Digital distractions and study discipline: An empirical study of academic performance in selected secondary schools in Rivers State, Nigeria

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ABSTRACT

This study investigated how digital distractions and study discipline influence the academic performance of senior secondary school students in Rumuokwurusi Local Government Area, Rivers State, Nigeria. The purpose was to determine the extent to which study hours, sleep duration, and social media use predict academic outcomes in a context where adolescent digital engagement is rapidly increasing. The design followed an ex post facto approach grounded in Self-Regulated Learning Theory and Cognitive Load Theory. A sample of 117 students was selected from three public secondary schools, and data on study habits, sleep patterns, and digital usage were collected through a structured behavioral questionnaire, while academic performance was obtained from school records. The analysis combined descriptive statistics, correlation patterns, and multiple regression. The findings show that study hours and sleep duration significantly enhance academic performance, whereas social media use significantly reduces it. The interaction between study time and social media use was positive but statistically weak, indicating that disciplined study behavior can mitigate the negative influence of digital distractions but cannot fully eliminate it. Gender did not significantly predict academic outcomes once behavioral factors were controlled. These results demonstrate that consistent study routines, healthy sleep patterns, and moderated digital engagement are essential for improving academic readiness and learning effectiveness. The practical implications point to the need for school-level digital discipline programs, enhanced parental guidance on online activity, and policies that promote structured study schedules and adequate rest to support students' academic performance in digitally saturated environments.

Contribution/ Originality: This study integrates behavioral discipline and digital distraction using real student scores. It advances learning theory by demonstrating how study habits and adequate sleep reduce the negative effects of social media, offering practical guidance for strengthening academic focus and performance among secondary school students.

1. INTRODUCTION

Digital technology now plays a central role in everyday life, and schools are no exception to this shift (Serdyukov, 2017). On the positive side, digital tools have expanded access to information and enriched learning by supporting students' critical thinking and problem-solving skills (Valverde-Berrocoso, Acevedo-Borrega, & Cerezo-Pizarro, 2022). At the same time, however, constant exposure to digital devices has increased the risk of distraction,

particularly among adolescents. Excessive engagement with social media and other non-academic digital activities can reduce study time, disrupt sleep, and weaken students' ability to remain focused on academic tasks (Dontre, 2021; Nye, 2020; Sampasa-Kanyinga, Chaput, & Hamilton, 2019).

Digital distraction occurs when students' attention shifts away from learning activities toward non-academic uses of technology, such as social networking, gaming, or online media consumption (Dontre, 2021; Junco, 2012). These frequent shifts in attention divide mental effort and make it harder for students to concentrate for sustained periods. From a cognitive perspective, this pattern increases unnecessary mental load and limits the working memory available for processing academic information (Rosen, Carrier, & Cheever, 2013; Sweller, 1988). In contrast, study discipline refers to students' ability to organize their study routines, manage time effectively, and maintain consistent effort toward academic goals. It reflects the broader concept of self-regulated learning, in which learners take active responsibility for how and when they study (Zimmerman, 2002). Importantly, the way students manage their digital engagement often determines how much mental energy they can devote to meaningful learning (Awofala et al., 2020; Palalas & Wark, 2020).

Two theoretical perspectives help to explain these relationships. Cognitive Load Theory suggests that learning becomes less effective when limited cognitive resources are strained by frequent interruptions from digital activities (Sweller, 1988). Self-Regulated Learning Theory further emphasizes that students who plan, monitor, and reflect on their learning are better equipped to control distractions and achieve stronger academic outcomes (Zimmerman, 2002). Empirical studies support these views, demonstrating that the use of smartphones, laptops, and social media can disrupt attention, increase procrastination, and reduce concentration in both classroom-based and online learning environments (Dontre, 2021; Offor, Obi, Okore, Baro, & Idahosa, 2017; Palalas & Wark, 2020).

Within the Nigerian context, evidence from both tertiary and secondary institutions consistently indicates that excessive social media use undermines academic performance. Studies conducted across different regions, including Gombe, Kaduna, Sokoto, Ogun, Port Harcourt, and Benue, report reduced study time, sleep disruption, loss of focus, and declining academic achievement associated with heavy digital engagement (Age & Echoda, 2021; Aiyende & Omojola, 2021; Iro-Idoro & Jimoh, 2017; Muhammad, 2025; Sabo & Audu, 2025; Zubairu, 2021). These challenges are often intensified by weak institutional controls over digital technology use, which leave students with limited guidance on responsible engagement (Nannim, Njoku, Onuoha, Orji, & Njoku, 2023; Ojo, Opeloye, & Olugbade, 2024). Although some studies suggest that moderate and well-guided social media use can support peer learning (Zhang, 2024), the overall evidence indicates the risks associated with unregulated digital behavior for sustained academic engagement.

Despite this growing body of research, important gaps remain. Nigerian literature often focuses on university students, while senior secondary school learners who are easily distracted are less studied. Many studies rely on self-reported grades and rarely examine study hours, sleep, and social media use together with actual academic scores in a unified model. Research also provides scarce evidence that maintaining strict study habits can reduce the harmful impact of digital distractions on students' academic results.

This study addresses existing gaps by examining how study discipline and digital distraction jointly influence academic performance among senior secondary school students in Rumuokwurusi Local Government Area of Rivers State, Nigeria. Using data from 117 students across three secondary schools and actual academic scores as the outcome measure, the study applies Ordinary Least Squares regression to estimate both direct and interaction effects of study hours, sleep duration, and social media use. Grounded in Cognitive Load Theory and Self-Regulated Learning Theory, the research demonstrates that the academic impact of digital technology depends not only on exposure but also on the level of behavioral discipline exercised by students. The findings provide practical insights for educators, parents, and policymakers seeking to promote balanced digital engagement and effective study habits that support adolescents' academic success.

2. THEORETICAL UNDERPINNING AND HYPOTHESES DEVELOPMENT

This study is grounded in Cognitive Load Theory and Self-Regulated Learning Theory to explain how digital distraction and study discipline influence academic performance among secondary school students. Cognitive Load Theory, proposed by Sweller (1988), argues that effective learning depends on the amount of mental capacity available for processing new information. When students attempt to study while simultaneously engaging with digital activities such as instant messaging, social networking, or online media, their mental resources are divided. This added mental demand increases what is known as extraneous cognitive load, leaving fewer cognitive resources available for understanding, integrating, and retaining academic content. As a result, learning becomes more superficial, comprehension declines, and retention weakens. In this sense, digital distraction acts as a form of mental interference that competes directly with academic tasks. This effect is especially pronounced among adolescents, whose ability to regulate attention and maintain cognitive control is still developing.

Self-Regulated Learning Theory, as articulated by Zimmerman (2002), focuses on learners' ability to actively manage their own learning processes. Self-regulated students plan their study activities, monitor their progress, and evaluate their learning outcomes. They demonstrate discipline in how they allocate time, sustain motivation, and manage both environmental and behavioral distractions. Such students are more likely to maintain concentration during study, establish consistent routines, and recognize the importance of adequate sleep for effective learning. In the context of this study, study hours and sleep duration are treated as observable indicators of self-regulated behavior, while social media use represents a competing activity that challenges students' ability to remain focused and disciplined.

Taken together, these two theories offer a complementary explanation of learning behavior in digitally saturated environments. Cognitive Load Theory explains why multitasking with social media, messaging applications, and other digital platforms can undermine learning by consuming limited cognitive resources. Self-Regulated Learning Theory accounts for the differences among students in managing distractions, attributing this variation to their capacity to structure study routines and exercise behavioral regulation. When students exercise strong study discipline, they are better positioned to reduce the cognitive interference created by digital distractions. By managing their time effectively, maintaining consistent study habits, and getting sufficient sleep, students can lower unnecessary cognitive load and improve academic performance. These theoretical insights are particularly relevant in the Nigerian context, where adolescents often have unrestricted access to mobile devices and limited guidance on responsible digital use.

Empirical evidence strongly supports these theoretical arguments. Research shows digital distractions reduce students' focus and meaningful engagement in academics. For example, Awofala et al. (2020) reported that Nigerian pre-service teachers experience high levels of distraction linked to emotional factors, digital addiction, and procrastination. Offor et al. (2017) similarly found that mobile phone use disrupts concentration and private study habits among students in South-South and South-East Nigeria. International studies report comparable findings. Junco (2012) demonstrated that frequent social media use is associated with lower academic performance, while Lepp, Barkley, and Karpinski (2015) found that excessive smartphone use among undergraduates reduces study efficiency and academic achievement. Dontre (2021) further showed that multitasking with smartphones, laptops, and social media increases cognitive overload, directly supporting the assumptions of Cognitive Load Theory.

Evidence also highlights the positive role of disciplined behavior in supporting academic success. Curcio, Ferrara, and De Gennaro (2006) demonstrated that adequate sleep improves comprehension and memory consolidation, reinforcing the link between behavioral regulation and cognitive performance. Research grounded in Self-Regulated Learning Theory consistently shows that effective time management, structured study routines, and continuous self-monitoring are critical determinants of academic achievement (Zimmerman, 2002). In the Nigerian context, studies by Iro-Idoro and Jimoh (2017), Sabo and Audu (2025), and Zubairu (2021) found that excessive social media use erodes study discipline, weakens motivation, and reduces academic engagement. Age and Echoda (2021) similarly

observed that digital addiction among secondary school students in Benue State negatively affects study habits and learning outcomes. Nannim et al. (2023) further argued that weak regulatory frameworks in Nigerian institutions intensify digital distraction, while Ojo et al. (2024) linked social media use to increased procrastination and reduced attentiveness during lectures.

Nevertheless, some studies suggest that digital tools can support learning when used purposefully and under conditions of strong self-regulation. Zhang (2024) found that moderated social media use can enhance peer learning and academic collaboration when students exercise adequate control over their digital behavior. Similarly, Oteyola, Oyeniran, Awopetu, and Bello (2021) observed that digital engagement can contribute positively to academic performance when students restrict their usage to educational purposes. These findings align with Self-Regulated Learning Theory by reinforcing the idea that the academic impact of digital media depends largely on how effectively learners regulate their behavior.

Together, these theoretical and empirical insights provide a clear foundation for the hypotheses of this study. Cognitive Load Theory suggests that social media use, as a source of extraneous cognitive load, is likely to reduce academic performance. Self-Regulated Learning Theory indicates that disciplined behaviors, reflected in study time and adequate sleep, should enhance academic outcomes. Integrating both perspectives implies a moderating mechanism in which strong study discipline can weaken, though not completely eliminate, the negative effects of digital distraction. Based on these arguments, the study proposes the following hypotheses.

H_1: Study hours have a positive and significant effect on students' academic performance.

H_2: Sleep hours have a positive and significant effect on students' academic performance.

H_3: Social media usage has a negative and significant effect on students' academic performance.

H_4: Study discipline moderates the relationship between social media usage and academic performance such that higher study hours weaken the negative effect of social media use.

By integrating cognitive and behavioral explanations within the context of Nigerian secondary education, these hypotheses extend existing research and reinforce the view that digital technology is not inherently harmful. Rather, its academic consequences depend on the level of behavioral discipline exercised by learners. This study, therefore, contributes to a deeper understanding of how self-regulated learning interacts with digital engagement to shape academic performance among adolescents in a developing educational system.

3. METHODOLOGY

This study adopted an ex post facto research design to investigate the influence of study discipline and digital engagement on the academic performance of senior secondary school students in Rumuokwurusi Local Government Area of Rivers State. This design was appropriate because the variables under investigation, such as study habits, sleep patterns, and social media use, already existed and could not be manipulated by the researchers. The focus was to analyze naturally occurring behavioral variations and how they relate to academic outcomes, consistent with Self-Regulated Learning Theory and Cognitive Load Theory.

The target population consisted of 256 Senior Secondary School students enrolled in three public secondary schools within the Local Government Area. A sample of 117 students was selected through proportionate random sampling to ensure fair representation from each school. Gender stratification was applied to reflect the actual distribution in the schools and to enable the use of gender as a control variable. The final sample comprised approximately 55 percent females and 45 percent males.

Data were sourced from both primary and secondary origins. Primary data were collected through a structured student questionnaire designed by the researchers and included as Appendix 1. The instrument captured students' average daily study hours, average nightly sleep duration, and average daily social media use. Responses were based on student behavior over the previous 90 days to avoid one-off reporting and to improve reliability. Secondary data were obtained from official school academic records. Academic performance was measured using each student's most

recent average term score, expressed as a percentage. The use of official records rather than self-reported grades increased objectivity and eliminated social desirability bias.

The variables were measured as follows. Academic performance (AP) was the dependent variable. Study hours (SH), sleep hours (SL), and social media hours (SM) served as the independent variables. An interaction term (SH_SM), calculated as the product of study hours and social media hours, was introduced to assess whether disciplined study habits might mitigate the negative effects of digital distractions. Gender (GEN) was used as a control variable, with a code of 1 representing females and 0 representing males.

The Ordinary Least Squares method was used to estimate the linear relationships. All tests were conducted at the 5 percent significance level. The estimated model is presented as:

$$AP_i = \beta_0 + \beta_1 SH_i + \beta_2 SL_i + \beta_3 SM_i + \beta_4 (SH_i \times SM_i) + \beta_5 GEN_i + \mu_i \quad (1)$$

Prior to estimation, descriptive statistics and correlation tests were conducted to assess the data structure and variable associations. Variance Inflation Factors were examined and found to be within acceptable limits, indicating no significant concern about multicollinearity. The Breusch-Pagan test confirmed homoscedasticity. The Shapiro-Wilk test was used to assess whether the residuals were normally distributed. Visual inspection of residual scatterplots also indicated that the assumptions of linearity and constant variance were reasonably satisfied. These diagnostic checks support the suitability of ordinary least squares (OLS) for the analysis.

All ethical guidelines were strictly followed. The Institute of Education at the University of Abuja provided ethical approval. The appropriate school authorities granted authorization. The students, along with their teachers and parents or guardians, gave their consent. The questionnaires used student numbers instead of names to facilitate merging with academic records, and all identifiers were removed before analysis to ensure confidentiality.

3.1. Descriptive Statistics

Table 1 presents the descriptive statistics for all study variables based on 117 observations drawn from senior secondary school students in Rumuokwurusi Local Government Area. Academic performance (AP) has a mean score of 66.94 with a standard deviation of 7.30, indicating moderate variability in achievement. The range of scores from 49.80 to 81.20 shows that performance levels vary considerably across students, suggesting differential behavioral patterns and learning conditions. The mean study hours (SH) of 3.79 (SD = 1.00) reflect a moderate level of study engagement among the respondents. This average aligns with typical study recommendations for adolescents and supports the behavioral expectations of Self-Regulated Learning Theory, which emphasizes planned and sustained study routines.

Table 1. Descriptive statistics of study variables (N = 117).

Variable	Mean	Std. Deviation	Minimum	Maximum
Academic performance (AP)	66.94	7.30	49.80	81.20
Study hours (SH)	3.79	1.00	1.50	5.70
Sleep hours (SL)	7.12	0.59	5.50	8.30
Social media hours (SM)	3.23	1.50	0.50	8.00
Gender (GEN)*	0.56	0.50	0	1

Note: *Gender is coded as 1 = Female, 0 = Male.

The mean sleep duration (SL) of 7.12 hours (SD = 0.59) falls within the range associated with optimal cognitive functioning for adolescents, supporting the idea that sufficient rest contributes to attention stability and retention. Social media engagement (SM) has a mean of 3.23 hours per day (SD = 1.50), which is relatively high for school-age learners and may represent a competing stimulus against academic tasks. Gender (GEN) shows that 55.6 percent of the sample are female, while 44.4 percent are male, providing a balanced representation for the behavioral and performance analysis conducted.

These patterns reflect a learning environment where students combine moderate study routines and adequate sleep with substantial digital engagement. The descriptive trends are consistent with behavioral theories stating that academic success depends on a balance between cognitive investment, self-control, and the regulation of distractions.

3.2. Correlation Matrix

Table 2 presents the correlation coefficients among the study variables. The results demonstrate strong and statistically significant relationships between academic performance and behavioral factors such as study hours, sleep hours, and social media use. Specifically, academic performance (AP) is positively correlated with study hours ($r = 0.878$, $p < 0.01$) and sleep hours ($r = 0.743$, $p < 0.01$). These positive correlations suggest that students who dedicate more time to studying and sleeping tend to achieve better academic results.

Table 2. Correlation matrix of study variables (N = 117).

Variables	AP	SH	SL	SM	GEN
Academic performance (AP)	1.000				
Study hours (SH)	0.878**	1.000			
Sleep hours (SL)	0.743**	0.572**	1.000		
Social media hours (SM)	−0.733**	−0.697**	−0.522**	1.000	
Gender (GEN)	−0.059	0.006	−0.066	0.086	1.000

Note: ** indicates significance at $p < 0.01$ (two-tailed).

Conversely, social media hours (SM) show a strong negative correlation with academic performance ($r = -0.733$, $p < 0.01$), suggesting that increased digital engagement may hinder concentration and reduce the time available for learning. Study hours and social media usage are also negatively correlated ($r = -0.697$, $p < 0.01$), implying that social media consumption competes with study time. Sleep hours also exhibit a negative correlation with social media ($r = -0.522$, $p < 0.01$), indicating that students who spend more time on social media may compromise rest time, which can adversely affect learning outcomes.

The correlation between gender (GEN) and academic performance is weak and statistically insignificant ($r = -0.059$, $p > 0.05$), suggesting that performance differences between male and female students are not pronounced once behavioral patterns are considered. These results provide preliminary support for hypotheses H1, H2, and H3, which propose that study and sleep hours are positively associated with academic performance, while social media usage has a negative effect. The weak association between gender and performance aligns with hypothesis H4, confirming that performance outcomes are primarily determined by behavioral factors rather than gender differences.

Overall, the correlation results are consistent with the theoretical expectations of Self-Regulated Learning Theory (Zimmerman, 2002), which emphasizes self-discipline and time management, and Cognitive Load Theory (Sweller, 1988), which asserts that multitasking through social media can overload working memory and reduce academic efficiency.

3.3. Diagnostic Tests

Diagnostic evaluation confirms that the Ordinary Least Squares model is appropriate and robust. The high and significant F-statistic ($F(5, 111) = 151.98$, $p < .001$) indicates that the independent variables collectively explain a considerable proportion of variance in academic performance. An R^2 of 0.8725 and an adjusted R^2 of 0.8668 suggest that approximately 87% of the variation in performance is accounted for by the behavioral and demographic factors assessed.

The Breusch-Pagan test ($\chi^2 = 0.04$, $p = 0.838$) indicates no heteroskedasticity, supporting the assumption of constant variance. Variance Inflation Factors (mean VIF = 7.63) fall within acceptable limits. Although the VIF for social media and the interaction term is relatively higher, such values are expected because interaction terms are mathematically related to their constituent variables. The absence of severe collinearity confirms that the coefficient

estimates are stable and interpretable. The diagnostic evidence demonstrates that the model is well specified and suitable for hypothesis testing.

4. RESULTS AND DISCUSSION

4.1. Results

Table 3 presents the regression estimates for the determinants of students' academic performance. The model demonstrates strong explanatory power, with an R-squared of 0.8725, indicating that approximately 87 percent of the variation in academic outcomes is explained by the independent variables. The F-statistics are statistically significant at the one percent level ($F_{(5,111)} = 151.98$; $p < 0.001$), which confirms the model's adequacy.

Table 3. Regression results for determinants of academic performance (N = 117).

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value	95% Confidence Interval
Study hours (SH)	3.256	0.707	4.60	0.000	[1.855, 4.657]
Sleep hours (SL)	3.999	0.523	7.64	0.000	[2.962, 5.036]
Social media hours (SM)	−1.844	0.702	−2.63	0.010	[−3.235, −0.454]
Study × social media (SH_SM)	0.261	0.157	1.66	0.100	[−0.050, 0.572]
Gender (GEN)	−0.438	0.501	−0.88	0.383	[−1.430, 0.554]
Constant	29.384	4.836	6.08	0.000	[19.802, 38.966]
R²	**0.8725**				
Adjusted R²	**0.8668**				
F (5, 111)	**151.98**			**0.000**	
Root MSE	**2.6627**				

Note: **Dependent variable:** Academic performance (AP).

Both study hours and sleep hours are positive and statistically significant predictors of academic performance. Each additional hour of studying per day is associated with a 3.26-point increase in achievement ($β = 3.256$, $p < 0.001$). Sleep has an even larger effect, where an additional hour of sleep improves performance by nearly 4 points ($β = 3.999$, $p < 0.001$). These effect sizes indicate strong practical significance in real classroom settings. For example, a student who increases sleep from five to eight hours per night could gain up to 12 points in assessment scores.

Social media hours exhibit a statistically significant negative influence ($β = −1.844$, $p = 0.010$), indicating that just one additional hour of non-academic social media use daily may decrease academic scores by nearly two points. The interaction term is positive but statistically weak ($β = 0.261$, $p = 0.100$), suggesting partial moderation where disciplined study behavior may offset some, but not all, of the performance losses caused by digital distraction. Gender has no statistically significant effect.

4.2. Discussion

The results provide strong empirical support for the proposition that behavioral self-regulation is central to academic success in the digital era. The significant positive effects of study hours and sleep hours reinforce Self-Regulated Learning Theory, which emphasizes effort regulation, optimal time allocation, and readiness for learning as important predictors of student achievement (Zimmerman, 2002). The magnitude of the coefficients also confirms this relationship. An additional hour spent studying per day is associated with an improvement of about 3.26 points in academic performance, while an extra hour of sleep yields an increase of approximately four points. This latter result aligns with evidence from neuroscience, which indicates that sleep supports cognitive recovery, attention stability, and memory consolidation necessary for learning efficiency (Curcio et al., 2006).

In contrast, social media use has a significant negative effect on academic outcomes. The coefficient indicates that increasing daily non-academic screen time by one hour is associated with a decrease of approximately 1.84 points in performance. This finding supports Cognitive Load Theory, which argues that digital multitasking consumes cognitive resources necessary for focused learning (Sweller, 1988). Prior studies in both Nigerian and international

contexts have reported similar detrimental outcomes when social platforms dominate students' daily routines (Ajewole, Abdullahi, Olaifa, Ajadi, & Onimago, 2024; Akhter, 2013; Junco, 2012). From a practical perspective, reallocating one hour from social media to schoolwork could result in an improvement of up to five points, which is of notable significance in school-based assessments and promotion examinations.

The marginally significant interaction term suggests that disciplined study behavior can reduce the harmful influence of social media use on academic performance. This aligns with the view that purposeful online engagement, such as accessing academic content or participating in study groups, may contribute positively to educational outcomes (Oteyola et al., 2021; Paul, Baker, & Cochran, 2012). Therefore, digital technology does not automatically hinder performance. The way and timing of a learner's use determine its educational value.

The fact that there is no notable gender effect suggests that behavioral patterns account for differences in performance more than demographic factors do. This finding is consistent with prior literature that shows gender-related academic gaps tend to disappear when motivation, engagement, and time use are controlled (Niemi & Nevgi, 2014).

4.3. Endogeneity and Practical Significance Considerations

The cross-sectional nature of the data prevents making strong causal claims. It is plausible that lower-performing students turn to social media more frequently as an escape or coping mechanism, which could result in reverse causality. To reduce the risk of endogeneity, it is advisable to conduct longitudinal studies in the future and to employ instrumental variables.

From a policy perspective, improving sleep and study routines could meaningfully enhance academic performance. The estimated coefficients suggest that reducing non-academic screen time by one hour daily and reallocating that time to reading or homework could increase cumulative scores by up to five points, which is of practical significance for school promotion examinations.

To enhance clarity and distinguish statistical outputs from inferential interpretations, the supported and unsupported hypotheses are summarized in Table 4.

Table 4. Summary of hypotheses outcomes.

Hypothesis	Conclusion
H1: Study hours → Positive effect	Accepted
H2: Sleep hours → Positive effect	Accepted
H3: Social media use → Negative effect	Accepted
H4: Moderation of study hours	Partially supported

5. CONCLUSION AND POLICY IMPLICATIONS

This study examined the influence of study discipline and digital distraction on the academic performance of senior secondary school students in Rumuokwurusi Local Government Area of Rivers State. Drawing on Cognitive Load Theory and Self-Regulated Learning Theory, the findings show that disciplined study behavior and adequate sleep are positively associated with academic performance, while excessive social media use has a detrimental effect. Although the moderating role of study discipline in weakening the negative impact of digital distraction was only marginally significant, the overall pattern of results indicates that behavioral factors, rather than demographic characteristics such as gender, are central to explaining differences in students' academic outcomes.

From a theoretical perspective, the study reinforces the view that academic performance in digitalized learning environments is shaped by the interaction between cognitive capacity and behavioral regulation. Students who organize their study time, maintain consistent routines, and obtain sufficient rest are better able to manage the cognitive demands of learning in the presence of digital stimuli. In contrast, prolonged engagement with social media increases extraneous cognitive load, diverts attention, and undermines sustained academic effort. These findings

strengthen the relevance of self-regulated learning as a critical mechanism through which students navigate the challenges posed by pervasive digital technologies. The results have clear policy and practical implications. Education authorities should prioritize behavioral and digital literacy programs that emphasize structured study habits, responsible technology use, and the importance of adequate sleep for learning. Schools can support this goal through guidance and counseling services that help students understand the cognitive costs of multitasking and excessive social media use. Teachers may also enhance learning outcomes by integrating purposeful and time-bound digital activities into classroom instruction while discouraging unrestricted online engagement. At the household level, parents and guardians play an essential role in monitoring digital habits and reinforcing regular study routines. Community-based sensitization initiatives can further complement these efforts by promoting awareness of how digital distraction affects adolescents' academic development. There are certain limitations in this study that need to be taken into account when understanding the results. First, the analysis was confined to three public secondary schools within a single local government area, which limits the generalizability of the results. Second, although academic performance was measured using official school records, behavioral variables relied partly on self-reported logs, which may be subject to reporting errors despite teacher supervision. Third, the cross-sectional design restricts causal inference. Finally, the study did not account for other potentially relevant factors such as socio-economic background, parental education, school resources, or individual personality traits.

These limitations highlight clear directions for future research. Studies involving multiple states and larger samples would enhance external validity and enable broader generalization. Longitudinal designs could offer deeper insights into how study discipline and digital behavior evolve over time and influence long-term academic outcomes. Experimental or quasi-experimental studies may also be employed to evaluate the effectiveness of structured digital literacy or study skills interventions. Future research could further benefit from incorporating objective digital-use tracking tools and additional behavioral variables such as motivation, self-control, or grit, as well as applying multilevel modeling techniques to capture school-level influences.

In summary, the study demonstrates that disciplined study habits and sufficient sleep support academic performance, while excessive social media use undermines it. The findings underscore that digital technology is not inherently harmful, but its academic consequences depend on how effectively students regulate their behavior. By fostering self-regulated learning, responsible digital engagement, and supportive learning environments at home and in school, educators, policymakers, and families can help adolescents develop the behavioral resilience needed to succeed in an increasingly technology-driven educational context.

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Appendix 1. Student Study Discipline and Digital Engagement Questionnaire

Instructions to Students

This questionnaire is intended solely for research purposes. Your personal details will **not** be used in data analysis or reported in any form. Please answer honestly based on your usual behavior over the **last 90 days**. Tick or fill in the response that best applies to you.

Section A: Background Information

A1. **Student Number**: _____

Researchers note: This will be anonymized before analysis.

A2. **Name of School**: _____

A3. **Class**:

□ SS2A □ SS2B □ SS2C □ Other: _____

A4. **Gender**:

□ Male

□ Female

A5. **Age**: _____ years

Section B: Study Discipline

B1. On average, during the last 90 days, how many hours per day have you spent on private study outside normal classes (homework, reading, revision, assignments)?

Average study hours per day: _____ hours

B2. In the last 90 days, how often did you keep to a regular study timetable?

□ Never

□ Rarely

□ Sometimes

□ Often

□ Always

Section C: Sleep Pattern

C1. On average, during the last 90 days, how many hours per night did you **sleep**?

Average sleep hours per night: _____ hours

C2. In the last 90 days, how often did you feel sleepy during lessons?

□ Never

□ Rarely

□ Sometimes

 □ Often

□ Always

Section D: Social Media and Digital Usage

D1. On average, during the last 90 days, how many hours per day have you spent on social media and non-academic online activities (for example, chatting, short videos, gaming, sports betting)?

Average social media hours per day: _____ hours

D2. Where do you mainly access social media?

□ At home

□ At school

□ Both equally

D3. How often did you use social media while studying in the last 90 days?

□ Never

 □ Rarely

□ Sometimes

□ Often

□ Always

Researcher Coding Note (not included in final printed version)

- SH = B1
- SL = C1
- SM = D1
- GEN = 1 if Female, 0 if Male

Student number is used solely for merging with academic records and is deleted before analysis.