



Digital Device Usage Patterns, Social-Emotional Functioning, and Elementary Students' Learning Outcomes

Evidence from Indonesia

¹Andina Lucky Puspa Dini, ¹Kukuh Andri Aka*

Corresponding Author: *kukuh.andri@unpkediri.ac.id

¹University of Nusantara PGRI Kediri, Kediri, Indonesia

ARTICLE INFO

Article history

Received 04 April 2026

Revised 30 May 2026

Accepted 03 June 2026

ABSTRACT

Digital devices have become an integral part of primary school students' daily lives, while social-emotional functioning is increasingly recognized as an important factor in academic development. This study aimed to examine the relationship between digital device use patterns, social-emotional functioning, and academic achievement among fifth-grade primary school students. The study employed a quantitative cross-sectional correlational design involving 29 students selected through total sampling. Data were collected using two closed-ended Likert-scale questionnaires and students' summative academic scores. The digital device use questionnaire retained 17 valid items, while the social-emotional questionnaire retained 14 valid items. The data were analyzed using descriptive statistics, validity and reliability testing, Shapiro-Wilk normality, linearity testing, and simple as well as multiple regression analyses. The findings showed that digital device use patterns were significantly associated with academic achievement in the simple model ($p = 0.036$), and social-emotional functioning was also significantly associated with academic achievement ($p = 0.018$). However, when both predictors were tested simultaneously, the model did not reach statistical significance ($p = 0.056$). These findings indicate that digital device use and social-emotional functioning are each related to students' learning outcomes, although their combined contribution was not confirmed in the present model. The study highlights the importance of understanding digital device use contextually and strengthening students' social-

emotional functioning to support learning in primary education.

Keywords

Digital Device
Elementary School
Learning Outcomes
Social-Emotional
Usage Patterns

This is an open-access article under the [CC-BY-SA](#) lice.



Introduction

Digital devices have become part of the daily lives of elementary school children, whether for communication, entertainment, or accessing learning materials. In an educational context, the presence of these devices opens up broader learning opportunities, but the benefits are not automatic, as they are still influenced by the quality of access, environmental support, and user skills [1]. The relationship between screen time and educational outcomes is also seen as a complex issue, influenced by the type of activity, social inequality, and the quality of adult support [1],[2]. More recent evidence also suggests that children's digital experiences are shaped not only by screen duration but also by the broader digital ecosystem, including platform design, developmental appropriateness, and patterns of family mediation [3],[4].

International findings suggest that the relationship between digital device use and academic achievement is not straightforward. Large-scale international evidence also indicates that digital devices can support learning when used purposefully, but they may also distract students and weaken academic engagement when their use is poorly regulated [5],[6]. Previous research showed that aggregate screen media use is not consistently associated with academic achievement, but television viewing and video game playing more frequently exhibit negative associations [7]. In elementary school students, longitudinal studies also show that higher screen time tends to be associated with lower reading and math achievement, although the magnitude of the effect is small and depends on the type of use observed [8],[9].

Meanwhile, other research emphasized that the type of screen time can moderate outcomes, as educational use may be more positively related to educational outcomes than passive or recreational use [10]. Recent evidence further indicates that screen-use contexts, rather than total exposure alone, are important for understanding cognitive and psychosocial outcomes, and that higher early screen exposure may be linked with poorer later educational and peer-related outcomes [11],[12]. This supports the view that screen time should not be treated as a single uniform exposure, because its implications may differ across activity types, developmental stages, and outcome domains [13].

This relationship can be understood through several conceptual pathways. High digital device use can displace time for activities that support learning, such as sleep, focused study, and meaningful social interactions. Recreational digital activities have been associated with weaker self-regulation, whereas access to or use of portable screen devices near bedtime has been linked to poorer sleep quality [14],[15]. Related evidence on problematic smartphone use further suggests that less regulated patterns of device use are associated with poorer academic achievement, behavioral difficulties, and school functioning, reinforcing the need to distinguish purposeful digital use from problematic use [16],[17]. Screen exposure has also been linked to attention-related difficulties in children, while broader evidence suggests that cognitive and academic functioning is shaped by the combined pattern of sleep, movement, and sedentary behavior [18],[19]. Recent policy reviews also emphasize that the impact of screen time on educational outcomes is often indirect and mediated by self-regulation, parental scaffolding, and students' socioeconomic contexts [2]. This pathway is also consistent with evidence showing that parental technology use in children's presence may be associated with less favorable psychosocial and developmental outcomes, highlighting the importance of adult mediation [20].

On the other hand, social-emotional functioning has long been viewed as a relevant factor for academic success. Students who are better able to recognize emotions, manage their own responses, persist in the face of learning demands, and interact adaptively tend to demonstrate better academic engagement. This view is consistent with the social and emotional learning (SEL) framework, which links self-awareness, self-management, social awareness, relationship skills, and responsible decision-making to students' learning and development [21]. Meta-analytic evidence also shows that school-based SEL programs can improve students' social-emotional and academic outcomes [22]. Contemporary meta-analyses indicate that SEL interventions in schools are associated with improved academic achievement, although effect sizes are generally small to moderate [23],[24]. Longitudinal evidence also suggests that social-emotional competencies at the end of primary school can predict reading and numeracy achievement in later stages of education [25], while the OECD confirms that social and emotional skills are associated with broader academic success [26].

Digital device use and social-emotional functioning should not be positioned as two entirely separate domains. This position is consistent with broader reviews showing that associations between digital technology use and young people's well-being are often small, heterogeneous, and strongly dependent on how digital use is measured and contextualized [27],[28]. The relationship between screen use and social-emotional problems can be bidirectional, such that high screen use can be associated with later social-emotional problems, but social-emotional problems can also predict subsequent screen use [29]. Other meta-

analyses have shown that screen exposure is associated with lower social-emotional competence and higher problem behaviors, although the effects tend to be small and influenced by the type of screen exposure and age [30],[31]. This pattern suggests that relationships between variables need to be interpreted with caution, especially when studies use only cross-sectional data.

In Indonesia, this issue is increasingly relevant because children are growing up in a society with expanding internet access, while schools and families are still expected to ensure that digital technology supports learning rather than merely increasing exposure to screens [32]–[34]. In this context, a study of elementary school students in Indonesia can provide valuable contextual evidence. Variations in digital access, the quality of learning support, and students' experiences in using devices for both academic and non-academic purposes mean that the meaning of digital device use on learning outcomes may not be the same as in more established contexts [1]. Although previous correlational studies have examined the relationship between screen time or digital media exposure and academic achievement, many of these studies have treated digital use mainly as a general exposure variable. Less attention has been given to how elementary students' digital device usage patterns relate to learning outcomes when considered together with social-emotional functioning. This distinction is important because students' academic outcomes may be shaped not only by the amount of screen exposure, but also by the pattern and purpose of device use, self-regulation, family supervision, and social-emotional adjustment. Therefore, this study does not intend to claim a causal relationship, but rather to provide exploratory evidence regarding how digital device use patterns and social-emotional functioning relate to elementary school students' learning outcomes.

Based on this gap, this study aims to analyze the relationship between digital device usage patterns, social-emotional functioning, and the learning outcomes of fifth-grade elementary school students.

Materials and Methods

This study used a quantitative approach with a correlational cross-sectional design. The study was conducted with fifth-grade students at a public elementary school in Nganjuk Regency, involving the entire accessible population of 29 students. Therefore, the sampling technique used was total sampling.

Data were collected using two closed-ended questionnaires using a 1–5 Likert scale and documentation of students' summative scores. The first variable was measured using a questionnaire on digital device use patterns, originally consisting of 20 items; after item validity testing, 17 items were declared valid. The second variable was measured using a social-emotional function questionnaire, also consisting of 20 items, with 14 items declared

valid after validity testing. Learning outcomes were measured using students' summative scores obtained from school documentation.

Prior to use, both questionnaires were reviewed by experts to assess the appropriateness of the content and item clarity. Empirical validity was tested using item-total correlation, while internal reliability was calculated using Cronbach's alpha. The alpha coefficients obtained were 0.674 for the digital device usage questionnaire and 0.687 for the social-emotional questionnaire, thus the instruments' reliability was deemed adequate for an exploratory study.

Data analysis was conducted using SPSS 25 through descriptive statistics, validity tests, reliability tests, Shapiro–Wilk normality tests, linearity tests, and exploratory simple and multiple regressions. However, because the learning outcome scores were not normally distributed and the relationship between digital device usage patterns and learning outcomes did not fully meet the linearity assumption, the results of the parametric analysis were interpreted cautiously as exploratory relationships/associations, not as evidence of strong causal influence.

Results and Discussions

A. Feasibility of Research Instruments

A summary of the instrument test results is presented in Table 1. In general, both instruments have gone through an item selection process and demonstrated adequate internal consistency for exploratory studies, although their reliability is still at a moderate level.

Table 1. Summary of instrument test results

Variables	Initial Items	Valid Items	Discarded Items
Digital device usage patterns	20	17	3
Social-Emotional Functioning	20	14	6

The findings in Table 1 indicate that the digital device usage pattern and social-emotional function instruments are quite suitable for use as initial measurement tools, even though their psychometric quality is classified as moderate.

B. Description of learning outcomes and prerequisite analysis tests

Description of student learning outcomes is presented in Table 2. Students' summative scores are in a relatively narrow range, which needs to be noted because limited outcome variation can reduce the sensitivity of the relationship analysis.

Table 2. Description of student learning outcomes

N	Minimum	Maximum	Average	Median	Standard Deviation
29	83	91	87.79	88	2.04

The distribution of scores in Table 2 indicates that student academic achievement tends to be high with relatively little variation. This condition is noteworthy because a narrow score range can affect the sensitivity of the relationship analysis. Therefore, reading the results of the

inferential analysis should consider the possibility that a weak model does not simply indicate an absence of a relationship but may also be influenced by the limited variation in the learning outcome data.

The prerequisite tests for the analysis are summarized in Table 3. These results are important because they form the basis for determining how to read the parametric analysis used in the manuscript.

Table 3. Summary of normality and linearity tests

Variable/Pair	Type of test	Sig.	Interpretation
Digital device usage patterns	Shapiro–Wilk	0.770	Normal
Social-Emotional Functioning	Shapiro–Wilk	0.387	Normal
Learning outcomes	Shapiro–Wilk	0.014	Not normal
Digital device usage patterns – learning outcomes	Deviation from linearity	0.034	Not completely linear
Social-Emotional Functioning – learning outcomes	Deviation from linearity	0.468	Linear

Table 3 shows that learning outcome scores are not normally distributed, while the relationship between digital device usage patterns and learning outcomes also does not fully meet the linearity assumption. Therefore, the results of the parametric analysis should be interpreted cautiously as evidence of association rather than as a basis for drawing causal conclusions.

C. The relationship between digital device usage patterns and learning outcomes

A summary of the relationship analysis is presented in Table 4. In a simple analysis, the pattern of digital device usage showed a statistically significant relationship with learning outcomes.

Table 4. Summary of simple and simultaneous relationship analysis

Model	F	Sig.	Interpretation
Digital device usage patterns → learning outcomes	4,897	0.036	Significant in the simple model; interpreted as an exploratory association
Social-emotional function → learning outcomes	6,350	0.018	Significant in the simple model; interpreted as an exploratory association
Digital device usage patterns + Social-Emotional Functioning → learning outcomes	3,222	0.056	The simultaneous model is not significant

As shown in Table 4, digital device usage patterns were significantly associated with learning outcomes in a simple analysis ($p = 0.036$). However, the direction of the correlation coefficient cannot be definitively determined from the available summary output alone, so this result is more likely to be interpreted as a meaningful association rather than a definitive positive or negative relationship. This position aligns with international literature, which indicates that the academic meaning of screen use is not a single concept but is strongly influenced by the type of activity, the quality of use, and the context in which it is monitored [7]–[9]. This finding is theoretically plausible because the instrument used in this study

recorded not only duration but also patterns of digital device use, which may blend educational activities, entertainment, daily routines, and indications of less controlled use. Evidence from primary school students also suggests that smartphone use may influence learning effectiveness differently depending on students' usage behavior, reinforcing the importance of examining digital device use as a pattern rather than as screen exposure alone [35]. Previous research has shown that the type of screen time can moderate educational outcomes; educational use may have different implications than passive or recreational use [10]. Furthermore, the relationship between digital devices and learning outcomes is often explained through indirect mechanisms such as weakened self-regulation, reduced focused study time, disrupted sleep, and the quality of parental support [2],[14],[15]. Therefore, the results of this study are stronger when understood as a reflection of the ecology of students' digital device use rather than as evidence that digital devices are always harmful or always beneficial.

D. The relationship between Social-Emotional Functioning and learning outcomes

In the same simple analysis, social-emotional functioning also showed a significant relationship with learning outcomes ($p = 0.018$). Unlike the pairing of digital device usage patterns and learning outcomes, the relationship between social-emotional functioning and learning outcomes still met the assumption of linearity, making this finding relatively more statistically stable within the available data framework.

Theoretically, these results align with a more consistent international research landscape that positions social-emotional aspects as a relevant factor for academic success. Longer-term evidence also indicates that school-based SEL interventions can produce sustained benefits for students' development, suggesting that social-emotional functioning should be understood as part of a broader developmental foundation for learning [36]. Meta-analyses indicate that social and emotional learning (SEL) interventions in schools are associated with improved academic achievement, although the effect sizes are generally small to moderate [23],[24]. Longitudinal evidence also suggests that social-emotional competencies at the end of primary school can predict reading and numeracy achievement at later stages of education [25], and OECD findings confirm that social and emotional skills are associated with higher educational aspirations, learning engagement, and well-being [26]. Thus, these research findings provide initial support that students' social-emotional well-being is related to their learning performance in primary school.

However, these results should still be interpreted in a balanced manner. These findings indicate that students' social-emotional functioning is related to learning outcomes in the context of the sample studied, while also providing initial support for the importance of social-emotional aspects in elementary school students' academic performance.

E. Simultaneous model and implications of findings

The findings in Table 4 indicate that when digital device use patterns and social-emotional functioning were tested together, the combined model did not reach statistical significance ($p = 0.056$), suggesting that their joint relationship with learning outcomes is not simple and may involve additional factors beyond this model. This finding indicates that the relationship between the variables is more complex and likely involves factors beyond this research model.

These findings align with international literature showing that the relationship between screen use and academic and socioemotional outcomes tends to be complex and not always substantial, and is strongly influenced by the type of activity, context of use, and other contributing factors [29]–[31]. Potentially beneficial digital use may include guided activities for accessing learning materials, reading digital texts, completing teacher-assigned exercises, watching instructional videos with clear learning purposes, practicing academic skills through educational applications, and communicating with teachers or peers for learning-related tasks. In contrast, unstructured recreational use, excessive gaming, passive video consumption, multitasking during study, and device use close to bedtime may be less supportive of learning because they can reduce focused study time, weaken self-regulation, and interfere with rest.

From a practical perspective, the findings of this study point to the need for a more nuanced approach in elementary education. School and family attention to digital device use should not stop at limiting duration, but should also encompass the quality of activities, usage time, the context of support, and students' self-regulation skills. Furthermore, the findings regarding Social-Emotional Functioning emphasize that support for emotional management, social relationships, and self-control needs to be integrated into efforts to improve learning outcomes. Thus, the results of this study indicate that digital device use patterns and Social-Emotional Functioning are each related to learning outcomes in simple analyses, but do not form a significant combined model when tested together. Therefore, these findings provide a relevant initial overview of the relationship between digital device use patterns, Social-Emotional Functioning, and elementary school student learning outcomes in the Indonesian context.

Conclusion

This study shows that digital device usage patterns and Social-Emotional Functioning each have a significant relationship with student learning outcomes in a simple analysis. This finding confirms that digital device usage needs to be understood contextually, while Social-Emotional Functioning need to be positioned as a relevant aspect in elementary school students' learning outcomes. However, when both variables were tested together, the simultaneous model did not reach statistical significance. Overall, this study provides a relevant initial picture that digital device usage patterns and Social-Emotional Functioning are

related to elementary school students' learning outcomes, although their joint contribution still requires further testing.

However, this study is limited by its small single-school sample, cross-sectional correlational design, reliance on self-report questionnaires, and limited variation in students' learning outcome scores. Future studies should involve larger and more diverse samples, examine specific types and purposes of digital device use, and apply longitudinal or mixed-method designs to better explain these relationships.

Conflict of Interest

The authors declare no conflict of interest.

References

- [1] UNICEF, "Digital learning landscape in Indonesia: A situational analysis on digital learning." 2021. [Online]. Available: <https://www.unicef.org/indonesia/media/8766/file/DigitalLearningLandscapeinIndonesia.pdf>
- [2] K. Nett, "Screen time and educational outcomes of children and adolescents: A complex, multifaceted relationship." Luxembourg, 2025. https://education-socioeconomic-experts.ec.europa.eu/publications/ad-hoc-reports-and-other-publications/screen-time-and-educational-outcomes-children-and-adolescents-complex-multifaceted-relationship_en.
- [3] T. Munzer *et al.*, "Digital ecosystems, children, and adolescents: Policy statement," *Pediatrics*, vol. 157, no. 2, e2025075320, Feb. 2026, doi: 10.1542/peds.2025-075320.
- [4] S. Teague *et al.*, "Digital media use and child health and development," *JAMA Pediatr.*, vol. 180, no. 5, pp. 510-517, Mar. 2026, doi: 10.1001/jamapediatrics.2026.0085.
- [5] OECD, "Students, digital devices and success," 2024. [Online]. Available: https://www.oecd.org/en/publications/students-digital-devices-and-success_9e4c0624-en.html
- [6] OECD, "PISA 2022 results (volume II) learning during – and from – disruption," 2022. [Online]. Available: https://www.oecd.org/en/publications/pisa-2022-results-volume-ii_a97db61c-en.html
- [7] M. Adelantado-Renau, D. Moliner-Urdiales, I. Cavero-Redondo, M. R. Beltran-Valls, V. Martínez-Vizcaíno, and C. Álvarez-Bueno, "Association between screen media use and academic performance among children and adolescents," *JAMA Pediatr.*, vol. 173, no. 11, pp. 1058-1067, Nov. 2019, doi: 10.1001/jamapediatrics.2019.3176.
- [8] X. Li *et al.*, "Screen time and standardized academic achievement tests in elementary school," *JAMA Netw. Open*, vol. 8, no. 10, e2537092, Oct. 2025, doi: 10.1001/jamanetworkopen.2025.37092.
- [9] L. K. Mundy *et al.*, "Electronic media use and academic performance in late childhood: A longitudinal study," *PLoS One*, vol. 15, no. 9, e0237908, Sep. 2020, doi: 10.1371/journal.pone.0237908.
- [10] T. Sanders, P. D. Parker, B. del Pozo-Cruz, M. Noetel, and C. Lonsdale, "Type of screen time moderates effects on outcomes in 4013 children: Evidence from the longitudinal study of Australian children," *Int. J. Behav. Nutr. Phys. Act.*, vol. 16, no. 1, e 117, Dec. 2019, doi: 10.1186/s12966-019-0881-7.
- [11] M. Gath, L. J. Horwood, G. Gillon, B. McNeill, and L. J. Woodward, "Longitudinal associations between screen time and children's language, early educational skills, and peer social functioning," *Dev. Psychol.*, vol. 62, no. 3, pp. 638–652, Mar. 2026, doi: 10.1037/dev0001907.
- [12] S. Mallawaarachchi *et al.*, "Early childhood screen use contexts and cognitive and psychosocial outcomes," *JAMA Pediatr.*, vol. 178, no. 10, pp. 1017-1026, Oct. 2024, doi: 10.1001/jamapediatrics.2024.2620.
- [13] N. Stiglic and R. M. Viner, "Effects of screentime on the health and well-being of children and adolescents: A systematic review of reviews," *BMJ Open*, vol. 9, no. 1, e023191, 2019, doi: 10.1136/bmjopen-2018-023191.
- [14] S. J. Howard *et al.*, "A meta-analysis of self-regulation and digital recreation from birth to

- adolescence," *Comput. Human Behav.*, vol. 163, e108472, Feb. 2025, doi: 10.1016/j.chb.2024.108472.
- [15] B. Carter, P. Rees, L. Hale, D. Bhattacharjee, and M. S. Paradkar, "Association between portable screen-based media device access or use and sleep outcomes," *JAMA Pediatr.*, vol. 170, no. 12, pp. 1202-1208, Dec. 2016, doi: 10.1001/jamapediatrics.2016.2341.
- [16] T. Kliesener, C. Meigen, W. Kiess, and T. Poulain, "Associations between problematic smartphone use and behavioural difficulties, quality of life, and school performance among children and adolescents," *BMC Psychiatry*, vol. 22, no. 1, e195, Dec. 2022, doi: 10.1186/s12888-022-03815-4.
- [17] A. Paterna, M. Alcaraz-Ibáñez, J. M. Aguilar-Parra, C. Salavera, Z. Demetrovics, and M. D. Griffiths, "Problematic smartphone use and academic achievement: A systematic review and meta-analysis," *J. Behav. Addict.*, vol. 13, no. 2, pp. 313-326, Jun. 2024, doi: 10.1556/2006.2024.00014.
- [18] R. M. S. Santos, C. G. Mendes, D. M. Miranda, and M. A. Romano-Silva, "The association between screen time and attention in children: A systematic review," *Dev. Neuropsychol.*, vol. 47, no. 4, pp. 175-192, May 2022, doi: 10.1080/87565641.2022.2064863.
- [19] R. Bao *et al.*, "Is adherence to the 24-h movement guidelines associated with greater academic-related outcomes in children and adolescents? A systematic review and meta-analysis," *Eur. J. Pediatr.*, vol. 183, no. 5, pp. 2003-2014, Feb. 2024, doi: 10.1007/s00431-024-05461-2.
- [20] M. Toledo-Vargas, K. H. Chong, C. I. Maddren, S. J. Howard, B. Wakefield, and A. D. Okely, "Parental technology use in a child's presence and health and development in the early years: A systematic review and meta-analysis," *JAMA Pediatr.*, vol. 179, no. 7, pp. 730-737, Jul. 2025, doi: 10.1001/jamapediatrics.2025.0682.
- [21] CASEL, "What is the CASEL framework? A framework creates a foundation for applying evidence-based SEL strategies to your community," CASEL. [Online]. Available: <https://casel.org/fundamentals-of-sel/what-is-the-casel-framework>
- [22] J. A. Durlak, R. P. Weissberg, A. B. Dymnicki, R. D. Taylor, and K. B. Schellinger, "The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions," *Child Dev.*, vol. 82, no. 1, pp. 405-432, Jan. 2011, doi: 10.1111/j.1467-8624.2010.01564.x.
- [23] C. Cipriano *et al.*, "The state of evidence for social and emotional learning: A contemporary meta-analysis of universal school-based SEL interventions," *Child Dev.*, vol. 94, no. 5, pp. 1181-1204, Sep. 2023, doi: 10.1111/cdev.13968.
- [24] C. Ha, M. F. McCarthy, M. J. Strambler, and C. Cipriano, "Disentangling the effects of social and emotional learning programs on student academic achievement across grades 1-12: A systematic review and meta-analysis," *Rev. Educ. Res.*, e00346543251367769, Oct. 2025, doi: 10.3102/00346543251367769.
- [25] E. J. Carpendale *et al.*, "Promoting effective transitions: Primary school social-emotional competencies predict secondary school reading and numeracy achievement," *Br. J. Educ. Psychol.*, vol. 95, no. 2, pp. 496-512, Jun. 2025, doi: 10.1111/bjep.12735.
- [26] OECD, *Social and emotional skills for better lives findings from the OECD survey on social and emotional skills 2023*. Paris: OECD Publishing, 2024. doi: 10.1787/35ca7b7c-en.
- [27] A. Orben and A. K. Przybylski, "The association between adolescent well-being and digital technology use," *Nat. Hum. Behav.*, vol. 3, no. 2, pp. 173-182, Jan. 2019, doi: 10.1038/s41562-018-0506-1.
- [28] C. L. Odgers and M. R. Jensen, "Annual research review: Adolescent mental health in the digital age: Facts, fears, and future directions," *J. Child Psychol. Psychiatry*, vol. 61, no. 3, pp. 336-348, Mar. 2020, doi: 10.1111/jcpp.13190.
- [29] R. P. Vasconcellos *et al.*, "Electronic screen use and children's socioemotional problems: A systematic review and meta-analysis of longitudinal studies," *Psychol. Bull.*, vol. 151, no. 5, pp. 513-543, May 2025, doi: 10.1037/bul0000468.
- [30] R. Eirich, B. A. McArthur, C. Anhorn, C. McGuinness, D. A. Christakis, and S. Madigan, "Association of screen time with internalizing and externalizing behavior problems in children 12 years or younger," *JAMA Psychiatry*, vol. 79, no. 5, pp. 393-405, May 2022, doi: 10.1001/jamapsychiatry.2022.0155.
- [31] W. Jia, X. Deng, and H. Zeng, "The association between screen exposure and social-emotional development in children and adolescents: A meta-analysis," *Acta Psychol. (Amst.)*, vol. 261, e105818, Nov. 2025, doi: 10.1016/j.actpsy.2025.105818.
- [32] UNESCO, "Technology in education," 2023. [Online]. Available: <https://www.unesco.org/gem-report/en/publication/technology>
- [33] APJII, "Profil internet Indonesia 2026 (Indonesia internet profil 2026)," 2026. [Online]. Available:

- <https://survei.apjii.or.id/survei/group/12>
- [34] BPS, *Statistik telekomunikasi Indonesia 2024 (Indonesian telecommunications statistics)*. Badan Pusat Statistik, 2025. [Online]. Available: <https://www.bps.go.id/id/publication/2025/08/29/beaa2be400eda6ce6c636ef8/statistik-telekomunikasi-indonesia-2024>
- [35] J. C. Wang, C.-Y. Hsieh, and S.-H. Kung, "The impact of smartphone use on learning effectiveness: A case study of primary school students," *Educ. Inf. Technol.*, vol. 28, no. 6, pp. 6287–6320, Jun. 2023, doi: 10.1007/s10639-022-11430-9.
- [36] R. D. Taylor, E. Oberle, J. A. Durlak, and R. P. Weissberg, "Promoting Positive Youth Development Through School-Based Social and Emotional Learning Interventions: A Meta-Analysis of Follow-Up Effects," *Child Dev.*, vol. 88, no. 4, pp. 1156–1171, 2017, doi: 10.1111/cdev.12864.

Authors



Andina Lucky Puspa Dini is an elementary school teacher, having graduated with a bachelor's degree in elementary education from the University of Nusantara PGRI Kediri, Indonesia. Her current interests lie in child psychology in elementary school. (email: andinna682@gmail.com).



Kukuh Andri Aka     is a lecturer at the University of Nusantara PGRI Kediri, Indonesia. His academic focus includes technology in learning, elementary education, and interdisciplinary approaches to teaching and curriculum development. He is actively involved in research that bridges pedagogical theory and classroom practice, particularly in the context of foundational education. He has published several works indexed in Scopus and is committed to advancing innovative and holistic approaches in elementary teacher education. (email: kukuh.andri@unpkediri.ac.id).