

The Effects of Gadget Use on Students' Communication Ethics and Styles: A Quantitative Comparative Study

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Abstract

Purpose: This study examines the impact of gadget-use intensity on elementary students' communication ethics and communication styles. It further compares these two dimensions between high- and low-intensity user groups to understand how digital exposure shapes students' social interaction patterns.

Methods: A quantitative comparative design was employed involving 200 Grade IV and V students in Surakarta selected through stratified random sampling. Three variables were measured using a structured questionnaire: Intensity of Gadget Use (X), Communication Ethics (Y_1), and Communication Style (Y_2). Instrument development was informed by social learning theory and media effects theory. Validated items ($r = .446-.775$) demonstrated sufficient reliability ($\alpha = .612-.764$). Data analysis included MANOVA and follow-up independent-samples t-tests, with results reported using international statistical standards.

Results: MANOVA indicated a significant multivariate difference between high- and low-intensity groups, $F(2,197) = 4.316, p = .015, \eta^2 = .042$, representing a small effect size. Subsequent t-tests revealed no significant difference in communication ethics ($p = .187$), but a significant difference emerged in communication styles ($p = .012$), indicating that higher gadget-use intensity is associated with more digitally oriented communication behaviors.

Applications/Originality Value: This study addresses an unexamined gap by simultaneously analyzing communication ethics and communication styles. Findings suggest that gadgets influence students' communicative patterns more strongly than their ethical orientation, offering implications for digital literacy programs in elementary education.

Introduction

The widespread integration of digital technology into daily life has reshaped how elementary school students interact, communicate, and learn. Smartphones and tablets commonly referred to as gadgets are now used not only for entertainment but also for accessing information, participating in online learning, and engaging with peers. Recent research shows that since the debut of the iPhone in 2007, the popularity of smartphones and tablets among young children has surged, with at least one-third of preschoolers already having access to a mobile device by the age of three and using it for more than two hours daily on average (Sriandila & Suryana, 2023). This rapid increase in gadget exposure raises concerns about its influence on children's interpersonal communication and ethical behavior.

From a theoretical standpoint, children's communication behaviors are often shaped by models observed through media and digital interactions. *Social Learning Theory* (Bandura & Walters, 1977) explains that children imitate behaviors presented repeatedly in digital environments, including communication patterns that may differ from conventional norms. Meanwhile, *Media Effects Theory* highlights how repeated digital exposure can gradually influence attitudes, values, and social behaviors. These theories provide a critical foundation for examining how gadget use may shape students' communication ethics and styles in face-to-face interactions.

Communication ethics refers to norms that regulate appropriate behavior in interpersonal communication, including politeness, responsibility, and respect (Naingolan, 2024). Communication style, however, involves patterns of expressing ideas whether assertive, passive, aggressive, or adaptive. Research suggests that intensive gadget use may reduce empathy, hinder direct communication fluency, and increase individualistic tendencies among children. These outcomes indicate that digital habits may shape communication style differently from ethical judgment, which is more deeply rooted in moral development.

Children's device use can have both beneficial and detrimental effects. On the one hand, devices can be effective learning tools, improving digital skills and providing access to a variety of educational resources. On the other hand, inappropriate device use can lead to problems such as addiction, sleep disturbances, and poor social interactions (Kao,

2023). In this increasingly sophisticated digital era, devices have become an integral part of everyday life. Elementary school children are no exception to this phenomenon. They are immersed in an environment filled with highly developed technologies such as smartphones, tablets, and computers. Gadgets offer various benefits, but it is important to understand how children use them. This impacts children's learning behavior in elementary school. By understanding the effects of device use on children's learning behavior, proactive steps can be taken to maximize the benefits of technology while minimizing risks.

Previous research has explored various aspects of this issue, which provides the foundation for this study. For example, (Nahdlatul & Surabaya, 2019) investigated strategies for digital etiquette education, highlighting the need for structured guidelines to address technology use. (Uin et al., 2023) examined the challenges of ethics and moral education in the technological era and concluded that technology demands new adaptations in the educational process. Similarly, (Kurniawati & Sutharjana, 2023) conducted a literature review and found that gadgets have a significant impact on children's behavior and character, emphasizing the important role of parental supervision in mitigating negative impacts.

No previous quantitative-comparative studies have simultaneously analyzed communication ethics and communication styles as dual outcomes of gadget-use intensity among elementary school students. Most existing studies remain descriptive, rely on literature reviews, or focus only on one variable, leaving a clear absence of multivariate empirical evidence that could explain how digital exposure might influence ethical judgment and communication behavior differently. This gap creates uncertainty about whether gadget use exerts stronger effects on communication ethics or on communication style, and which of these domains is more vulnerable to changes driven by children's increasing interaction with digital devices. Responding to this gap, the present study aims to examine the relationship between gadget-use intensity and students' communication ethics, analyze its influence on communication style, and compare both variables simultaneously between groups of high- and low-intensity users using a quantitative-comparative design. The findings are expected to offer evidence-based insights for schools, teachers, and parents in designing interventions that strengthen digital literacy and foster healthy interpersonal communication among elementary school students.

Methods

Research Design

This study employed a quantitative-comparative research design. This approach was chosen to quantitatively measure and statistically analyze differences in the dependent variables (ethics and communication styles) between two different groups. Quantitative methods allow for the collection of objective and measurable numerical data from the sample through standardized questionnaires, enabling statistical analysis and generalization of the findings. This method ensures that the results are objective, measurable, and their validity and reliability can be statistically tested.

Participant and sampling

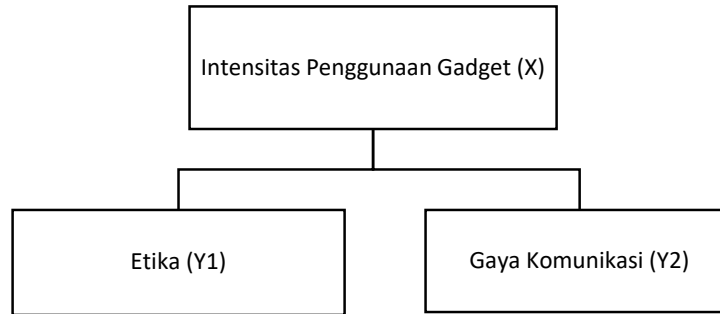
The research was conducted at an elementary school in Surakarta, with data collected in September during the active academic term. The population consisted of all Grade IV and Grade V students enrolled at the school. A total sample of 200 students was selected using a Stratified Random Sampling technique. In this study, the strata were formed based on the two grade levels Grade IV and Grade V to ensure proportional representation. The previous mention of "three different grade levels" has been corrected, as the study involved only two strata. Stratified sampling was chosen to improve representativeness and reduce sampling bias between grade levels.

Data Collection and Instruments

Data were collected using a closed-ended questionnaire, structured with Likert-scale items designed to measure three variables: device-use intensity, communication ethics, and communication styles. The development of the questionnaire items was grounded in existing theoretical frameworks, including *Social Learning Theory* and communication behavior models, and adapted from previously validated instruments used in related studies. This approach ensured that the operational indicators for each variable were theoretically supported rather than arbitrarily constructed.

The questionnaire was administered directly to respondents, namely fourth and fifth grade students, under the guidance of the researcher and class teachers to ensure accuracy. The questionnaire used a Likert scale with multiple answer options representing the respondent's level of agreement with each statement. Before being used in the main data collection, the questionnaire underwent validity and reliability testing to ensure that each item was appropriate for use and able to consistently measure the variables. Therefore, the data obtained through the questionnaire is expected to be accurate and reflect the actual situation regarding the relationship between device use and students' ethics and communication styles in social interactions in elementary schools.

The research instrument was designed to measure three core variables:



Instrument Validity and Reliability Procedures

Prior to the primary data collection, the instrument underwent a pilot test involving students with similar characteristics outside the main sample. Validity testing was conducted using the Pearson Product–Moment Correlation with the criterion of $r_{count} > r_{table}$. All 15 tested items were declared valid, with r_{count} values ranging from 0.446 to 0.775, exceeding the r_{table} value of 0.1388.

Reliability testing employed Cronbach’s Alpha to assess internal consistency. Importantly, the previously stated minimum threshold of 0.06 has been corrected international standards require $\alpha \geq 0.60$ or preferably ≥ 0.70 . The obtained reliability coefficients were: device-use intensity ($\alpha = 0.764$; 5 items), communication ethics ($\alpha = 0.612$; 3 items), and communication styles ($\alpha = 0.677$; 7 items). All values meet acceptable reliability standards, indicating that the instrument is consistent and suitable for primary data collection.

Data Analysis Techniques

Data analysis proceeded through multiple stages to ensure accuracy and statistical rigor. The first stage involved descriptive statistical analysis, including calculations of means, medians, and standard deviations for each variable to provide an overview of student responses.

Next, several prerequisite tests were conducted to ensure compliance with MANOVA assumptions. Normality was tested using the Kolmogorov–Smirnov method. Homogeneity of variance was assessed using Levene’s Test, while Box’s M Test evaluated the homogeneity of covariance matrices. Only after all assumptions were met was the inferential analysis conducted.

The hypothesis testing stage utilized Multivariate Analysis of Variance (MANOVA) to examine the simultaneous effects of device-use intensity on both dependent variables: communication ethics (Y_1) and communication style (Y_2). Statistical reporting follows international standards, for example: $F(2, 197) = 4.316, p = .015, \eta^2 = .042$. Importantly, the η^2 value of .042 representing a small effect size was interpreted to highlight that although the effect is statistically significant, its practical magnitude is modest, indicating limited real-world influence.

Following MANOVA, Independent Samples t-tests were conducted as post-hoc analyses to examine the individual effects of device-use intensity on each dependent variable separately. These analyses provided a more detailed understanding of how device exposure influences the communication ethics and communication styles of elementary school students.

Results

Table 1. Statistic Descriptive

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
TOTAL	200	21.00	50.00	37.3950	4.40294
Valid N (listwise)	200				

Prior to data collection, all instrument items were tested for validity and reliability.

The validity test was conducted using the Pearson Product Moment correlation technique, which aims to assess the extent to which the questionnaire items measure the intended construct. Based on the calculation results, all items in the

third variable (Intensity of Gadget Use, Communication Ethics, and Communication Style) demonstrated correlation values greater than the r-table (0.1388), thus being declared valid.

Next, a reliability test was conducted to determine the internal consistency of the instrument using the Cronbach's Alpha coefficient. The test results showed that all variables had Cronbach's Alpha values above 0.60, indicating that each construct met the reliability criteria and was suitable for use in research.

Descriptive Data Analysis

Data were collected from 200 students at Muhammadiyah PK Kottabarat Elementary School, Surakarta. The 200 respondents were spread across two grade levels, as shown in [Table 2](#).

Respondent Characteristics

Table 2. Respondent Frequency Distribution by Class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Kelas 5	122	61.0	61.0	61.0
	Kelas 4	78	39.0	39.0	100.0
	Total	200	100.0	100.0	

The study sample consisted primarily of 5th-grade students (61.0%), while the remaining 39.0% were from 4th-grade students.

Variable Category

Respondents were categorized into the High or Low group based on their Gadget Use Intensity (X1) score.

Table 3. Respondent Frequency Distribution by Gadget Intensity Category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rendah	123	61.5	61.5	61.5
	Tinggi	77	38.5	38.5	100.0
	Total	200	100.0	100.0	

[Table 3](#) shows that the majority of students (61.5%) fall into the Low Gadget Use Intensity category, while 38.5% fall into the High Intensity category. This grouping forms the basis for the comparative analysis.

Descriptive Statistics

The following table presents descriptive statistics (Mean and Standard Deviation) for the dependent variables (Ethics and Communication Style), which are compared across the two gadget use intensity groups.

Table 4. Descriptive Statistics of Communication Ethics and Style by Gadget Intensity

Kategori Intensitas Gadget		Etika Komunikasi.	Gaya Komunikasi.
Rendah	Mean	7.65	16.50
	N	123	123
	Std. Deviation	2.022	3.439
Tinggi	Mean	7.26	17.81
	N	77	77
	Std. Deviation	2.048	3.770
Total	Mean	7.50	17.00
	N	200	200
	Std. Deviation	2.036	3.617

[Table 4](#) shows two distinct descriptive trends. For Communication Ethics (Y1), the Low-intensity group had a higher mean score (Mean = 7.65) than the High-intensity group (Mean = 7.26). Conversely, for Communication Style (Y2), the High-intensity group had a higher mean score (Mean = 17.81) than the Low-intensity group (Mean = 16.50).

Prerequisite Test Results

Before hypothesis testing, several prerequisite tests were conducted to ensure the data met the assumptions for inferential analysis.

Normality Test

A Kolmogorov-Smirnov test was used to determine if the data for each variable was normally distributed. Data is considered normal if the significance value (Sig.) is greater than 0.05.

Table 5. Normality Test Results (Kolmogorov-Smirnov)

Variabel	Statistic	df	Sig.	Keterangan
Intensitas <i>Gadget</i> (X1)	0.059	200	0.084	Normal
Etika Komunikasi (X2)	0.050	200	0.200	Normal
Gaya Komunikasi (X3)	0.055	200	0.200	Normal

As shown in [Table 5](#), the significance values for all three variables (0.084, 0.200, and 0.200) were greater than 0.05. This confirms that all data were normally distributed.

Homogeneity of Variance Test

Levene's Test was used to ensure that the variance of the dependent variables was equal across the two independent groups (High and Low intensity). The variance is considered homogeneous if the Sig. value is greater than 0.05.

Table 6. Homogeneity of Variance Test Results (Levene's Test)

Variabel	Levene Statistic	df1	df2	Sig.	Keterangan
Etika Komunikasi	0.014	1	198	0.907	Homogen
Gaya Komunikasi	1.184	1	198	0.278	Homogen

The results in [Table 6](#) show Sig. values of 0.907 for Communication Ethics and 0.278 for Communication Style. Since both values are greater than 0.05, the assumption of homogeneity of variance was met.

Homogeneity of Covariance Matrices Test

Box's M Test was used as a prerequisite for MANOVA to ensure that the covariance matrices of the dependent variables were equal across the groups. This assumption is met if the Sig. value is greater than 0.001.

Table 7. Homogeneity of Covariance Matrices Test Results (Box's M Test)

Box's M	F	df1	df2	Sig.	Keterangan
1.818	0.599	3	1098718	0.616	Homogen

The Box's M Test yielded a Sig. value of 0.616, which is far greater than 0.001. This confirms that the assumption of homogeneity of covariance matrices was met, and MANOVA could be reliably performed.

Hypothesis Testing

Simultaneous Hypothesis Test (MANOVA)

MANOVA was used to test Hypothesis 3 (Ha3) : whether a significant difference exists in the *combination* of Communication Ethics (Y1) and Communication Style (Y2) based on Gadget Use Intensity. The hypothesis is accepted if the Sig. value is less than 0.05.

Table 8. Multivariate Test Results (MANOVA)

Effect	Kriteria Multivariat	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
X1_Kategori	Pillai's Trace	0.042	4.316	2	197	0.015	0.042
	Wilks' Lambda	0.958	4.316	2	197	0.015	0.042
	Hotelling's Trace	0.044	4.316	2	197	0.015	0.042
	Roy's Largest Root	0.044	4.316	2	197	0.015	0.042

Multivariate testing revealed a statistically significant difference between high and low gadget users on the combined dependent variables,

$$F(2,197) = 4.316, p = .015, \eta^2 = .042.$$

The effect size ($\eta^2 = .042$) indicates that gadget intensity explains approximately 4.2% of the variance in the combined outcomes. Although statistically significant, this represents a small effect size, suggesting that gadget use intensity has a modest practical influence on students' communication ethics and communication style collectively.

Individual Hypothesis Tests

Following the significant MANOVA result, Independent Samples T-tests were conducted to test Hypotheses 1 (Ha1) and 2 (Ha2) individually.

Table 9. Independent Samples T-Test Results for (Y1) and (Y2)

Variabel	Uji Levene's Sig.	t	df	Sig. (p-value)	Mean Difference
Etika Komunikasi (Y1)	0.907	1.323	198	0.187	0.391
Gaya Komunikasi (Y2)	0.278	-2.524	198	0.012	-1.309

The results of the T-test on the two Y variables provide specific insights:

For Communication Ethics (Y1), the T-test results showed a significance value (p-value) of 0.187. Because this p-value (0.187) is significantly greater than the critical significance limit of $\alpha = 0.05$, Alternative Hypothesis 1 (Ha1), which states a significant difference, is rejected. This means there is no statistically significant difference in Communication Ethics between students with high and low gadget use intensity.

For Communication Style (Y2), the T-test yielded a significance value (p-value) of 0.012. This p-value (0.012) is less than the alpha limit of 0.05, so Alternative Hypothesis 2 (Ha2) is accepted. This proves that there is a statistically significant difference in students' Communication Style between the two groups.

In conclusion, the results indicate that although gadget use intensity does not significantly differentiate students' communication ethics, it does have a significant relationship with their communication style.

Discussion

The results of this study reveal important dynamics regarding how the intensity of device use relates to the communication ethics and communication styles of elementary school students. The multivariate analysis showed that, simultaneously, there was a significant difference in the combination of the two communication variables between groups of students with high and low device use intensity. However, when examined separately, communication ethics did not show a significant difference, whereas communication styles demonstrated a meaningful distinction ([Hafidz & Hidayat,](#)

[2025](#)). This indicates that while the presence of digital devices influences expressive aspects of communication, it does not necessarily reshape the ethical foundations of how children communicate.

The findings suggest that communication ethics among elementary school students remain relatively stable despite differing levels of device use, whereas communication styles tend to shift more noticeably in groups with higher device use. This pattern aligns with research by [\(Nahdlatul & Surabaya, 2019\)](#) and [\(Uin et al., 2023\)](#), emphasizing that moral values in children are more strongly connected to structured habituation and adult supervision than to technology exposure itself. Meanwhile, the more flexible nature of communication style aligns with [\(Kurniawati & Sutharjana, 2023\)](#), who argue that devices more easily shape how children express themselves and interact. In this sense, the present findings reinforce the conclusion that digital exposure does not directly alter communication ethics but more readily modifies communication styles that are expressive, adaptive, and closely tied to digital communication norms.

Within elementary school developmental stages, moral values, manners, and communication ethics are typically shaped by strong patterns of habituation within the family and school environments. This explains why communication ethics appear stable regardless of device use intensity. These results are consistent with [\(Waluyo & Deska, 2024\)](#), who found that even among college students, emotional intelligence remains stable when supported by social and academic guidance, despite high device exposure. Similar findings by [\(Aslamiyah et al., 2024\)](#) showed that devices influence students' moral values only when used without supervision; under controlled conditions, ethical behavior remains intact. For younger children, [\(Astria & Ruwaidah, 2022\)](#) demonstrated that device use intensity influences emotional aspects of development, but less directly affects communication ethics. Taken together, these studies support the conclusion that communication ethics in elementary school students demonstrate resilience to device exposure because moral development at this stage is not yet deeply shaped by digital media.

However, this stability must be interpreted within the context of age-related development. [\(Khotijah & Maburi, 2025\)](#) found that among junior high school students, TikTok use had a significant negative effect on etiquette, including imitation of impolite speech, increased offensive expressions, and reduced sensitivity to polite norms. These differences from elementary school outcomes are attributed to adolescents' greater digital autonomy, wider content exposure, and reduced parental supervision. [\(Rohana & Hartini, 2020\)](#) further reported that while devices can reduce children's social interaction quality, such reductions do not necessarily translate to weakened communication ethics. Thus, the non-significant ethics result in this study likely reflects the developmental stage of elementary students, whose moral foundations are still closely shaped by their immediate environment.

In contrast, communication styles showed significant differences between high- and low-intensity device users. Students with higher device use tend to adopt communication styles that are more modern, concise, and direct, often incorporating digital language patterns similar to those found in online communication. This is consistent with [\(Agustanty & Rozy, 2023\)](#), who found that smartphone exposure reshapes interaction patterns, affecting vocabulary choice, intonation, and social contextual sensitivity. Research by [\(Fauziah & Haryati, 2023\)](#) also supports this by showing that higher device use increases tendencies toward digital self-disclosure, making children more accustomed to expressing thoughts via text rather than face-to-face interaction. These shifts reflect the influence of digital platforms, where the use of emojis, stickers, and short expressions becomes normative, ultimately shaping new communication behaviors.

This phenomenon is further strengthened by findings from [\(Wahyuliarmy & Sari, 2021\)](#), who reported a negative correlation between device use intensity and the quality of children's direct social interactions. Higher exposure reduces face-to-face engagement, pushing communication habits toward digital norms. [\(Hartania et al., 2023\)](#) found similar effects, noting declining interpersonal communication skills among children aged 5–6 years as device use increases. [\(Mediari et al., 2025\)](#) also observed that uncontrolled device use among elementary students leads to more passive behavior and reduced responsiveness in verbal interactions. Among early adolescents, [\(Albar et al., 2024\)](#) demonstrated that device intensity produces shorter, more impulsive, and less nuanced communication patterns. These findings collectively confirm that communication style being highly expressive and adaptable is more vulnerable to digital influence than communication ethics.

When examined simultaneously using MANOVA, the combination of communication ethics and communication style significantly differentiated the high and low device use groups. Although the effect size was small, the result provides important insight into the collective influence of digital exposure on communication. Similarly [\(Sitanggang et al., 2024\)](#) found that higher device use in junior high school students correlates with lower-quality social interactions. Parental supervision remains a key variable in this relationship. Then [\(Khairani & Sunarti, 2025\)](#) demonstrated that low parental supervision significantly increases device use intensity among adolescents, which subsequently affects communication behavior and social patterns. Among elementary school students, the role of supervision is even more critical due to their limited capacity for digital self-regulation.

In relation to academic achievement, the findings also align with broader evidence. [\(Harmain et al., 2022\)](#) showed that devices can support learning outcomes when used under structured educational settings, whereas [\(Pramesti et al., 2025\)](#) found that high device use among adolescents reduces academic achievement due to digital distractions. For younger children, [\(Khasanah & Rochmani, 2022\)](#) reported lower academic performance among elementary students with high device use, and [\(Putri et al., 2024\)](#) confirmed that device impact varies significantly depending on usage patterns and supervision quality.

Regarding emotional dynamics, (Marilyama et al., 2023) found that the intensity and type of device use strongly correlate with children's emotional regulation, particularly among those consuming entertainment content. This is echoed by (Faradibah et al., 2025), who found that high device involvement reduces children's ability to understand others' emotions and expressions, contributing to weaker social development.

Overall, the results of this study demonstrate that communication ethics among elementary students remain stable despite differing levels of device use, owing to strong environmental influences from family and school. In contrast, communication styles differ significantly, reflecting their susceptibility to digital communication norms. The collective analysis shows that device intensity affects communication behavior, although not uniformly across variables. Ultimately, these findings indicate that digital devices exert a stronger influence on *how children communicate* rather than on the ethical values underlying their communication behavior.

Conclusion

Based on the results of research and data analysis regarding the relationship between device use and the ethics and communication styles of elementary school students, it can be concluded that the intensity of device use is not significantly related to students' communication ethics in social interactions. Although there is a difference in the average scores between the groups of high and low device users, this difference is not statistically significant. Conversely, device use is significantly related to students' communication styles. The results show that students with high device use intensity have different communication patterns compared to students with low device use intensity. Thus, it can be said that although the values of communication ethics are relatively maintained, device use has a real relationship to how students interact and express themselves in social contexts.

Implications

The findings of this study have important implications for schools, teachers, and policymakers. For educators, structured digital literacy programs should be integrated into the curriculum to teach students how to communicate responsibly and expressively in digital environments. Teachers can incorporate classroom activities that promote face-to-face communication skills such as roleplay, group discussions, and storytelling to balance the digital influences on communication style.

For parents, the study highlights the need for active supervision and the establishment of clear device-use routines at home. Parents should be guided to monitor screen time, curate accessible content, and engage children in reflection about ethical communication, both online and offline. Schools can support this by offering parent workshops on digital parenting.

For policymakers, the findings support the development of age-specific digital behavior standards. National or regional guidelines can help schools design programs that emphasize the ethical use of devices while strengthening interpersonal communication skills. Policies could include mandatory digital citizenship education, recommended daily screen-time limits for school-aged children, and training programs for teachers to manage device use constructively in classrooms. Collectively, these implications underscore the importance of balancing digital engagement with intentional communication development strategies to ensure that children grow into effective, ethical, and empathetic communicators in a technology-driven society.

Limitations

This study has several limitations that should be acknowledged. First, the use of self-report questionnaires increases the possibility of social desirability bias, especially given that elementary school students may provide responses they perceive as "correct." Second, the cross-sectional research design does not allow conclusions about causality; it captures only associations at a single point in time. Third, the study was conducted in a single school, which limits generalizability across different socio-economic or regional contexts. Finally, the measure of device use did not differentiate between academic and entertainment use, which may have different impacts on communication behaviors.

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