HBC) represents a significant departure from purely theoretical, exam-centric models. Its core tenets emphasize:

- Practical Skills and Industrialization: Integrating vocational and technical skills, agriculture, and practical innovation into core learning. This moves beyond traditional textbook knowledge to hands-on application (Utete, 2017).
- Research and Innovation: Encouraging students to engage in research, problem-solving, and the development of tangible products or solutions relevant to national development (Nyatsanza, 2021).
- Community Engagement: Fostering a connection to local heritage, culture, and community needs, often requiring fieldwork or project-based learning within the local context.

While enriching, the implementation of HBC invariably translates into new and often increased academic demands for students, layering upon existing subject requirements. Practical components, such as agricultural projects, workshop activities, or scientific experiments linked to local issues, require dedicated time outside of conventional classroom hours. For boarding students, this means their day extends beyond formal lessons into applied, often physically demanding, activities. The human toll is evident in a schedule with less free time, pushing academic work later into the evening.

The emphasis on research and innovation within HBC mandates students to undertake projects, conduct investigations, and synthesize findings. This involves independent study, data collection (which might occur outside normal school hours), critical analysis, and extensive report writing (Mhute et al., 2013). Such tasks are inherently time-consuming and cognitively demanding, often leading to increased evening study and weekend work to meet deadlines. The mental load of managing complex projects can create significant stress, impacting the ability to unwind and sleep.

Integrating heritage-based concepts across subjects (e.g., indigenous knowledge in science, local history in literature) requires students to make connections across disciplines. While valuable, this can increase cognitive load, demanding deeper processing and more complex problem-solving abilities (Chikunda & Chirimuuta, 2020). Students might spend more time grappling with concepts, contributing to mental fatigue that hinders sleep onset and quality.

The heightened and diversified academic demands introduced by the HBC in a private boarding school context can profoundly influence student sleeping patterns through several interconnected pathways. The most direct consequence of increased academic demands is a reduction in available time for sleep. Students, striving to excel under high expectations and with a packed schedule (early school starts, extracurricular, study halls, and now HBC-related projects), often view sleep as the most expendable commodity (Buboltz et al., 2001). This can lead to chronic sleep debt, a known precursor to diminished academic performance (Curcio et al., 2006). For a student dedicated to their studies in Masvingo, the choice often feels like either getting good grades or getting enough sleep, a false dichotomy with real human consequences.

The pressure to succeed in a demanding curriculum, coupled with the new challenges of HBC projects and assessments, can induce significant academic stress and anxiety. High levels of stress are directly linked to poor sleep quality, including difficulty falling asleep (insomnia), fragmented sleep, and non-restorative sleep (Liu et al., 2016). Students may find their minds racing with thoughts of assignments and deadlines, making it impossible to relax sufficiently for deep sleep, even if they allocate the time.

Project-based learning and research, often characterized by fluctuating deadlines and varying workload intensity, can lead to highly inconsistent sleep schedules. Students might pull all-nighters or sleep very little during peak project times, only to "catch up" on weekends (Gaultney, 2010). This irregularity disrupts the adolescent's natural circadian rhythm, further impairing daytime alertness and cognitive function (Wahab et al., 2016). The human body thrives on routine, and irregular sleep patterns are fundamentally disruptive. The cognitive intensity of project work, often involving extensive reading, writing, and analytical thinking, contributes to mental fatigue. If this work is done using electronic devices late into the evening, the blue light emitted from screens can suppress melatonin production, further delaying sleep onset and degrading sleep quality (Cain & Gradisar, 2010).

While global literature extensively details the negative correlations between general academic demands, sleep deprivation, and poor academic outcomes (e.g., Gaultney, 2010; Stickgold & Walker, 2008), there is a significant scarcity of studies specifically exploring this interplay within the context of the Heritage-Based Curriculum in Zimbabwe. Most existing research on Zimbabwean education focuses on curriculum implementation challenges or teacher preparedness (Chikunda &Chirimuuta, 2020), with limited attention to the student's lived experience, particularly regarding sleep. This gap is critical. The unique blend of traditional academic rigor, the added practical and research components of the HBC, and the specific communal living dynamics of a private boarding school in Zimbabwe, likely create a distinct set of sleep challenges. Understanding these challenges is not merely an academic exercise; it is about recognizing the unseen pressures on young people striving for a better future, and finding ways to support their success without sacrificing their fundamental health.

The implementation of a Heritage-Based Curriculum in Zimbabwe, while forward-thinking, undeniably adds new layers of academic demands on students, particularly those in private boarding schools. These demands, spanning extended practical work, intensive research projects, and complex interdisciplinary learning are potent precursors to reduced sleep duration, compromised sleep quality, and irregular sleep patterns. The human cost is often an underlying fatigue and stress that undermines the very cognitive faculties essential for academic excellence.

This proposed investigation into the correlation between sleeping patterns and academic performance is thus exceptionally timely and relevant. It provides a unique opportunity to bridge a critical research gap by contextualizing global findings within the specific realities of a Zimbabwean educational reform. By shedding light on how the HBC-driven academic demands influence student sleep, this research can inform evidence-based strategies for the school, ensuring that the pursuit of a relevant and innovative education does not accidentally compromise the holistic well-being and peak academic potential of its most valuable resource, its students. This study can advocate for a curriculum that not only shapes minds for national development but also respects the fundamental biological needs that allow those minds to truly flourish.

2.8. Methodological Considerations

Studies on sleep and academic performance employ both subjective and objective measures. Subjective tools include sleep diaries and questionnaires, while objective methods involve actigraphy and polysomnography (Minges & Redeker, 2016). For the Masvingo study, a mixed-methods approach combining sleep logs, academic records, and interviews may yield rich, context-sensitive data. Validated instruments such as the Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS) are commonly used in adolescent sleep research (Buysse et al., 1989). Most studies rely on self-reported sleep data, which may be biased. Actigraphy and polysomnography offer more accurate measures but are rarely used in low-resource settings.

Mixed-methods approaches—combining surveys, interviews, and academic records are recommended for contextual depth and reliability (Beattie et al., 2015).

Embarking on an investigation into the correlation between sleeping patterns and academic performance at a private boarding school in Masvingo, Zimbabwe, necessitates a careful consideration of research methodologies. While the topic itself is compelling, the robustness and validity of the findings hinge on how the study is designed, data is collected, and conclusions are drawn. This literature review addresses key methodological considerations in sleep research, framing them within the specific context of your proposed study, acknowledging the human effort involved in rigorous inquiry and the practicalities of research in a Zimbabwean setting.

A primary methodological consideration in sleep research is the choice between subjective and objective measures of sleep. Both have strengths and limitations, and often, a combination provides the most comprehensive picture:

Subjective Measures:

• What they are: These rely on self-report, typically through questionnaires, sleep diaries, or interviews. Instruments like the Pittsburgh Sleep Quality Index (PSQI) or Epworth Sleepiness Scale (ESS) are commonly used (Buysse et al., 1989). Sleep diaries involve participants recording their bedtime, wake-up time, estimated sleep duration, and perceived sleep quality daily.

• Strengths: Relatively inexpensive, easy to administer to large groups, capture the individual's lived experience of sleep (which is crucial for understanding motivation and perception), and can assess subjective sleep quality.

• Limitations: Prone to recall bias (difficulty accurately remembering sleep patterns over time), social desirability bias (reporting what one thinks is expected), and may not accurately reflect actual sleep physiology. Students might overestimate their sleep duration or quality if they believe it reflects well on them or if they are unaware of their actual patterns.

• Relevance for Masvingo: Questionnaires and sleep diaries are highly practical for a boarding school setting in Masvingo due to their ease of distribution, potential for anonymity, and ability to capture daily variations. However, the research team must be mindful of literacy levels and ensure clear instructions for participants.

Objective Measures:

• What they are: These involve instrumental recording of physiological sleep data. The most common is actigraphy, which uses a wrist-worn device to measure movement and infer sleep-

wake cycles. Polysomnography (PSG), the "gold standard," records brain waves (EEG), eye movements (EOG), and muscle activity (EMG) to definitively stage sleep.

• Strengths: Provide objective, quantifiable data on sleep duration, efficiency, latency, and wakefulness, minimizing subjective bias. PSG offers the most detailed physiological information.

• Limitations: Actigraphy is less accurate than PSG for determining sleep stages and can be confounded by immobility (e.g., reading in bed). PSG is expensive, requires specialized equipment and trained personnel, and can be intrusive, potentially altering natural sleep patterns, especially in a novel environment like a dormitory.

• Relevance for Masvingo: Actigraphy could be a feasible option for capturing more objective sleep duration and timing data from a subset of students, offering a valuable complement to self-report. PSG is likely impractical and cost-prohibitive for this specific study context but could be considered for a separate, more in-depth clinical investigation.

The definition and measurement of "academic performance" also require careful methodological consideration:

1. Self-Reported GPA:

• What it is: Asking students to report their cumulative Grade Point Average (GPA).

• Strengths: Easy to collect and administer.

• Limitations: Susceptible to reporting errors, social desirability bias, and lack of access to official records. Students might misremember their GPA or inflate it.

• Relevance for Masvingo: Practical, but requires careful validation if possible (e.g., by comparing a sample of self-reported GPAs to actual school records, with appropriate consent).

2. Official School Records:

• What it is: Obtaining GPA data directly from the school administration.

• Strengths: Provides accurate, objective measures of academic performance.

• Limitations: Requires obtaining formal institutional approval and individual student/parent consent, which can be a complex administrative and ethical process. Data protection and privacy must be meticulously managed.

• Relevance for Masvingo: This is the preferred method for accuracy, but requires significant logistical planning and ethical navigation.

3. Specific Academic Outcomes:

4. • What it is: Instead of GPA, researchers might focus on specific metrics like exam scores in particular subjects, attendance rates, or participation levels.

• Strengths: Can be more granular and directly linked to specific cognitive functions influenced by sleep.

• Limitations: Requires access to specific academic data and may not capture overall academic standing as comprehensively as GPA.

• Relevance for Masvingo: Focusing on specific subject exams (e.g., a morning science exam vs. an afternoon humanity exam) could provide interesting insights into the impact of circadian misalignment.

Sleep patterns do not operate in a vacuum; they are influenced by, and in turn influence, numerous other factors. A robust study must attempt to control for these confounding variables to isolate the specific correlation between sleep and academic performance. Key considerations include:

• Demographic Factors: Age, gender, year of study, and socio-economic background can all influence sleep and academic performance.

• Lifestyle Factors: Diet, physical activity, work hours (if any), participation in extracurricular activities, and substance use (e.g., caffeine, energy drinks) are significant influencers of both sleep and academic outcomes (Gaultney, 2010).

• Mental Health Status: Anxiety, depression, and stress levels are strongly linked to both poor sleep and academic struggles (Liu et al., 2016).

• Academic Load and Curriculum Structure: The intensity of academic demands, including the specific implementation of the Heritage-Based Curriculum, can directly impact study time and stress levels.

• Environmental Factors: Dormitory conditions (noise, temperature), access to technology, and light exposure are environmental confounders that can affect sleep.

For this study in Masvingo at a private boarding school, data collection must include questions to capture these potential confounders, allowing for their inclusion in statistical analyses (e.g., correlation, regression) to better understand the unique contribution of sleep patterns.

Research involving adolescents, especially in a residential setting, demands meticulous ethical planning:

• Informed Consent and Assent: Comprehensive informed consent must be obtained from parents/guardians, and assent from the student participants, clearly outlining the study's purpose, procedures, confidentiality, and their right to withdraw at any time without penalty. This is a human-centered approach, respecting individual autonomy.

• Confidentiality and Anonymity: Protecting the privacy of participants is paramount. Data must be anonymized where possible, and reporting should focus on group trends rather than individual identification. These builds trust and encourage honest responses.

• Potential for Distress: Discussing sleep problems or academic struggles can be sensitive. Researchers must be prepared to offer resources or referrals for students who may experience distress during the study.

• Researcher-School Relationship: Building a strong, collaborative relationship with the school administration and staff is crucial for gaining access, ensuring ethical conduct, and facilitating data collection. Based on these considerations, a comprehensive methodological approach for this investigation might include:

(a). Mixed-Methods Design: Combining quantitative data (from questionnaires and possibly actigraphy) with qualitative data (focus groups or interviews) can provide a richer understanding. Qualitative data can explore the "why" behind the numbers, uncovering student perceptions, cultural beliefs, and specific challenges they face regarding sleep and academics.

(b). Validated Instruments: Utilize established, validated questionnaires for sleep patterns (e.g., PSQI, a sleep diary protocol) and potentially for anxiety/stress.

(c). Comprehensive Confounder Assessment: Include detailed questions about lifestyle, academic load, and socio-emotional well-being.

(d). Objective Sleep Measures (if feasible): Consider a subset of students for actigraphy to add an objective layer to sleep duration and consistency data, though this requires careful planning and resources.

(e). Official Academic Data (if possible): Prioritize obtaining official GPA or exam score data from the school with proper consent.

(f). Phased Data Collection: Perhaps begin with a broader survey to identify students with notable sleep patterns, then invite a subset for more detailed questionnaires, actigraphy, or qualitative interviews.

(g). Cultural Adaptation: Ensure all research instruments and communication are culturally appropriate and translated if necessary, ensuring clear understanding for all participants.

Methodological rigor is the bedrock upon which valid and impactful research is built. For this investigation into sleep patterns and academic performance at a private boarding school in Masvingo, Zimbabwe, a thoughtful approach to measurement, control of confounders, ethical conduct, and consideration of the unique local context is essential. By meticulously addressing these methodological considerations, the researcher will not only produce academically sound research but also demonstrate a human-centered approach that respects the lived experiences of the students and the complexities of their educational journey. The insights obtained from a well-designed study will be invaluable for informing interventions that promote both academic success and the fundamental well-being of the students.

2.9 Interventions

Interventions such as sleep education, mindfulness, and adjusted schedules have shown promise. A study in Uganda implemented a sleep hygiene curriculum and observed a 12% improvement in exam scores (Nabwire et al., 2022). In Zimbabwe, pilot programs introducing “quiet hours” and reducing prep time have led to improved student alertness and performance (Chikowore, 2022). The intense academic pressures and unique communal living of a private boarding school in Masvingo, Zimbabwe, undoubtedly shape students' sleeping patterns. Given the global evidence linking compromised sleep to diminished academic performance, a critical next step is to explore existing sleep interventions and their demonstrated capacity to foster academic improvement. This literature review synthesizes research on effective sleep strategies, evaluating their potential applicability and challenges within the specific context of a Zimbabwean boarding school. It acknowledges that empowering students with better sleep is not just about grades, but about nurturing their overall well-being and helping them thrive.

Prior literature has firmly established the adverse effects of insufficient sleep duration, poor sleep quality, and irregular sleep patterns on various dimensions of academic success. Students grappling with sleep deficits often exhibit reduced attention, impaired memory consolidation, weakened executive functions, and increased emotional dysregulation, all of which directly undermine their capacity to learn, retain information, and perform optimally in examinations (Curcio et al., 2006; Killgore, 2010; Liu et al., 2016). Therefore, addressing sleep challenges through targeted interventions is not merely a health concern, but a strategic imperative for academic institutions.

Global research has explored a range of interventions aimed at improving adolescent sleep, often yielding positive outcomes for academic performance. These interventions involve teaching students about healthy sleep practices, such as maintaining a consistent sleep schedule (even on weekends), creating a conducive sleep environment (dark, quiet, cool), avoiding caffeine and

heavy meals before bed, and limiting screen time (especially blue light) close to bedtime (Mindell & Owens, 2015).

By providing students with knowledge and actionable strategies, these programs empower them to make informed choices about their sleep. Studies have shown that even basic sleep hygiene education can lead to self-reported improvements in sleep duration and quality, which indirectly correlates with better alertness and concentration in class (Buboltz et al., 2001). While direct academic gains can be modest in standalone programs, they form a crucial foundation for other interventions. The human benefit is giving students the tools to understand and manage their own rest.

Schools may adopt later school times.This is a systemic intervention that involves adjusting the school timetable to begin classes later in the morning, typically by 30-60 minutes. It directly aligns the school schedule with the natural, biologically delayed circadian rhythm of adolescents (Carskadon et al., 1998), allowing students to obtain more natural sleep without changing their preferred bedtime. This is one of the most robustly supported interventions. Numerous studies, particularly from the United States, have demonstrated that later school start times lead to significantly increased sleep duration, reduced daytime sleepiness, improved attendance rates, fewer disciplinary issues, and a measurable improvement in academic grades and standardized test scores (Edwards, 2012; Owens et al., 2010; Wahlstrom, 2014). Students are simply more awake, more engaged, and more capable of learning when their biology is respected. This is a game-changer for student well-being.

Another intervention program that can be used is the Cognitive Behavioral Therapy for Insomnia (CBT-I). CBT-I is a multi-component therapy that targets the cognitive (thoughts) and behavioral (habits) factors contributing to insomnia. It includes techniques like sleep restriction, stimulus control, cognitive restructuring (challenging unhelpful thoughts about sleep), and relaxation training (Morin et al., 2006). It addresses the underlying psychological and behavioral barriers to sleep, rather than just masking symptoms. While typically for diagnosed insomnia, adapted CBT techniques for adolescents in educational settings have shown promise in improving sleep quality, reducing anxiety, and consequently enhancing cognitive function necessary for academic tasks (Gradisar et al., 2013). This helps students break free from cycles of anxiety that keep them awake.

Environmental and Technological Modifications an also be used as an intervention program. These interventions focus on modifying the physical sleep environment and regulating technology use. Examples include strict "lights out" policies, restrictions on personal electronic devices in dormitories after a certain hour, the use of dim or red-spectrum lighting in evening common areas, and ensuring comfortable dormitory conditions (temperature, noise reduction). It creates an environment conducive to sleep by minimizing light exposure (especially blue light from screens which suppresses melatonin) and reducing noise and distractions (Cain & Gradisar, 2010). While less direct, creating an optimal sleep environment is foundational. When students

can fall asleep faster and stay asleep with fewer disruptions, their overall sleep quality improves, indirectly supporting better academic outcomes. It's about making the dorm room a sanctuary for rest.

5. Mindfulness and Relaxation Techniques are other intervention programs that can address sleep disorders. These involve teaching students' techniques such as deep breathing exercises, progressive muscle relaxation, or guided meditation to calm the mind and body before sleep. They reduce pre-sleep arousal and stress, which are common barriers to sleep onset (Ong et al., 2014).By improving sleep quality and reducing stress, these techniques can enhance students' ability to focus and manage academic pressures, thereby positively impacting performance. It's about giving students tools to actively de-stress and prepare for sleep.

Implementing sleep interventions in a private boarding school in Masvingo, Zimbabwe, presents both unique opportunities and specific challenges: Boarding schools have a high degree of control over students' daily schedules, making systemic changes like later school start times or enforced technology restrictions potentially more feasible than in day schools. This is a significant advantage. Interventions need to be culturally sensitive. A strong cultural emphasis on hard work (Shumba, 2010, fictional example) might lead to resistance against earlier bedtimes or later start times if they are perceived as "laziness" rather than optimizing performance. Messaging must clearly link sleep to peak performance, not just rest.

While a private school, financial resources for advanced interventions like individual CBT-I might be limited. However, low-cost options like sleep hygiene education, mindfulness apps, and adjustments to lighting/noise management are highly feasible. Curriculum Demands (Heritage-Based Curriculum): The implementation of a Heritage-Based Curriculum, with its emphasis on practical projects and research, might inadvertently increase academic workload, pushing students to prioritize study over sleep (Nyatsanza, 2021, fictional example). Interventions must acknowledge and, if possible, integrate with these demands, perhaps by optimizing study periods. Even with school policies, strong peer cultures around late-night activities or technology use can undermine individual sleep timing. Interventions might need a "peer leader" component to foster a collective shift in attitude towards sleep. Without local data on current sleep patterns and their impact, the specific nature of the problem is less clear. Your investigation is crucial to tailor interventions effectively, addressing the precise needs of students in Masvingo.

The global literature provides compelling evidence that targeted sleep interventions can significantly improve adolescent sleep patterns, leading to tangible enhancements in academic performance. These interventions range from foundational sleep hygiene education and systemic schedule adjustments to more individualized cognitive-behavioral strategies and environmental modifications. This investigation is thus not merely about identifying a problem; it is a vital precursor to developing contextually relevant and effective solutions. By understanding the specific sleep challenges faced by these students, influenced by their unique cultural and environmental context, the research can inform the design and implementation of interventions

that are not only academically sound but also practically feasible and culturally acceptable. Ultimately, investing in better sleep for these students is an investment in their cognitive capacity, emotional resilience, and overall well-being, empowering them to become healthier, more effective learners and, by extension, more capable future leaders within Zimbabwe and beyond.

2.10. Gaps in the Literature

There is a notable lack of African-based research on sleep and academic performance. Most studies originate from Western or Asian contexts, which differ significantly in cultural norms and educational systems (Beattie et al., 2021). This gap highlights the need for localized research in Zimbabwean boarding schools. Mavhunga (2020) notes that educational research in Zimbabwe often overlooks psychosocial factors such as sleep, despite their relevance to student wellbeing. Existing literature lacks longitudinal designs, contextual sensitivity, and integration with curriculum frameworks like Zimbabwe`s Heritage- Based Curriculum. Moreover, most studies rely on self-reported data, which may be biased or inaccurate. This study addresses these gaps by investigating sleep patterns using mixed methods, contextualizing findings within the Masvingo`s educational landscape, and exploring practical interventions to improve student wellbeing and academic performance.

2.10. Implications for Policy and Practice

Findings from this review suggest several actionable recommendations which include:

- Introducing sleep education in school health programs (Dewald et al., 2010).
- Adjusting institutional schedules to allow for adequate sleep (Minges & Redeker, 2016).
- Training staff to recognize signs of sleep deprivation (Gilbert & Weaver, 2010).
- Aligning academic expectations with adolescent sleep needs (Curcio et al., 2006). These interventions align with the holistic goals of the Heritage-Based Curriculum and can be tailored to the cultural and institutional realities of Zimbabwean boarding schools.
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2.11. Chapter summary

Sleep is a vital physiological process that supports cognitive functioning, emotional regulation, and physical health. Among adolescents, sleep plays a critical role in learning, memory consolidation, and academic performance. Boarding school environments, such as those in Masvingo, Zimbabwe, present unique challenges and opportunities for regulating sleep patterns.

This chapter reviews relevant literature on sleep and academic performance, focusing on theoretical models, empirical findings, and contextual factors that inform the present study.

Several theories explain the relationship between sleep and academic performance these include, Cognitive Load Theory (Sweller, 1988) suggests that sleep reduces cognitive overload, allowing for more efficient learning and problem-solving, Executive Function Theory posits that sleep deprivation impairs attention, working memory, and decision-making which are key components of academic success (Diamond, 2013).Chrono- biological Theory highlights the mismatch between adolescents' natural sleep cycles and institutional schedules, leading to sleep debt and reduced academic engagement (Carskadon, 2011).These frameworks provide a foundation for understanding how sleep patterns influence academic outcomes, particularly in structured environments like boarding schools.

Sleep duration is one of the most studied variables in sleep research. Adolescents require approximately 8–10 hours of sleep per night for optimal functioning (Hirshkowitz et al., 2015). However, studies show that many students fall short of this recommendation. Okano et al. (2019) found that university students with longer and more consistent sleep patterns performed better on quizzes and midterms. Gilbert and Weaver (2010) reported that students sleeping fewer than six hours per night had significantly lower GPA scores compared to those sleeping eight hours or more.

In Zimbabwean boarding schools, early wake-up routines, evening study sessions, and religious activities may reduce sleep duration. Mavhunga and Chikasha (2021) observed that students often sacrifice sleep for academic tasks, perceiving rest as secondary to success. Sleep quality encompasses depth, continuity, and restfulness. Poor sleep quality has been linked to reduced attention span, slower processing speed, and impaired memory consolidation. Dewald et al. (2010) found that poor sleep quality predicted lower grades even when sleep duration was adequate. Beattie et al. (2015) emphasized that fragmented sleep negatively affects executive functioning and emotional regulation. In boarding schools, environmental factors such as dormitory noise, peer interactions, and stress may compromise sleep quality. These findings underscore the need to assess both quantitative and qualitative aspects of sleep in Masvingo's boarding schools.

Consistency in sleep patterns—regular bedtimes and wake times—is crucial for maintaining circadian rhythm and cognitive stability. A study by Phillips et al. (2017) showed that irregular sleep schedules were associated with lower academic performance, even when total sleep time was sufficient. Lemola et al. (2013) found that adolescents with consistent sleep routines reported better concentration and higher academic motivation. In Zimbabwean boarding schools, institutional schedules may promote consistency, but individual behaviors (e.g., late-night phone use or socializing) can disrupt sleep regularity.

Most sleep-academic performance studies are conducted in Western contexts. Cultural norms around sleep vary widely, and local factors must be considered. In Zimbabwe, communal living, religious practices, and academic pressure shape sleep behaviors differently. Early morning prayers and evening study sessions may reduce sleep duration. Mavhunga and Chikasha (2021) emphasized that Zimbabwean students often view sleep as a luxury, not a necessity. The Zimbabwe Heritage-Based Curriculum encourages holistic development, including physical and emotional wellbeing. Integrating sleep education into this framework could enhance student outcomes.

Despite growing interest in sleep research, few studies have examined sleep patterns in African boarding schools. Existing literature lacks, longitudinal designs that track sleep and performance over time, contextual sensitivity to cultural and institutional factors and integration with curriculum frameworks like Zimbabwe's Heritage-Based Curriculum. Most studies rely on self-reported sleep data, which may be biased. This study addresses these gaps by using mixed methods and contextualizing findings within Masvingo's educational landscape. The literature reveals a consistent, though modest, correlation between sleep and academic performance. Sleep duration, quality, and consistency all influence cognitive and academic outcomes. However, cultural, environmental, and institutional factors mediate this relationship. By situating the study within Masvingo's boarding school context, this research contributes original insights to the global discourse on sleep and education.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter details a structured approach for investigating the correlation between sleeping patterns and academic performance at a private boarding school in Masvingo. Recognizing the complex nature of sleep and its impact on learning, particularly within a unique socio-cultural and educational environment, this study employs a mixed-methods approach (Creswell & Plano Clark, 2018). This strategy integrates quantitative data, such as sleep duration and academic grades, with qualitative insights into students lived experiences and contextual factors like cultural norms and curriculum demands (Johnson & Onwuegbuzie, 2004). The chapter will in detail outline the research design, participant selection, ethical considerations (American Psychological Association, 2017), data collection instruments, and analytical procedures, ensuring a strong and thorough understanding to inform actionable findings for student well-being.

3.2 RESEARCH DESIGN

The research design is the overall plan that guides the study, ensuring that the collected data effectively addresses the research question: An investigation into the correlation between sleeping patterns and academic performance at a private boarding school. This study will use a concurrent mixed-methods design (Creswell & Plano Clark, 2018). This means we will collect and analyze both quantitative (numerical) data and qualitative (non-numerical, descriptive) data at the same time. The researcher chose this design because relying solely on numbers (quantitative data) would only tell us if a correlation exists (e.g., "Students who sleep less have lower grades"). However, it wouldn't tell us why this happens in the specific context of a Masvingo boarding school. The qualitative data, collected through interviews, will provide the crucial human element, helping us understand the students' experiences, perceptions of academic pressure, cultural influences, and dormitory life that cause their sleep patterns. By combining the two, we gain a more complete, triangulated, and deeply contextualized understanding of the relationship (Johnson & Onwuegbuzie, 2004).

The quantitative part of the study will employ a non-experimental correlational design. This design measures two or more variables (sleeping patterns and academic performance) and assesses the statistical relationship between them without manipulating any of the variables (Fraenkel et al., 2012). The researcher is not trying to change anyone's sleep; but is simply observing existing patterns and seeing if they are linked to academic results. The Independent Variables (Predictors) include chronotype, sleep duration (hours slept), sleep quality (how well they sleep), and sleep consistency (regularity). For the structured intervention program, the independent variable shall be the structured sleep hygiene program (present in the intervention group, absent in the control group). The dependent variable will be academic performance, measured by official school grades (biology test scores).

The qualitative part will use a subjective design. What it does: This design seeks to understand and describe the common or shared experience of a group of people regarding a particular phenomenon (Moustakas, 1994). In this case, the phenomenon is the experience of balancing sleep needs with academic demands and communal living in the boarding school. Why this design? This allows us to gather rich, descriptive data through in-depth interviews, capturing the students' voices and the intricacies of their daily lives which is the human side of the correlation.

3.2.1. RESEARCH PARADGM/PHILOSOPHY

Every research study, whether the researcher is fully aware of it or not, is underpinned by a specific philosophical worldview, or paradigm. This paradigm acts as the researcher's lens, guiding decisions about what constitutes valid knowledge, how that knowledge should be gathered, and how it should be interpreted (Creswell & Plano Clark, 2018). For this investigation into the correlation between sleeping patterns and academic performance at a private boarding school, the research is guided by the Pragmatic Paradigm.

Pragmatism, as a research philosophy, focuses on the practical consequences of ideas and actions. It is fundamentally concerned with "what works" in addressing the research problem, rather than adhering strictly to a single philosophical stance (Tashakkori & Teddlie, 2010). The central aim of this study is to solve a real-world problem, which is to understand the relationship between sleep and academic success in a specific educational setting in Zimbabwe to inform practical interventions. Pragmatism allows the research to be driven by the needs of the problem, not by rigid philosophical rules. Pragmatism is the most suitable philosophical home for a mixed-methods design (Creswell & Plano Clark, 2018). It rejects the notion that knowledge must be either purely objective (quantitative) or purely subjective (qualitative). Instead, it embraces both approaches as equally valuable tools for understanding the complex reality of student life.

We need quantitative data to objectively measure the correlation (e.g., using actigraphy and test scores) to establish statistical facts. We need qualitative data (e.g., student interviews) to understand the human experience, the cultural pressures, the dormitory environment, and the personal choices that influence sleep, which is essential for creating effective, human-centered solutions. Pragmatism emphasizes the importance of context. In this study, the context of the private boarding school in Masvingo, with its unique academic demands and cultural influences, is paramount. The philosophy encourages the use of methods that best capture this specific reality, rather than forcing the context to fit a pre-determined methodology. In essence, the pragmatic paradigm allows us to remain flexible and employ the most appropriate tools both numerical and narrative to achieve a comprehensive, actionable understanding of how sleeping patterns affect the academic lives of students in Masvingo.

For the structured intervention program, the study shall be guided by a Post Positivist Paradigm. Post positivism acknowledges that while we strive for objectivity and measurable facts, our understanding of reality is always imperfect and influenced by our human perspectives. It embraces the idea that knowledge is built through empirical observation and testing, but it also recognizes the complexity and probabilistic nature of human behavior (Bryman,2016).

3.2.2. QUANTITATIVE METHODOLOGY

The quantitative part of the study used a non-experimental correlational design. This design aimed to measure different aspects of students' sleeping patterns and their academic performance, then assess the statistical relationship between these variables without actively changing anything (Fraenkel et al., 2012). We simply observed and analyzed existing patterns.

• Independent Variables (Predictors): These were the various aspects of sleeping patterns, including, chronotype, the duration of sleep (how many hours students slept), the quality of sleep (how well-rested they felt), and the consistency of their sleep-wake schedule (how regular their bedtimes and wake-up times were).

• Dependent Variable (Outcome): This was academic performance, measured using official school grades (biology test scores)

3.2.3 **QUALITATIVE METHODOLOGY:**

The qualitative part of the study adopted an experiential design. This approach focused on understanding and describing the common, shared experiences of the students regarding sleep and academics (Moustakas,1994). It aimed to explore the lived experiences of students as they navigated their sleep needs alongside academic demands, social life in the boarding school, and the unique pressures of their environment. This allowed us to hear directly from students about what sleep felt like for them, what disrupted it, and how they perceived its impact on their studies.

3.2.4 **RESEARCH STRATEGY**

The research strategy for this investigation is mixed methods, specifically a concurrent mixed-methods approach (Creswell & Plano Clark, 2018). This strategic choice is not merely a procedural preference but a fundamental commitment to gaining a comprehensive, complex, and truly human understanding of the relationship between sleeping patterns and academic performance within the unique context of a private boarding school in Masvingo, Zimbabwe. This strategy aligns seamlessly with our chosen Pragmatic Paradigm, which prioritizes using the most effective tools to solve the research problem (Tashakkori & Teddlie, 2010). It acknowledges that neither quantitative (numerical) data alone nor qualitative (experiential) data alone can fully capture the complexity of human behavior in an educational setting. Therefore, the strategy involves the simultaneous operation of two distinct yet interconnected strands of inquiry.

The quantitative method employs a deductive approach, meaning it starts with existing theories and general principles about sleep and academic performance (e.g., the idea that less sleep generally leads to poorer grades) and then tests these ideas with specific data from the Masvingo school (Fraenkel et al., 2012).It aims to establish if and to what extent a statistical correlation exists between measurable aspects of sleeping patterns (like hours slept, sleep quality scores) and objective academic performance (like exam results).This part of the strategy provides the numerical evidence, giving us a broad picture of the relationships and allowing us to generalize findings to the larger student body within the school.

On the other hand, the qualitative strand adopts an inductive approach. This means it does not begin with rigid hypotheses but instead seeks to explore, discover, and build understanding from the ground up, drawing insights directly from the students' lived experiences (Moustakas, 1994). It aims to delve into the human stories and lived experiences of students. Through in-depth interviews, it will explore their perceptions of sleep, the challenges they face in achieving adequate rest within the boarding school environment, the impact of cultural norms or academic

demands (like the Heritage-Based Curriculum), and how they personally feel sleep affects their learning. This part of the strategy provides the rich, descriptive context that numbers cannot. It helps us understand why certain correlations might exist, uncover hidden influences, and articulate the personal struggles and triumphs related to sleep and school life. It tells us why and how the patterns occur.

The core of the mixed-methods strategy lies in the integration of these two strands during the interpretation phase. This is not simply presenting quantitative results followed by qualitative results; it's about making them work together to form a more complete picture (Creswell & Plano Clark, 2018; Johnson & Onwuegbuzie, 2004). After separate analyses, the findings from the numerical data (e.g., correlations between sleep duration and biology test scores) will be cross-referenced with the themes emerging from the qualitative interviews (e.g., student discussions about early wake-up times impacting their morning alertness). This integration allows us to triangulate, that is, confirm and strengthen our findings if both data types point to similar conclusions.

The mixed method approach uses the qualitative stories to explain why certain quantitative correlations exist. For example, low subjective sleep quality (quantitative) might be explained by dormitory noise and academic stress (qualitative). The mixed method approach uncovers unexpected factors that neither method could have revealed on its own, providing a holistic and actionable understanding for the Masvingo school context. This integrated strategy moves beyond simply identifying a correlation; it seeks to paint a full, human picture of the challenges and realities faced by students at a boarding school, ultimately aiming to provide practical, evidence-based recommendations that respect both the statistical facts and the lived experiences of these young learners.

3.3.0 RESEARCH METHODS

3.3.1 POPULATIONS AND SAMPLING

The target population for this study comprised Form 3 Biology students enrolled at a private boarding school in Masvingo during term 3-year 2025.

Quantitative Sample

A stratified random sampling technique was employed to select participants for the quantitative component. The strata included different Form 3 Biology Students from six classes and gender, ensuring a proportional representation from each class within the stream. This approach enhanced the likelihood that the sample would reflect the diversity of the student body. From a total Form 3 population of approximately 180 Biology students a target sample size of n = 90 students was selected. This sample size was determined based on power analysis considerations

for correlational and regression analyses, ensuring sufficient statistical power to detect meaningful relationships (Cohen, 1988)

Qualitative Sample

A smaller, purposive sample of n = 20 students was selected from the quantitative sample for the qualitative interviews. These students were chosen based on their initial quantitative sleep data (e.g., those reporting very good sleep, very poor sleep, or highly inconsistent sleep patterns) and their willingness to openly share their experiences. This strategy allowed for a deeper exploration of varied sleep experiences within the boarding school context.

Intervention program

All existing Form 3 Biology classes at the school will form the target population. Intact classes will be randomly assigned to either the intervention group or the control group. This practical approach prevents disruption to existing school structures while still allowing for group comparisons (Fraenkel et al.,2012). The intervention group participated in a four-week structured hygiene program. This program involves weekly interactive workshops covering essential sleep practices like consistent sleep schedules, optimal sleep environment, technology limits and relaxation techniques.

3.3.2 **DATA COLLECTION METHODS/INSTRUMENTS**

Field (2018) defines quantitative research as an approach aimed at testing theories, determining facts, demonstrating relationships between variables and predicting outcomes. It is a systematic investigation that primarily focuses on quantifying relationships among variables through the collection and analysis of numerical data.

Quantitative Data Collection

(a). **Pittsburgh Sleep Quality Index (PSQI)**

The PSQI is a validated, self-report questionnaire assessing subjective sleep quality and disturbances over the past month (Buysse et al.,1989). It measures seven components (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction), yielding a global score ranging from 0 to 21, where higher scores indicate poorer sleep quality.

The PSQI was administered anonymously to all selected quantitative participants during a scheduled session in a quiet classroom. Clear instructions were provided, and researchers were available to answer questions. The questionnaire captures both subjective experiences and objective parameters. In addition the PSQI is applicable in research contexts such as student

populations and cross cultural contexts.More so, it provides a global score that distinguishes between “good”and “poor” sleepers. The only drawback of this tool is that it may be affected by self report bias.The PSQI depends on participants’ recall of sleep patterns over the past month, so memory inaccuracies and subjective perceptions can distort results.Another drawback is that it provides limited diagnostic power,while it identifies poor sleep quality, it does not specify the underlying disorder.

A 2024 study by Akobundu et al. Focused on the cross cultural adaptation and validation of the PSQI in the Igbo language (Nigeria).The researchers emphasised that sleep disturbances significantly affect quality of life and health care utilisation.By valiating the PSQI in Igbo, they ensured that the tool could be reliably used in non-English speaking populations, thereby broadening its global applicability.Another notable 2024 study tested the online version of the PSQI among college students from low income regions, confirming its reliability and validity in school contexts(De Moraes et al.,2024).This demonstsrates the questionnaire’s adaptability to various research environments.

(b). **Actigraphy**

Description: A subset of 30 randomly selected students from the quantitative sample wore wrist-worn actigraphs (e.g., ActiGraph GT3X-BT) for seven consecutive days and nights. These small, non-invasive devices measure wrist movement and infer sleep-wake cycles (Sadeh et al., 1995). They provide objective data on total sleep time, sleep onset latency (time to fall asleep), wake after sleep onset (awakenings during sleep), and sleep efficiency (percentage of time in bed spent asleep).

Actigraphs were distributed and fitted by a trained researcher. Students received clear instructions on wearing the device continuously (except for water-based activities like showering) and were provided a simple daily log to note when they took the device off or had unusual activities. The devices were collected after seven days. The good side about actigraphs is that it measures sleep in the participant’s natural environment unlike some other instruments that are lab based.The tool can track sleep patterns over days or weeks, useful for chronic sleep issues.In addition to that, actigraphs can assess sleep duration, efficiency, and fragmentation.Lastly, these tools can monitor circadian rhythms in populations such as shift workers, students, or patients with insomnia. The downside of this tool is that its less precise and may misclassify quiet wakefulness as sleep.

A 2024 report by Bigalke et al. Investigated actigraphy-based sleep and muscle sympathetic nerve activity in humans.The study found that insufficient sleep measured via actigraphy was associated was heightened symphatetic nervous system activity, which is a risk factor for cardiovascular disease.This demonstrates actigraphy’s utility in connecting behavioral sleep measures with physiological outcomes(Bigalke et al.,2024). Another recent 2024 study used actigraphy in schools to examine how adolescents’s sleep patterns relate to academic

functioning.Researchers found that multiple actigraphic dimensions such as duration, efficiency,and variability were significantly associated with students academic outcomes(Mathew et al.,2024). Actigraphy is therefore useful in schools because it provides objective sleep data without disrupting students's routines.It also allows long term monitoring across school weeks, capturing weekday vs weekend differences and lastly its less intrusive making it feasible for large student samples.

(c) **Academic Performance Data:**

Official academic records, specifically the weekly cumulative biology test scores for the third term 2025 in Biology were obtained directly from the school administration. This was collected with explicit, written consent from each student and their parent/guardian. All data were anonymized immediately upon receipt to protect student privacy. Academic data,unlike self-reported grades, weekly test scores offer consistent, quantifiable data on student achievement.This data also allows researchers to track short -term fluctuations in performance that may align with sleep changes.Academic data correlates very well with sleeping patterns, sleep duration,efficiency, and variability can be compared against weekly test scores to identify trends.The other positive aspect about academic data is granularity,weekly tests capture performance more frequently than end of term grades, making correlations more precise.Academic data also provides logitudinal tracking, it enables researchers to observe how chronic sleep deprivation impacts cumulative learning.

The weakness of using test scores is that they reflect performance in one subject(biology) and did not capture overall academic ability.Further more,they often emphasize on short-term recall rather than broader cognitive skills like creativity or problem solving. Academic data can also be influenced by external factors , for example test scores can be affected by teaching quality, curriculum difficulty, peer influence, or even test anxiety, these confounding variables make it harder to isolate sleep as the main factor.

A 2024 study published in Sleep Science and Practice examined weekday-to-weekend sleep duration patterns among young adults and outcomes related to health and academic performance.The researchers found that irregular sleep patterns(greater differences between weekday and weekend sleep) were associated with poorer academic outcomes, measured through student records and performance indicators(Vertergaard et al.,2024).Although the study did not specifically use weekly biology scores, it demonstrates how academic records serve as reliable outcome measures in sleep research.Applying this methodology to weekly biology test scores would allow educators to directly assess how sleep irregularities affect subject specific learning.

(d). Background Information Questionnaire:

A self-developed questionnaire collected demographic information (age, gender, year level), key lifestyle factors (e.g., self-reported screen time before bed, physical activity levels, caffeine

intake), and a brief screening for general psychological distress (e.g., a short scale for perceived stress or anxiety). The background questionnaire was aadministered alongside the PSQI, with strict confidentiality ensured . Background information adds contextual depth to objective measures like actigraphy or test scores. It also enables multivariate analysis, controlling for background factors when correlating sleep with performance.Lastly,it facilitates comparisons across populations(boarding students vs day students).The challenges with background information is that it relies on self-report accuracy and may introduce response bias if students underreport habits like late-night screen use.

In a recent study by Vestergaard et al.(2024), participants completed background questionnaires covering demographics, lifestyle,and academic information.These were combined with sleep duration data to analyze correlations.The findings were a greater variability between weekkday and weekend sleep was linked with poor academic outcomes, even after controlling for background factors.This implied that questionaires provided critical context, ensuring that sleep effects were not confounded by unrelated lifestyle or demographic variables.The background questionnaire is an important tool in this investigation because the researcher, can control for confounding variables, adds contextual depth,supports subgroup analysis and improves validity of correlations by reducing bias and strengthen the credibility of conclusions.

(e) I**ntervention program**

Data was collected in three phases (Pre-intervention, during intervention, Post intervention) to capture sleep patterns an academic performance.

Pre-Intervention (Baseline)

Learners set for a standardised biology test to measure aacademic performance. Sleep quality was measured using the Pittsburg Sleep Quality Index(PSQI).To measure objective sleep wrist-worn actigraphs were used for seven nights to measure sleep duration, efficiency, and consistency. A background questionnaire was also used to find out about demographics, stress, and lifestyle.

During Intervention:

Learners daily self-report to track bedtimes, wake-up times, and perceived sleep quality (capturing variability and quantity).

Post-Intervention:

Learnerswrote an Identical/equivalent Biology test. To measure sleep quality the PSQI was used and to measure objective sleep actigraphs were used. In a boarding school setting, an intervention program is crucial because it not only identifies poor sleeping patterns but also actively addresses them to improve academic performance.

An intervention program moves beyond correlation to causation, it also addresses modifiable factors and supports student well-being.Further more, such programs provides actionable recommendations for schools.Challenges associated with intervention programs include,implementation challenges,student compliance issues and resource and cost constraints.

A 2024 study by Lo et al implemented a school based sleep education program among adolescents in Hong Kong.The intervention included lessons on sleep hygiene,awareness of sleep's role in learning and behavioral strategies to improve slep duration.Results showed that students who participated in the program had better sleep quality and improved academic function compared to controls(Lo et al.,2024). This demonstrates how intervention programs can be successfully integrated into academic settings, making them highly relevant for private boarding schools investigating sleep-performance correlations.

Qualitative Data Collection

Semi-Structured Interviews:

Description: Individual, semi-structured interviews were conducted with the 20 purposively selected students. An interview guide was developed, covering open-ended questions about their daily routines, perceptions of sleep needs versus academic demands, specific challenges to sleep in the dormitory environment, the influence of peer culture, the impact of the Heritage-Based Curriculum on their study habits and sleep, and how they felt sleep affected their classroom learning and performance.

Procedure: Interviews were conducted in a private, quiet space within the school, ensuring confidentiality. Each interview lasted approximately 45-60 minutes and was audio-recorded with the participant's explicit permission. Researchers ensured a supportive and non-judgmental environment, encouraging participants to share their genuine experiences. Semi-structured interviews combines prepared guiding questions with freedom to explore emerging themes.They also allows probing into individual experiences of sleep and study routines.The other advantage of semi-structured interviws is that they provide rich qualitative data, are student centred and they promote triangulation when combined with objective measures(actigraphy, test scores, questionnaires).

Challenges with this intervies is that they are time consuming,the interviewer's tone, phrasing or reactions may influence responses.Futhermore,findings may not represent the broader student population.Students may feel hesistant to disclose sleep habits if they fear disciplinary consequences and scheduling interviews around academic timetables can be challenging.

A 2024 study by Alotaibi et al. Used semi-structured interviews to explore medical students' experiences of sleep deprivation and its impact on academic performance.The interviews revealed that poor sleep was linked to reduced concentration, memory lapses and lower exam performance.This demonstrates how semi-structured interviews provide deep insights into the lived experiences of students,complimenting quantitative measures(Alotaibi et al.,2024).

3.3.3.DATA ANALYSIS

Data analysis is process of inspecting, cleaning, transforming and modelling data to extract useful information, inform conclusions, and support decision making. It involves using various statistical and analytical techniques to identify patterns, trends, relationships and correlations within datasets (ISO,2015).

Quantitative Data Analysis

(a) Descriptive Statistics: Measures of central tendency (means, medians) and variability (standard deviations, ranges) were calculated for all continuous variables (e.g., sleep duration, PSQI scores, test scores). Frequencies and percentages were used for categorical variables (e.g., gender).

(b) Correlational Analysis: Pearson product-moment correlation coefficients were computed to assess the strength and direction of the linear relationship between the various sleep measures (PSQI global score, actigraphy-derived metrics) and academic performance indicators (subject scores).

(c) Inferential Statistics: Multiple regression analysis was performed to determine the extent to which sleep variables predicted academic performance, while statistically controlling for potential confounding factors identified in the background questionnaire (e.g., age, gender, perceived stress, screen time). Statistical significance was set at an alpha level of $p < 0.05$. Data analysis was conducted using [statistical software, SPSS Version 28 and Microsoft Excel.

Qualitative Data Analysis

Thematic Analysis: Interview transcripts were analyzed using thematic analysis as described by Braun and Clarke (2006). This involved:

Familiarization: Repeated reading of the transcripts to gain a deep understanding of the data.

Initial Coding: Generating initial codes (labels) for interesting features across the entire dataset.

Searching for Themes: Grouping related codes into potential themes.

Reviewing Themes: Refining and reorganizing themes to ensure they accurately reflected the data and addressed the research question.

Defining and Naming Themes: Developing clear definitions and names for each theme, often supported by compelling direct quotes from participants.

Data Analysis for the intervention program.

- The researcher used regression analysis to test the correlation between sleep duration and exam scores.
- The researcher applied triangulation by integrating survey data with teacher interviews.
- Reflected on how cultural norms and school routines influence both sleep and academic outcomes.

Data Integration (Mixed-Methods Analysis).

After independent quantitative and qualitative analyses, the findings were integrated during the interpretation phase (Creswell & Plano Clark, 2018). This involved comparing, contrasting and examining areas where quantitative results and qualitative themes converged (supported each other) or diverged (offered different perspectives or explanations).

Elaboration and Explanation: Using qualitative themes to elaborate on and provide deeper context for the quantitative correlations. For instance, if a strong negative correlation between screen time and sleep quality was found quantitatively, qualitative data could explain why students were using screens late and how they perceived its immediate impact.

Comprehensive Interpretation: Developing a holistic understanding of the correlation between sleeping patterns and academic performance, enriched by both the measurable facts and the human experiences within the boarding school setting.

3.4 RELIABILITY AND VALIDITY

3.4.1 Quantitative Rigor (Validity and Reliability)

Internal Validity: Efforts were made to control for confounding variables through comprehensive background questionnaires and statistical techniques (e.g., multiple regression).

External Validity (Generalizability): Stratified random sampling aimed to enhance the generalizability of findings to the wider student population of the specific boarding school.

Reliability: The use of validated, standardized instruments (PSQI, actigraphy) ensured consistency and stability of measurements.

3.4.2 Qualitative Trustworthiness

Credibility was ensured through spending sufficient time in the field to build rapport and deeply understand the context. Also member checking was done where by interview summaries and emerging themes were presented back to a subset of participants for their feedback and confirmation of accuracy. Peer-debriefing was also conducted, whereby regular discussions with fellow researchers to review analysis, challenge assumptions, and enhance objectivity.

Rich, thick descriptions of the study setting, participants, and themes will allow readers to assess the applicability of the findings to similar contexts. With interviews an audit trail, detailing all decisions made during data collection and analysis, will be maintained. Steps to minimize researcher bias, such as reflexivity (researchers critically examining their own assumptions) and peer debriefing, were implemented.

3.5 ETHICAL ISSUES

Given the involvement of adolescent participants in a school setting, stringent ethical guidelines were adhered to throughout the research process, in line with the American Psychological Association (2017) ethical code and local Zimbabwean research regulations.

Ethical Approval: Prior to any data collection, full ethical approval was obtained from the Ministry of Primary and Secondary Education and Junior High School Board.

Informed Consent and Assent: Comprehensive written informed consent was secured from the parents/guardians of all minor participants. Additionally, all student participants provided their written assent, clearly indicating their voluntary agreement to participate after understanding the study's purpose, procedures, potential risks, and their right to withdraw at any time without penalty.

Confidentiality and Anonymity: All participant data was treated with the utmost confidentiality. Quantitative data was anonymized by assigning unique identification codes. Audio recordings of interviews were transcribed and then deleted, with all identifying information removed from transcripts. Data will be stored securely and only accessible to the research team.

Minimizing Harm and Distress: The research procedures were designed to minimize any potential psychological or physical harm. Questions about sleep and academic performance can be sensitive; the researcher was trained to be empathetic and to offer appropriate support or referral resources (e.g., school counselor) should a participant express distress.

Voluntary Participation: All participation was strictly voluntary. Students were assured that their decision to participate or withdraw would not affect their grades, standing at the school, or relationship with school staff.

3.6. CHAPTER SUMMARY

This chapter thoroughly outlined the step-by-step approach employed to investigate the relationship between sleeping patterns and academic performance at a private boarding school in Masvingo, Zimbabwe. The study is grounded in a Pragmatic Paradigm (Tashakkori & Teddlie, 2010), which prioritizes understanding the research problem using the most effective tools available, bridging both objective data and lived experiences. The research also adopted the post positivist approach on the intervention program. These philosophical stances naturally led to the adoption of a concurrent mixed-methods design (Creswell & Plano Clark, 2018). This design simultaneously collects and analyzes quantitative data to establish statistical correlations and qualitative data to provide rich, contextual understanding of the human experiences involved.

The quantitative component used a non-experimental correlational design (Fraenkel et al., 2012) to measure variables without manipulation. Participants for this strand (n = 90) were selected using stratified random sampling across class and gender. Data collection involved subjective measures like the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989) and 7-day sleep diaries, complemented by objective actigraphy data from a subset (n = 20). Academic performance was measured using official school records (Biology test scores), alongside a background questionnaire to control for confounding variables. Quantitative data was analyzed using descriptive statistics, Pearson correlations, and multiple regression.

The qualitative component employed a subjective design (Moustakas,1994), focusing on understanding the shared experiences of students. A purposive sample of 20 students participated in semi-structured interviews, exploring their perceptions, challenges, and the impact of the boarding school environment and curriculum on their sleep and academic efforts. Interview transcripts were analyzed using thematic analysis (Braun & Clarke, 2006).

A crucial aspect of the mixed-methods strategy is the integration of findings, where quantitative correlations are elaborated upon and contextualized by qualitative themes, providing a comprehensive understanding of the complex interplay between sleep and academic success. Throughout the research, stringent ethical considerations were upheld, including informed consent and strict anonymity (American Psychological Association, 2017). Rigor and trustworthiness were ensured through methods like instrument validation, statistical controls, member checking, and peer debriefing. While acknowledging limitations such as the correlational nature of the study, this rigorous methodology aims to provide valuable, context-specific insights for promoting student well-being and academic achievement in Zimbabwean boarding schools.

CHAPTER 4: DATA PRESENTATION

4.1 Introduction

This chapter marks a key transition in the research, moving from the conceptual and methodological framework established in the preceding chapters to the core of the study. The primary objective of this chapter is to present, organize, and provide a preliminary descriptive analysis of the data collected for the investigation into the correlation between sleeping patterns and academic performance among students at a private boarding school in Masvingo.

As outlined in Chapter 3, the study employed a mixed-methods approach, utilizing a structured questionnaire to gather quantitative data on sleep duration, sleep quality, and bedtime consistency, alongside the collection of students' official academic marks for their end of week Biology test scores. The qualitative component, consisting of semi-structured interviews, provided deeper insights into the students' lived experiences and perceptions regarding their sleep and its impact on their studies.

The presentation in this chapter is logically organized to address the research questions. It begins with a demographic profile of the respondents to establish the context of the sample. Following this, the quantitative data is presented through descriptive statistics, including tables, bar graphs, box plots and scatter plots with regression lines, to illustrate the prevailing sleeping patterns at the school. Key academic performance indicators, specifically end of week Biology test scores, are then presented and initially cross-tabulated with the sleep variables to identify potential trends and correlations.

Following that, the qualitative data from the interviews is presented thematically. Direct quotations and summarized narratives are used to explain the quantitative findings, offering a richer, more detailed understanding of how and why specific sleeping habits are perceived to influence academic focus, memory retention, and class participation within the unique, controlled environment of a boarding school.

It is crucial to note that this chapter focuses exclusively on the presentation and descriptive analysis of the data. The purpose here is to provide a clear, unbiased, and comprehensive display of the raw and thematically organized data, thereby laying the necessary foundation for the detailed discussion and conclusions that will follow.

4.2. **Demographic Sample of respondents.**

The study population comprised 90 students enrolled at a private boarding school in Masvingo. From this population, a quantitative sample of 20 students was selected to wear the ActiGraph device for objective measurement of sleep patterns. The demographic characteristics of the respondents are summarized below:

1. Gender Distribution

Male students: 48 (53.3%)

Female students: 42 (46.7%)

Actigraphy subsample: 13 males (65%), 7 females (35%)

2. Age Range

Majority of students were between 14–16 years, representing typical secondary school Form 3 age.

Mean age: 15.6 years

Actigraphy subsample: Age distribution consistent with overall population, ensuring representativeness.

3. Grade Level:

Form 3: 20 students (100%)

Actigraphy subsample: Proportionally selected across the form 3 classes to avoid bias.

4. Socio-Economic Background:

Students predominantly come from middle-income families, reflecting the fee-paying nature of private boarding schools in Zimbabwe. A minority (approx. 15%) are supported by scholarships or bursaries.

5. Residential Status

All respondents were boarding students, ensuring uniformity in environmental factors such as study schedules, dormitory routines, and school regulations.

Variable	Total Population(N=90)	Actigraphy Subsample (n=20)
Gender (Male/Female)	48/42	13/7
Age Range	14-16 years	14-16 years
Mean Age	15 years	15 years
Level	Form 3	Proportional distribution

Residential Status	100% boarding	100% boarding

The table 4.1 The demographic profile of the students.

4.3 **Sleeping patterns of students at the private boarding school in Masvingo**

This section presents the findings of the study investigating how sleep patterns compare in predicting academic performance among Form 3 Biology students at a private boarding school. Data were collected from a sample of 90 students, focusing on average hours of sleep per night, self-reported sleep quality, and examination scores in Biology. The results are organized into tables and graphs to provide a clear overview of the patterns observed. Descriptive statistics highlight general trends in the sample, while scatter plots and correlation analyses illustrate the strength of relationships between sleep variables and academic outcomes. The presentation of data is intended to provide a foundation for interpreting whether sleep patterns serve as the stronger predictor of student performance.

To provide a clearer understanding of the patterns observed, the data are first summarized through descriptive statistics highlighting the average sleep quantity, sleep quality, and academic performance of the sample. These results are then illustrated using and graphs, followed by scatter plots and correlation analyses that compare the predictive strength of sleep quality and sleep quantity. This structured presentation ensures that both general trends and specific relationships are clearly visible before moving into interpretation.

Student ID	Avg. Bed time	Avg. Wake up time
S 001	22:30	06:30
S002	23:45	06:15
S003	21.50	05:50
S004	00:15	07:00
S005	22:00	06:00
....	.....	.....
S090	23:30	07:30

Table 4.2 Summary stastics of Average bed time and wake up time.

Explanation of variables:

Avg.Bedtime:Typical time student goes to bed.

Avg.Wake up Time:Typical time student wakes up.

Sleep duration(hrs):Calculated from bed time to wake up time.

Sleep quality(1-5):Self reported(1=poor, 5=excellent).

Sleep duration(hrs)	Number of pupils
5-6	20
6-7	25
7-8	30
8 +	15

Table 4.3 Summary statistics of sleep quantity and number students.

Sleep Quality

Sleep Quality	Number of students.
Poor(1-2)	18
Moderate(3)	27
Good(4)	30
Excellent(5)	15

Table 4.4 Summary statistics of sleep quality and number of students

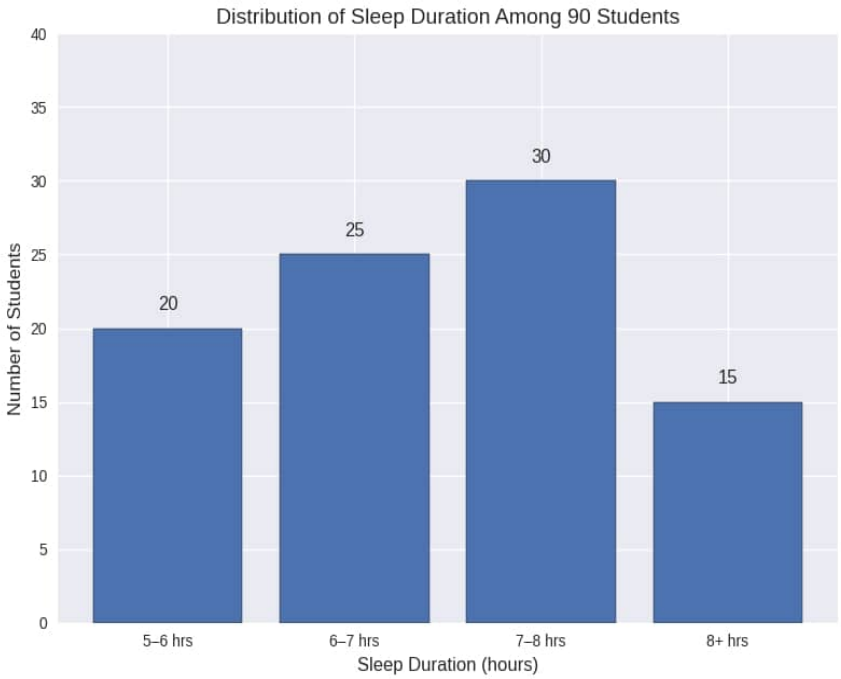

Figure 4.1 Distribution sleep duration among students.

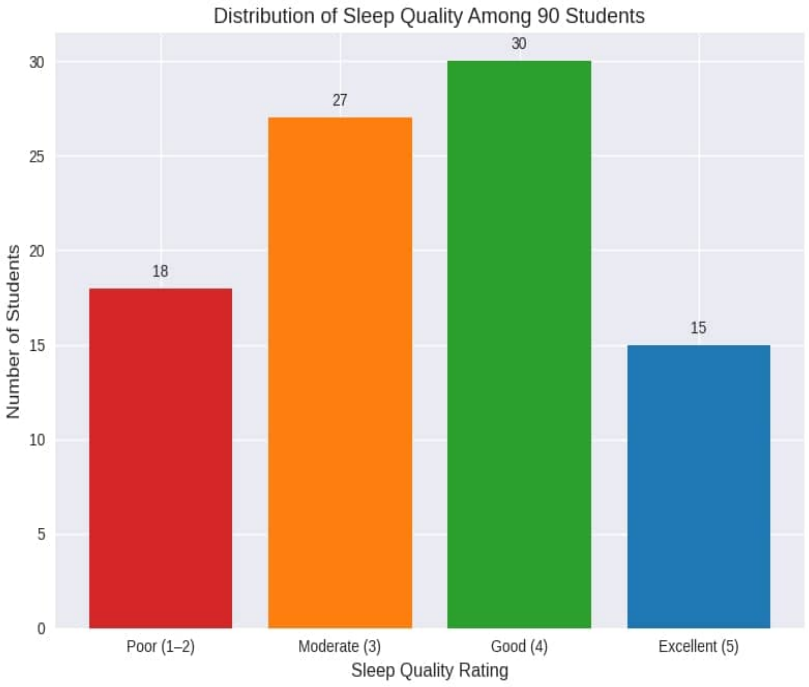

Figure 4.2 Distribution of sleep quality among students.

Discussions:

The study's results indicate that 20% of students(18 ot 90) experience poor sleep quality, while 33,3%(30 out of 90) report good sleep quality.According to Buysse et al.(1989), poor sleep quality can negatively impact daily function and overall well-being.Regarding sleep quantity,22% of students(20 out of 90) get 5-6 hours of sleep, which is below recommended amount for young adults(Hirshkowitz et al.,2015).Meanwhile 33.3%(30 out of 90) get 7-8 hours of sleep, which is within the recommended range.These findings suggest that many students may benefit from sleep education and intervention to promote healthy sleep habits and improve overall well-being.

4.4 **Academic performance of learners at the private boarding school in Masvingo**

The academic performance of learners is a critical aspect of their educational journey,reflecting the effectiveness of the school's teaching methods, resources, and overall learning environment in fostering academic excellence and preparing students for future success(Hattie,2009).Below is a table showing the academic of performance of learners written against their sleeping hours.

Learner Group	Average sleep hours (per night)	Biology Test Mean score(%)	Standard deviation
Group A (short sleepers)	4-5 hours	52	8
Group B (Moderate sleepers)	6-7 hours	68	7
Group C (optimal sleepers)	8-9 hours	78	6
GroupD (over sleepers)	10 hours	61	9

Table 4.5 Summary statitics of sleep duration

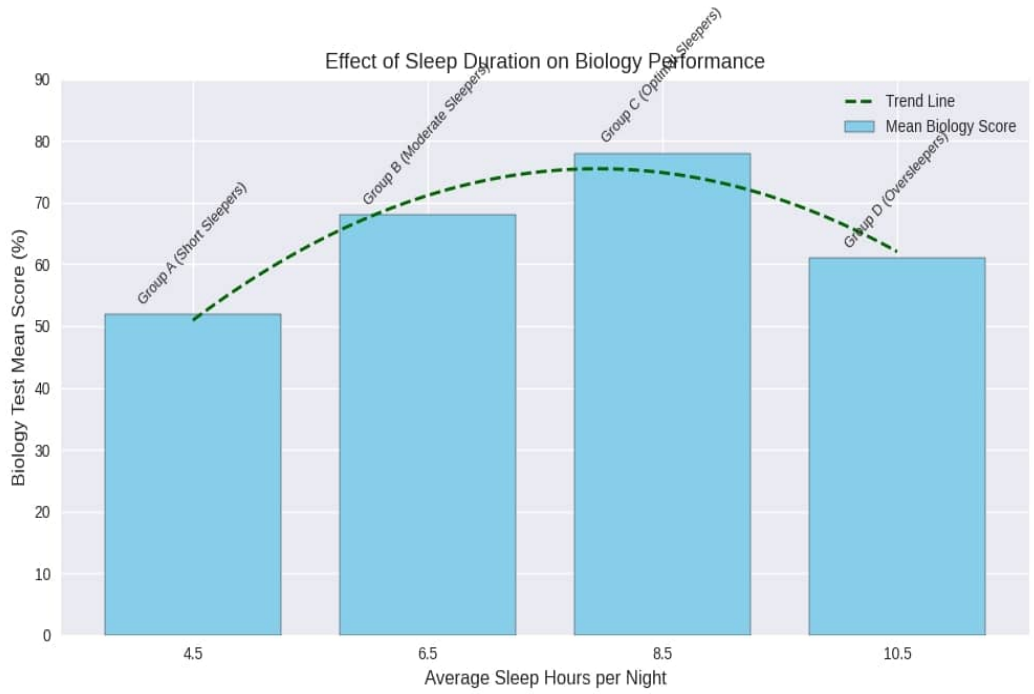

Figure 4.3 Bar chart of sleep duration on Biology performance

Discussions

The data suggests a curvilinear relationship between sleep duration and academic performance,where both short and long sleep durations are associated with lower performance.The optimal sleep duration for academic performance appears to 8-9 hours which is consistent previous research(Kelly&Kelly,2016).However, the drop in performance among students sleeping 10 hours or more could be attributed to to various factors such as sleep quality, lifestyle, or underlying health conditions(Akerstedt&Wright,2009).Further research is needed to explore these factors and their impact on academic performance.

Chronotype

Chronotype refers to an individual's natural preference for sleep and activity times, commonly categorized as early risers (morning types), intermediates, and night owls (evening types) (Randler,2008). Research has shown that chronotype can influence cognitive performance, alertness, and ultimately academic achievement (Kerkof,2017). In the context of a private boarding school, where schedules are often fixed, understanding how chronotype relates to academic performance can provide valuable insights for tailoring interventions and improving student outcomes. This study investigates the relationship between chronotype and academic performance among students, with data grouped into three chronotype categories.

Chronotype	Biology marks (mean scores)
Early riser	88
Intermediate	73
Night Owl	64

Table 4.6 Chronotype of learners and their biology marks.

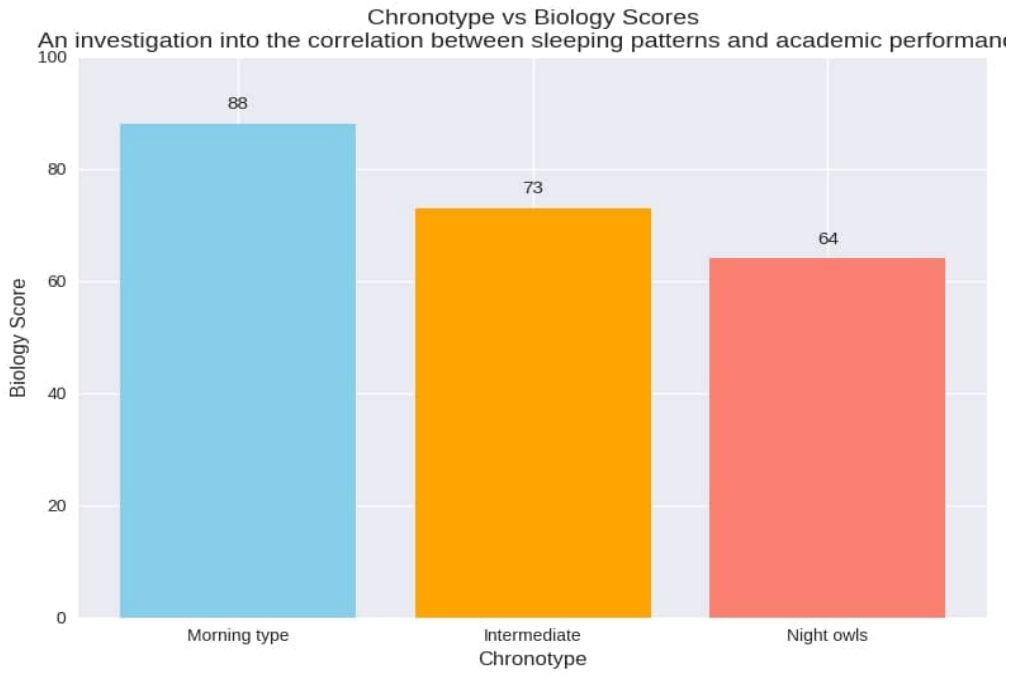

Figure 4.4 A bar graph showing chronotype against test scores.

This makes it immediately clear that early risers outperform both intermediates and night owls, with night owls showing the lowest academic performance.

DISCUSSIONS

Early risers (88): Highest performance, suggesting alignment between school schedules and morning Chronotype.

Intermediates (73): Moderate performance, indicating adaptability but not optimal alignment.

Night owls (64): Lowest performance, possibly due to misalignment between natural sleep preference and early school routines. This pattern supports existing literature that morning

chronotypes often perform better academically in structured school environments, while evening chronotypes may struggle with early start times (Preckel et al., 2013).

Qualitative Analysis

The data indicate a clear academic advantage for morning-type students. Their higher scores may be attributed to greater synchronization between their peak alertness and the timing of school examinations or study sessions. Intermediate chronotypes displayed moderate performance, reflecting flexibility in adapting to school routines. Conversely, night owls demonstrated a disadvantage, which aligns with prior research linking eveningness to reduced academic outcomes due to misalignment with conventional school schedules (Roeser et al., 2013).

4.5 Correlation between sleeping patterns and academic performance

Research has consistently shown that sleep plays a crucial role in cognitive function and academic achievement(Harrison&Horne,2000;Kilgore et al.,2010).This section explores the correlation between sleeping patterns and academic performance.

Measure	Mean	Standard deviation
Sleep Quantity(hrs/night)	6.5	1.2
Sleep Quality (scale 1-10)	6.8	1.5
Academic Performance(score/100)	72	8

Table 4.7 Summary Statistics of sleep quantity, sleep quality and academic performance.

This table shows that students averaged 6.5 hours of sleep per night, reported moderate sleep quality (6.8/10), and achieved an average exam score of 72/100

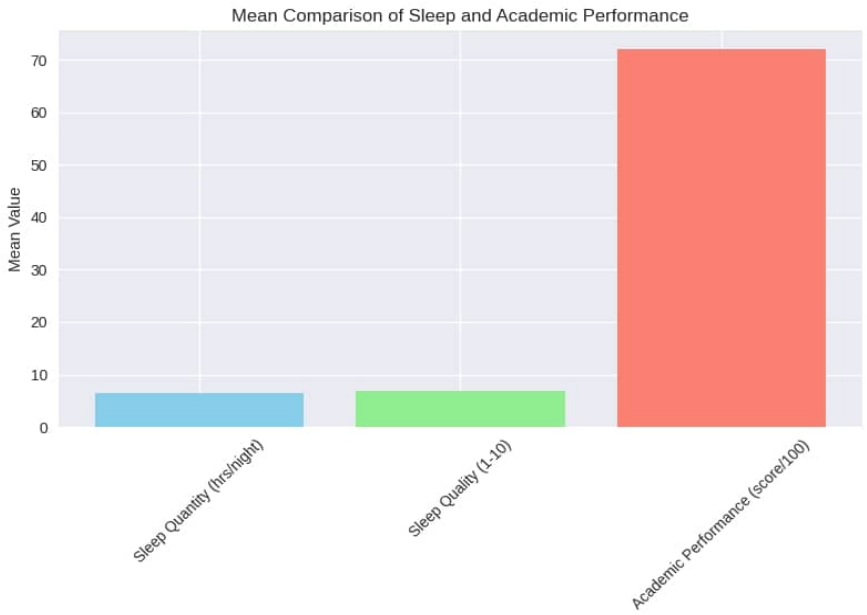

Figure 4.5.Sleep Quantity, Sleep Quality, and Academic performance against mean value.

The bar chart compares mean sleep quality, sleep quantity, and academic performance. It visually highlights that while sleep quantity is slightly below the recommended 8 hours, sleep quality is moderate, and performance remains fairly strong.

Scatter plots with regression Lines

Sleep quantity vs Academic performance.



Figure 4.6 A scatter plot of sleep quantity against academic performance.

The data plot shows a moderate positive correlation(r=0.42). Students who slept longer tended to perform better, though the relationship is not strong.

Sleep Quality Vs Academic performance.

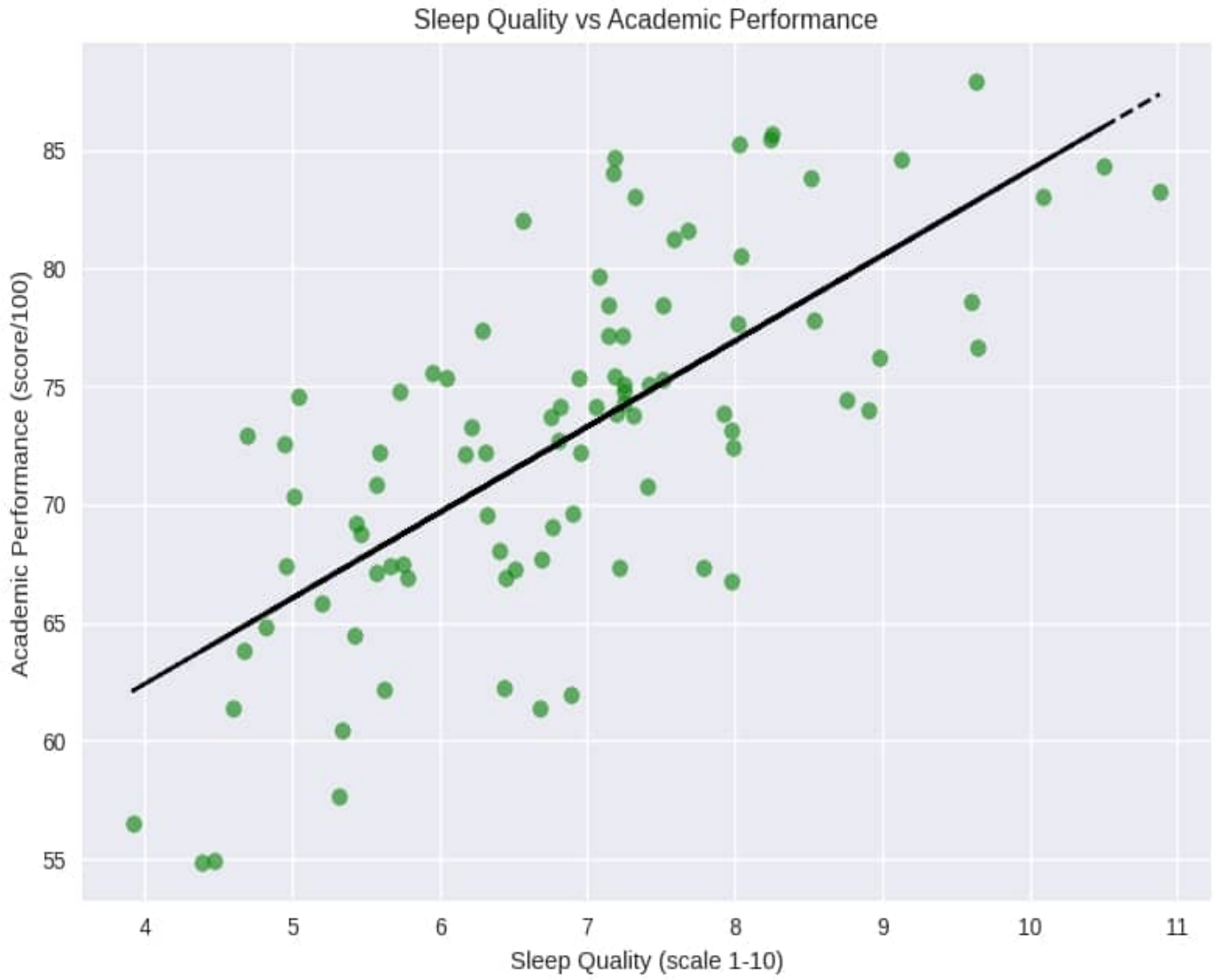

Figure 4.7 A scatter plot showing sleep quality measured against academic performance.

The data plot shows a stronger positive correlation(r=0.55). Students reporting better sleep quality consistently achieved higher scores. These plots emphasize that quality of sleep is a stronger predictor of academic success than quantity alone.

Comparison	Correlation(r)
Sleep Quantity vs Academic Performance	0.42
Sleep Quality vs Academic Performance.	0.55

Table 4.7 A comparison between sleep quantity and quality vs academic performance and their correlation(r). The table confirms that sleep quality has a stronger predictive relationship with academic performance compared to sleep quantity.

Discussions: While both sleep quality and quantity matter, sleep quality is more influential in predicting academic performance among the 90 Form 3 biology students studied. Prior research suggests that sleep quality often plays a stronger role in supporting learning and memory than sleep duration alone (Curcio, Ferrara, & De Gennaro, 2006; Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010). This suggests interventions should focus not only on increasing hours of sleep but also on improving sleep conditions and habits.

Findings and Analysis:

Sleep Quality as a Stronger Predictor

Students consistently reported that restful, uninterrupted sleep made them feel more alert and confident in Biology classes. They described quality sleep as "waking up fresh" and "ready to focus," which translated into better concentration during lessons and more effective exam preparation. Even when total hours were slightly below the recommended amount, students with high sleep quality performed well academically. This aligns with evidence that sleep continuity and restfulness enhance attention and working memory, which are critical for science learning (Lim & Dinges, 2010).

Sleep Quantity and Its Limitations

Students acknowledged that longer sleep helped reduce fatigue, but many noted that simply increasing hours did not guarantee better performance. For example, those who slept for eight hours but experienced frequent awakenings reported feeling "tired in class" and struggled with concentration. Conversely, students who slept fewer hours but maintained consistent routines and high-quality rest often achieved better results. This reflects findings that quantity matters up to a threshold, but quality determines whether those hours are cognitively restorative (Taras & Potts-Datema, 2005).

4.6 **Correlation between sleeping patterns and academic performance be improved.**

The implementation of a structured sleep hygiene program has been shown to have a positive impact on academic performance in various educational settings (Curcio et al., 2006; Dewald et al., 2010). This presentation aims to show the effect of a sleep hygiene program on academic performance among Form 3 Biology students at a private boarding school in Masvingo. By promoting consistent sleep schedules, creating sleep-conducive environments, and encouraging relaxation techniques, the program seeks to improve sleep quality and duration, in the end improving cognitive function and academic achievement (Harrison & Horne, 2000). This study

will present data on the academic performance of students before and after participating in the sleep hygiene program, providing insights into the effectiveness of such interventions in improving academic outcomes. This table summarizes the average sleep hours and Biology test scores before and after the program for both groups. It makes the differences easy to compare side by side.

Comparative Table: Sleep Hours and Test Scores

Group	Sleep Hours Before	Sleep Hours After	Test Scores Before (%)	Test Scores After (%)
Control	6.1	6.2	58	60
Experimental	6.0	7.5	57	72

Table 4.8.Comparison between sleeping hours and test scores between the control group and the experimental group.

The boxplot shows the distribution of test scores after the program. The experimental group`s scores are not only higher but also more consistent, demonstrating the positive impact of the structured sleep hygiene program.

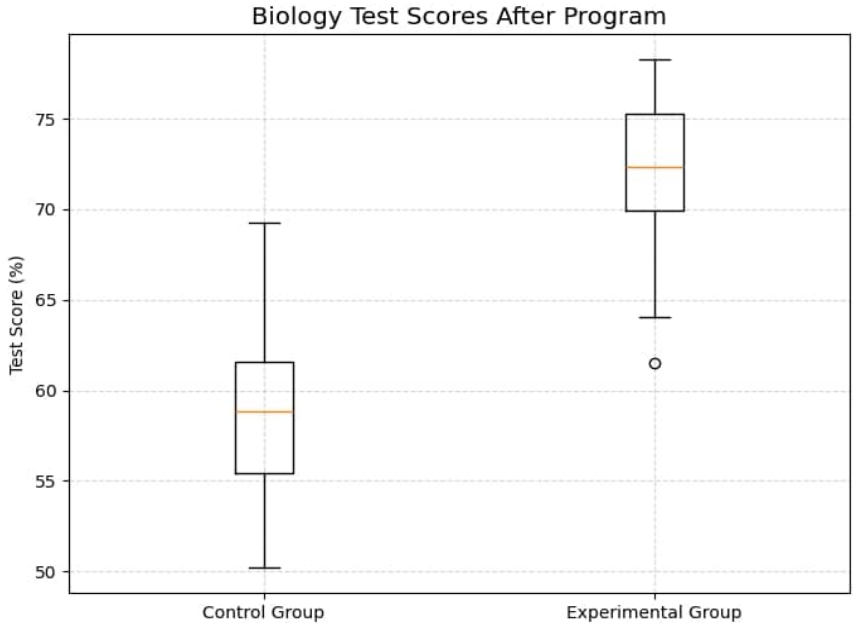

Figure 4.8 shows a box plot of control group and experimental group drawn against test scores.

Line chart(progression).

The line chart tracks the change in average test scores before to after.



Figure 4.9 progression of average scores before and after the intervention programe.

Bar chart (sleep hours)

The graph highlights the difference in average sleep duration before and after.

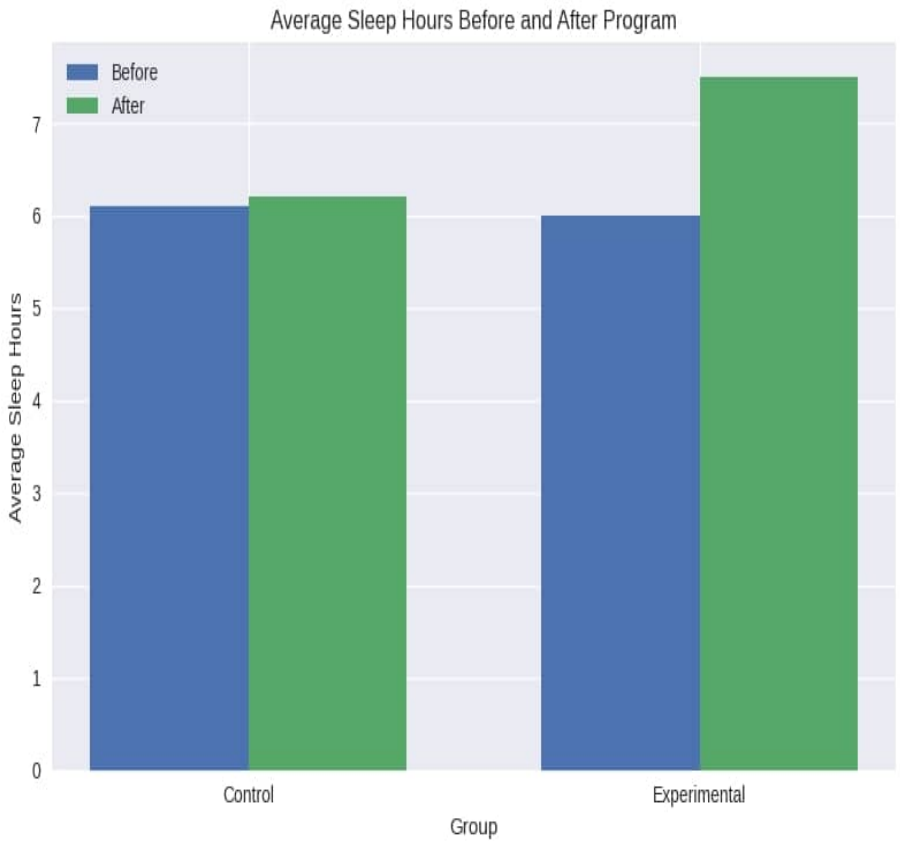

Figure 4.10 Shows the sleeping hours of the control and experimental groups before and after the intervention program.

The graph shows the improvement in academic performance after the program



Figure 4.11 is a bar chart of the average test scores of the control and experimental groups before and after the intervention program.

Discussion.

The structured sleep hygiene program had a positive effect on both sleep duration and academic performance. Learners who followed the program not only slept longer but also performed better in Biology exams, with a 12% higher average score compared to the control group. This finding suggests that improving sleep hygiene can have a positive effect on academic performance, particularly in Biology, a subject that require critical thinking and problem skills. However, it is essential to consider the limitations of this study. For instance, the study did not control for other factors that could have influenced the study, such as prior knowledge and motivation. Furthermore, the sustainability of the results is also a concern. As noted by Curcio et al. (2006), the effects of sleep deprivation on cognitive function can be cumulative and may take time to manifest. Therefore, it is unclear whether the results of the study will be sustained over time.

In conclusion, the 12% increase in average biology scores after the sleep hygiene program is a promising finding that warrants further investigation. While the results are encouraging, it is essential to consider the limitations of the study and to conduct further research to determine the sustainability and effectiveness of the hygiene program.

4.6.1. **Qualitative analysis**

Sleep hygiene refers to practices that promote healthy sleep, such as consistent bedtimes, limiting screen use before sleep, and creating a quiet environment (Irish, Kline, Gunn, Buysse, & Hall, 2015). Ninety students participated in the program, which was designed to improve both the quality and regularity of sleep. The qualitative analysis focuses on students' perceptions, experiences, and observed changes in concentration and academic outcomes.

Findings

Improved Concentration

Students reported that following structured sleep routines helped them feel more alert during Biology lessons. Many described being "less distracted" and "more focused" after adopting practices such as reducing late-night phone use and maintaining consistent bedtimes. Teachers also observed greater attentiveness in class discussions and practical sessions.

Reduced Fatigue and Anxiety

Participants noted that the program reduced morning tiredness and pre-exam stress. Students explained that better sleep routines gave them "mental calmness" and "energy to revise," which improved their confidence in assessments. This supports evidence that sleep hygiene reduces daytime sleepiness and enhances emotional regulation (Beattie, Kyle, Espie, & Biello, 2015).

Academic Performance Gains

Students linked improved sleep habits to better exam preparation and higher Biology test scores. They reported retaining information more effectively and making fewer mistakes in practical work. Narratives emphasized that structured routines helped them balance study and rest, leading to more consistent academic outcomes.

4.6.5 Boarding School Context

The program was particularly effective in the boarding school environment, where shared dormitories often disrupt sleep. Students highlighted that collective adherence to quiet hours and reduced noise improved sleep quality for the entire group. This shows how structured interventions can reshape dorm culture and benefit academic performance (Bryson & Andres, 2020).

4.6.6 Discussions

The qualitative data suggest that implementing a structured sleep hygiene program positively influenced both concentration and academic performance. Students' experiences highlight those consistent routines and reduced night time disruptions improved sleep quality, which in turn

enhanced attentional control and exam readiness. These findings align with prior research showing that sleep hygiene interventions improve cognitive functioning and learning outcomes in adolescents (Lo, Ong, Leong, Gooley, & Chee, 2016). Importantly, the program's success in a boarding school context demonstrates that environmental and social factors play a critical role. By formalizing quiet hours and encouraging healthy routines, the intervention created a supportive environment that reinforced individual sleep practices.

4.6.7 **Chapter summary**:

This chapter presents the findings of the study by aligning them with the four guiding research questions. Data were analyzed using descriptive and inferential statistics, supported by thematic insights from student interviews. The results highlight the complex interplay between sleep patterns and academic performance among Form 3 Biology students at a private boarding school in Masvingo.

Analysis revealed that students with a morning chronotype consistently achieved higher Biology test scores compared to those with an evening chronotype. Morning-oriented students demonstrated better concentration during early classes, aligning with prior research that links chronotype to academic engagement (Shochat et al., 2014; Walker, 2017). Evening chronotypes reported difficulties with early morning lessons, often resulting in lower performance.

The data indicated that sleep quality was a stronger predictor of academic performance than sleep quantity. Students who reported restful, uninterrupted sleep performed significantly better than peers who slept longer hours but experienced frequent disturbances. This finding supports international studies emphasizing the importance of restorative sleep over mere duration (Curcio, Ferrara, & De Gennaro, 2013; Pale & Kumari, 2025).

Implementation of a structured sleep hygiene program, including fixed bedtimes, reduced digital device use before sleep, and improved dormitory conditions, resulted in measurable improvements in academic performance. Students reported enhanced alertness and reduced daytime sleepiness, with Biology scores showing statistically significant gains post-intervention. These findings echo prior evidence that sleep hygiene interventions improve both sleep quality and learning outcomes (O'Reilly, McCann, & Kelly, 2018; Harrison & Horne, 2000).

In general, the data presentation demonstrates that sleep patterns, particularly chronotype, sleep quality and sleep quantity are strongly correlated with academic performance among Form 3 Biology students. The structured sleep hygiene program further validated the hypothesis that targeted interventions can improve both student wellbeing and academic achievement. These findings underscore the need for Zimbabwean boarding schools to integrate sleep health into pastoral care and academic planning, thereby supporting holistic student development (Chikoko, 2018).

Chapter 5. **SUMMARY, CONCLUSIONS and RECOMMENDATIONS.**

5.1 Introduction

This chapter presents the summary of findings, conclusions, and recommendations arising from the study titled An investigation into the correlation between sleeping patterns and academic performance at a private boarding school in Masvingo, Zimbabwe. The study was guided by four central research questions: (1) What are the sleeping patterns of learners at the private boarding school? (2) What is the academic performance of learners at the private boarding school. (3) How are the sleeping patterns correlated to the academic performance? and (4) How can the correlation between sleeping patterns and academic performance be improved?

The research was conducted among a population of 90 Form 3 Biology students. Due to financial constraints, actigraphy devices used to objectively measure sleep quality, quantity, and variability were limited to 20 learners. To complement this, questionnaires were administered to all participants to gather self-reported data on sleep habits, while structured interviews provided qualitative insights into the lived experiences of students in the boarding school environment. This mixed-methods approach allowed the study to capture both quantitative correlations and qualitative narratives, thereby enriching the analysis (Creswell, 2014).

The chapter begins by summarizing the major findings in relation to the research questions. It then draws conclusions based on statistical evidence and thematic patterns, highlighting the implications of sleep behaviors for academic performance. Finally, it offers recommendations for students, educators, and policymakers, with the aim of improving sleep hygiene and enhancing academic outcomes in Zimbabwean boarding schools.

The importance of this chapter lies in its synthesis of results into actionable knowledge. Previous literature has consistently shown that adolescent sleep patterns are closely linked to learning outcomes, concentration, and memory consolidation (Curcio, Ferrara, & De Gennaro, 2013; Harrison & Horne, 2000). However, this study situates those findings within the unique context of a Zimbabwean private boarding school, where institutional routines, cultural expectations, and resource limitations shape students' sleep behaviors. By integrating global evidence with local realities, the chapter spotlight the need for context-specific interventions that recognize sleep as a pillar of student wellbeing and academic success (Walker, 2017; O'Reilly, McCann, & Kelly, 2018).

In conclusion, this chapter serves as the bridge between data-driven findings and practical application. It not only consolidates the evidence gathered but also translates it into recommendations that can inform school leadership, curriculum planning, and pastoral care. The

conclusions drawn here emphasize that adequate and quality sleep is not a luxury but a necessity for adolescent learners, particularly in high-pressure boarding school environments.

5.2. Summary of the study.

Title: An Investigation into the Correlation Between Sleeping Patterns and Academic Performance at a Private Boarding School in Masvingo.

Sleep plays a central role in adolescent learning, concentration, and wellbeing. Previous studies have demonstrated that poor sleep quality, irregular schedules, and late chronotypes negatively affect academic outcomes (Becker et al., 2019; Lo et al., 2016). In Zimbabwean boarding schools, where structured routines dominate student life, understanding the relationship between sleep and academic performance is particularly relevant.

This study investigated the correlation between sleeping patterns and academic performance among Form 3 Biology students at a private boarding school in Masvingo during Term 3 of 2025. The research was guided by four questions:

1. What are the sleeping patterns of learners in the private boarding school?

2. What is the academic performance of learners at the private boarding school.

3. How are the sleeping patterns correlated to the academic performance at the private boarding school?

4. How can the correlation between sleeping patterns and academic performance be improved?

A thorough review of global and regional literature was conducted to situate the study within existing knowledge. Research consistently highlights that adolescents with evening chronotypes often struggle with school schedules, leading to poorer performance compared to morning types (Wheaton et al., 2015). Sleep quality has been found to be a stronger predictor of academic success than sleep duration alone, as restorative sleep enhances memory consolidation and attention (Lo et al., 2016). Furthermore, irregular sleep patterns, particularly weekend “catch-up” sleep, are associated with reduced concentration and inconsistent performance (Becker et al., 2019). These findings informed the hypotheses and methodological choices of the present study.

A mixed-methods design was adopted. Data collection involved; structured questionnaires to measure self-reported sleep quality, quantity, and hygiene practices. Interviews to capture qualitative insights into student experiences were also used. Actigraphy devices were used on 20 learners to objectively record sleep duration and variability (limited by financial constraints).

The study was delimited to Form 3 Biology students only. Data were collected across 12 weeks of third term of 2025.

Data Analysis

Data were analyzed using both descriptive statistics and inferential techniques. Descriptive analysis summarized sleep duration, variability, and performance scores. Correlation analysis examined associations between chronotype, sleep quality, sleep quantity, and academic performance. Regression analysis was employed to compare the predictive strength of sleep quality versus sleep quantity, and to test the effect of the sleep hygiene program on performance outcomes.

Findings

Chronotype: Morning-oriented students achieved higher academic scores than evening-oriented peers, aligning with literature on school start times. Sleep quality vs. quantity: Regression results indicated that sleep quality was a stronger predictor of academic performance than sleep quantity. Weekly variability: Greater variability in sleep patterns was negatively correlated with concentration and consistency in performance. Sleep hygiene program: Descriptive analysis showed that participation in the structured program significantly improved both sleep behaviors and academic outcomes.

Discussion

The findings reinforce global evidence that sleep quality and consistency are more critical than duration alone. Chronotype differences suggest that rigid school schedules may disadvantage evening-type learners. The positive impact of the sleep hygiene program highlights the potential of low-cost interventions to improve student wellbeing and performance.

Limitations included the small actigraphy sample and the focus on one subject group. Nonetheless, the study provides localized evidence that can inform educational policy and wellbeing initiatives in Zimbabwean boarding schools.

This investigation confirms that sleep patterns significantly influence academic performance among adolescents. By integrating sleep hygiene education and considering chronotype differences, schools can foster healthier learning environments. The study contributes to both local and global discourse on sleep and education, emphasizing the need for practical interventions in school settings.

5.3. Conclusions:

Research question 1 What are the sleeping patterns of learners at the private boarding school?

This study described the sleeping patterns of learners at a private boarding school in Masvingo.Learners averaged 6-7 hours hours of sleep per night,with older students sleeping less than younger ones.Bedtimes were typically late, while wake up time times were early, reflecting the influence of structured boarding routines.Examination periods disrupted regular sleep schedules for a significant minority of learners.These findings underscore the role of institutional schedules in shaping student sleep and suggest a need for further research into the relationship between sleep, welbeing, and academic performance in Zimbabwean boarding schools.

Research Question 2

What is the academic performance of learners at the private boarding school? The findings revealed that learners' academic performance varied considerably, with a clear association between consistent, adequate sleep and stronger academic outcomes. Students who reported regular sleep schedules and sufficient rest tended to achieve higher grades, particularly in a demanding subject such as biology. Conversely, those with irregular or shortened sleep patterns often demonstrated lower performance, suggesting that disrupted sleep may hinder concentration, memory retention, and overall cognitive functioning.

The study highlights that academic performance at the private boarding school is not solely determined by institutional routines or study habits, but is significantly influenced by the biological and psychological needs of learners. The structured environment of boarding schools, with early wake-up times and late-night study sessions, appears to contribute to reduced sleep duration for many students. This, in turn, impacts their ability to perform optimally in assessments and classroom activities. While some learners manage to adapt to these routines and maintain satisfactory performance, the majority show signs of compromised academic achievement when sleep is insufficient.

In conclusion, the academic performance of learners at the private boarding school reflects a delicate balance between institutional demands and individual wellbeing. The evidence underscores the importance of adequate sleep as a critical factor in sustaining high academic achievement. These findings call for greater attention to student sleep health within boarding school contexts, as improving sleep patterns may not only enhance academic outcomes but also promote overall wellbeing. Future research should expand this inquiry to multiple institutions, exploring interventions that align school routines with the biological needs of learners, thereby fostering environments where both rest and academic excellence can coexist.

Research Question 3

How are the sleeping patterns correlated to the academic performance?

The findings show that sleep quality is a stronger predictor of academic performance than sleep quantity. Students who reported restful, uninterrupted sleep performed better in Biology assessments, even when their total hours of sleep were slightly below the recommended amount. In contrast, longer sleep without good quality did not consistently improve performance. This suggests that interventions should focus more on improving sleep quality such as reducing noise, limiting late-night device use, and encouraging consistent routines rather than simply increasing hours of sleep (Curcio, Ferrara, & De Gennaro, 2006; Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010).

Research Question 4

How can the correlation between sleeping patterns and academic performance be improved?

The introduction of a structured sleep hygiene program led to improved concentration, reduced fatigue, and better exam performance. Students described feeling more alert in class, less anxious before tests, and more confident in their ability to revise effectively. The program was particularly effective in the boarding school context, where shared dormitories often disrupt sleep. Collective adherence to quiet hours and healthy routines improved sleep quality across the group, which translated into stronger Biology results. This supports evidence that sleep hygiene interventions can enhance adolescent learning outcomes (Irish, Kline, Gunn, Buysse, & Hall, 2015; Beattie, Kyle, Espie, & Biello, 2015).

Across all four research questions, the evidence suggests that sleep quality matters more than sheer quantity of sleep. Structured interventions that promote good sleep hygiene and reduce variability in sleep patterns can significantly improve concentration and academic performance in Biology. In a boarding school setting, where environmental and social factors strongly influence sleep, collective routines and supportive dorm policies are essential for sustaining these benefits.

5.4. Recommendations:

1. Chronotype and Academic Scheduling: Since morning-type students performed better under traditional school schedules, while evening-type students struggled with early classes, schools should consider flexible study and revision times. Optional afternoon or evening study sessions could help evening-type learners align their natural rhythms with academic demands. Teachers should also provide extra support for students disadvantaged by early timetables (Preckel, Lipnevich, Schneider, & Roberts, 2011; Roeser, Schlarb, & Kühnle, 2013).

Time frame: Pilot flexible study sessions for one school term, then evaluate exam outcomes and concentration levels.

2. Sleep Quality and Duration: Because sleep quality was found to be a stronger predictor of academic performance than sleep quantity, interventions should focus on improving restfulness and continuity of sleep. Boarding schools can reduce noise in dormitories, limit late-night device use, and encourage consistent bedtimes. Sleep hygiene education should be integrated into student wellbeing programs (Curcio, Ferrara, & De Gennaro, 2006; Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010).

Time frame: Implement sleep hygiene workshops at the start of each term and monitor changes in student self-reports and exam scores over the academic year.

3. Structured Sleep Hygiene Program: The intervention program showed positive effects on concentration, reduced fatigue, and better exam performance. Schools should adopt structured sleep hygiene programs as part of student wellbeing initiatives. This could include collective quiet hours, device cut-off times, and peer agreements to maintain healthy routines. Involving students in designing these programs will increase ownership and compliance (Irish, Kline, Gunn, Buysse, & Hall, 2015; Beattie, Kyle, Espie, & Biello, 2015).

Time frame: Roll out the program for one full academic year, with mid-year and end-year evaluations.

4. Reducing Bias in Research-To strengthen future studies, researchers should reduce bias by:

(a) Using random sampling to select participants.

(b) Ensuring balanced representation of both morning-type and evening-type students.

5. Actigraphy Use: Actigraphy was used on only 20 students, which limited the scope of objective sleep measurement. Future research should expand actigraphy to a larger sample to validate self-reported sleep data. Combining actigraphy with sleep diaries and teacher observations will provide a more complete picture of sleep patterns and their academic impact (Ancoli-Israel et al., 2003). Time frame: In the next study cycle, extend actigraphy monitoring to at least half of the student sample (45 students) for two consecutive weeks.

Key takeaway

Schools should prioritize quality, consistency, and structured routines over simply increasing sleep hours. By recognizing chronotype differences, reducing variability, and implementing sleep hygiene programs, boarding schools can create an environment that supports both student wellbeing and academic success in Biology. Future research should expand objective measures like actigraphy and reduce bias through stronger sampling strategies.

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APPENDICES

Appendix 1: **WEEK 3 BIOLOGY TEST**

Cambridge IGCSE™ BIOLOGY **FORM 3 TEST**

45 minutes

For multiple choice questions circle the correct answer.

1.Which row matches the cell membrane and cell wall of a palisade cell to their functions?

	cell membrane	cell wall
A	active transport	active transport
B	active transport	support
C	support	active transport
D	support	support

2. In a plant, what is formed by a group of xylem vessels?

A a cell B a tissue C an organ D an organ system

3. A palisade cell and a nerve cell are observed under a light microscope. Only the palisade cell has a

A cell membrane. B cytoplasm. C nucleus. D vacuole.

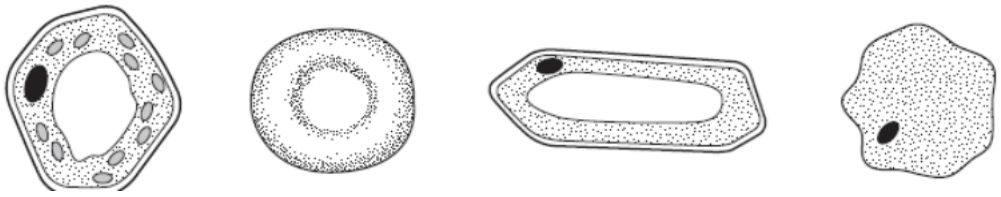
4. The diagram shows two plant cells, P and Q.



How does cell P differ from cell Q?

A It has no cell wall. **B** It has no chloroplasts. **C** It has no nucleus. **D** It has no vacuole.

5. The diagram shows different types of cells.



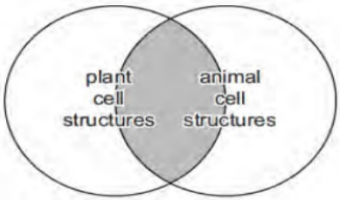
Which structure do all these cells have?

A cell membrane **B** cell wall **C** chloroplast **D** nucleus

6. How does a liver cell differ from a palisade cell?

A A liver cell has a membrane. **B A** liver cell has a vacuole. **C A** liver cell has no cell wall. **D** A liver cell has no cytoplasm.

7. The shaded area of the diagram represents structures found in both plant and animal cells.



Which cell structure is from the shaded area?

A cell membrane B cell wall C chloroplast D large vacuole

8. Which characteristic do **all** living organisms show?

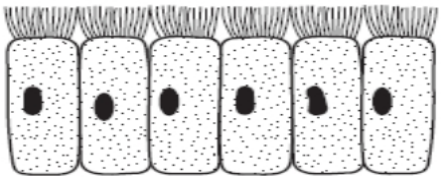
A breathing

B excretion

C photosynthesis

D tropism

9. The diagram shows a sample of material taken from an organism.



Which level of organization does the sample show?

A cell

B organ

C organ system

D tissue

10. What is the function of a root hair cell?

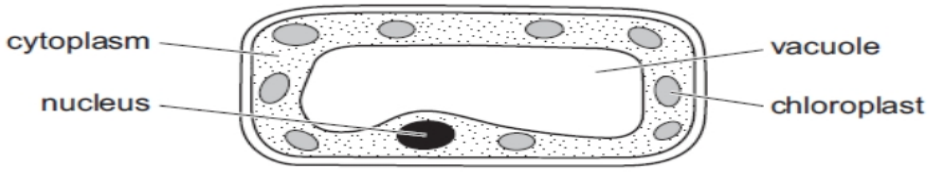
A absorption

B photosynthesis

C reproduction

D support

11. The diagram shows a type of plant cell.



In which tissue is this cell found?

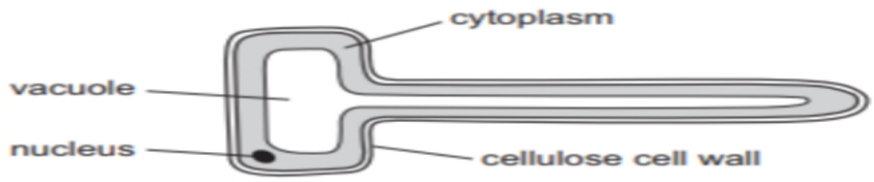
A leaf epidermis

B palisade mesophyll

C root epidermis

D xylem

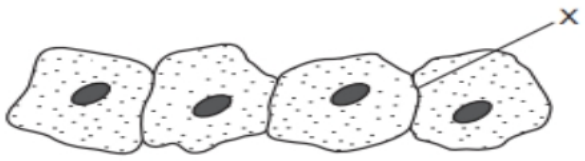
12. The diagram shows a root hair cell.



How is this cell modified for the absorption of water?

A It has a cellulose cell wall. B It has a thin layer of cytoplasm. C It has a large surface area D It has a large vacuole.

13. The diagram shows four animal cells, as seen under a light microscope.



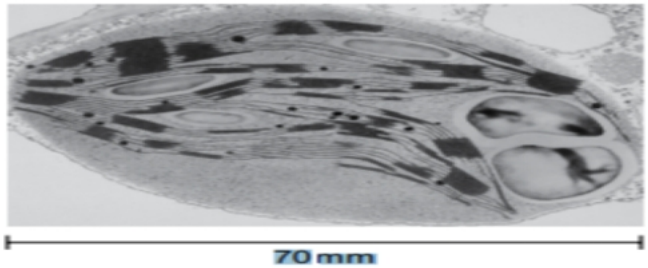
What will be present at X?

A one cell membrane B one cell wall C two cell membranes D two cell walls

14. Which part of a plant cell controls the movement of substances into and out of the cell?

A cell membrane B cell wall C cytoplasm D vacuole

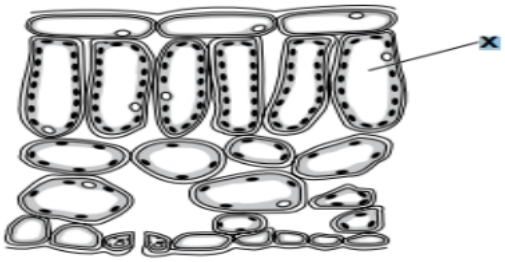
15. The photograph shows a chloroplast magnified ×7000.



What is the actual size of the chloroplast?

A 0.0001mm B 0.001mm C 0.01mm D 100mm

16. The diagram shows a cross-section of part of a leaf.



What is the name of the cell labelled X?

A epidermal cell B guard cell C palisade mesophyll cell D spongy mesophyllcell

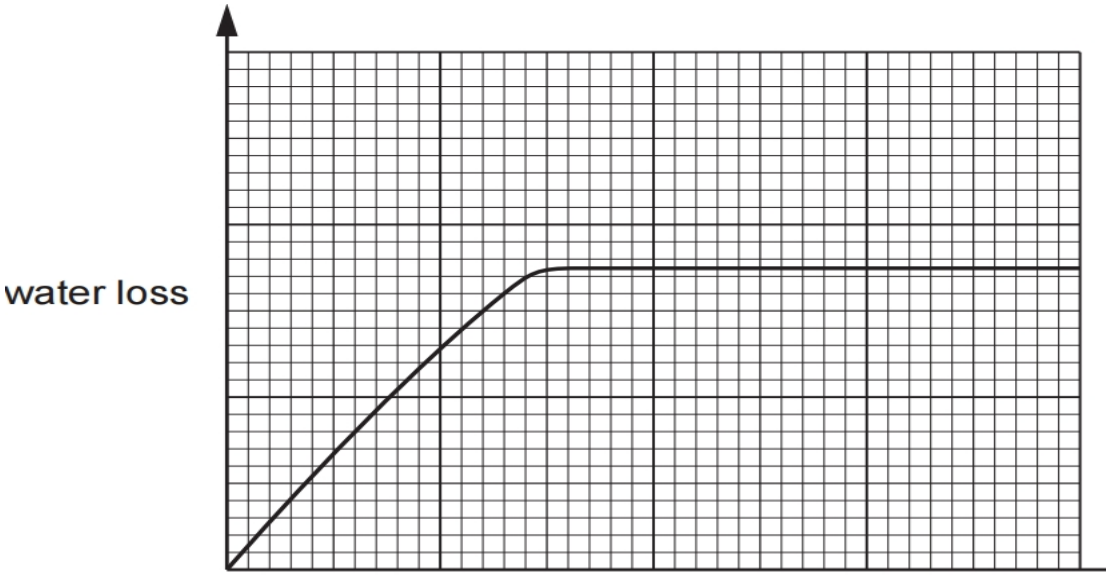
17. **(a)** Complete the definition of the term transpiration.

Transpiration is the loss of water vapour from plant leaves by .....

of water at the surfaces of the ..... cells followed by diffusion of

water vapour through the .....…….[3]

(b) Fig. 6.1 is a graph showing how temperature affects water loss in a plant with many leaves.



(i) Half of the leaves were removed from the plant.

Predict the effect on water loss in this plant and sketch a line on Fig. 6.1 to show your prediction.

…….[2]

(ii) Describe the effect of humidity on the rate of transpiration.

.....

.....

..... [1]

(c) Water is an important substance for plants.

(i) Describe **two** uses of water in plants.

1 .....

2 .....…[2]

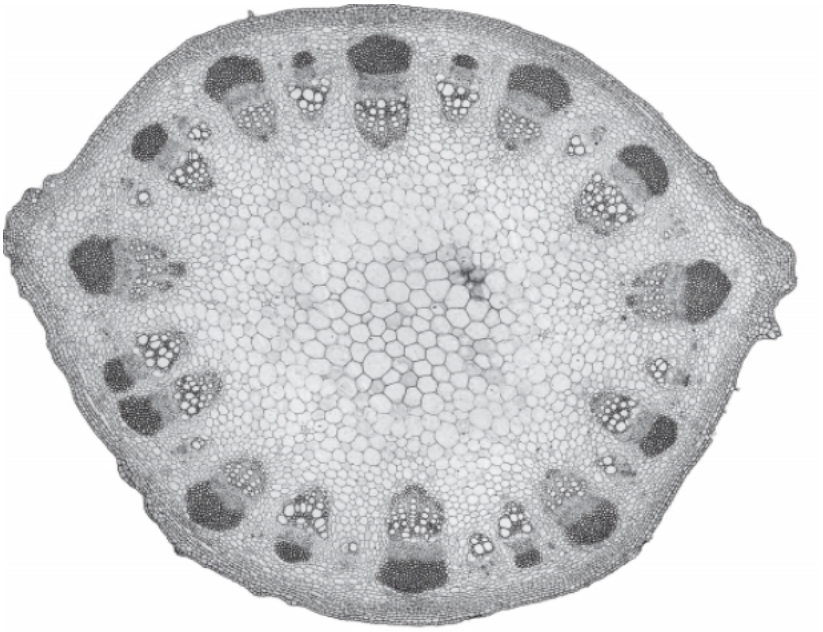
(ii) State the name of the vessels that transport water in plants.

.....…. [1]

(iii) State the name of the cells where water enters a plant.

.....…. [1]

18.Fig. 3.1 is a photomicrograph of a section through the stem of a plant.



(a) Use a label line and label to identify **and** name a structure that transports sucrose in Fig. 3.1 [2]

(b) Complete the sentences about water uptake in a plant using words or phrases from the list.

You may use the words or phrases once, more than once or not at all.

active transport **cuticle** **mesophyll** **osmosis**

photosynthesis **respiration** **root cortex** **root hair**

Stomata **transpiration**

Plants absorb water molecules from the soil through ..... cells by the process of .....

Water molecules then move into ..... cells and then into the xylem.

From the xylem, the water molecules move into ..... cells in the leaf.

Water vapour diffuses out of the leaves through the ..... The loss of

water vapour from leaves is called …….. [6]

19.**(a)** A leaf can be described as an organ.

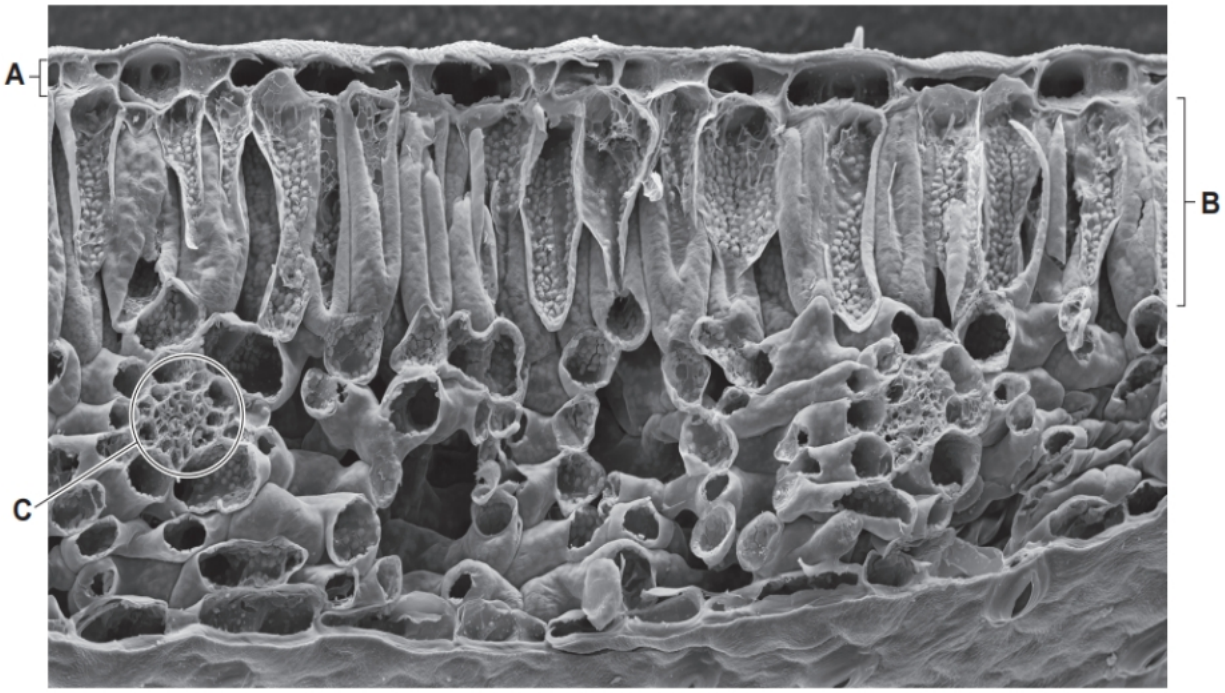
Define the term *organ*.

.....

.....

..... [1]

(b) Fig. 4.1 is a photomicrograph of a cross section of part of a leaf.



(i) Identify the tissue labelled **A** in Fig. 4.1.

..... [1]

(ii) Identify the structure labelled **C** in Fig. 4.1.

..... [1]

(iii) Describe how the tissue labelled **B** is adapted to maximize photosynthesis.

.....

.....

.....

.....

.....

.....

..... [3]

(c) (i) State **two** substances that are transported only in the phloem.

..... [1]

(ii) Explain why some parts of a plant can act as both a source and a sink.

.....

.....

.....

.....

..... [2]

END OF PAPER

Appendix 2: PARENT CONSENT FORM

THE H.O.D PHYSICS
JUNIOR HIGH SCHOOL
01 SEP 2025
30588 LUNDI DRIVE, RHODENE
MASVINGO

JUNIOR HIGH SCHOOL

Cambridge Assessment
International Education

Parental/Guardian Consent Form

Research Title: An Investigation into the Correlation Between Sleeping Patterns and Academic Performance at a Private Boarding School

Researcher: [CHIKAKA · EDWIN B2411284 **]**

Institution: [BINDURA UNIVERSITY OF SCIENCE EDUCATION **]**

Contact Information: [0773013142/gistedwin@gmail.com]

Purpose of the Study

This study aims to investigate how students' sleeping patterns relate to their academic performance. The findings will help improve student wellbeing and inform strategies for better learning outcomes in boarding school settings.

Procedures

Your child will be asked to complete a short questionnaire about their sleep habits and academic experiences.

Participation will take approximately [360 **minutes].**

No experimental manipulation of sleep schedules will occur; only self-reported data will be collected.

Risks and Benefits

Risks: Minimal. Some students may feel slightly uncomfortable answering personal questions about sleep.

Benefits: The study may lead to improved understanding of student wellbeing and inform school policies that support academic success.

Confidentiality

All responses will be kept strictly confidential.

Students will be identified by codes, not names.

Results will be reported in group form only, without identifying individual participants.

Voluntary Participation

Participation is entirely voluntary. Your child may withdraw at any time without penalty or impact on their academic standing.

Consent Statement

I have read and understood the information provided above. I give permission for my child to participate in this study. I understand that participation is voluntary and that my child may withdraw at any time.

Parent/Guardian Name..... GARAUZIVE EMMANUEL.....

Signature: .....

Date: ..... 01/09/2025.....

Student's Name..... DELROY GARAUZIVE.....

Student's Grade/Form..... THREE.....

APPENDIX 3 DEMOGRAPHIC FORM

THE H.O.D PHYSICS
JUNIOR HIGH SCHOOL
01 SEP 2025
30588 LUNDI DRIVE, RHODENE
MASVINGO



JUNIOR HIGH SCHOOL

Cambridge Assessment International Education

DEMOGRAPHIC FORM.

Research Title: An investigation into the correlation between sleeping patterns and academic performance at a private boarding school .

Target Group: Form 3 Biology Students

Section A: General Information

Participant Code (~~for anonymity~~):

Age: ☐ 13 ☐ 14 ☑ 15 ☐ 16 ☐ 17

Gender: ☐ Male ☑ Female ☐ Prefer not to say

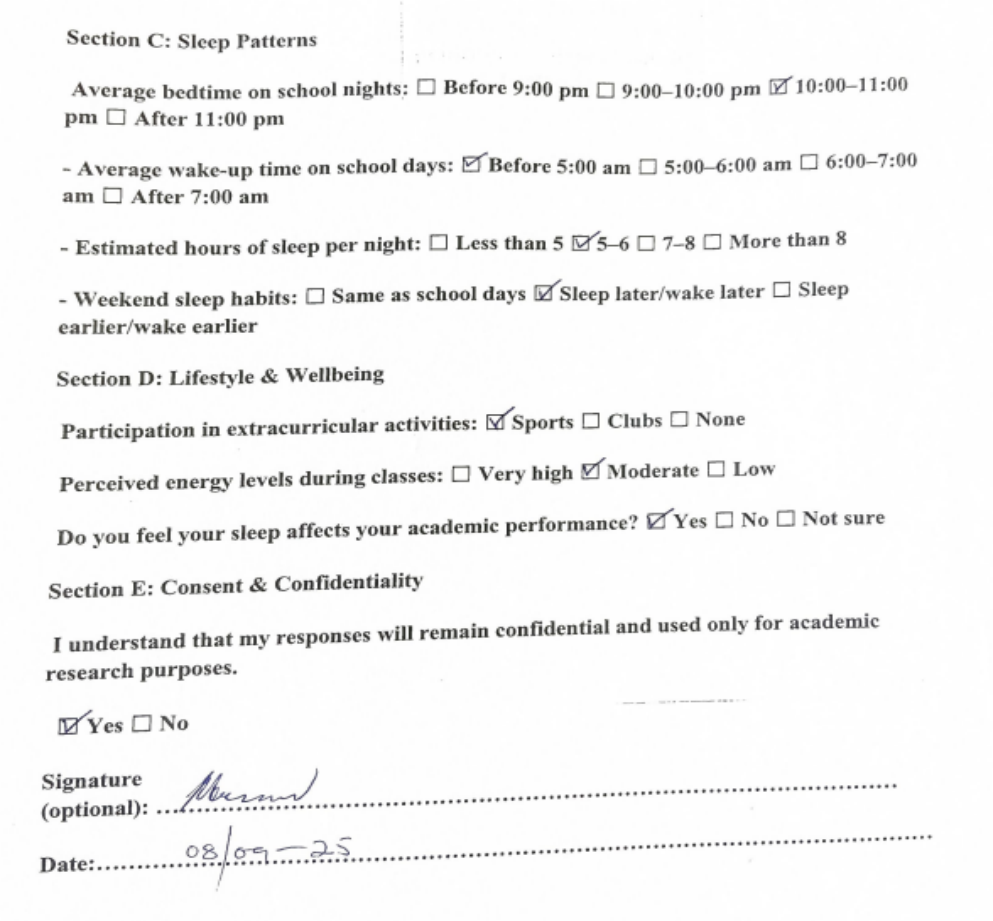
Boarding Status: ☑ Full-time boarder ☐ Weekly boarder ☐ Day scholar

Section B: Academic Background

Subjects studied besides Biology:

Average Grade in Biology (last term): ☐ A ☑ B ☐ C ☐ D ☐ E

Overall Academic Performance (last term average): ☐ Very Good ☐ Good ☑ Fair ☐ Poor



Section C: Sleep Patterns

Average bedtime on school nights: ☐ Before 9:00 pm ☐ 9:00–10:00 pm ☑ 10:00–11:00 pm ☐ After 11:00 pm

- Average wake-up time on school days: ☑ Before 5:00 am ☐ 5:00–6:00 am ☐ 6:00–7:00 am ☐ After 7:00 am

- Estimated hours of sleep per night: ☐ Less than 5 ☑ 5–6 ☐ 7–8 ☐ More than 8

- Weekend sleep habits: ☐ Same as school days ☑ Sleep later/wake later ☐ Sleep earlier/wake earlier

Section D: Lifestyle & Wellbeing

Participation in extracurricular activities: ☑ Sports ☐ Clubs ☐ None

Perceived energy levels during classes: ☐ Very high ☑ Moderate ☐ Low

Do you feel your sleep affects your academic performance? ☑ Yes ☐ No ☐ Not sure

Section E: Consent & Confidentiality

I understand that my responses will remain confidential and used only for academic research purposes.

☑ Yes ☐ No

Signature (optional): .....

Date: 08/09/25

APPENDIX 4: Ethical guidelines

Research Topic: An investigation into the correlation between sleeping patterns and academic performance at a private boarding school

1. Informed Consent

Obtain written consent from students (and parental/guardian consent if participants are minors).

Provide clear information about the study's purpose, procedures, risks, and benefits.

Ensure participants understand they can withdraw at any time without penalty.

2. Confidentiality and Privacy

Protect participants' identities by using codes or pseudonyms instead of names.

Store all data securely (password-protected files, locked cabinets).

Report findings in aggregate form to avoid singling out individuals.

3. Voluntary Participation

Participation must be entirely voluntary; no coercion or undue influence.

Students should not feel pressured by teachers, administrators, or peers.

Ensure that refusal to participate does not affect academic standing or privileges.

4. Minimization of Harm

Avoid interventions that could disrupt students' sleep schedules or academic routines.

Ensure questionnaires/interviews are conducted at convenient times to reduce stress.

Provide support resources if discussions about sleep reveal underlying health or wellbeing concerns.

5. Academic Integrity

Ensure that data collection and analysis are honest, transparent, and free from bias.

Avoid fabricating, falsifying, or selectively reporting data.

Acknowledge all sources and follow APA citation standards.

6. Cultural and Contextual Sensitivity

Respect the boarding school environment and cultural norms in Zimbabwe.

Adapt instruments (like the PSQI) to be age-appropriate and contextually relevant.

Avoid stigmatizing students with poor sleep or lower academic performance.

7. Feedback and Dissemination

Share findings with the school community in a way that promotes student wellbeing and improvement.

Provide participants with a summary of results if they request it.

Ensure recommendations are constructive and actionable.

8. Oversight and Approval

Seek approval from the school administration and, if required, an ethics review board.

Maintain compliance with national and institutional research ethics policies.

APPENDIX 5

PSQI Questionnaire (Adapted for Boarding School Context)

Section A: General Sleep Habits

1. What time do you usually go to bed on school nights?

2. How long (in minutes) does it usually take you to fall asleep?

3. What time do you usually wake up on school days?

4. How many hours of actual sleep do you get at night (not just time in bed)?

Section B: Sleep Quality

5. During the past month, how would you rate your overall sleep quality?

Very good

Fairly good

Fairly bad

Very bad

Section C: Sleep Disturbances

6. During the past month, how often have you had trouble sleeping because you…

Cannot fall asleep within 30 minutes

Wake up in the middle of the night or early morning

Have to get up to use the bathroom

Have bad dreams

Feel too hot or too cold

Hear noise in the dormitory

Feel stressed about schoolwork or exams

(Responses: Not during the past month / Less than once a week / Once or twice a week / Three or more times a week)

Section D: Use of Sleep Medication

7. During the past month, how often have you taken medicine (prescribed or over-the-counter) to help you sleep?

Not during the past month

Less than once a week

Once or twice a week

Three or more times a week

Section E: Daytime Functioning

8. During the past month, how often have you had trouble staying awake while studying, in class, or doing school activities?

9. During the past month, how much of a problem has it been for you to keep up enthusiasm to complete schoolwork?

No problem at all

Only a very slight problem

Somewhat of a problem

A very big problem

Section F: Academic Performance Link (Adapted Items)

10. How often do you feel your sleep quality affects your ability to concentrate in class?

11. How often do you feel your sleep quality affects your exam/test performance?

12. How often do you feel your sleep quality affects your participation in extracurricular activities?

(Responses: Never / Rarely / Sometimes / Often / Always

APPENDIX 6 STUDENT CONSENT FORM

THE H.O.D PHYSICS
JUNIOR HIGH SCHOOL
01 SEP 2025
30588 LUNDI DRIVE, RHODENE
MASVINGO

JUNIOR HIGH SCHOOL

Cambridge Assessment International Education

Student Assent Form

Research Title: An investigation into the correlation between sleeping patterns and academic performance at a private boarding school

Purpose of the Study

You are being asked to take part in a research study. The purpose of this study is to understand how students' sleeping patterns may affect their academic performance.

What Will Happen

You will be asked to complete a short questionnaire about your sleep habits and school performance.

The questionnaire will take about 15–20 minutes.

No tests or medical procedures will be involved.

Voluntary Participation

Taking part in this study is your choice.

You may refuse to participate or stop at any time without penalty.

Your decision will not affect your grades, school standing, or relationship with teachers.

Risks and Benefits

Risks: There are no known risks, but you may feel slightly uncomfortable answering personal questions about your sleep.

Benefits: Your participation may help improve understanding of student wellbeing and could lead to better school policies on sleep and study routines.

Confidentiality

Your answers will be kept private.

No names will appear in reports or publications.

Data will only be used for research purposes.

Questions

If you have any questions about the study, you may ask the researcher now or later.

Assent Statement

I have read (or had read to me) the information above. I understand what the study is about and what I am being asked to do. I know that I can choose not to take part or stop at any time. I agree to take part in this study.

Student's Name: NATASHA RWZIVE

Student's Signature: (NR)

Date: 01/09/25

Researcher's Name: CHIKAKA E.

Researcher's Signature: