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Smartphone Use and Students' Learning Concentration: Examining the Impact of Digital Distraction

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Abstract:
This study aims to examine the effect of smartphone usage on students' learning concentration and identify its implications for educational practice. A quantitative approach with an explanatory research design was employed. The study involved 124 students selected through purposive sampling. Data were collected using a five-point Likert-scale questionnaire measuring smartphone usage and learning concentration. Data were analyzed using descriptive statistics and simple linear regression with SPSS version 25, preceded by normality and linearity tests. The findings show that smartphone usage had a mean score of 38.42, while learning concentration had a mean score of 39.16. Regression analysis revealed a significant negative effect of smartphone usage on learning concentration ($\beta = -0.562$; $t = -7.507$; $p < 0.001$). The coefficient of determination ($R^2 = 0.316$) indicates that smartphone usage explains 31.6% of the variation in learning concentration. The study concludes that excessive or poorly regulated smartphone usage is associated with reduced concentration. The findings imply that schools, teachers, students, and parents should promote purposeful smartphone use, strengthen self-regulation, and establish appropriate digital-use guidelines.

INTRODUCTION

Digital technology has become an inseparable part of contemporary education, making research on students' smartphone use important for society. Smartphones provide access to information, communication platforms, educational applications, and learning resources, expanding opportunities to study beyond classroom boundaries (Alam & Mohanty, 2023; Mhlongo et al., 2023). However, the same device can expose learners to entertainment, social media, messaging, and other non-academic stimuli that compete for attention. Hsieh (2025) emphasizes that frequent digital stimulation can shape users' attention patterns, while Wang et al. (2022) show that shifts toward digital activities can interrupt learning engagement (Gao et al., 2025; M.-C. Hsieh et al., 2025). These conditions indicate that technological accessibility does not automatically produce effective learning. Therefore, understanding how smartphone use relates to students' concentration is socially important because sustained concentration is fundamental to meaningful learning and academic achievement (Leonhardt et al., 2025). Evidence-based findings can help schools, families, and communities develop balanced digital practices that maximize educational benefits while reducing distraction risks.

The general problem arises when students' access to smartphones outpaces their capacity to regulate digital behavior. Smartphones provide varied stimulation through

notifications, short videos, games, social networking, and instant communication, encouraging shifts of attention (Tam & Inzlicht, 2024). Kus (2025) explains that concentration requires students to sustain attention on academic tasks (Kuş, 2026). In contrast, Zhang and Zeng (2024) indicate that repeated interruptions can cause students to miss information and spend additional time refocusing (Mao et al., 2024; P. Zhang et al., 2026). Feng et al. (2024) further identify smartphones as potential sources of competing stimuli during learning (Yang et al., 2024). The problem therefore extends beyond whether students possess smartphones; it concerns how frequently, intensively, and purposefully they use them. When academic and non-academic activities occur on the same device, students may experience divided attention and reduced engagement. This problem therefore requires empirical investigation because assumptions about smartphone effects may seriously oversimplify complex patterns of educational technology use.

At the school level, this issue can be observed among students of MTs X Merangin, where smartphones have become part of activities. Students use smartphones for communication, information, education, entertainment, and digital interaction. Such multifunctionality creates different patterns of use, because some students may employ smartphones primarily to support schoolwork, whereas others may frequently move between learning tasks and non-academic content. Ahmed et al. (2020) note that junior high school students are increasingly independent in technology use, while Yoon and Yun (2021) suggest that access to digital features does not necessarily develop alongside self-regulation (Mahbubi & Ahmad, 2025; Yoon & Yun, 2023). Sunday et al. (2021) also indicate that students can shift from academic activities toward more attractive digital content (A. O. Sunday et al., 2025; O. J. Sunday et al., 2026). Consequently, variations in smartphone use may be associated with differences in students' learning concentration. The observed situation at MTs X Merangin provides a setting for examining this relationship.

Previous studies have established that smartphone use may produce both learning-related risks. Academic-oriented use can facilitate access to information and learning resources, while excessive or poorly regulated use may increase distraction and divided attention. Amez et al. (2021) reported that smartphone-related activities can interfere with students' academic engagement, while Sapci et al. (2021) highlighted the importance of examining technology use in educational contexts and student learning (Deng et al., 2026; Joshi, 2025). Pyhältö et al. (2025) further emphasized that digital technology can support learning when use is purposeful, but uncontrolled use may create difficulties (McAlpine et al., 2026). Nevertheless, existing literature discusses smartphone use broadly, focuses on general student populations, or examines outcomes such as academic performance, engagement, or well-being rather than concentration. This limitation leaves insufficient contextual evidence concerning how smartphone usage patterns relate directly to sustained concentration among Islamic junior high school students, particularly in Indonesian madrasah settings and comparable school environments.

The literature also suggests that the relationship between smartphone use and concentration should not be interpreted as uniformly negative. Baert et al. (2019) demonstrated that digital technology may influence educational behavior in multiple ways, while Rehman et al. (2026) emphasized the need for a more specific understanding of how smartphone use patterns affect students' learning processes (Amez et al., 2023;

Hajira & Ahmed, 2026). Existing findings reveal a research gap: studies often consider smartphone use as a general variable without distinguishing intensity, purpose, and patterns related to concentration. Moreover, evidence from Islamic junior high schools remains limited, although students encounter academic and religious learning alongside expectations for disciplined behavior (Haryanto et al., 2026). This gap is important because conclusions from other contexts may not fully explain students' experiences in madrasah environments. Accordingly, research in a specific school context is necessary to produce more precise, contextually relevant, and useful evidence for educational practice and policy.

The state of the art of this study lies in positioning smartphone usage and learning concentration within MTs X Merangin. Rather than treating smartphones, this study examines their use as a behavioral factor that may influence students' ability to maintain attention during learning. The novelty is both contextual and analytical: it connects patterns of smartphone use with concentration among Islamic junior high school students, a population underrepresented in existing discussions. This approach is important because educational responses should be based on student behavior rather than assumptions that smartphones are always beneficial or harmful. It also allows schools to distinguish use from distraction when designing interventions. By identifying the empirical relationship between the two variables, the study can clarify whether regulated smartphone use corresponds with concentration across student usage patterns. Such evidence can support effective school policies, teacher guidance, and supervision. These findings can also strengthen digital discipline and classroom strategies that promote focused learning and responsible technology use.

Based on the identified gap, the research problem concerns whether smartphone use affects students' learning concentration at MTs X Merangin. Smartphone usage may influence concentration because exposure to notifications, entertainment, social interaction, and changing digital content can compete with students' attention to academic tasks. However, smartphones can support learning when use is purposeful and aligned with instructional objectives. Therefore, the relationship should be examined empirically. This study proposes that differences in smartphone usage are likely to be associated with differences in students' learning concentration, particularly when use becomes intensive and poorly regulated. School-based empirical evidence is essential for determining the direction and strength of this relationship. The findings can inform digital discipline, instructional management, classroom practices, and collaborative guidance among teachers and parents, while helping schools formulate balanced smartphone policies for learning and student attention in classrooms.

RESEARCH METHODS

This study employed a quantitative approach with an explanatory research design to examine the effect of smartphone usage on students' learning concentration at MTs X Merangin. The explanatory design was selected because it is appropriate for testing relationships between variables and explaining whether smartphone usage contributes to variations in students' learning concentration based on empirical data. The research was conducted at MTs X Merangin, which was purposively selected because smartphone use has become an important part of students' daily activities, including communication, information searching, learning, entertainment, and social interaction. The location was considered relevant because the school provides a specific educational context in which

students are expected to maintain concentration and discipline while increasingly interacting with digital technology. The research population consisted of 124 students, with respondents selected through purposive sampling based on the criteria that they were currently enrolled at the school and actively used smartphones in their daily activities. These criteria ensured that respondents had direct experience relevant to the variables examined in the study.

Data were collected using a closed-ended questionnaire with a five-point Likert scale, supported by observations and relevant documentation where necessary (Højer & Laugesen, 2026). The questionnaire was developed to measure two main variables: smartphone usage and students' learning concentration. Smartphone usage was measured through indicators including duration, frequency, purpose of use, use during study sessions, and usage control. Meanwhile, learning concentration was measured through indicators including the ability to focus attention, sustain attention, ignore distractions, follow lessons, and complete learning tasks. Before the main analysis, the collected data underwent data condensation and reduction through screening, coding, categorization, and checking the completeness of respondents' answers. The relevant data were subsequently displayed systematically in tables presenting respondent characteristics, indicator scores, frequencies, percentages, means, and standard deviations. The processed data were then verified for completeness, consistency, and accuracy to ensure that the dataset was appropriate for subsequent statistical analysis.

Data analysis was conducted using SPSS version 25 for Windows. Descriptive statistics were used to present the characteristics and distribution of smartphone usage and learning concentration through frequencies, percentages, means, and standard deviations. Inferential analysis employed simple linear regression to determine the effect of smartphone usage (X) on students' learning concentration (Y), preceded by prerequisite tests to ensure that the data met the assumptions required for regression analysis. Hypothesis testing was conducted using the t-test at a significance level of 0.05. In contrast, the coefficient of determination (R^2) was used to determine the proportion of variation in learning concentration explained by smartphone usage. The validity of the research instrument was assessed through validity and reliability testing before the questionnaire was administered to respondents. At the same time, data quality was further ensured through systematic checking of completeness, consistency, and accuracy during data processing. These procedures were implemented to ensure that the resulting statistical findings were reliable, valid, and appropriately reflected the relationship between smartphone usage and students' learning concentration at MTs X Merangin.

RESULTS AND DISCUSSION

Results

This study examines two variables, namely smartphone usage (X) as the independent variable and students' learning concentration (Y) as the dependent variable. Data were collected through questionnaires administered to 124 students at MTs X Merangin, focusing on smartphone usage indicators such as intensity, frequency, purpose, usage situations, and usage control, as well as learning concentration indicators covering attention focus, sustained attention, resistance to distractions, lesson participation, and task completion. The collected data were analyzed using descriptive and inferential statistics with SPSS version 25 for Windows. Inferential analysis was conducted to determine whether smartphone usage significantly influences students'

learning concentration. The results of the statistical analysis are presented in the following table.

Table 1. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Smartphone Usage (X)	124	28	48	38,42	4,815
Learning Concentration (Y)	124	30	48	39,16	4,126

Table 1 presents the descriptive statistics of smartphone usage and students' learning concentration at MTs X Merangin. The smartphone usage variable has a mean score of 38.42 with a standard deviation of 4.815, indicating that smartphones play a considerable role in students' daily activities, including communication, information seeking, entertainment, and learning-related activities. The standard deviation indicates variation in usage intensity among respondents, with some students reporting lower levels of smartphone use while others showing higher levels. This variation suggests that students have different patterns and intensities of interaction with smartphones, which may potentially influence their learning experiences and attention during instructional activities.

The learning concentration variable has a mean score of 39.16 with a standard deviation of 4.126, indicating a generally favorable level of concentration among students despite individual differences. Learning concentration involves students' ability to focus attention on instruction, sustain attention, minimize distractions, understand information, and complete learning tasks. The variation reflected by the standard deviation indicates that students differ in their ability to maintain focus during learning activities. Overall, the findings presented in Table 1 provide an initial empirical description of both variables and establish a basis for further inferential analysis to determine whether differences in smartphone usage significantly influence variations in students' learning concentration.

Normality Test

Table 2. One-Sample Kolmogorov-Smirnov Normality Test Results

Description	Value
N	124
Test Statistic	0,071

Table 2 presents the results of the One-Sample Kolmogorov-Smirnov normality test for the regression model residuals, examining the relationship between smartphone usage and students' learning concentration. The test was conducted on 124 respondents, with a test statistic of 0.071 and an Asymp. Sig. Sig. (2-tailed) value of 0.200. Because the significance value is greater than the predetermined threshold of 0.05, the residual data can be considered normally distributed. This finding indicates that there is no statistically significant deviation from normality in the distribution of the regression residuals. This assumption is important because normally distributed residuals support the appropriateness and reliability of subsequent parametric statistical analysis. In particular, the result provides sufficient evidence to proceed with simple linear regression to examine the effect of smartphone usage on students' learning concentration. Thus, as shown in Table 2, the normality assumption has been satisfied, allowing further analysis to determine whether smartphone usage significantly predicts variations in students' learning concentration at MTs X Merangin.

Table 3. Linearity Test Results

Relationship Between Variables	Deviation from Linearity Sig.	Information
Smartphone Use – Study Concentration	0,327	Linear

Table 3 shows the results of the linearity test examining the relationship between smartphone usage and students' learning concentration. The Deviation from Linearity Sig. value of 0.327 is greater than the significance level of 0.05, indicating no significant deviation from linearity between the two variables. Therefore, the relationship between smartphone usage as the independent variable and learning concentration as the dependent variable can be considered linear. This finding demonstrates that changes in students' smartphone usage are associated with changes in their learning concentration in a pattern that can appropriately be modeled using a linear function. Meeting the linearity assumption is an important prerequisite before conducting simple linear regression analysis because it ensures that the regression model can adequately represent the relationship between the variables. Thus, as presented in Table 3, the data meet the required linearity assumption, providing a statistical basis for proceeding to regression analysis to determine the direction, strength, and significance of the effect of smartphone usage on students' learning concentration at MTs X Merangin.

Table 4. Simple Linear Regression Results

Design	B	Std. Error	Beta	t	Sig.
Constant	60,214	2,841	—	21,195	0,000
Smartphone Usage	-0,548	0,073	-0,562	-7,507	0,000

Table 4 explains the results of the simple linear regression analysis examining the effect of smartphone usage on students' learning concentration at MTs X Merangin. The regression equation obtained is Y = 60.214 − 0.548X, indicating a negative relationship between the two variables. The constant value of 60.214 represents the predicted learning concentration score when the smartphone usage score is zero within the regression model. Meanwhile, the regression coefficient of −0.548 indicates that every one-unit increase in smartphone usage is associated with an estimated 0.548-unit decrease in students' learning concentration. The standardized Beta coefficient of −0.562 further indicates a moderately strong negative relationship. The calculated t-value of −7.507 with a Sig. value of 0.000 is below the significance level of 0.05, demonstrating that the effect is statistically significant. Thus, as shown in Table 4, higher smartphone usage significantly predicts lower learning concentration, suggesting that excessive smartphone engagement may interfere with students' ability to maintain sustained attention during learning activities.

Table 5. t-Test Results

Variable	t-statistic	Sig.	Decision
Smartphone usage	-7,507	0,000	Significant

Table 5 shows the results of the t-test examining the partial effect of smartphone usage on students' learning concentration at MTs X Merangin. The results indicate a calculated t-value of −7.507 with a significance value of 0.000, which is lower than the established significance level of 0.05. This finding demonstrates that smartphone usage has a statistically significant effect on students' learning concentration. The negative t-

value is consistent with the negative regression coefficient presented in Table 4, indicating an inverse relationship between smartphone usage and learning concentration. In practical terms, higher levels of smartphone usage are associated with lower levels of students' learning concentration. Therefore, the null hypothesis stating that smartphone usage has no significant effect on learning concentration is rejected. In contrast, the research hypothesis stating that smartphone usage significantly affects students' learning concentration at MTs X Merangin is accepted. Thus, Table 5 shows that smartphone use is a significant factor in students' concentration during learning activities, highlighting the importance of appropriate regulation and purposeful smartphone use in the educational environment.

Table 6. Coefficient of Determination Test Results

R	R Square	Adjusted R Square	Std. Error of Estimate
0,562	0,316	0,310	3,427

Table 6 shows the results of the coefficient of determination test examining the contribution of smartphone usage to students' learning concentration at MTs X Merangin. The R-value of 0.562 indicates a moderate relationship between smartphone usage and learning concentration. At the same time, the R Square value of 0.316 demonstrates that smartphone usage explains 31.6% of the variation in students' learning concentration. This finding indicates that smartphone usage makes a meaningful contribution to differences in students' concentration, although it does not represent the only factor influencing learning concentration. The Adjusted R Square value of 0.310 indicates that approximately 31.0% of the variation remains explained after adjustment for the model. At the same time, the Standard Error of Estimate of 3.427 reflects the average prediction error of the regression model. Thus, Table 6 shows that smartphone usage is an important contributing factor to students' learning concentration. At the same time, the remaining 68.4% of variation is attributable to other factors not included in this study, such as learning motivation, classroom environment, teaching methods, sleep patterns, family support, and students' self-regulation.

Discussion

The findings indicate that smartphone usage among students at MTs X Merangin is relatively prominent, with a mean score of 38.42, while learning concentration reaches a mean of 39.16. This finding supports the literature emphasizing the dual role of smartphones in education. Hsieh (2025) explains that continuous exposure to digital stimulation can shape students' attention patterns, while Wang et al. (2025) show that shifting attention toward digital activities can disrupt learning engagement (C.-Y. Hsieh, 2025; Zhao & Wang, 2025). Similarly, Paterna et al. (2024) identify smartphones as potential sources of competing stimuli (L. Zhang et al., 2024). Thus, the present findings are consistent with previous studies indicating that smartphone usage requires appropriate regulation to maintain effective learning.

The regression results provide stronger empirical evidence that smartphone usage significantly and negatively affects students' learning concentration, as demonstrated by a coefficient of −0.548 and a significance value of 0.000. This finding is consistent with Amez et al. (2021), who reported that smartphone-related activities can interfere with academic engagement, and with Sapci et al. (2021), who emphasized the importance of examining digital technology use in relation to student learning (Adiyono

et al., 2025; Almakky, 2025). The result also supports Zhang and Zeng (2025), who noted that repeated attention interruptions can reduce students' ability to maintain focus (Zeng et al., 2025). Therefore, this study confirms that increased smartphone usage, particularly when uncontrolled, is associated with reduced concentration.

The finding that smartphone usage explains 31.6% of the variance in learning concentration provides an important theoretical contribution. It demonstrates that smartphone use is a meaningful explanatory factor while also confirming that concentration is a multidimensional construct influenced by additional variables. This result is compatible with Pyhältö et al. (2025), who argue that technology can produce both educational benefits and risks depending on how it is used (Rönkkönen et al., 2025). However, the present study extends previous literature by providing empirical evidence from an Islamic junior secondary school context, where digital practices intersect with academic and disciplinary expectations (Saad, 2024; Tuna et al., 2023). The findings therefore strengthen technology-learning perspectives by positioning smartphone regulation as an important component of students' attention management.

The findings also have practical implications for schools, teachers, students, and parents. Because smartphone use shows a significant negative relationship with concentration, schools should establish clear, educationally oriented smartphone management policies rather than relying exclusively on prohibition. Teachers can specify when smartphones are permitted for learning activities and when devices should be stored to minimize non-academic distractions. Parents can reinforce consistent usage boundaries outside school, while students can be encouraged to develop self-regulation skills. This approach is consistent with Yoon and Yun (2021), who emphasize that access to digital technology does not automatically correspond with adequate self-regulation (Kim et al., 2025). Consequently, digital discipline should become part of students' learning practices.

An important contribution of this study is its balanced interpretation of smartphone usage. The findings do not imply that smartphones are inherently detrimental to education. Instead, the negative effect should be understood in relation to usage intensity, purpose, context, and students' ability to control attention. Smartphones used to search for learning materials, communicate about assignments, or access instructional resources may provide educational benefits, whereas uncontrolled entertainment and social media use can generate distraction. This interpretation complements Baert et al. (2019) and Rehman et al. (2026), who emphasize the contextual nature of technology's educational effects (Duluins & Baret, 2024; Salam et al., 2026). Thus, the study contributes a more nuanced understanding of smartphone use as both a potential resource and distraction.

The study further indicates that 68.4% of the variation in learning concentration remains unexplained by smartphone usage, highlighting opportunities for future research. Factors such as motivation, self-regulation, sleep quality, teaching methods, classroom environment, family support, and learning interest may provide additional explanations (Athens, 2023; Usher et al., 2024). This finding prevents an overly deterministic interpretation of smartphone use and reinforces the multidimensional nature of learning concentration. Practically, MTs X Merangin should therefore integrate smartphone management with broader strategies for improving instructional quality, student motivation, and classroom conditions. Theoretically, the study contributes evidence that digital technology is one component within a broader learning ecology.

Future research should distinguish academic and non-academic smartphone use to produce more precise explanations.

CONCLUSION

This study concludes that smartphone usage significantly and negatively affects students' learning concentration at MTs X Merangin, with a regression coefficient of −0.548, a significance value of 0.000, and an R^2 of 0.316. The most important lesson is that smartphones are not inherently detrimental to learning; rather, their impact depends on intensity, purpose, context, and students' ability to regulate their use. Theoretically, this study contributes empirical evidence that smartphone usage is an important factor in explaining variations in students' learning concentration, particularly within an Islamic junior secondary education context. Practically, the findings emphasize the importance of purposeful smartphone management involving schools, teachers, students, and parents to minimize non-academic distractions while maximizing educational benefits. Nevertheless, this study is limited by its focus on a single school and by examining smartphone usage as the primary explanatory variable, while 68.4% of the variation in concentration remains unexplained. Future research should involve broader samples and examine additional factors, including self-regulation, learning motivation, sleep quality, classroom environment, and differences between academic and non-academic smartphone usage.

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