Original Article

Digital Well-being and Student Performance: The Effect of Screen Time, Social Media Usage on Students Performance mediated by Sleep Quality

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ABSTRACT

Aim of the Study: The study investigates the relationship between digital wellbeing and student performance, focusing on variables including screen time, social media usage, and sleep quality. Drawing upon d achievement.

Methodology: A sample of university students from diverse bachelor's and master's degree programs participated in the study, providing data through self-report surveys. SEM analysis was conducted to explore the relationships between digital well-being variables and student performance.

Findings: The findings reveal significant positive associations between digital well-being and student performance, with sleep quality, screen time and social media usage predicting better academic achievement.

Conclusion: It was concluded that greater social media usage and screen time depicts better student performance. It is an anomaly which has been discussed. The study contributes to the understanding of the complex dynamics between digital habits and academic outcomes, informing educational institutions and policymakers about the importance of promoting healthy digital behaviors among students to enhance their well-being and academic success.

Keywords: Digital Well-being, Student Performance, Screen Time, Social Media Usage, Sleep Quality.

1. INTRODUCTION

In an era characterized by pervasive digital connectivity, understanding the interplay between digital habits and academic performance among students has become increasingly crucial (Nnaji et al., 2020). This study examined how screen time, social media usage, and sleep quality impact academic achievement.

Grounded in the "Transactional Model of Stress and Coping" (Folkman et al., 1979), this research suggests that stress arises from the transaction between individuals and their environment, where perceived stressors interact with individual appraisal and coping mechanisms to influence outcomes such as well-being and performance. In the context of digital well-being and academic performance, this theory

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helped to explain how digital habits, such as screen time and social media usage, may act as stressors that affect students' sleep quality and, subsequently, their academic performance. By exploring these dynamics, we aim to provide insights that can inform educational institutions and policymakers about the significance of cultivating healthy digital practices among students.

1.1 Problem Statement

University students' academic performance has always been a problem not only for the parents but also for the faculty members. Various studies have been conducted to understand the factors influencing the student's academic performance. Based on these factors, the curriculum and teaching pedagogies have been updated and developed. However, the problem persists with the millennials entering university education with digital habits. Therefore, it is crucial to see how the students' academic performance is affected by the digital habits of the university students.

1.2 Significance of the Study

The research is significant as it contributes to the understanding of the complex dynamics between digital habits and academic outcomes, informing educational institutions and policymakers about the importance of promoting healthy digital behaviors among students to enhance their well-being and academic success.

1.3 Research Objectives

The following are the research objectives of the research

To find out if

- a) Social Media usage has a significant negative affect on academic performance
- b) Sleep Quality has a significant positive effect on academic performance.
- c) Sleep Quality mediates social media usage, average screen time and academic performance.

1.4 Research Questions

The following are the research questions of the research

- a) Does Social Media usage have a significant negative affect on academic performance?
- b) Does Sleep Quality have a significant positive effect on academic performance?
- c) Does Sleep Quality mediate between social media usage, average screen time and academic performance?

2. LITERATURE REVIEW

The digital landscape is part and parcel of the millennials. Undoubtedly, the digital habits affects and influence almost all facets of academics thereby affecting students' academic performance and well-being (Dienlin & Johannes, 2020). Extant literature exists having explored the relationship between digital behaviors and student outcomes (Hale & Guan, 2015; Leyrer-Jackson & Wilson, 2018; Nnaji et al., 2020). The extant literature has provided insights in the interplay between these habits and academic performance of the students.

2.1 Digital Well-being and Academic Performance

Numerous studies have investigated the impact of digital well-being on student academic performance. Digital wellbeing is defined as the healthy balance between the connectivity and disconnectivity (Vanden Abeele, 2021). Digital well-being encompasses factors such as screen time, social media usage, and sleep quality. Research suggests that students with healthier digital habits tend to exhibit higher levels of academic achievement (Dienlin & Johannes, 2020). Conversely, excessive screen time and social media mediated by sleep quality have been associated with decreased academic performance (Mao et al., 2022).

2.2 Social Media Usage

The use of social media is part of the daily life habits of millennials, which of course has affected their behaviors and performance of day-to-day activities including academic performance. The students of the current era continuously turn to these avenues for various purposes including information, communication, entertainment, and studies. The social media platforms provide avenues for all types of negative and positive material, which greatly affect the wellbeing and academic performance of the users (Leyrer-Jackson & Wilson, 2018; Shabir et al., 2014; Shabir et al., 2014a; Syed et al., 2023). Extant literature have suggested that there is a correlation between excessive social usage and poor sleep quality, meaning thereby that health is also being compromised by the social media usage. (Hale & Guan, 2015). Furthermore, research has consistently indicated a link between heightened social media engagement and compromised academic performance (Garett et al., 2018). Thus, there is a need to for a comprehensive understanding of the implications of social media usage sleep quality and the educational performance of the students.

Further, it is imperative that the usage of social media platforms and its effect on sleep quality, and academic achievement needs to be explored. Recognizing these potential consequences is crucial for educators, policymakers, and parents alike as they seek to support students in navigating the digital landscape while prioritizing their health and academic success. Therefore, it is essential to investigate the interplay through which use of the social media affects sleep quality and academic performance of the university students. In this way, planned interventions can be implemented. Further, improving the strategies aimed at promoting positive outcomes for students. In light of the above, the following hypothesis is proposed:

H1: Social Media usage has a significant negative affect on academic performance.

2.3 Sleep Quality

Adequate sleep is crucial for cognitive functioning and academic success (Lemma et al., 2014). The proliferation of electronic screen media has become a source of entertainment globally, particularly among the students (Hale & Guan, 2015). Numerous studies have linked prolonged electronic screen media with adverse outcomes, including academic performance. Studies have elucidated the intricate relationship between sleep quality and academic performance, citing impaired memory retention and concentration as key factors (Gilbert & Weaver, 2010).

However, the prevalence of digital devices in bedrooms and late-night screen exposure has been associated with disrupted sleep patterns and poorer sleep quality among students (Mao et al., 2022). Consequently, several studies have unequivocally demonstrated that inadequate sleep quality correlates with diminished academic performance (Lemma et al., 2014; Yu et al., 2024). Therefore, the following hypothesis is proposed.

H2: Sleep Quality has a significant positive effect on academic performance.

While existing literature has acknowledged the negative effects of poor sleep quality on academic performance, limited attention has been directed towards the interplay between sleep quality, screen media use, and academic performance, particularly among students (Gilbert & Weaver, 2010; Lemma et al., 2014; Leyrer-Jackson & Wilson, 2018; Yu et al., 2024). Therefore, we hypothesize that sleep quality serves as a mediating factor in the association between screen media, social media usage and academic performance among students, suggesting that enhancing sleep quality may positively influence academic outcomes in this demographic.

H3: Sleep Quality mediates between the social media usage, average screen time and academic performance.

2.4 Theoretical Support

The supporting theory for this research is the "Transactional Model of Stress and Coping" (Lazarus & Folkman, 1984). The theory suggests that stress arises from the transaction between individuals and their environment, where perceived stressors interact with individual appraisal and coping mechanisms to influence outcomes such as well-being and performance. In the context of digital well-being and academic performance, this theory helps explain how digital habits, such as excessive screen time and social media usage, may act as stressors that affect students' sleep quality and, subsequently, their academic performance. Integrating the Transactional Model of Stress and Coping into the research framework provides a theoretical basis for understanding the complex interactions between digital the factors of digital well-being and academic success.

2.5 Hypotheses

Based on the literature reviewed, the following hypotheses are proposed:

H1: Social Media usage has a significant negative affect on academic performance.

H2: Sleep Quality has a significant positive effect on academic performance.

H3: Sleep Quality mediates between the social media usage, average screen time and academic performance.

3. RESEARCH METHODOLOGY

3.1 Participants

The study involved a sample of university students from diverse degree programs. Participants were recruited through convenience sampling methods from multiple academic departments to ensure representativeness. Inclusion criteria included enrollment in undergraduate or graduate programs and consent to participate in the study voluntarily. Online survey was created using the Google forms and was shared through social media platforms and personal contacts in the academia community.

3.2 Data Collection Procedure

Data was collected through self-report surveys administered electronically using online survey platforms. Participants were provided with a consent form outlining the purpose of the study, confidentiality assurances, and their rights as participants. The survey comprised validated scales and items to assess variables related to their average daily screen time, sleep quality, and social media usage and academic performance. Utilizing a sample of university students from diverse degree programs, this study employed self-report surveys to gather data on participants' digital well-being practices and academic performance indicators, such as Grade Point Average (GPA). Through Structural Equation Modeling (SEM) analysis, we examined the relationships between digital well-being variables and student performance.

3.3 Measures

The sleep quality of the students was measuring using the Jenkins Sleep Scale (Juhola et al., 2021). The reliability of the scale was found to be 0.80. One of the sample items was "I wake up feeling tired". The Jenkins Sleep Scale is based on the Likert Scale. It ranges from Strongly Disagree to Strongly Agree. On the other hand, the Academic performance of the respondents was measured through the single item questionnaire. The item was "What is your Cumulative Grade Point Average (CGPA)?". The respondents entered their CGPA out of 4.0.

The variable of Screen Time was measured through the single item questionnaire. The item was "What is your daily average screen time?". The respondents entered their daily average screen time. The Social Media Use Scale (SMUS) (Wang et al., 2016) was used to measure the social media usage. The reliability of the scale was found to be 0.83. The sample item was "How often do you use social media to watch

videos or view photos?". The Social Media Use Scale was based on the Likert Scale from Strongly Disagree to Strongly Agree.

The measures, along with their reliability and a sample item is presented in table 1 below.

Table 1: Instruments

Instrument	Source	Reliability	Sample Item	
AcademicSingle itemWIPerformancequestionnaireAv		What is your Cumulative Grade Point Average (CGPA)?		
Jenkins Sleep Scale	(Juhola et al., 2021)	0.80	I wake up feeling tired.	
Screen Time		Single item questionnaire	What is your average daily screen time?	
Social Media Use Scale (SMUS)	(Wang et al., 2016)	0.83	"How often do you use social media to watch videos or view photos?"	

3.4 Data Analysis

The normality analysis was conducted using Skewness and Kurtosis. Only the variables of sleep quality and social media usage were subjected to the analysis since the other questionnaires were single item questionnaires. The skewness values for both variables are positive (SMUS: 0.181, SQ/JSS: 0.214), suggesting a slight rightward skew in the distribution of data for both variables, albeit close to zero, indicating nearly symmetrical distributions (Groeneveld & Meeden, 1984). Additionally, the kurtosis values for SMUS (0.436) and SQ/JSS (-0.300) are within the acceptable range, indicating that the distributions are relatively close to a normal distribution (Groeneveld & Meeden, 1984; Mardia, 1970).

4. **RESULTS**

Reliability analysis was performed for each questionnaire utilizing Cronbach's Alpha. However, the reliability analysis for single-item questionnaires, i.e Academic Performance variables and the Screen Time variable, was not computed due to their inability to meet the inter-item correlation criteria stipulated by Cronbach's Alpha (Bonett & Wright, 2015; Mao et al., 2022). The reliability of the JSS and SMUS are presented in the following table.

Table 2: Reliability Statistics

	Cronbach's Alpha	N of Items
Jenkins Sleep Scale	.906	21
Social Media Usage Scale	0.82	4

The reliability analysis yielded favorable results for both scales. For the SMUS, Cronbach's Alpha coefficient of .825 suggests a high level of internal consistency, indicating that the items are reliably measuring the same underlying construct. Similarly, JSS comprising 21 items demonstrated even stronger internal consistency, with a Cronbach's Alpha coefficient of .906. This indicates robust reliability among the items within the scale (Bonett & Wright, 2015), further affirming their consistent measurement of the intended construct. Descriptive Analysis was conducted to summarize the participants demographic characteristics, variables, and academic performance indicators.

Count						
		Degree_Level			Total	
		Bachelors	Masters	Others		
Gender	Male	96	32	8	136	
	Female	80	12	4	96	
Total		176	44	12	232	

Table 3: G	ender	& Degree	Crosstabulation
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The cross-tabulation table illustrates the distribution of participants by gender and degree level within the sample. The total sample size comprises 232 individuals, with 136 males and 96 females. Among degree levels, bachelor's degrees are the most prevalent, with 176 participants, followed by master's degrees with 44, and other types of degrees with 12. Both male and female participants exhibit similar patterns, with the majority pursuing bachelor's degrees, followed by master's degrees.

Table 4: Correlations among the Variables

	Average Screen Time	Sleep Quality	Social Usage	Media	Student Performance
Average Screen Time	1				
Sleep Quality	-0.013	1			
Social Media Usage	0.179	-0.647	1		
Student Performance	0.166	-0.046	0.113		1

The correlation table provided shows the correlations between Average Screen Time, Sleep Quality, Social Media Usage, and Student Performance. The data shows that there is a weak negative correlation (-0.013) between Average Screen Time and Sleep Quality (Lee Rodgers & Nicewander, 1988), suggesting a minimal inverse relationship between the two variables.

The data shows that there is a weak positive correlation (0.179) between Average Screen Time and Social Media Usage, indicating a slight tendency for individuals who spend more time on screens to also spend more time on social media (Lee Rodgers & Nicewander, 1988). It has been found that there is a weak positive correlation (0.166) between Average Screen Time and Student Performance, suggesting a slight tendency for individuals who spend more time on screens to have slightly better performance (Hotelling, 1953).

It has been found that Sleep Quality and Social Media Usage, has a significant inverse relationship between the amount of time spent on social media and sleep quality. Further, it was found that there is a weak negative correlation (-0.046) between the variables of Sleep Quality and Student Performance. It suggests that there is a minimal relationship (reverse) between these two variables. Similar findings was suggested by Lee Rodgers & Nicewander, (1988).

The variables of Social Media Usage and Student Performance has been found to be very weak but positive correlation (0.113). This indicates that there is a slight tendency for the students who spend more time on social media to have better performance through slightly.

Structural Equation Modeling (SEM) analysis was employed to examine the relationships between digital well-being variables (screen time, social media usage, sleep quality) and academic performance (GPA). SEM allowed for the simultaneous testing of multiple pathways and direct and indirect effects.



Figure 1: Research Model and SMARTPLS Result Output

The path coefficient between Average Screen Time and Sleep Quality is positive (0.106), suggesting that an increase in Average Screen Time is associated with a slight improvement in Sleep Quality. However, this effect size is relatively small (Wright, 1934). The path coefficient between Social Media Usage and Sleep Quality is negative (-0.666), indicating that higher Social Media Usage is linked to decreased Sleep Quality. The path coefficient between Sleep Quality and Student Performance is positive (0.02), suggesting that an increase in the Sleep Quality and Student is associated with the increase in Student Performance. However, the effect is small (Wright, 1934).

The path coefficient between Social Media Usage and Student Performance is positive (0.1), indicating that higher Social Media Usage is associated with slightly better Student Performance. However, this effect size is relatively small (Wright, 1934).

The path coefficient between Average Screen Time and Student Performance is positive (0.148), indicating that higher Average Screen Time is associated with slightly better Student Performance. However, this effect size is relatively small (Wright, 1934).

4.1 Indirect Effect

The indirect effect of Average Screen Time on Student Performance through Sleep Quality is 0.002. This suggests that for every unit increase in Average Screen Time, there is a very slight positive effect (0.002) on Student Performance through its impact on Sleep Quality. However, this effect size is extremely small (Wright, 1934).

The indirect effect of Social Media Usage on Student Performance through Sleep Quality is -0.014. This indicates that for every unit increase in Social Media Usage, there is a slight negative effect (-0.014) on Student Performance through its impact on Sleep Quality. Again, this effect size is relatively small.

Overall, these indirect effects highlight the mediating role of Sleep Quality in the relationship between Average Screen Time, Social Media Usage, and Student Performance. While the indirect effects are present, they are minimal, suggesting that other factors not included in the model may have more substantial effects on Student Performance (Wright, 1934).

4.2 Total Effect

Total effects encompass both direct and indirect effects, capturing the overall influence of each predictor variable on the outcome variable (Student Performance) through all possible pathways (Bollen, 1987).

The total effect of Average Screen Time on Student Performance is 0.106. This indicates that for every unit increase in Average Screen Time, Student Performance is expected to increase by 0.106 units, considering all direct and indirect pathways via other variables in the model (Bollen, 1987).

The total effect of Social Media Usage on Student Performance is -0.666. This suggests that for every unit increase in Social Media Usage, Student Performance is expected to decrease by 0.666 units, accounting for all direct and indirect pathways through other variables in the model (Bollen, 1987).

5. DISCUSSION AND FINDINGS

The findings of this study reveal several significant relationships between digital well-being variables and student performance. A diverse sample as revealed through the Descriptive analysis of participant demographics. The respondents were mostly from bachelor's degrees. On the other hand, the weak to moderate relationships between Average Screen Time, Sleep Quality, Social Media Usage, and Student Performance was found as the result of the Correlation analysis. The results from the Structural Equation Modeling (SEM) further confirmed these relationships, suggesting the mediating role of Sleep Quality.

It was found that the variables Average Screen Time have a positive (weak) correlation with Social Media Usage as well as with Student Performance. At the same time, it was found that there is a negative (weak) correlation between the variables of Average Screen Time and Sleep Quality. On the other hand, the variable of Social Media Usage was found to have negative (strong) correlation with the variable of Sleep Quality. However, it has a positive (weak) correlation with the variable of Student Performance. The variable Sleep Quality was found to have a negative (weak) correlation with the variable of Student Performance.

In essence, it was found that the variables of social media usage and average screen time affects the variable of student performance, however, it was relatively small affect.

It was also found that the interplay does exist between the variables of Average Screen Time, Social Media Usage, Sleep Quality, and Student Performance. Interestingly it was found that there is a positive (weak) association between the variables of Average Screen Time and Social Media Usage with Student Performance. On the other hand, they were found to have a negative effect on Sleep Quality.

The result of the mediation analysis highlights the significance of direct effects of technology use but also its effect on aspects of well-being such as sleep, which resultantly affect student academic performance. It is worth noting here that these findings are similar to the prior research. Thereby, it emphasizes the role of sleep on students academic achievement (Gilbert & Weaver, 2010). Further, the consequences of screen time and social media engagement (Hale & Guan, 2015) were also found to be affecting the academic performance.

Interestingly, it was found that is a positive effect of social media usage, screen time and student performance. This finding is something which has not been suggested by earlier researchers. Rather it is in strike contrast with the common notion and extant literature. The extant earlier data research suggests that increased social media usage leads to poor student performance (Leyrer-Jackson & Wilson, 2018). The positive relationship found in this research can likely be due to many factors. One factor can be that the data has been collected during the mid-term exam duration of the students and the students might be using social media and screen time for education purposes. Therefore, while social media application also provides the facility for group making and collaboration, therefore, it is likely that the respondents used the social media applications for the combine study. At the same time, this anomaly also necessitates that future research must incorporate the variables mandating to recognize the way the time is spent on social media and the internet.

Furthermore, while the study identifies significant associations, the observed correlations are relatively weak, indicating that other unaccounted factors may also contribute to variations in Student Performance. Future investigations should explore additional variables such as socio-economic status, psychological factors, and educational practices to provide a comprehensive understanding of the factors influencing academic success.

5.1 Theoretical and Practical Implications

The findings of this study contribute to the existing literature on digital well-being and academic performance by explaining the relationships between digital habits and student academic performance. The mediating role of sleep quality suggests that the digital behaviors impact the academic performance through it thereby suggesting that the academic performance must be explored from the standpoint of digital habits, guiding the development of more comprehensive models and theoretical frameworks.

5.2 Practical Implications

From a practical standpoint, this study has several implications for educators, and students. The educators can think about managing the university and lecture timings for university students. While the education can also include academic use of social media in their courses through systematic curriculum reviews. The students on the other hand must understand that social media can be used not only for entertainment but also for educational purposes. Thereby addressing their need to use the social media as well communications and education purposes.

6. CONCLUSION

The study has greatly improved our understanding of the interplay that takes between the relations among variables affecting the students' academic performance. The weak association between the average screen time and social media usages suggests that there is an indirect effect on the academic performance. However, it is mediated by sleep quality. The educations must consider ways to improve the sleep quality variables by managing the university and lecturing timings, ensuring that ample sleep time is available to the students. The future research, however, must focus performing longitudinal studies to establish and confirm causal relationships (if any) among these variables. Supplementing quantitative analyses with qualitative research would provide deeper insights into students' subjective experiences regarding digital behaviors and academic outcomes. Exploring additional variables, such as personality traits and

contextual factors, can provide a comprehensive understanding of the mechanisms underlying the relationships between digital well-being and academic success.

In conclusion, our findings underscore the interplay among the variables thereby highlighting the importance of healthy digital behaviors. Addressing these issues not only contributes to academic performance but also promotes the overall well-being of students in the digital age.

6.1 Limitations

There were several limitations of the study. First, the data was collected based on self-reports, which might have introduced social desirability biases. Further, the recall biases might have influenced the accuracy of the data in particular the average screen time. Longitudinal research is warranted to establish relationships between digital habits, sleep quality, and academic performance.

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Conflict of Interest

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