Research Article

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The Influence of Smartphone Use and Digital Interaction on Alone Together Behavior Among University Students

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Abstract
The rapid development of digital communication technology has significantly transformed social interaction patterns, particularly among university students who are active smartphone users. Although smartphones facilitate instant communication and access to information, excessive use may lead to social alienation despite physical togetherness, a phenomenon known as alone together. This study aims to analyze the influence of smartphone use and digital interaction on alone together behavior among university students. The research employed a quantitative approach using a descriptive-correlational method. Data were collected through an online questionnaire distributed to 121 university students in Malang City. The variables examined were smartphone use, digital interaction, and alone together behavior. Data analysis was conducted using validity and reliability tests, classical assumption tests, multiple linear regression, t-test, Ftest, and coefficient of determination (R^2). The results indicate that smartphone use has a positive and significant effect on alone together behavior. Digital interaction also shows a positive and significant influence and is the most dominant variable affecting alone together behavior. Simultaneously, smartphone use and digital interaction significantly influence alone together behavior among students. This study concludes that high dependence on smartphones and intensive digital interaction contribute to decreased quality of face-to-face social interaction. Therefore, balancing digital communication and direct interpersonal interaction is essential to maintain students' social and emotional well-being.

Keyword: smartphone use, digital interaction, alone together, university students.

1. Introduction

The advancement of information and communication technology has reshaped the way individuals interact socially. Smartphones have become an integral part of daily life, especially for university students, supporting academic activities, social communication, and entertainment. However, the increasing intensity of smartphone use has altered traditional patterns of face-to-face interaction. Students often engage more in digital communication than direct interpersonal communication, potentially reducing emotional closeness and social engagement. Sherry Turkle introduced the concept of alone together to describe a paradoxical social condition in which individuals are physically present with others but psychologically detached due to digital device engagement. Several studies indicate that excessive smartphone use and digital interaction can decrease empathy, weaken interpersonal relationships, and increase feelings of loneliness. Previous research by Wang et al. (2024), Rahmawati (2023), and Islamiah et al. (2024) demonstrates that intensive smartphone use is associated with social alienation among students. Despite extensive research on smartphone use, there is still a need to examine how smartphone use and digital interaction simultaneously influence alone together behavior in the context of Indonesian university students. Therefore, this study aims to analyze the effect of smartphone.

2. The Art of Research

a. Frequency of Smartphone Use (X_1)
Frequency of smartphone use refers to the level of intensity with which individuals utilize smartphones in their daily lives, including frequency of access, duration of use, and the purposes for which the device is used. Smartphones are no longer limited to communication tools but have become primary media for obtaining information, entertainment, and maintaining social relationships. According to Nasution (2018), smartphone use intensity reflects the degree of individual engagement with digital activities, which may influence social behavior patterns.
Rahmawati (2020) explains that the frequency of smartphone use among university students can be measured through how often smartphones are accessed daily, the amount of time spent using them, and the types of activities performed, such as communication, social media use, information seeking, and entertainment. Chóliz (2019) further argues that excessive smartphone use may lead to digital dependency, which affects individuals' interaction patterns and social involvement.
In the context of university students, high frequency of smartphone use contributes to a shift in communication patterns from face-to-face interaction to digital communication. This shift potentially reduces the quality of direct social

relationships and increases the tendency toward social isolation. Therefore, frequency of smartphone use is a crucial variable in understanding the emergence of alone together behavior among students.

Indicators of frequency of smartphone use (X_1) include:

1. Duration and frequency of smartphone use
2. Level of dependence on smartphones
3. Intensity of social media use
4. Smartphone use for communication
5. Smartphone use for information seeking
6. Smartphone use for entertainment

b. Digital Interaction (X_2)

Digital interaction refers to forms of communication and social engagement that occur through digital media, such as social networking platforms, instant messaging applications, and other online communication technologies. McQuail (2011) defines digital interaction as communication patterns mediated by digital technology that enable individuals to interact without spatial and temporal limitations. For university students, digital interaction has become an essential part of both academic and social life.

Nasrullah (2018) explains that digital interaction creates a new social space that influences how individuals communicate, build relationships, and express themselves. However, digital communication often emphasizes speed and convenience rather than emotional depth. As a result, excessive reliance on digital interaction may reduce the quality of face-to-face communication and weaken interpersonal relationships.

Previous studies by Nurakhmi (2023) and Wang et al. (2023) indicate that high levels of digital interaction are associated with decreased quality of interpersonal communication and increased social alienation. In this regard, digital interaction not only facilitates virtual connectivity but also contributes to the development of alone together behavior, where individuals are physically present but emotionally disengaged from their social environment.

Indicators of digital interaction (X_2) include:

1. Anxiety and dependence on smartphones
2. Smartphone use that interferes with academic or work activities
3. Habitual checking of smartphones even when focused on tasks
4. Preference for digital communication over face-to-face interaction
5. Excessive smartphone use in social situations
6. Decreased attention and focus during direct interactions

c. Alone Together Behavior among University Students (Y)

Alone together behavior refers to a condition in which individuals are physically present with others but psychologically and emotionally detached due to their focus on digital devices. The term was introduced by Sherry Turkle (2011) to describe the social paradox of the digital era, where technology creates an illusion of connection while diminishing emotional closeness.

Saleh and Pitriani (2018) explain that alone together behavior emerges when digital communication replaces face-to-face interaction, resulting in shallow and less meaningful social relationships. Wang et al. (2023) further emphasize that this behavior may reduce empathy, emotional intimacy, and individuals' ability to build healthy interpersonal relationships.

Among university students, alone together behavior is reflected in a preference for virtual interaction over direct communication, difficulty in engaging in deep conversations, and feelings of loneliness despite being surrounded by others. Therefore, alone together behavior serves as a key indicator of the social impact of excessive smartphone use and digital interaction.

Indicators of alone together behavior (Y) include:

1. Perception of digital relationships as shallow and fragile
2. Using social media as an escape when feeling lonely
3. Difficulty engaging in deep face-to-face conversations
4. Face-to-face interactions becoming brief and superficial
5. Feeling ignored because others are focused on smartphones

d. Hypothesis Development

Previous studies have extensively examined the relationship between smartphone use, digital interaction, and alone together behavior. Students with high levels of smartphone use tend to spend more time engaging in digital activities rather than building direct social relationships. Wang et al. (2024) found that increased smartphone use is positively associated with higher levels of loneliness and social anxiety, which reinforce alone together tendencies.

Digital interaction also plays a significant role in shaping students' social behavior. Studies by Nurakhmi (2023) and Setiadi (2021) indicate that the dominance of digital communication reduces interpersonal communication quality and emotional closeness. This supports Turkle's (2011) argument that digital connectivity does not necessarily lead to emotional connectedness.

Based on theoretical frameworks and previous empirical findings, the following hypotheses are proposed:

H1: Frequency of smartphone use has a significant effect on alone together behavior among university students.

H2: Digital interaction has a significant effect on alone together behavior among university students.

H3: Frequency of smartphone use and digital interaction simultaneously have a significant effect on alone together behavior among university students.

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3. Method

This study employed a quantitative associative research design aimed at examining the influence of social media use intensity and interpersonal communication style on self-image formation in digital environments. The associative approach was selected to analyze the causal relationships between independent variables and the dependent variable within the context of digital social interaction.

The population of this study consisted of adolescents and young adults aged 13–30 years who actively use social media platforms. A total of 144 respondents were selected as the research sample using purposive sampling, with the criteria that respondents were active social media users and engaged regularly in online interactions. This demographic was chosen due to their high level of exposure to digital environments and social media activities.

Data were collected using a structured questionnaire distributed online, employing a five-point Likert scale ranging from strongly disagree to strongly agree. The variable social media use intensity (X_1) was measured using indicators including frequency of social media access, duration of use, engagement in digital activities (such as posting, commenting, and sharing), purposes of use (communication, entertainment, and information seeking), and emotional attachment to social media. The variable interpersonal communication style (X_2) was assessed based on indicators of openness, empathy, supportiveness, positive attitudes, and equality in two-way communication. Meanwhile, self-image formation in digital environments (Y) was measured through indicators of self-presentation, self-perception, social recognition through feedback, consistency of digital identity, and satisfaction with one's displayed self-image.

The collected data were analyzed using multiple linear regression analysis to examine both the partial effects of each independent variable and their simultaneous effects on self-image formation in digital environments. Prior to conducting regression analysis, classical assumption tests were performed, including tests of normality, multicollinearity, and heteroskedasticity, to ensure that the data met the requirements of the regression model. All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS).

4. Result

This section presents the empirical findings of the study examining the influence of Smartphone Use (X_1) and Digital Interaction (X_2) on Alone Together Behavior (Y). The results are derived from quantitative analysis using SPSS and are organized systematically to reflect instrument quality, model feasibility, and hypothesis testing outcomes. Each subsection is accompanied by its corresponding statistical table to enhance clarity and interpretability.

Instrument Validity

Instrument validity testing was conducted to ensure that each questionnaire item accurately measured the intended construct. The validity assessment was based on a comparison between the item correlation coefficient (r-count) and the critical value (r-table) of 0.178 at a significance level of 0.05. An item is considered valid when the r-count exceeds the r-table value. The results indicate that all items used to measure Smartphone Use, Digital Interaction, and Alone Together Behavior meet the validity criteria. This suggests that respondents consistently interpreted the questionnaire items in accordance with the theoretical constructs, and the instrument is appropriate for further statistical analysis.

Table 1. Validity Test Results.

Item	r-count	r-table	Result
X1.1	0.628	0.178	Valid
X1.2	0.745	0.178	Valid
X1.3	0.638	0.178	Valid
X1.4	0.639	0.178	Valid
X1.5	0.530	0.178	Valid

X1.6	0.459	0.178	Valid
X1.7	0.581	0.178	Valid
X1.8	0.485	0.178	Valid
X1.9	0.624	0.178	Valid
X1.10	0.724	0.178	Valid
X2.1	0.845	0.178	Valid
X2.2	0.750	0.178	Valid
X2.3	0.642	0.178	Valid
X2.4	0.810	0.178	Valid
X2.5	0.856	0.178	Valid
X2.6	0.805	0.178	Valid
X2.7	0.825	0.178	Valid
X2.8	0.834	0.178	Valid
X2.9	0.740	0.178	Valid
Y1	0.727	0.178	Valid
Y2	0.430	0.178	Valid
Y3	0.816	0.178	Valid
Y4	0.802	0.178	Valid
Y5	0.706	0.178	Valid

Instrument Reliability

Reliability testing was conducted using Cronbach's Alpha to evaluate the internal consistency of the measurement instrument. A Cronbach's Alpha value greater than 0.70 indicates that the items within a variable are consistently measuring the same construct.
The results show that all variables have Cronbach's Alpha values exceeding the recommended threshold. This confirms that the research instrument is reliable and capable of producing stable and consistent results across respondents.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha	Interpretation
Smartphone Use (X_1)	0.750	Reliable
Digital Interaction (X_2)	0.784	Reliable
Alone Together Behavior (Y)	0.779	Reliable

Classical Assumption Tests

Before conducting multiple linear regression analysis, classical assumption tests were performed to ensure that the regression model met statistical requirements and produced unbiased estimates.

Normality Test

The normality of residuals was assessed using the One-Sample Kolmogorov–Smirnov test. A significance value greater than 0.05 indicates that the residuals are normally distributed. The test results show that the residuals follow a normal distribution, indicating that the regression model satisfies the normality assumption.

Table 3. Normality Test Results

Statistic	Value
N	121
Test Statistic	0.063
Asymp. Sig. (2-tailed)	0.200

Multicollinearity Test

Multicollinearity testing was conducted to examine whether the independent variables were highly correlated with each other. High multicollinearity can weaken the explanatory power of a regression model. The results indicate that all tolerance values

are above 0.10 and VIF values are well below 10, confirming the absence of multicollinearity between Smartphone Use and Digital Interaction.

Table 4. Multicollinearity Test Results

Variable	Tolerance	VIF
Smartphone Use (X_1)	0.952	1.050
Digital Interaction (X_2)	0.952	1.050

Heteroskedasticity Test

The heteroskedasticity test was conducted using the Glejser method to determine whether the variance of residuals was constant across levels of the independent variables. The findings indicate no heteroskedasticity in the regression model, suggesting that the error variance is evenly distributed and the regression coefficients are reliable.

Table 5. Heteroskedasticity Test Results

Variable	Sig.
Smartphone Use (X_1)	0.144
Digital Interaction (X_2)	0.053

Hypothesis Testing

Partial Effects (t-test)
The t-test was used to examine the partial effect of each independent variable on Alone Together Behavior. The results indicate that both Smartphone Use and Digital Interaction significantly influence Alone Together Behavior. However, Digital Interaction exhibits a much stronger effect, suggesting that the quality of digital engagement plays a more critical role than device usage alone.

Table 6. Partial Regression Results

Variable	t-value	Sig.	Decision
Smartphone Use (X_1)	1.323	0.008	Accepted
Digital Interaction (X_2)	9.990	0.000	Accepted

Simultaneous Effect (F-test)

The F-test was conducted to examine the simultaneous influence of Smartphone Use and Digital Interaction on Alone Together Behavior. The significant F-value indicates that both variables jointly affect social behavior patterns characterized by physical presence but limited interpersonal interaction.

Table 7. Simultaneous Test Results

F-value	Sig.
56.360	0.000

Coefficient of Determination

The coefficient of determination was used to evaluate the explanatory power of the regression model.The results show that a substantial proportion of variance in Alone Together Behavior is explained by the independent variables included in the model.

Table 8. Model Summary

R	R Square	Adjusted R Square
0.699	0.689	0.480

Overall Results Interpretation

Overall, the findings indicate that alone-together behavior is significantly influenced by digital factors. While smartphone use provides the technological medium, digital interaction quality emerges as the dominant predictor shaping contemporary social behavior.

5. Discussion

a. Empirical Interpretation of the Research Findings
The statistical results presented in this study provide strong empirical evidence supporting the proposed research hypotheses regarding the influence of smartphone use and digital interaction on alone together behavior. The regression analysis demonstrates that both independent variables exert a statistically significant effect on the dependent variable, either partially or simultaneously. These findings confirm that contemporary social behavior is increasingly shaped by digital engagement patterns rather than solely by physical co-presence. The partial test results indicate that smartphone use (X_1) has a significant effect on alone together behavior, although its magnitude is relatively modest compared to digital interaction. This suggests that the frequency and intensity of smartphone usage contribute to behavioral changes in social settings, particularly by diverting attention from face-to-face interaction. However, smartphone use alone does not fully explain the emergence of alone together behavior; instead, it functions primarily as an enabling medium. In contrast, digital interaction (X_2) emerges as the most dominant predictor, as evidenced by its substantially higher t-value and significance level. This finding implies that the quality, intensity, and nature of online interaction—such as messaging, social media engagement, and online responsiveness—play a more decisive role in shaping social disengagement within physical environments. Individuals may remain physically present in social settings while being cognitively and emotionally immersed in digital spaces, reinforcing the phenomenon of being "alone together." The simultaneous test further strengthens this interpretation by confirming that smartphone use and digital interaction jointly influence alone together behavior. This indicates that the phenomenon cannot be attributed to a single technological factor but rather to the interaction between device usage and digitally mediated social behavior. The high coefficient of determination ($R^2 = 0.689$) suggests that these variables explain a substantial proportion of behavioral variance, underscoring the central role of digital engagement in modern social dynamics. These results are fully consistent with the research hypotheses and reinforce the relevance of the theoretical framework employed in this study.

b. Behavioral Trends, Strengths, and Limitations Revealed by the Data
From a behavioral perspective, the findings reveal a clear trend toward digitally mediated social presence, where interpersonal interaction is increasingly displaced by online engagement. The strong explanatory power of digital interaction highlights a shift in social norms, in which responsiveness to digital communication is often prioritized over direct interpersonal exchange. This trend reflects broader transformations in communication culture, particularly among adolescents and young adults who constitute the study sample. One of the main strengths of this study lies in its empirical rigor. The research instrument demonstrated strong validity and reliability, ensuring that the constructs were measured accurately and consistently. In addition, the regression model satisfied all classical assumptions, indicating that the statistical conclusions drawn are robust and reliable. The relatively high R^2 value further strengthens the explanatory relevance of the model, suggesting that smartphone use and digital interaction are not peripheral factors but central determinants of alone together behavior.

c. Implications and Recommendations for Future Research and Practice
Based on the empirical findings, several implications for future research and practical application can be identified. From a research perspective, future studies should aim to expand the analytical model by incorporating additional psychological and social variables, such as social anxiety, self-control, or peer norms, to further explain the unexplained variance in alone together behavior. Longitudinal research designs are also recommended to examine how digital engagement patterns influence social behavior over time, rather than capturing a single cross-sectional snapshot. Further research could also explore contextual differences, such as variations in alone together behavior across educational, professional, or cultural environments. This would allow for a more nuanced understanding of how digital interaction reshapes social presence in different settings. Additionally, qualitative approaches could complement quantitative findings by providing deeper insight into individuals' subjective experiences of digital immersion and social disengagement. From a practical standpoint, the findings highlight the need for greater awareness of how digital interaction affects social quality. Educational institutions, families, and organizations should promote digital literacy programs that emphasize balanced technology use and mindful interaction. Rather than discouraging smartphone use entirely, interventions should focus on fostering intentional digital engagement that supports, rather than replaces, meaningful interpersonal relationships. Overall, this study contributes empirical evidence that alone together behavior is not merely a byproduct of technological availability, but a behavioral outcome shaped by how individuals interact digitally. Addressing this phenomenon therefore requires not only technological regulation but also behavioral, educational, and cultural strategies aimed at restoring balance between digital and face-to-face social interaction.

6. Conclusion

This study concludes that smartphone usage has a statistically significant influence on alone together behavior among students. The results demonstrate that higher levels of smartphone usage are associated with a stronger tendency for individuals to

disengage from direct social interaction while being physically present with others. This finding confirms that smartphones are an important factor in shaping contemporary social behavior among students.

The significant relationship identified in this study indicates that smartphones contribute to changes in communication patterns, shifting interactions from face-to-face engagement toward digital-mediated communication. While smartphones offer convenience and connectivity, excessive or uncontrolled use may reduce the quality of direct social interaction and social awareness in shared environments.

In conclusion, this research provides empirical evidence that smartphone usage affects students' social interaction behavior, particularly in the form of alone together behavior. The findings contribute to the academic literature on digital communication and social behavior and offer practical implications for students, educators, and institutions in encouraging more mindful and balanced smartphone use. Future research is recommended to include additional variables or different population groups to gain a deeper understanding of the social impact of smartphone usage.

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