

Article

# Exploring Smartphone Use and Learning Behaviors among Senior High School Students: Insights from a Developing Region in Indonesia

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**Abstract:** Smartphone use among adolescents has surged globally, reshaping communication and learning patterns, especially in developing countries. However, the implications of such digital habits on students in rural or under-resourced areas remain underexplored. This study aims to examine the patterns of smartphone usage and its effects on learning among high school students in Tarutung, a developing region of North Sumatra, Indonesia. Utilizing a quantitative descriptive approach, data were collected from 358 students using structured questionnaires. The results show that 96.05% of students own personal smartphones regardless of socioeconomic background, with an average daily usage of 4 hours and 45 minutes. While 91.81% believe smartphones support their learning, 25.99% report declining academic performance. Alarming, 20.62% of students admitted involvement in cyberbullying activities, highlighting a critical digital risk impacting the school environment and student well-being. The study concludes that although smartphones offer educational benefits, their misuse can lead to negative academic, social, and psychological outcomes. This study recommends digital literacy curricula and structured cooperation between parents and educators to prevent risks while optimizing educational opportunities in smartphone use.

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**Keywords:** Smartphone Use; High School Students; Digital Learning; Fear of Missing Out; Cyberbullying

## 1. Introduction

Smartphones, as mobile devices with computing capabilities and internet access, are increasingly central to adolescent life. Beyond communication, they serve functions related to entertainment, learning, and socialization [1]. However, international studies have highlighted that excessive or unregulated use can negatively impact adolescents, leading to psychological stress, sleep deprivation, reduced physical activity, and poor academic outcomes [2,3]. In Indonesia, the widespread availability of low-cost internet and mobile devices has further accelerated usage among students, while school-level regulatory frameworks remain underdeveloped [4].

The behavior of students in using smartphones is often shaped by social and psychological factors. Developed in 1991, Ajzen's Theory of Planned Behavior offers a useful lens for understanding this phenomenon, asserting that behavior is determined by attitudes, subjective norms, and perceived behavioral control [5]. In school settings, peer influence, individual attitudes toward entertainment, and students' perceived control over their own actions can all contribute to usage intensity [6]. Similarly, the uses and gratifications theory explain how individuals engage with media such as smartphones to

fulfill cognitive, emotional, and social needs, particularly in environments with limited alternatives [7].

While many educators view smartphones as distractions, studies also point to their potential as tools for learning. Research has shown that smartphones can support mobile learning, digital collaboration, and quick access to educational resources [8,9]. In under resourced or rural schools, smartphones may even compensate for the lack of physical infrastructure [10]. However, without clear guidance and support, students may misuse these tools, leading to problems such as cyberbullying, academic disengagement, and exposure to inappropriate content [11-13].

Despite the growing body of international literature, little is known about the contextual dynamics of smartphone use among high school students in developing or semi-urban areas of Indonesia. Existing studies tend to focus on urban populations, often overlooking regional variations in sociocultural norms, parenting practices, and institutional policies. Tarutung, a town in North Tapanuli Regency, encompasses both urban and rural school environments, making it a strategic site for in-depth investigation of these issues.

This study aims to explore the patterns of smartphone use among high school students in Tarutung and to understand the socio-cultural and psychological factors underlying those patterns. Specifically, it seeks to: (1) map students' digital habits, (2) examine perceived benefits and risks from the students' perspectives, and (3) provide context-sensitive recommendations for school policy that balance educational utility with behavioral regulation.

## 2. Materials and Methods

This study employed a quantitative descriptive design using a structured survey to explore smartphone usage among high school students in Tarutung, North Sumatra. Tarutung was selected as a representative area, exemplifying characteristics common to developing regions in Indonesia, particularly rural and semi-urban settings. Guided by a descriptive-analytical framework, the research aimed to map the prevalence and patterns of smartphone use, as well as to identify behavioral and contextual factors shaping students' digital habits. A stratified random sample of 354 students was selected from a population of 3,604, using Krejcie and Morgan's sample size table to ensure a 95% confidence level and a 5% margin of error.

Primary data was collected through a structured questionnaire based on the Theory of Planned Behavior and the Uses and Gratifications Theory. The instrument consisted of closed-ended questions designed for quantitative analysis. Its validity was confirmed through expert review, and the survey was administered directly in classrooms with researchers present to assist where needed. In addition to the survey, a small number of semi-structured interviews were conducted with selected students to provide supplementary insights and to contextualize the statistical findings. These qualitative inputs were used illustratively and did not undergo formal thematic analysis.

Descriptive statistical techniques, including frequencies and percentages, were used to analyze quantitative data. These results formed the basis for identifying patterns in smartphone ownership, usage duration, preferred applications, and perceived educational impacts. Qualitative inputs were referenced where relevant to enrich the interpretation of students' digital behaviors.

### 3. Results

#### 3.1. Demographic Characteristics of Respondents

**Table 1. Demographic Characteristics of Respondent**

Descriptions	Category	Frequency (n)	Percentage (%)
Participants	Senior High School	355	100%
Grade	Grade X	143	40.39%
	Grade XI	104	29.38%
	Grade XII	107	30.23%
Parental occupation	Farmer	162	45.76%
	Weaver	3	0.85%
	Doctor	1	0.28%
	Honorary Teacher	1	0.28%
	Village Head	2	0.56%
	Trader	21	5.93%
	Private Employee	12	3.39%
	Pastor	2	0.56%
	Civil Servant/Military/Police/Teacher	74	20.90%
Monthly Parental income	Entrepreneur	75	21.19%
	< IDR 2,000,000/USD 125	179	50.56%
	IDR 2,000,000 – 5,000,000/USD 125 – 312	129	36.44%
	IDR 5,000,000 – 10,000,000/USD 312 – 625	40	11.30%
	>IDR 10,000,000/US\$ 625	6	1.69%

#### 3.2. Smartphone Ownership and Usage Patterns

Smartphone ownership among students was remarkably high, with 96.05% owning a personal device. A substantial portion of students reported monthly expenditures for mobile data between IDR 10,000–30,000, approx. USD 0.63 – 1.88 (14.12%), IDR 31,000–60,000, approx. USD 1.94 – 3.75 (35.03%), IDR 61,000–90,000, approx. USD 3.81–5.63 (12.71%), IDR 91,000–120,000, approx. USD 5.69 – 7.50 (20.34%), IDR 121,000–150,000, approx. USD 7.56 – 9.38 (2.54%), >IDR 151,000 approx. USD 9.44 (2.54%), and home WiFi subscription (12.71%). And with the primary funding source being parental support (70.42%).

Notably, 55% of the respondents brought their smartphones to school despite regulations in certain schools prohibiting the practice. Parental attitudes toward smartphone use at school varied, with 29.94% disapproving and 70.06% allowing it. The average daily smartphone usage of students were 4 hours and 45 minutes. The most frequently used applications included WhatsApp (92.10%), Instagram (78.81%), TikTok (59.04%), and games (20.34%). Other apps such as Facebook and YouTube were less prevalent, used by 4.53% and 3.11% of students, respectively.

#### 3.3. Behavioral Tendencies and Educational Impact

Most students (98.87%) perceived smartphones as beneficial, although 1.13% considered them harmful due to overuse. Smartphones were commonly used during idle times such as commuting or waiting, and even while walking. Only 8.76% reported experiencing anxiety when separated from their device. Group participation was also common, with 67.80% of students being active in more than five chat groups. Discipline

issues were present, with 34.18% of students frequently reprimanded by parents for excessive smartphone use. However, 57.06% indicated occasional reprimands, and 8.76% had never been disciplined for this reason.

Smartphones were widely viewed as a learning aid, with 91.81% affirming their educational value. Furthermore, 74.01% believed smartphones improved their academic performance, while 25.99% reported a decline. Socially, 94.35% preferred face-to-face interaction over solitary smartphone use, and 92.94% valued group discussion over individual screen time. When seeking academic help, 59.32% preferred direct communication with teachers over internet searches. Regarding credibility, 56.21% trusted smart peers over digital sources, whereas 43.79% placed greater trust in online information. Additionally, 70.34% believed that reviewing lessons at home was more effective than using smartphones alone. When completing homework, 57.63% relied on digital searches, while 42.37% used printed materials.

### ***3.4. Emotional Expression and Cyberbullying Behavior***

Students primarily expressed their emotional burdens to their parents or family in person (46.05%), followed by teachers (29.10%). Communication through smartphones was less frequent, with 16.95% sharing feelings with friends and 7.34% with family. A mere 0.56% confided directly in peers. Incidences of cyberbullying were present though limited. About 1.98% of students admitted to frequently engaging in online bullying, while 18.64% had done so occasionally. Additionally, 18.08% reported participating in bullying behavior within social media groups, and 22.60% had witnessed or engaged in cyberbullying within those groups.

## **4. Discussion**

This study offers a comprehensive overview of smartphone behavior, perceptions, and impacts among high school students. Despite most students coming from lower-middle-income families, smartphone ownership reaches 96.05%. This phenomenon reflects that the digital devices are no longer symbols of social status, but have become essential tools for the younger generation surpassing the rational boundaries of household economic capacity [14]. This shift also indicates a change in family consumption values, where students increasingly influence technological ownership decisions, often under the pretext of educational necessity [15], though this can contribute to fear of missing out (FoMO) behaviors [16,17].

Although only 55% of students bring their smartphones to school, their average daily usage reaches 4 hours and 45 minutes approaching global standards. This reveals an ambiguity between adherence to school policies banning phones and the digital needs of students that cannot be easily restricted. This need is further confirmed by the finding that 98.87% of students actively accept and use smartphones. From the perspective of the Technology Acceptance Model [18] and the Theory of Planned Behavior [5], this illustrates that technology is not merely passively adopted, but has become an integral part of students' daily lives.

In terms of application preferences, there is a notable shift from traditional social media platforms like Facebook to entertainment-based apps such as TikTok and mobile games, with 20.34% of students actively using gaming applications. This not only indicates a change in digital consumption preferences but also highlights the growing risk that smartphone function more as entertainment devices rather than tools for productivity supporting concerns over the rise of digital leisure culture among adolescents [19].

Moreover, the finding that 46.32% of students use smartphones while walking suggests a lack of awareness regarding personal safety, and may reflect symptoms of

“phubbing” or neglect of one’s surroundings due to screen attachment [20]. Such behaviors pose risks to mental health and diminish the quality of social interaction [21]. Within family dynamics, 91.24% of students reported having been reprimanded by their parents regarding smartphone usage. This underscores a widening intergenerational communication gap. Consistent with findings by [22], the lack of structured control over smartphone use contributes to weakened interpersonal communication and the decline of traditional parenting models in favor of reactive oversight.

While the majority of students (92%) still express a preference for direct social interaction, early signals of a digital-social shift are apparent: 5.65% of students prefer spending time alone with their smartphones, and 7.06% derive more enjoyment from screen time than from real-life discussions. These findings support the notion that digitalization has not eradicated social interaction but has transformed its forms and quality [23].

Another notable trend is the decline in students’ reliance on academic authorities. Only 59.32% still ask teachers directly when they have questions, while 40.68% prefer searching for answers via their smartphones. This shift represents a potential epistemological transition, where teachers are no longer the sole source of knowledge, giving way to increased trust in digital sources and AI-driven platforms [24].

In addition to the shifting trust dynamics between students and teachers, a significant change is also evident in how students relate to their peers. The study found that 56.21% of students trusted answers provided by smartphones more than those given by academically high-achieving classmates. This marks a notable departure from the traditional classroom dynamic, where top-performing students often served as academic references for their peers. The increasing reliance on digital devices indicates that smartphones are increasingly perceived as reliable problem-solvers in academic settings. This trend reflects a broader degradation in social relationships not only among students but also between students and teachers, and even with their families. As such, longstanding psychological theories regarding student-to-student, student-to-parent, and student-to-teacher interactions may need to be revisited in light of these evolving behavioral patterns. Further evidence of this shift is seen in students’ emotional disclosure habits: 46.05% reported confiding in parents or family directly, while 7.34% did so via smartphones; 29.10% confided in friends face-to-face, and 16.95% of students reported that they confided in their friends using smartphones (e.g., through messaging apps or social media), rather than speaking to them in person. Alarming, only 0.56% reported confiding directly in their teachers.

These findings suggest a significant erosion of direct emotional trust and communication with parents, family, and especially teachers. While earlier studies have indicated that high school students typically build strong peer friendships during mid-adolescence to boost self-esteem and reduce anxiety and depressive symptoms in early adulthood and that female students tend to be more emotionally expressive with their peers face-to-face [25,26], this study presents an antithesis to such conclusions. The extraordinarily low rate of emotional disclosure to teachers highlights a deep emotional disengagement between students and educators. Students increasingly view teachers primarily as facilitators of cognitive development, rather than as emotionally supportive figures. This represents a shift from a mutual social-emotional dependency model toward a more transactional perception of the teacher-student relationship. As [27] suggests, the erosion of emotional connection in the learning environment could have profound implications for student motivation and overall educational outcomes.

The findings of this study highlight a critical transformation in students’ perceptions and behaviors related to independent learning, particularly in their approach to reviewing

school materials at home. While a majority (70.34%) of students acknowledged the importance of repetition in developing academic skills and becoming smarter, only 59.04% reported that they actually engage in reviewing lessons at home. This gap between belief and behavior points to a growing inconsistency between what students understand as effective learning strategies and the choices they make in practice. Smartphones appear to play a central role in this behavioral shift. The study found that 40.96% of students preferred using smartphones over traditional study methods, and 57.63% relied more on smartphones to complete homework assignments than consulting textbooks or other formal references. This indicates a functional shift from deliberate, effortful learning strategies toward more immediate, convenience-driven methods facilitated by digital devices [28].

Although students still intellectually value the role of repetition and self-study in achieving academic success, the ease of access to instant information via smartphones may be subtly reshaping their learning discipline and effort. These findings suggest a gradual erosion rather than a complete loss of learning motivation and habits that traditionally emphasized independent cognitive engagement. Moreover, this pattern of smartphone dependency is not limited to high school students. Previous research noted that primary school students were already showing a preference for entertainment-based smartphone use at home instead of reviewing school lessons [15]. The current findings support the notion that digital habits are taking root early and persisting into adolescence, which may have long-term implications for academic performance, attention spans, and self-directed learning [29]. This apparent contradiction between students' stated beliefs and their actual study behavior demands attention from educators and policymakers. It suggests the need for targeted interventions that not only promote digital literacy but also reinforce traditional learning strategies in ways that align with students' digital realities [30]. Educational frameworks must begin to integrate technology not just as a tool for access, but as a means to rebuild student engagement with the learning process itself [31].

The most concerning finding relates to cyberbullying, with 20.62% of students admitting to engaging in digital bullying, either individually or through social media group attacks. This underscores that smartphones, while valuable tools, can also serve as platforms for deviant behavior that threatens students' psychosocial development. In line with studies by Kowalski *et al.* (2014) and Patchin & Hinduja (2020), these results highlight the urgent need for ethical digital literacy and collaborative monitoring between schools and families [32-34].

Despite these challenges, the positive potential of smartphones in education remains significant. A total of 91.81% of students acknowledged being helped in their studies, and 74.01% felt that their academic performance improved. However, 25.99% reported a decline, illustrating that the benefits of smartphone use are closely tied to students' self-regulation and digital literacy [17]. Hence, any educational intervention must adopt a holistic approach, emphasizing time management, information filtering skills, and digital ethics awareness as core elements of 21st-century learning strategies [35].

## 5. Conclusions

This study reveals the pervasive role of smartphones in shaping the learning experiences and behavioral patterns of high school students in a developing Indonesian region. While smartphones are widely perceived as educational tools, their unregulated use has led to concerning consequences such as diminished academic engagement, weakened interpersonal relationships, and increased exposure to digital risks like cyberbullying. The findings emphasize a growing reliance on smartphones that often displaces traditional learning practices and undermines direct social interactions with

peers, teachers, and family members. Nevertheless, the continued belief among students in the cognitive value of self-study indicates an opportunity for re-engaging learners through balanced and guided digital integration.

To address these challenges, educational institutions should prioritize the implementation of structured digital literacy programs and ethical digital behavior education. Collaborative efforts involving schools, parents, and communities are essential to cultivate responsible smartphone use while maximizing its potential as a learning resource. This study contributes valuable insights to the broader discourse on digital education in developing regions and underscores the urgency of proactive policy and pedagogical responses to ensure that mobile technology enhances rather than hinders student development.

## References

- [1] Dzogbenuku RK, Doe JK, Amoako GK. Social media information and student performance: the mediating role of hedonic value (entertainment). *Journal of Research in Innovative Teaching & Learning*. 2022 Apr 1;15(1):132–46.
- [2] Li T, Liu X, Cao C, Yang F, Ding P, Xu S, et al. Association between screen time, homework and reading duration, sleep duration, social jetlag and mental health among Chinese children and adolescents. *BMC Psychiatry*. 2024 Nov 8;24(1):2–13.
- [3] Gull M, Ruth Sravani B. Do screen time and social media use affect sleep patterns, psychological health, and academic performance among adolescents? evidence from bibliometric analysis. *Child Youth Serv Rev [Internet]*. 2024;164:107886. Available from: <https://www.sciencedirect.com/science/article/pii/S0190740924004584>
- [4] Pratama AR. Fun first, useful later: Mobile learning acceptance among secondary school students in Indonesia. *Educ Inf Technol (Dordr)*. 2021 Mar 17;26(2):1737–53.
- [5] Naskar ST, Lindahl JMM. Forty years of the theory of planned behavior: a bibliometric analysis (1985–2024). *Management Review Quarterly*. 2025 Feb 13;
- [6] Havewala M, Bowker JC, Smith KA, Rose-Krasnor L, Booth-LaForce C, Laursen B, et al. Peer Influence during Adolescence: The Moderating Role of Parental Support. *Children*. 2021 Apr 17;8(4):306.
- [7] Moon JW, An Y. Scale Construction and Validation of Uses and Gratifications Motivations for Smartphone Use by Tourists: A Multilevel Approach. *Tourism and Hospitality*. 2022 Jan 20;3(1):100–13.
- [8] Ubben MS, Kremer FE, Heinicke S, Marohn A, Heusler S. Smartphone Usage in Science Education: A Systematic Literature Review. *Educ Sci (Basel)*. 2023 Mar 27;13(4):345.
- [9] Hartley K, Hoffman B, Andújar A. Smartphones and Learning: Evaluating the Focus of Recent Research. *Eur J Investig Health Psychol Educ*. 2023 Apr 6;13(4):748–58.
- [10] Valencia-Arias A, Méndez Velásquez LM, Agudelo-Ceballos E, Cumpa Vásquez JT, Jimenez Garcia JA, Martínez Rojas E. Virtual education in the rural sector: analysis of scientific literature. *Front Educ (Lausanne)*. 2025 Apr 10;10.
- [11] Colella GM, Palermi AL, Bartolo MG, Servidio RC, Costabile A. Problematic Social Media Use, Retaliation, and Moral Disengagement in Cyberbullying and Cybervictimization Among Italian Preadolescents: A Moderated Mediation Model. *International Journal of Bullying Prevention*. 2024 Oct 24;
- [12] Dou K, Wang ML, Li YY, Yuan XQ, Wang LX. The Longitudinal Association Between Peer Victimization and Problematic Social Media Use Among Chinese College Students: Testing a Moderated Mediation Model. *Int J Ment Health Addict*. 2024 Apr 26;
- [13] Cassidy W, Faucher C, Jackson M. Adversity in University: Cyberbullying and Its Impacts on Students, Faculty and Administrators. *Int J Environ Res Public Health*. 2017 Aug 8;14(8):888.
- [14] Zinich A V., Revyakina YN, Feng W. Young People's Readiness for Professional Future in a Digital Economy: An International Aspect. In 2023. p. 831–9.
- [15] Wang JC, Hsieh CY, Kung SH. The impact of smartphone use on learning effectiveness: A case study of primary school students. *Educ Inf Technol (Dordr)*. 2023 Jun 1;28(6):6287–320.
- [16] Casale S, Fioravanti G, Gioia F, Redditi E, Spada M. Fear of missing out and fear of not being up to date: investigating different pathways towards social and process problematic smartphone use. *Current Psychology*. 2023 Sep 5;42(26):22847–56.
- [17] Gezgin DM, Türk Kurtça T, Mihci C, Lin C, Griffiths MD. The role of self-regulated learning in modelling the relationships between learning approaches, FoMO, and smartphone addiction among university students. *British Journal of Educational Technology*. 2025 Feb 5;
- [18] Wang H, Hou X, Liu J, Zhou X, Jiang M, Liao J. Framework effect and achievement motivation on college students' online learning intention—based on technology acceptance model (TAM) and theory of planned behaviour (TPB) model. *Educ Inf Technol (Dordr)*. 2024 Dec 24;

- 
- [19] Meng X, Li Y. Technology-enabled subcultures among Chinese youths: smartphone addiction, virtual social capital, and ACGN addiction. *International Journal of Mobile Communications*. 2024;23(1):43–60.
- [20] Capilla Garrido E, Issa T, Gutiérrez Esteban P, Cubo Delgado S. A descriptive literature review of phubbing behaviors. *Heliyon*. 2021 May;7(5):1–10.
- [21] Sun J, Miller CH. Smartphone Attachment and Self-Regulation Mediate the Influence of Avoidant Attachment Style on Phubbing. *Hum Behav Emerg Technol*. 2023 Aug 29;2023:1–10.
- [22] Merkaš M, Bodrožić Selak M, Žulec Ivanković A. Problematic Smartphone Use and Communication in Families with Adolescents. *Adolescents*. 2024 Feb 7;4(1):107–19.
- [23] Milenkova V, Manov B, Peicheva D. Digitization and Society: Forms of Interaction and Expression. In 2023. p. 85–93.
- [24] Panciroli C, Russo V, Balzan F. Educating with Artificial Intelligence, Educating for Artificial Intelligence: Role, Impacts, and Possibilities in the Phygital Scenario. In 2024. p. 84–92.
- [25] Huang X, Hu N, Yao Z, Peng B. Family functioning and adolescent depression: A moderated mediation model of self-esteem and peer relationships. *Front Psychol*. 2022 Aug 9;13.
- [26] Joseph M, Walters L, Ashley M, Shaughnessy K. Talk about It, Don't Type about It: How In-Person and Technology-Mediated Sexual Self-Disclosure Relate to Sexual Satisfaction. *Sexes*. 2024 Jul 30;5(3):235–55.
- [27] Geertshuis S, Liu Q. An Exploration of the Relationships between Emotional Well-Being, Learning Behaviour, and Academic Success in Postgraduate Students Who Combine Work with Study. *Educ Sci (Basel)*. 2024 Aug 9;14(8):868.
- [28] Kohnke L, Foung D, Zou D. Microlearning: A new normal for flexible teacher professional development in online and blended learning. *Educ Inf Technol (Dordr)*. 2024 Mar 6;29(4):4457–80.
- [29] Seema R, Varik-Maasik E. Students' digital addiction and learning difficulties: shortcomings of surveys in inclusion. *Front Educ (Lausanne)*. 2023 Jul 13;8.
- [30] Wei Z. Navigating Digital Learning Landscapes: Unveiling the Interplay Between Learning Behaviors, Digital Literacy, and Educational Outcomes. *Journal of the Knowledge Economy*. 2023 Oct 7;15(3):10516–46.
- [31] Consoli T, Schmitz ML, Antonietti C, Gonon P, Cattaneo A, Petko D. Quality of technology integration matters: Positive associations with students' behavioral engagement and digital competencies for learning. *Educ Inf Technol (Dordr)*. 2025 Apr 29;30(6):7719–52.
- [32] Fonseca J, Borges-Tiago T. Digital Literacy Education and Cyberbullying Combat: Scope and Perspectives. In 2024. p. 157–64.
- [33] Martínez-Serrano M del C, Romero-García MA, García-Martínez I, Gavín-Chocano Ó. Inspection Digital Literacy for School Improvement. *Eur J Investig Health Psychol Educ*. 2023 Mar 29;13(4):701–14.
- [34] Fredrick SS, Coyle S, King J. Middle and high school teachers' perceptions of cyberbullying prevention and digital citizenship. *Psychol Sch*. 2023 Jun 19;60(6):1958–78.
- [35] de Vries P. The Ethical Dimension of Emerging Technologies in Engineering Education. *Educ Sci (Basel)*. 2022 Oct 27;12(11):754.