

Early Birds & Night Owls: Understanding Its Effect on Students' Study Habits at Mindanao State University-Sulu Senior High School

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Abstract. The students today faced increasing demand to required them to balance study, rest and personal time effectively. Sleep chronotype refers to an individual's natural preference for sleeping and being active in the morning or evening, which influences students' focus, productivity, and study habits. However, limited studies have explored this among students in the Philippine context. The study was limited to selected STEM Senior High School students from Grades 11 and 12 at Mindanao State University-Sulu during the academic year 2025-2026 and focused only on sleep chronotypes and study habits. This study aimed to determine the sleep chronotype preference of students and how sleep chronotypes affect the study habits of Senior High School students at Mindanao State University-Sulu. The study employed qualitative research design using focus group discussions and structured face-to-face interviews. A total of twelve (12) STEM students from Grades 11 and 12 were selected through purposive sampling. Data were collected using an interview guide and were analyzed through thematic analysis to identify patterns and key themes related to students' chronotypes and study habits. Findings showed that most students preferred nighttime study due to better focus and fewer distractions. Three key themes emerged: chronotype influences productivity, awareness of chronotype improves time management, and sleep patterns affect focus and academic performance. Misalignment with school schedules often results in fatigue and reduced classroom engagement. Sleep chronotype significantly influences students' study habits and academic performance. Aligning study schedules with peak productivity periods can improve learning, but school demands may create challenges for students.

Keywords: Early birds; Night owls; Sleep chronotype; STEM chronotype; Study habit

Introduction

In today's fast-paced academic environment, students face increasing demands that require them to balance study, rest, and personal time effectively. One key but often overlooked factor influencing students' academic behavior is their chronotype—an individual's natural tendency to be more active and alert at certain times of the day. People are generally categorized as either early birds (morning types), who perform best during the early hours, or night owls (evening types), who are more productive later in the day (Roenneberg et al., 2003). Understanding these natural sleep-wake patterns is essential, as they shape not only sleep quality but also students' productivity, focus, and study habits.

Dudley (2020) stated that for an early bird type, a 9:00 p.m. bedtime may be the norm, and rising at 5:00 a.m. without an alarm clock feels relatively effortless. "In contrast, adolescents' natural body clocks can keep them awake until 11:00 p.m. or later, despite efforts to maintain good sleep hygiene—such as avoiding stimulating activities at night and minimizing caffeine intake in the afternoon or evening" (Wheaton et al., 2016). These variations in biological timing demonstrate how chronotype differences can significantly affect students' study schedules and daily functioning.

Globally, research on chronotypes has grown, highlighting its potential role in optimizing learning and academic performance by aligning study schedules with students' peak cognitive periods. However, despite growing international attention, studies exploring the impact of chronotype on students' study habits in the Philippine context remain limited—particularly among those in the Science, Technology, Engineering, and Mathematics (STEM) strand, where cognitive demands and workloads are notably high.

In China and other countries, previous studies (Palaroan et al., 2023; Jongte & Trivedi, 2022; Sabaoui et al., 2022) have shown that morning-type students tend to perform better academically due to alignment with school schedules, while evening types often face challenges such as poor sleep quality, bedtime procrastination, and decreased academic consistency. Yet research by Evangelista et al. (2022) in

the Philippines revealed that both early birds and night owls preferred to study during the day, suggesting that study habits may not be solely determined by biological chronotype, but also by institutional schedules, environmental factors, and lifestyle differences.

This finding reveals a gap in understanding how chronotype interacts with contextual and cultural factors that influence Filipino students' study patterns—especially those in STEM programs, where effective study habits are crucial for success. Given this research gap, the present study titled “Early Birds and Night Owls: Understanding Their Effect on Students' Study Habits of Mindanao State University–Sulu” aims to explore how students' sleep chronotypes influence their study habits and daily academic behaviors. By examining how early birds and night owls manage their study time, motivation, and learning routines, this research seeks to uncover how these natural tendencies affect their academic engagement within a fixed school schedule. Through a qualitative approach, the study intends to gain a deeper understanding of students lived experiences, revealing how their biological rhythms shape their study patterns, academic motivation, and overall learning strategies.

The significance of this study extends to several groups. For students, understanding their chronotype can help them schedule study sessions during their peak cognitive hours, potentially improving focus, retention, and productivity. For teachers, insights into students' sleep-wake preferences may guide instructional strategies, promote engagement, and reduce academic fatigue. For future researchers, this study can serve as a foundation for further investigations on sleep chronotype and its connections to academic performance, class participation, and well-being.

As supported by prior findings (Huang et al., 2022; Manjareeka et al., 2025; Önder et al., 2025), aligning academic tasks with students' biological rhythms promotes better performance and well-being, while misalignment, as observed among evening types (Palaroan et al., 2023), can hinder productivity and academic success. Ultimately, this study seeks to contribute to a deeper understanding of how biological and behavioral factors intersect in the learning experiences of STEM students at Mindanao State University–Sulu, providing valuable insights for developing educational practices that respect students' natural rhythms while promoting academic excellence.

Research Questions

This study entitled “early bird & nighthowl: understanding its effect on students' study habits on Mindanao State University-Sulu Senior High School STEM Strand” attempts to determine the influence of sleep chronotypes on stem strand students' study habits. It targets students with different chronotypes (morningness and eveningness) and the study habits of STEM strand students in senior high school;

1. What is the view of the participant on sleep chronotypes:
 - 1.1 What do you think about sleep chronotypes such as being an early bird or a night owl,
 - 1.2 Do you think knowing your sleep chronotype (early bird or night owl) is helpful? Why or why not, and
 - 1.3 How do you feel your sleep chronotype affects your daily life or school activities
2. What is your sleep chronotype preference:
 - 2.1 Do you usually feel more active and alert during the morning or at night,
 - 2.2 What time do you usually go to sleep and wake up on school days?
 - 2.3 How do you feel your sleep schedule affects your energy level during classes
3. How does your sleep chronotype affect your study habits:
 - 3.1 At what time of the day do you prefer to study or do schoolwork? Why,
 - 3.2 Do you think your sleep pattern helps or affects your focus and performance while studying, and
 - 3.3 How do you adjust your study time when you have early or late classes or deadlines

Scope and Delimitation of the Study

The study will cover the effects of sleep chronotypes, specifically early bird and night owl types, on the study habits of the students. The primary subjects of this research will consist of STEM students from both Grade 11 and Grade 12 of Mindanao State University-Sulu during the academic year 2025-2026 for the second semester. The respondents will be limited to a total of 12 selected STEM students from both grade levels. The study will focus on the students' preferred sleep-wake patterns and how these patterns affect their study routines, concentration, productivity, and time management.

Literature Review

Previous studies and scholarly articles emphasize the importance of literature reviews in strengthening research by providing background information and supporting evidence related to the topic. For example, Boote and Beile (2005) stated that a strong literature review is essential because it builds the

foundation of a study by showing what is already known and what still needs further investigation. According to various researchers, reviewing related literature helps identify existing findings, compare different perspectives, and recognize patterns and gaps in knowledge. Several studies also show that a well-developed literature review guides researchers in formulating objectives, improving methodologies, and justifying the significance of the study. These related works serve as the foundation of the current research by connecting past findings with the present investigation and identifying areas that still require further study.

Methodology

Research Design

This study followed a focus group discussion design. perception and understanding of the students based on their chronotype (early bird & night owl) and their study habits (e.g., frequency, methods, time of day) , emphasizing the study of individuals' experiences as well as the state or configuration of their consciousness.. "An individual's self-disclosure tends to be natural and comfortable. However, for some, it requires trust and effort. Willingness to fully engage in a group discussion is instrumental in generating useful data and can be achieved more readily within a homogeneous group" (Krueger, 1994)..

Sampling Design

The study conducted and follow strict ethical guidelines for research at Mindanao State University-Sulu Senior High School, that have 228 students population and 111 STEM students who are currently enrolled at Mindanao State University- Sulu Senior High School in students were gathered, ranging from STEM 1 to 3, with each section having 2 students from grade 11 to 12. Due to this small sample size of 12 participants, the study exhibits limited demographic diversity. "The purposive method gives more leverage to the researcher to perform and bring out the best information possible from the samples and it depends on the knowledge, judgment, and intellect of the researcher to a large extent. Hence despite having some limitation, purposive sampling is the only possible solution when some of the units are very important and cannot be missed." (Rai & Thapa, 2015)

Research Locale

The locale of this study is Mindanao State University-Sulu Senior High School, located in Barangay Bangkal, Capitol Site, Patikul, Sulu. It is a university school established in 2016. Mindanao State University-Sulu stands as a monumental academic excellence to the people of the current.

Research Participants

The participants of this study were Senior High School STEM students at Mindanao State University-Sulu for the Academic Year 2025–2026. Structured interviews were conducted using open-ended questions developed by the researchers to gather qualitative data on students' chronotypes and study habits, including preferred study times, focus, time management, and motivation. Participants were selected through purposive sampling from Grade 11 and Grade 12 STEM strand students, with the sample size determined using thematic analysis to ensure representativeness. Interviews were conducted face-to-face during free periods or after classes to avoid disrupting school activities. All participants were informed of the study's purpose, and they were chosen according to the interest that they could contribute to the study's main goal, with responses treated confidentially and anonymously.

Research Instrument

The primary data collection instrument of this study was a structured interview guide composed of two sections. The first section assessed the students' sleep chronotypes using questions developed by the researchers to identify whether they are morning types (early birds) or evening types (night owls). The second section evaluated the students' study habits through an open-ended or descriptive method focusing on their preferred study time, focus, time management, and motivation. The interview guide was reviewed and validated by the research adviser to ensure clarity and relevance. In accordance with the research ethics protocol, informed of the study's purpose, gave their consent before conducting, and were assured of voluntarily , confidentiality, and anonymity of their responses.

Data Gathering Procedure

The data for this study were collected through structured interviews with senior high school STEM strand students at Mindanao State University-Sulu. Participants were asked about their sleep chronotype (early bird or night owl) and study habits, following the prepared interview guide. Before starting the interviews, all eligible were informed about the purpose of the study, and informed consent was obtained. Each interview was conducted in a quiet, to ensure comfortable environment could help respond freely.

Responses were recorded using notes and digital audio with permission. After the interviews, the collected data were organized, coded, and analyzed to identify patterns and relationships between students' sleep chronotype and their study habits. All data was kept confidential and only accessed by the research team.

Results and Discussions

Research Question 1: What is the view of the participant on sleep chronotype.

Students' academic focus and productivity are influenced by their sleep chronotype, with early birds performing better during morning hours and night owls showing greater concentration at night due to increased mental clarity and fewer distractions. Awareness of one's chronotype allows students to align study schedules with their peak alertness, improving efficiency and learning outcomes. However, studying outside preferred times or having insufficient sleep can lead to fatigue, reduced concentration, and lower academic performance. According to Zavgorodniaia et al. (2021) indicating that synchrony between chronotype and academic demands enhances cognitive performance, while misalignment negatively affects attention and functioning. Based on the analysis of the Focused Group Discussion, the responses of participants regarding their sleep chronotype and its influence on their studying were categorized into three interconnected themes: (1.1) Perceptions on Sleep Chronotype and Productivity, (1.2) Usefulness of Knowing One's Sleep Chronotype, and (1.3) Effects of Sleep Pattern on Focus During Studying.

Theme 1: Perceptions on Sleep Chronotype and Productivity

The findings regarding Theme 1 highlight a strong correlation between a student's perceived chronotype and their peak periods of cognitive performance. Participants identified as "early birds" (P1, P2, P3, P5, P6) consistently associated the morning hours with high energy and superior concentration. This aligns with the "Synchrony Effect," where task performance is enhanced when it matches an individual's peak circadian arousal. This result is consistent with the research of Facer-Childs et al. (2018), who found that cognitive and physical performance vary depending on the alignment between chronotype and time of day. The participants' emphasis on "freshness" and "active brains" also reflects existing findings that aligning academic tasks with one's natural rhythm may enhance engagement and reduce mental fatigue. Conversely, the "night owls" in this study (P7, P8, P10) emphasized the "quietness" and "lack of disturbance" as the primary reasons for their nighttime productivity. This reflects the findings of Zavgorodniaia et al. (2021), which indicate that chronotype influences patterns of activity and productivity, with evening-type individuals tending to function better later in the day. Interestingly, while the literature often suggests that night owls face "social jetlag" due to early school schedules, the participants in this study viewed their nighttime preference as a tactical advantage for avoiding distractions.

Theme 2: Usefulness of Knowing One's Sleep Chronotype

The findings of this study center on the metacognitive awareness of students regarding their biological clocks. Participants (P2, P3, P7, P8, P10, P11) collectively argued that identifying as either an early bird or a night owl is not merely a label, but a functional tool for academic planning. This self-recognition allows students to "set their tasks" (P7) and "plan what they will do" (P8) to maximize efficiency. By consciously choosing to study during their peak periods—whether it be the "fresh mind" of the morning or the "active brain" of the night—students are essentially practicing circadian management. Furthermore, Facer-Childs et al. (2018) support the participants' claims, noting that performance varies depending on the alignment between chronotype and time of day. Meanwhile, for the night owls in the group, knowing their chronotype provides a psychological justification for their late-night productivity. This mirrors the observations of Zavgorodniaia et al. (2021), who found that differences in chronotype are associated with variations in activity patterns and performance timing rather than a lack of ability. The participants' ability to organize their lives around these shifts suggests that chronotype awareness is a critical factor in student agency and self-regulation.

Theme 3: Effects of Sleep Pattern on Focus During Studying

The findings of this study address the qualitative impact of sleep consistency and rest on the ability to absorb information. Participants emphasized that "enough sleep helps you focus better" (P6) and that studying during non-preferred hours leads to a lack of focus (P2). This highlights that it is not just when one sleeps, but the quality and duration of that rest that influences academic performance. This is strongly supported by the literature. The participants' mention of a "refreshed mind" after rest (P2) reflects the

process of memory consolidation, a process where the brain stabilizes newly acquired information after learning. Recent research by Alfonsi et al. (2020) suggests that sleep quality and duration play a significant role in cognitive performance, attention, and learning among students. The discussion among participants suggests a "Focus-Rest Cycle" where sleep is viewed as the fuel for subsequent study sessions. As noted in the findings, when students ignore their biological "quietness" or "activity" windows, they face a mismatch that hinders information absorption. This reinforces the conclusion that academic success is not just about the number of hours spent studying, but about the strategic synchronization of rest and effort. Participants shared that studying at times that match their natural sleep habits helps them stay focused and productive. Night owls may feel tired during the day, but managing their schedule well allows them to complete tasks and feel satisfied without harming their schoolwork. Jankowski et al. (2023) note that misalignment leads to fatigue. This reflects the experiences of P3 and P8, who noted that nighttime productivity often results in daytime exhaustion and reduced focus in class. Overall, the findings indicate that sleep chronotype plays an important role in shaping students' study habits, productivity patterns, and academic focus. While many participants recognize the benefits of studying during their preferred time of day, academic schedules and responsibilities may require them to adjust their routines. As a result, students often balance their natural sleep preferences with

Research Question 2: What are your sleep chronotype preferences

Students' productivity and engagement are influenced by their sleep chronotype preferences, with most participants favoring nighttime and late-day productivity due to better focus, energy, and fewer distractions. However, productivity also varies depending on motivation, mood, and task type. Additionally, sleep schedules significantly affect classroom engagement, as students who sleep late or lack sufficient rest often experience fatigue, reduced concentration, and lower participation during class. These findings support sleep research indicating that adolescents tend to develop later sleep patterns, which can lead to sleep deprivation and decreased daytime functioning when misaligned with school schedules (Carskadon, 2011). This section presents the findings from the participants' responses to the research question: "What are your sleep chronotype preferences?" Through inductive coding and thematic analysis, three major themes emerged: (2.1) Preference for Nighttime and Late-Day Productivity, (2.2) Varied and Adaptive Student Sleep Patterns, and (2.3) Sleep Schedule Influencing Students' Energy and Classroom Engagement.

Theme 1: Preference for Nighttime and Late-Day Productivity

The findings of this study reveal that many students prefer nighttime or late-day productivity, during which their alertness, focus, and creativity appear to be enhanced. Participants associated this preference with fewer distractions and a quieter environment, allowing for better concentration. However, factors such as motivation, mood, and task type also influence when students feel most productive, indicating that productivity is shaped by both environmental and personal factors. This pattern aligns with the concept of chronotypes, where individuals differ in their natural timing of activity and alertness. Students who prefer studying at night reflect characteristics of "evening types" or "night owls," who tend to perform better during later hours of the day. The findings are consistent with existing research on circadian rhythms and chronotype. Adan et al. (2012) explain that individuals vary in their preferred activity times, with evening types showing greater alertness at night. Similarly, Escribano et al. (2014) found that students' attention and cognitive performance fluctuate depending on their biological rhythms. In addition, Walker (2008) emphasizes that sleep patterns significantly influence cognitive functions such as attention and learning. Overall, this theme highlights that students' preference for nighttime productivity reflects both biological rhythms and personal study habits, suggesting that productivity is not uniform but varies across individuals.

Theme 2: Varied and Adaptive Student Sleep Patterns

The findings indicate that students' sleep schedules are flexible and shaped by multiple personal and environmental factors, including academic demands, household responsibilities, social activities, and leisure habits. While some participants maintain consistent routines, others experience irregular or shifting sleep patterns depending on their daily obligations. This suggests that students actively adjust their sleep behaviors to balance competing demands, which may affect their rest and overall daily functioning. These patterns are consistent with research on adolescent sleep, which highlights the interaction between biological and lifestyle influences. At the same time, external factors such as school workload, social engagement, and technology use contribute to irregular sleep patterns. Overall, this theme emphasizes that students' sleep behaviors are not fixed but adaptive, reflecting both developmental changes and the need to manage academic and personal responsibilities.

Theme 3: Sleep Schedule Influencing Students' Energy and Classroom Engagement

The findings indicate that students' sleep schedules significantly influence their energy levels, concentration, and engagement in classroom activities. Insufficient or irregular sleep often results in fatigue and reduced focus, limiting students' ability to effectively absorb lessons. In addition, variations in energy across the school day suggest that while some students experience natural fluctuations in alertness, others develop coping strategies to remain attentive despite inadequate sleep. These results are supported by research in sleep science, which shows that sleep deprivation negatively affects cognitive functions such as memory, attention, and learning. Walker (2008) explains that insufficient sleep can impair academic performance by reducing students' ability to concentrate and process information. Similarly, broader research in chronobiology highlights the role of the circadian rhythm in regulating daily patterns of alertness and energy, influencing how students engage with classroom tasks at different times of the day. Overall, this theme emphasizes that sleep patterns are a critical factor in students' academic functioning, affecting both their cognitive performance and classroom participation.

Research Question 3: How does sleep chronotype affect your study habits?

A student's study habit is greatly affected by their chronotype alignment, yet many students have their own experience with sleep-wake preference and peak productivity. Sleep chronotype influences students' study habit include peak time productivity, academic learning, time management, sleep and wake preference, students' study routine and motivation, which can either be advantages for their academic learning or disadvantages, and creates a lack of sleep-in students. Yalçın et al (2022) stated that the synchrony effect describes the phenomenon where cognitive performance improves when tasks are undertaken during an individual's preferred time of day. Their research also stated that memory encoding, information processing speed, and executive function all vary significantly across the day based on chronotype, with peak performance. This section presents the findings from the participants' responses to the research question: "How does sleep chronotype affect your study habits?" Through inductive coding and thematic analysis, three major themes emerged: (3.1) Preferred Study Windows and Chronotype Alignment, (3.2) The Cognitive Trade-off between Rest and Retention, and (3.3) Sleep Schedule Influencing Students' Energy and Classroom Engagement.

Theme 1: Preferred Study Windows and Chronotype Alignment

The results of this study illustrate a clear application of the "Synchrony Effect," as originally proposed by Yançın et al. (2022). Participants like P5 (morning) and P2, P7, and P11 (nighttime) do not study at random intervals; they wait for their specific "peak productivity" alignment. For morning-oriented students, spiritual routines like the Subuh prayer may serve as a cue for alertness, while evening types wait for the "surroundings" to become quiet (P8) to achieve deep focus. This behavioral alignment is supported by Carciofo et al. (2021), who found that night owls significantly outperform morning types on tasks involving creativity and sustained attention during late hours. Furthermore, Goldstein et al. (2020) posit that when the time of day matches a student's chronotype, information processing speed and executive function are at their highest. The participants' insistence on waiting for "motivation" (P2) or an "active mind" (P5) suggests that students are intuitively aware of their biological windows and intentionally schedule study sessions to maximize academic performance.

Theme 2: The Cognitive Trade-off between Rest and Retention

The findings in Theme 3.2 highlight a distressing reality: the "Chronotype Mismatch." Students like P7 and P8 described a "groggy" state where "nothing sticks in my head" because their late-night study habits collide with early-morning school requirements. Reports of "sacrificing of health" (P11) or "sacrificing of quizzes for sleep" (P12) demonstrate students compromising sleep or academic performance to manage limited cognitive resources. This trade-off is explained by Zerbini and Mellow (2017) through the concept of "circadian competence." Students with lower circadian competence—or those forced into schedules that misalign with their chronotype—often show reduced alertness and impaired memory consolidation. Gilbert & Weaver (2010) further note that poor sleep quality directly hinders the brain's ability to filter out distractions and focus on core lesson content. The participants' experiences confirm that while late-night studying may complete a task, it often impairs the retention necessary for long-term learning, leading to a cycle of academic fatigue.

Theme 3: Adaptive Strategies for Academic Deadlines

The findings of this study is how students negotiate the tension between their internal clocks and external deadlines. Some use Proactive Organization (P1, P9, P11) through to-do lists and reminders to avoid the stress of "cramming." Others, however, rely on Reactive Adaptation, using an "adrenaline rush" (P2) to overcome their biological tiredness when a deadline is imminent. The reliance on adrenaline is a common compensatory mechanism for evening-type students facing morning deadlines. However, as noted in the responses of P7 and P10, this often leads to "task-completion anxiety" and a feeling of being overwhelmed. This reflects the variability in executive function discussed by Yançin et al. (2022); under high stress or non-optimal times, the brain's ability to organize and prioritize tasks diminishes. While proactive strategies like those used by P11 provide a buffer, the prevalence of "cramming" among participants indicates ongoing challenges in aligning biological rhythms with academic demands.

Ethical Considerations

This study adhered to strict ethical guidelines for research involving 12 student participants from the Grade 11 and 12 STEM strands, with two respondents representing each section to ensure balanced representation. Prior to data collection, formal permission was sought and granted by the school administrator, research coordinator, and research adviser. Following this administrative approval, participants selected through purposive sampling were provided with a thorough explanation of the study's purpose, procedures, and the specific topics to be discussed. Informed consent was obtained from all participants, ensuring they understood that their participation was entirely voluntary and that they maintained the right to withdraw at any time without consequence. To protect participant privacy, all responses remained confidential and anonymous through the use of unique alphanumeric codes. All interview data were securely stored and remained accessible only to the research team. This study was conducted in accordance with the protocols approved by the MSU-Sulu Senior High School Research Committee, ensuring that the collection of data regarding sleep chronotypes and study habits was performed in a safe, respectful, and responsible manner.

Conclusion

This study concludes that sleep chronotypes significantly influence the study habits, academic engagement, and daily functioning of STEM students at Mindanao State University-Sulu. While students recognize their natural tendencies as "early birds" or "night owls," their routines are shaped by the interaction between their biological rhythms and external demands such as academic schedules, leisure activities, and religious responsibilities. The findings reveal that the "night owl" preference is more common among participants because nighttime provides a quieter environment that enhances focus, productivity, and creativity. However, this preference often conflicts with early class schedules, leading to daytime fatigue, reduced classroom participation, and dependence on caffeine or sudden bursts of energy to stay alert. More importantly, this study contributes to existing knowledge by providing localized evidence on how chronotypes affect the academic experiences of STEM students in the context of Mindanao State University-Sulu. It highlights that academic performance and engagement are influenced not only by study habits and motivation but also by students' biological sleep patterns. The study further emphasizes the importance of recognizing chronotype differences when developing academic schedules, student support systems, and wellness programs. By increasing awareness of the relationship between sleep chronotypes and learning behaviors, this research may help educators, schools, and future researchers better understand the need for more flexible and health-conscious learning environments that support both academic success and student well-being.

Reccomendations

Based on the findings of this research, the following recommendations are offered to improve the academic experience and well-being of STEM students. Adopt Strategic Study Scheduling Many Students relies on last minute cramming and face lack of sleep should emulate the effective strategies demonstrated by) P9, P11, and P12 who used to-do lists, and early task initiation to avoid last-minute pressure, additionally Short sessions on planners, digital calendars, and to-do lists (modeled after P9 and P11's strategies) can help students plan ahead for deadlines. Aeon et al. (2021) state that time management positively affects academic success and life satisfaction by helping students schedule around their values. Breaking down large projects into smaller tasks and starting them days ahead of deadlines reduces the need for all-nighters and the subsequent cognitive decline they cause. To replace the unhealthy "cramming" culture with sustainable study habits. should develop and validate screening tools for students to identify their peak alertness windows and

intentionally schedule demanding academic tasks accordingly. Hebl et al. (2022) found that constant oscillations between preferred “night owl” and mandatory “early bird” schedules cause chronic circadian misalignment and stress. Research should test causal mechanisms linking regular bedtime/wake-up times (even on weekends) to circadian stabilization. Kalbacher & Randler (2024) noted that daytime sleepiness negatively associates with self-regulation, while high sleep quality positively links to robust self-regulation.

References

- Aeon, B., Faber, A., & Panaccio, A. (2021). Does time management work? A meta-analysis. *PLOS ONE*, 16(1), e0245066. <https://doi.org/10.1371/journal.pone.0245066>
- Adan, A., Archer, S. N., Hidalgo, M. P., Di Milia, L., Natale, V., & Randler, C. (2012). Circadian typology: A comprehensive review. *Chronobiology International*, 29(9), 1153–1175. <https://doi.org/10.3109/07420528.2012.719971>
- Alfonsi, V., Scarpelli, S., D'Atri, A., Stella, G., & De Gennaro, L. (2020). Later school start time: The impact of sleep on academic performance and health in the adolescent population. *International Journal of Environmental Research and Public Health*, 17(7), 2574. <https://doi.org/10.3390/ijerph17072574>
- Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher*, 34(6), 3–15. <https://doi.org/10.3102/0013189X034006003>
- Carciofo, R., Du, F., Song, N., & Zhang, K. (2013). Chronotype and time-of-day correlates of mind wandering and related phenomena. *Biological Rhythm Research*, 44(6), 950–964. <https://doi.org/10.1080/09291016.2013.790651>
- Carskadon, M. A. (2011). Sleep's effects on cognition and learning in adolescence. *Progress in Brain Research*, 190, 137–143. <https://doi.org/10.1016/B978-0-444-53817-8.00009-8>
- Dudley, K. (2020, December 18). Early birds may be more active, but night owls can catch up. *Harvard Health Publishing*. <https://www.health.harvard.edu/blog/early-birds-may-be-more-active-but-night-owls-can-catch-up-202011062316>
- Escribano, C., Díaz-Morales, J. F., Delgado, P., & Collado, M. J. (2014). Daily fluctuations in attention at school considering starting time and chronotype: An exploratory study. *Chronobiology International*, 31(6), 761–769. <https://doi.org/10.3109/07420528.2014.898649>
- Evangelista, G. H. P., Saliao, A., Bataque, K., & Lapa, M. E. A. (n.d.). *Early bird and night owl: A study on chronotype and academic performance of Science, Technology, Engineering, and Mathematics (STEM) students* [Unpublished manuscript]. University of the Philippines Visayas.
- Gilbert, S. P., & Weaver, C. C. (2010). Sleep quality and academic performance in university students: A wake-up call for college psychologists. *Journal of College Student Psychotherapy*, 24(4), 295–306. <https://doi.org/10.1080/87568225.2010.509245>
- Goldstein, D., Hahn, C. S., Hasher, L., Wiprzycka, U. J., & Zelazo, P. D. (2007). Time of day, intellectual performance, and behavioral problems in morning versus evening type adolescents: Is there a synchrony effect? *Personality and Individual Differences*, 42(3), 431–440. <https://doi.org/10.1016/j.paid.2006.07.008>
- Hebl, J., Velasco, J., & McHill, A. (2022). Work around the clock: How work hours induce social jetlag and sleep deficiency. *Clinics in Chest Medicine*, 43(2), 249–259. <https://doi.org/10.1016/j.ccm.2022.02.003>
- Huang, J., Yang, M., & Zhu, Y. (2022). Association between chronotype and sleep quality among Chinese college students: The role of bedtime procrastination and sleep hygiene awareness. *International Journal of Environmental Research and Public Health*, 20(1), 197. <https://doi.org/10.3390/ijerph20010197>
- Imam, H., Singla, D., & Basista, R. (2024). Effect of morningness-eveningness chronotype on academic performance of undergraduate students. *Bulletin of Faculty of Physical Therapy*, 29, 33. <https://doi.org/10.1186/s43161-024-00199-2>
- Jongte, L., & Trivedi, A. K. (2022). Chronotype, sleep quality and academic performances among Mizo students. *Chronobiology International*, 39(3), 398–408. <https://doi.org/10.1080/07420528.2021.2009416>
- Kalbacher, L. S., & Randler, C. (2024). Exploring the nexus between sleep, chronotype, and non-cognitive predictors in university students: Implications for academic success. *Chronobiology International*, 41(8), 1165–1175. <https://doi.org/10.1080/07420528.2024.2383396>
- Krueger, R. A. (1994). *Focus groups: A practical guide for applied research* (2nd ed.). Sage Publications.
- Manjareeka, M., Dasgupta, S., Kanungo, P., & Das, R. C. (2025). Perceived stress and academic achievement among medical students with different chronotypes: A cross-sectional study on first-year medical

- students from India. *BMC Medical Education*, 25, 723. <https://doi.org/10.1186/s12909-025-07281-w>
- Önder, A. N., Önder, İ., & Yıldırım, E. G. (2025). Morningness and academic burnout among university students: The mediating role of procrastination. *BMC Psychology*, 13, 630. <https://doi.org/10.1186/s40359-025-02969-6>
- Palaroan, M. A., Lardizabal, J. J., Madayag, N. J., & Rullan, J. J. (2023, May). *Night owl vs. early bird: Students' study habits, learning styles, and academic performance* [Conference presentation]. IAFOR International Conference on Arts & Humanities – Kyoto 2023, Kyoto, Japan.
- Rai, N., & Thapa, B. (2015). *A study on purposive sampling method in research*. Kathmandu School of Law.
- Roenneberg, T., Wirz-Justice, A., & Merrow, M. (2003). Life between clocks: Daily temporal patterns of human chronotypes. *Journal of Biological Rhythms*, 18(1), 80–90. <https://doi.org/10.1177/0748730402239679>
- Sabaoui, I., Lotfi, S., & Talbi, M. (2022). Analytical study of the impact of age, chronotype and time preferences on the academic performance of secondary-school students from a modest social background. *Retos*, 46, 631–640. <https://doi.org/10.47197/retos.v46.91415>
- Walker, M. P. (2008). Cognitive consequences of sleep and sleep loss. *Sleep Medicine*, 9(Suppl. 1), S29–S34. [https://doi.org/10.1016/S1389-9457\(08\)70014-5](https://doi.org/10.1016/S1389-9457(08)70014-5)
- Walker, M. (2017). *Why we sleep: Unlocking the power of sleep and dreams*. Scribner.
- Wheaton, A. G., Chapman, D. P., & Croft, J. B. (2016). School start times, sleep, behavioral, health, and academic outcomes: A review of the literature. *Journal of School Health*, 86(5), 363–381. <https://doi.org/10.1111/josh.12388>
- Yalçın, M., Mundorf, A., Thiel, F., Amatriain-Fernández, S., Kalthoff, I. S., Beucke, J. C., Budde, H., Garthus-Niegel, S., Peterburs, J., & Relógio, A. (2022). It's about time: The circadian network as time-keeper for cognitive functioning, locomotor activity and mental health. *Frontiers in Physiology*, 13, 873237. <https://doi.org/10.3389/fphys.2022.873237>
- Zavgorodniaia, A., Shrestha, R., Leinonen, J., Hellas, A., & Edwards, J. (2021). Morning or evening? An examination of circadian rhythms of CS1 students. *2021 IEEE/ACM 43rd International Conference on Software Engineering: Software Engineering Education and Training (ICSE-SEET)*, 261–272. <https://doi.org/10.1109/ICSE-SEET52601.2021.00035>
- Zerbini, G., & Merrow, M. (2017). Time to learn: How chronotype impacts education. *Psych Journal*, 6(4), 263–276. <https://doi.org/10.1002/pchj.178>