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Sleep Patterns among Engineering and Construction Students

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Abstract
Sleep issues are common problems that impact students in various majors at college. Studies show that students do not receive adequate or regular sleep hours with expected quality when at the college level. Various factors contribute to poor sleep quality, including course projects and assignments, college life, social media, and independence responsibilities. While some of the impacting factors and end results may be similar among various majors, differences among students' habits, patterns, and perceptions can reveal different traits of a certain major that should be considered. This paper reports on the second phase of a study designed to explore sleep pattern specification and recommendation. This phase of the study was conducted in the spring semester of 2025 at Mississippi State University and the University of Texas at San Antonio. A quantitative approach was employed to maximize the breadth of perceptions and patterns. A total of 468 students from various majors, including construction, mechanical engineering, civil engineering, electrical engineering, and architecture, participated in the study, and descriptive analyses were performed to highlight frequencies and possible associations between the major and its characteristics. The results indicate that while there are similarities among participating majors, various differences highlight majors' educational requirements and work demands. This study contributes to the body of knowledge by providing insight into factors out of class impacting student success, especially in the area of construction.

Keywords
Construction, Sleep Habits, Sleep Patterns, Deprivation

1. Introduction

College students experience a new social and educational life along with all new responsibilities inside and outside their educational involvements. Overwhelming course assignments and projects, new life responsibilities, social interactions, digital activities and communications, voluntary commitments, and possible part-time temporary jobs are all factors that impact student sleep health. In fact, student sleep patterns and duration are the ones that receive the possible negative influence from external factors in the equation, instead of the reverse direction. The mismanagement of sleep hygiene at college level has resulted in deficient performance and health issues among students. Many studies have investigated the impact of poor sleep health on various outcomes. Despite the prevalence of sleep issues, the literature does now show sufficient studies in construction programs. The importance is even more highlighted when working hours before and after graduation among construction students are considered. This gap motivated the design of the current study. In the second phase of the study, the sample group was expanded to include a more diverse population of students from Mississippi State University and the University of Texas at San Antonio. In addition, students from various majors participated in the study, which provided the possibility of comparative analyses based on major. While major is not generally a causal factor in sleep deficiencies, the association of major and perceived impacts or states may reveal potential for improvement. Academic instructors and scholars, especially in the area of construction, acknowledging the importance of sleep hygiene, can structure their educational activities based on students' sleep patterns and perceptions. In addition, constant emphasis on proper sleep routine in classes and other educational occasions may implant the notion of sleep priority in students' short-term and long-term behavioral routines.

2. Background

Sleep issues are not limited to college students. Different age groups suffer from sleep problems. Although sleep issues seem similar, the root causes may be different. Sleep issues, especially during the school period, are worthy of special attention. In a study conducted by Gunderson et al., high school students with reported insufficient sleep were more likely to feel sad or hopeless, compared to those who reported otherwise (Gunderson et al., 2023). The negative outcome is even more highlighted during certain uncommon events, such as COVID. Through a survey conducted with more than 7700 high school students during COVID-19 pandemic in 2021, it was found that most students experienced short sleep duration, and two-thirds perceived more difficulty doing schoolwork (Sliwa et al., 2023). While various factors such as sociodemographic characteristics, including age, sex, race and ethnicity, marital status, education, income, and urbanicity, contribute to sleep duration, a study found that one-third of adults in the U.S. reported short sleep duration(Pankowska et al., 2023). Tsai and Li (2004) conducted a study on 237 students aged 18–24 years and found that the gender difference in most sleep variables did not depend on weekday/weekend difference. However, they showed that the grade difference depended on the weekday/weekend difference. They stated that poorer sleep patterns of the female students compared to male students necessitate careful attention to their sleep hygiene and prevent them from long-term problems.

Research shows that a considerable portion of the student body in college reports daytime sleepiness or insufficient sleep. According to Hershner and Chervin (2014), more than half of students are dealing with both issues, and as a result, sleep deprivation, daytime sleepiness, and irregular sleep schedules are common issues among college students. Another study conducted by Schlarb (2017) indicated that about 60% of all college students suffer from a low quality of sleep, which may be due to various reasons, including irregular daytime routines, chronotype changes, side jobs, and exam periods. Pandolfo (2022) reviewed various causes and effects of sleep deprivation and poor sleep quality in college students and concluded that circadian rhythm disruption, irregular and unnecessary napping, hypervigilance to social media, feeling envious, and social life are among factors that impact sleep quality. On the other hand, physical health, mental health, and academic performance are heavily impacted by poor sleep hours or patterns. In another study conducted by Otenyo (2015) on the sleeping habits of 65 undergraduate students at the University of Arizona, it was found that despite their awareness of the damaging effects of sleep loss, students practiced poor sleep habits. Pascoe et al. (2020) stated that sleep disturbances, among others, is a consequence of academic-related stress. Insufficient or irregular sleep may be considered a factor connecting stress with poor health, especially among groups experiencing high levels of stress (Morey et al., 2023). Sleep deprivation may have a profound effect on brain function, mental health, and psychomotor performance, and therefore, academic and clinical performance is negatively affected by the lack of sleep (Guadiana & Okashima, 2021; Mbous et al., 2022). Growing research underscores the relationship among sleep, mental health, and chronic disease, which has resulted in public health awareness of the importance of sleep. Consequently, the American Heart Association added sleep duration as a vital component of its Life's Essential 8 (Ramos et al., 2023).

3. Methodology

The main research question was how students in different majors perceive their sleep patterns and duration, and how they relate it to their major and future careers. First, the structure of the study was designed, and factors, assumptions, resources, and objectives were identified. Then, the literature was reviewed to explore prior studies conducted on the subject. The review of the literature provided the causes for sleep deprivation and the consequences of it among college students, which were then utilized in the research design. However, the literature did not provide rich context for specific majors such as construction. In the next step, a quantitative method was determined to be used due to its breadth of data, required for students in various majors. Building upon the first phase of this study, a larger sample size was aimed for, and therefore, students from two institutions were planned for recruitment. The survey used in the first phase was refined to incorporate all points received and finalized. The research design was then submitted to the IRB board at both institutions and was approved. The data collection process was conducted during a three-week interval, and students from different majors, mainly engineering and construction majors, participated in the study. The data was gathered, cleaned, and modeled, obtaining a total of 468 viable responses. Various statistical tests, including descriptive analysis, were conducted to depict frequencies and potential associations among various factors. The current paper presents the analyses and findings on associations between major and potential factors or characteristics. This paper strives to highlight similarities and differences among students in various majors. Although

these results are not per se conclusive, they shed light on peculiar issues that are prevalent in each major and lay a foundation for further consideration by instructors or administrators.

4. Results

In the second phase of the study, students from various programs participated in the study. After collecting and cleaning the data, 468 responses were determined viable, and the data model was created. In the next step, programs with similar nature were combined. For instance, Construction Science and Management and Building Construction Science were combined to from "Construction". Also, students from Architecture and Interior Design were combined as "Architectural Design". The demographic information of all participants is shown in Table 1.

Table 1. Demographic information of all participants

Variable	Categories (%)							
Major	Architectural Design 10	Biomedical Engineering 4	Chemical Engineering 4	Civil Engineering 7	Computer Engineering 4	Construction 43	Electrical Engineering 9	Mechanical Engineering 19
Gender	Female 28	Male 72						
Class Level	Graduate 4	Senior 29	Junior 24	Sophomore 22	Freshman 21			
Work Experience	3 months or less 27	4-6 months 16	7-12 months 16	13-24 months 16	25+ months 25			

In the next question, students were asked to specify the time they spend inside and outside class during a week, on average, and five intervals were provided for them to choose. Table 2 shows the percentage of each category for majors is shown in Table 2.

Table 2. Time spent on courses per week

Major	12 hours or less (%)	13-20 hours (%)	21-28 hours (%)	29-36 hours (%)	37+ hours (%)
Architectural Design	7	27	30	18	18
Biomedical Engineering	0	32	42	21	5
Chemical Engineering	25	25	31	6	13
Civil Engineering	7	26	26	30	11
Computer Engineering	12	41	29	18	0
Construction	15	50	27	6	2
Electrical Engineering	8	31	36	19	6
Mechanical Engineering	15	36	23	16	10
All Majors	13	40	28	13	6

In the next section of the survey, students specified their "preferred" and "most efficient" time slots for their classes. As shown in Table 3, both preferred and most efficient times follow each other. In addition, "10 am to 12 pm" time slot has a considerably higher percentage than other categories.

Table 3. Time spent on courses per week

Major	8 am - 10 am (%)	10 am – 12 pm (%)	1 pm – 3 pm (%)	3 pm – 5 pm (%)	5 pm – 7 pm (%)
Preferred Time	26	50	19	3	2
Efficient Time	21	52	23	2	2

In addition, students were asked to specify their preferred time interval for their "individual" and "group" projects and activities. While various patterns were observed within different majors, overall, "individual" and "group" preferred assignment times vary in different time intervals, as shown in Table 4.

Table 4. "Individual" and "Group" preferred assignment time

Assignment Type	6 am – 10 am (%)	10 am – 2 pm (%)	2 pm – 6 pm (%)	6 pm – 10 pm (%)	10 pm – 2 am (%)	2 am – 6 am (%)
Individual	5	14	34	39	7	1
Group	2	29	48	20	1	0

In the next sections, students were asked to specify the sleep time (in hours) that they typically get during weekdays and weekends. Five different categories were provided to students to specify. The percentage of each category is shown in Figure 1 (weekday) and Figure 2 (weekend).

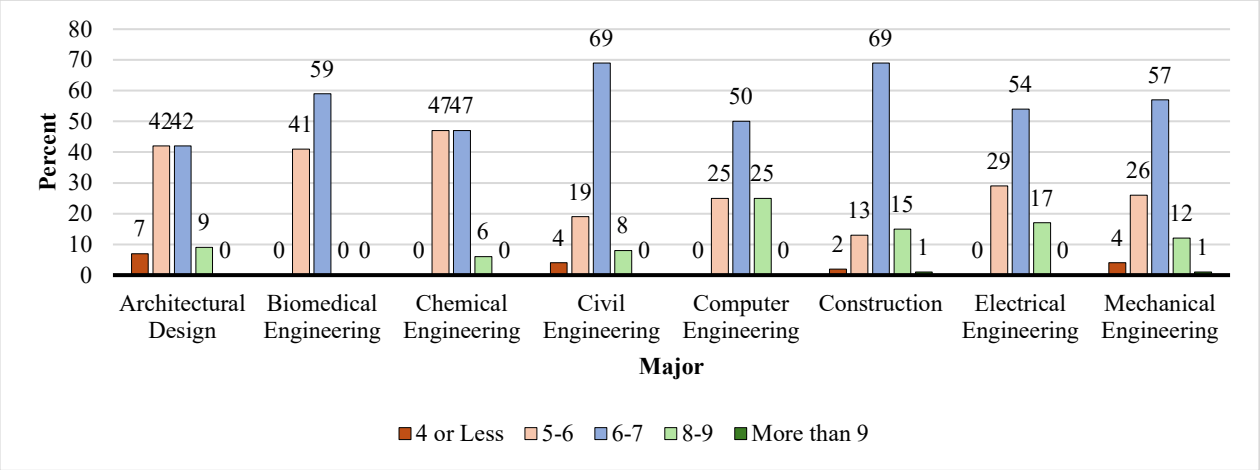

Fig. 1. Sleep hours among majors during weekdays

In the next question, students were asked if external factors and conditions allowed, what was the likelihood of

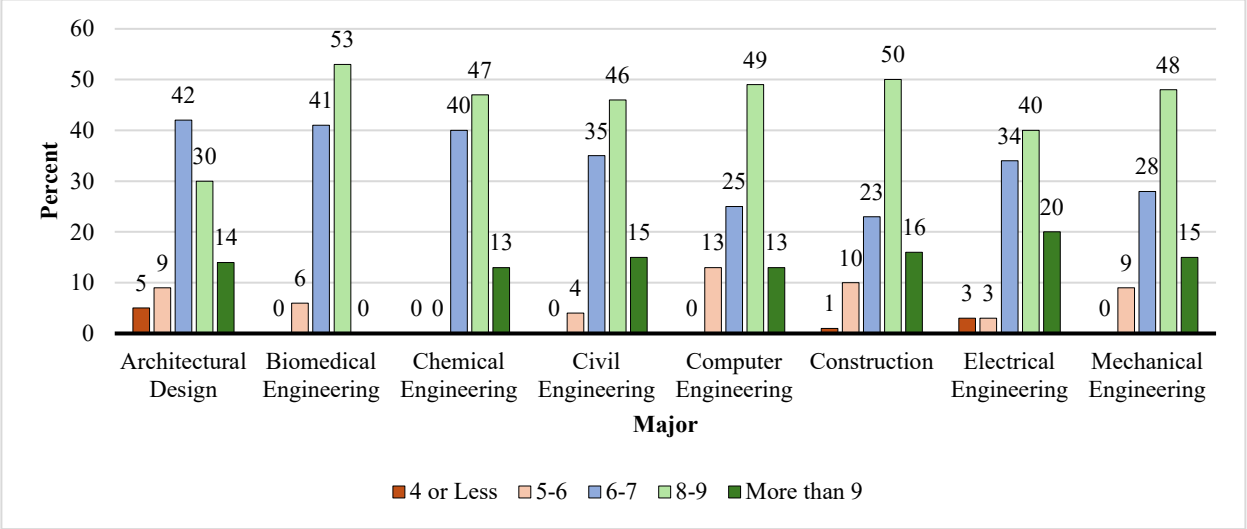

Fig. 2. Sleep hours among majors during weekends

changing their sleep time to get an ideal one. A five-level Likert scale was provided to students to quantify their responses. Figure 3 shows the percentage of each level among majors.

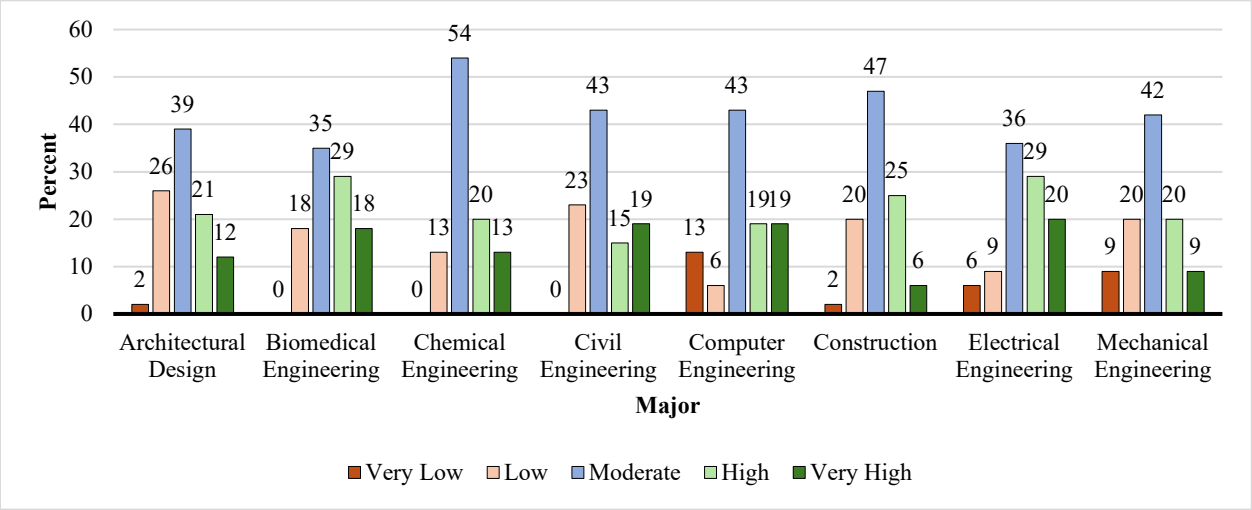

Fig 3. Likelihood of changing sleep time

In the next section, students were asked to express their opinion or perception about the number of working hours that professionals in their majors, on average. The percentage of each time interval for majors is shown in Table 5.

Table 5. Expected working hours per week during professional career

Major	40 h or less	41-50 h	51-60 h	61-70 h	70 h or more
Architectural Design	12	41	37	5	5
Biomedical Engineering	6	59	35	0	0
Chemical Engineering	13	54	33	0	0
Civil Engineering	12	68	16	4	0
Computer Engineering	38	57	5	0	0
Construction	5	51	34	9	1
Electrical Engineering	17	51	26	6	0
Mechanical Engineering	28	52	18	0	2
All Majors	13	53	28	5	1

5. Discussion

This paper reviewed the similarities and differences between various college majors in regard to sleep routines and perceptions. While the main focus of this study was to explore sleep behaviors in construction students, incorporating other majors provides a platform for more robust observations. Comparisons of responses based on majors showed similarities and differences that can be further investigated to draw major characteristics-based guidelines or a framework for students during their programs of study. One of the notable points in the results is the number of hours students generally spend inside and outside the class for their courses per week, as shown in Table 2. While 13-20 hours per week was the highest in computer engineering and mechanical engineering, similar to construction, the difference between that category and the second highest one in construction is considerably higher than those two. Also, the percentage of 29 hours or more (i.e., 29-36 h and 37+ h) for construction is less than for other majors. Another notable result is the similar trend between preferred and efficient class times. While this does not indicate a causal relationship, it means students' efficiency is associated with their preferred class time. Another notable point is preferred time intervals for individual and group activities. While for both types, "2-6 pm" was reported as a favorite one, individual works are preferred in the "6-10 pm" interval, and group works are favorable in "10am-2pm" interval.

Sleep duration during working days and weekends, as depicted in Figures 1 and 2, is also noticeable. As reported by students, a considerable portion of students had 6 or less hours of sleep during weekdays. For example, 49% of students in architectural design and 47% in chemical engineering reported 6 hours or less. On the other hand, a fraction of students in different majors reported 8 or more hours of sleep. Despite this, the considerable increase in sleep hours may be indicative of a lighter load of coursework during weekends. The next notable point is the willingness of students to change their sleep habits and patterns, if external factors allow. The majority of students in all majors stated their willingness level as moderate or above in rating the likelihood of sleep pattern change. It should be noted that the percentage of "very high" level in construction is lower than in other majors. Finally, the last notable point in results is derived from Table 5, in which students exhibited their perceptions of the required working time for professionals in their majors. A considerable portion of students in all majors selected 50 hours or more, which indicates the expected working hours of students per week in these majors was already higher than a normal work expectation. This expectation may lead to a work routine in their future jobs, which consequently affects sleep hygiene.

6. Conclusion

This paper presented the findings of a sleep study conducted in two higher education institutions in various majors, including engineering and construction programs. This paper reported on comparisons between construction and other programs to highlight similarities and differences among sleep patterns, habits, and perceptions. While the results showed differences in subjects such as coursework and likelihood of sleep patterns change, more similarities were identified between construction and other majors. While in this phase of the study, an ample number of subjects participated in the study, the generalization of the findings is not warranted. Conducting the study with a larger sample from other majors and institutions can increase the reliability of the findings. Also, repeating the study at different times of an academic year can incorporate weather and daylight effects. The findings of this study assist scholars and administrators in construction or other majors to better plan class-related activities and classes and provide information about the importance of sleep hygiene to students.

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