



## RESEARCH

# The Impact of Gadget Use on Learning Concentration among Secondary School Students in Indonesia: A Thematic Analysis of Multi-Perspective Interviews

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### Abstract

Widespread gadget use among students raises concerns about declining learning concentration, yet most prior research relies on single-perspective survey designs that capture only one stakeholder group at a time. This study maps thematic patterns in the impact of gadget use on students' learning concentration and the management strategies proposed by teachers, students, parents, and educational psychologists. A descriptive qualitative design with thematic analysis was applied to one structured interview transcript involving four substantive informants. Data were collected through document acquisition, segmentation, and staged coding, then analyzed following six phases of thematic analysis to identify patterns and assess convergence across informants. The analysis identified four negative impact patterns consistently corroborated across informants: declining attention span, digital addiction and procrastination, sleep disturbance, and reduced social interaction. It also identified five management strategies targeting teachers, parents, and students, with adult role modeling emerging as the most consistent theme. Source triangulation showed strong convergence across roles. The novelty of this study lies in extending the self-regulation framework by showing that failure to regulate digital distraction is an ecosystemic phenomenon rather than merely an individual issue. Its originality lies in the analytic approach itself: rather than separate single-perspective surveys, this study triangulates four stakeholder perspectives within a single dialogic interview event, a design rarely used in this research area. Practically and methodologically, the study offers evidence that effective intervention requires cross-actor collaboration rather than unilateral policy, and demonstrates a replicable procedure for multi-perspective source triangulation in future research on gadget use and learning concentration.

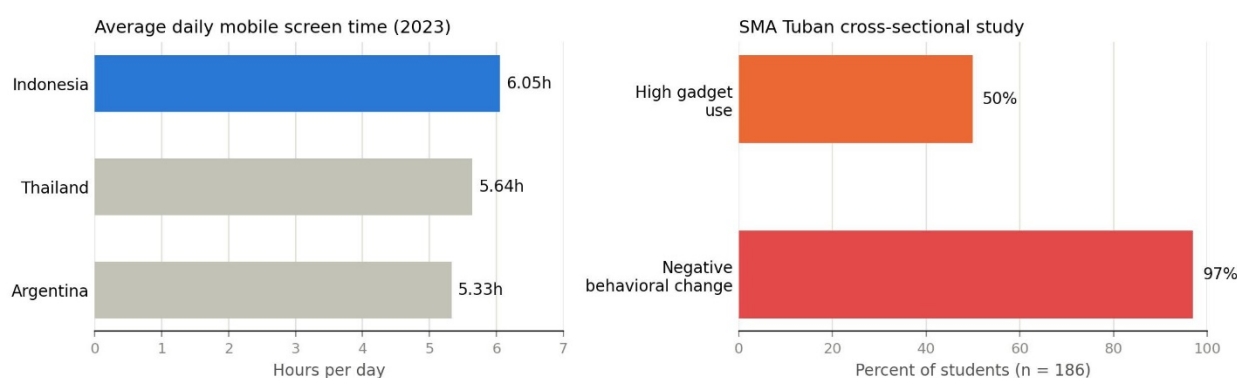
**Keywords** gadget use; learning concentration; thematic analysis; source triangulation; self-regulation; digital education

## INTRODUCTION

Digital transformation has fundamentally changed how younger generations learn. Smartphones are no longer merely communication tools. They have become multifunctional devices woven into nearly every aspect of students' daily activity, including the learning process itself (Ibragimov et al., 2023; Nikolopoulou, 2022). On one hand, integrating gadgets into learning opens access to more flexible and interactive learning resources (Ibragimov et al., 2023; Petrucco & Agostini, 2023). On the other hand, unmanaged dependence on these devices raises a more fundamental concern, a decline in students' capacity to sustain focus during learning (Martin et al., 2025).

This concern is not merely a normative perception held by parents or teachers. Several meta-analyses and large-scale studies over the past five years consistently show that smartphone use intensity correlates negatively with academic performance, although effect sizes vary depending on study design and measurement approach (Kuş, 2025; Sunday et al., 2021; Wedikandage & Zahir, 2024). In the cognitive-behavioral domain, excessive gadget use is closely linked to *nomophobia* and academic procrastination. Students who experience anxiety when separated from their phones tend to delay tasks and show reduced productivity (Al-Saliti et al., 2026; Fentaw et al., 2022; González-Brignardello et al., 2023). This pattern has also been confirmed among advanced-level student populations, where procrastination functions as a mediating variable between nomophobia and attentional disruption (Berdida & Grande, 2023; Karagöz & Çınar Özbay, 2025; Khan, 2025). At the physiological level, late-night screen exposure has been shown to disrupt adolescents' sleep quality and result in cognitive fatigue in class the following day (Al Ali & Abu-Libdha, 2025; Moavero et al., 2023; Mohd Saat et al., 2024). Even at the broader school-population level, screen duration is associated with daytime sleepiness and academic failure (Aryal et al., 2025; Pérez-Chada et al., 2023). Meanwhile, parental mediation and digital literacy are believed to buffer online risks, although their effectiveness in strengthening children's self-control remains inconsistent across studies (Gong & Popescu, 2025).

Within the Indonesian context, similar findings recur across educational levels. alongside national-level statistics that illustrate the scale of the issue. Internet penetration in Indonesia reached 79.5%, equivalent to roughly 221.5 million users, by early 2024, with Generation Z (ages 12–27) accounting for the largest share of users at 34.4% (Arif & Umum APJII Arfizar Zulkarnaen, n.d.). Gadget penetration among the 12–18 age group was even higher, reaching 87.02% during the same survey period (Arif & Umum APJII Arfizar Zulkarnaen, n.d.). Indonesian users also recorded the world's longest average daily mobile screen time, at 6.05 hours per day in 2023, ahead of Thailand (5.64 hours) and Argentina (5.33 hours). At the school level, a cross-sectional study of 186 senior high school students in Tuban found that 50% fell into the high gadget-use category and 97% showed negative behavioral change, illustrating how this national-level exposure is reflected in classroom-level outcomes (Putri et al., 2025).



**Figure 1. Gadget Use Among Indonesia Students**

Uncontrolled gadget use has been reported to reduce concentration and academic achievement among both senior and junior high school students (Adelia et al., 2021; Sistavin Lamanila et al., 2022;

Susanti et al., n.d.), to affect the emotional and cognitive development of elementary school students (Afidah et al., 2022), and to reshape children's social behavior patterns in the digital era (Andriyani et al., n.d.; Anugrah et al., 2023; Davani, n.d.; Misirli et al., 2025; Putri Lestari & Hasjiandito, 2025). Parallel to this trend, several states in the United States have begun adopting policies restricting phone use in classrooms in response to teachers' complaints that phone-related distraction is a major obstacle to learning. This indicates that the issue is not a local phenomenon but a global educational challenge that cuts across cultural contexts.

**Table 1. Mapping of Recent Literature Themes (2021–2025) on Gadgets and Learning Concentration**

| Theme                                              | Key Findings                                                                         | Representative Sources                                            |
|----------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Usage intensity &amp; academic performance</b>  | Consistent yet heterogeneous negative correlation across studies                     | Sunday et al. (2021); Agostini & Petrucco (2023)                  |
| <b>Nomophobia &amp; procrastination</b>            | Procrastination serves as a mediating pathway between nomophobia and declining focus | Fentaw et al. (2022); Berdida & Grande (2023)                     |
| <b>Screen time &amp; sleep quality</b>             | Late-night screen use → disrupted sleep → cognitive fatigue in class                 | Al Ali & Abu-Libdha (2025); Pérez-Chada et al. (2023)             |
| <b>Parental mediation &amp; digital literacy</b>   | Effects on children's self-control remain inconsistent                               | Fam et al. (2023); Purnama et al. (2021)                          |
| <b>Indonesian context (elementary–senior high)</b> | Similar patterns across levels; predominantly survey-regression methods              | Susanti et al. (2024); Adelia et al. (2021); Afidah et al. (2022) |

A critical review of these five clusters reveals a prominent methodological pattern: most studies use cross-sectional survey-quantitative designs that measure "concentration" or "academic achievement" as proxies through scores, intensity questionnaires, or report-card grades (Amez & Baert, 2020; Sistavin Lamanila et al., 2022; Sunday et al., 2021). This approach is robust in confirming the *direction* of the relationship but limited in explaining the underlying *mechanisms* and *cross-actor experiences*. It does not clarify how teachers, students, parents, and educational psychologists interpret and respond to the same issue within a single dialogic space. Existing studies also tend to adopt a single vantage point, focusing on students alone or parents alone, so that triangulation of perceptions across actors within one communicative event is rarely documented explicitly. This is the gap this study seeks to address. This gap could in principle be addressed either by conducting separate interviews with multiple informants per role or by analyzing multiple perspectives captured within a single dialogic event, as this study does. The latter approach was chosen deliberately: because all four informants responded to the same questions within the same interview context, variation in their accounts is more directly attributable to differences in role and lived experience rather than to differences in interview setting, timing, or interviewer effects across separate sessions. Rather than adding another correlational finding, it aims to map thematically how four different viewpoints mutually confirm and complement one another in explaining declining learning concentration due to gadget use within the same interview session.

Theoretically, this pattern of findings aligns with the self-regulation framework in learning: digital distraction is assumed to constrain students' capacity for attentional control over goal-directed tasks (Hrbackova et al., 2025), while external factors, such as time rules, parental or teacher modeling, and learning-environment design, function as external buffers against these self-regulation limitations. Building on this framework, the study proposes that negative impact patterns will emerge more consistently in themes directly related to attentional control and time management, namely focus, procrastination, and sleep, than in themes related to social interaction, because the literature points to a more direct causal mechanism along the former pathway.

Based on this gap, the study aims to: (1) identify and describe the thematic patterns in the impact of gadget use on learning concentration as understood by four different informant groups; (2) map the degree of convergence, or triangulation, of findings across informants for each emerging theme; and

(3) formulate gadget-management strategies proposed across actors as a basis for practical recommendations. These three objectives are specific and qualitatively measurable through the number of themes and the level of cross-informant confirmation identified. They are achievable through thematic analysis of the available transcript, relevant to the methodological gap described above, and bounded by a single interview corpus as the sole unit of analysis.

## CONCEPTUAL FRAMEWORK

This study is guided by a conceptual framework that positions gadget use as an antecedent condition affecting learning concentration through the mediating construct of self-regulation (Howard et al., 2025). Unmanaged smartphone access during study time functions as a form of digital distraction, and it competes with academic tasks for a student's limited attentional resources. When self-regulation capacity cannot sustain attentional control, learning concentration is likely to decline. However, this internal mechanism does not operate in isolation. Four external actors, namely students, teachers, parents, and educational psychologists, engage with this mechanism from distinct vantage points and offer different forms of regulatory support. Teachers structure the classroom environment and enforce device-use rules, while parents model behavior and mediate gadget access outside school hours. Educational psychologists, in turn, interpret the developmental and clinical dimensions of digital addiction and procrastination. The framework therefore treats self-regulation failure as an ecosystemic phenomenon, not an isolated individual deficit, shaped jointly by the student and surrounding adult actors. Consequently, effective management strategies are expected to emerge at the intersection of these four perspectives rather than from any single actor working alone. This conceptual framework subsequently guides the thematic analysis. It structures how impact patterns and management strategies are identified, compared, and triangulated across informants in the Results and Discussion section.

## RESEARCH METHODS

This study uses a descriptive qualitative design with a thematic analysis approach applied to structured interview transcript data. This design was chosen because the research aims to understand in depth how various educational stakeholders interpret and respond to the phenomenon of declining learning concentration due to gadget use within a single communicative event. Thematic analysis was selected for its flexibility in identifying patterns of meaning across data sources without being rigidly bound to a single theoretical framework, while also enabling source triangulation when data originate from multiple informants holding different roles within one corpus.

It is important to clarify the sense in which "triangulation" is used in this study. Unlike triangulation across independent data sources or methods, the triangulation here operates across roles and perspectives captured within a single dialogic event. This form of triangulation is weaker than fully independent source triangulation, since all informants responded within the same interview context and were exposed to the same interviewer prompts. However, it offers a distinct methodological advantage: because all four perspectives emerged under identical contextual conditions, differences and convergences in their accounts are more plausibly attributable to genuine differences in role and experience rather than to variation in interview setting, timing, or interviewer approach.

This research was conducted through a structured interview session held in the context of a senior high school setting in Indonesia. The interview took place in an off-classroom setting to allow for open, in-depth dialogue among the four substantive informants and the moderator, without the constraints of a formal classroom environment.

The primary data for this study come from a single structured interview transcript involving five speakers. Participants were included in the unit of analysis using purposive sampling with a maximum variation sampling approach. That is, informants were deliberately selected to represent different roles within the educational ecosystem in order to capture diverse viewpoints on the same

phenomenon. The inclusion criteria were direct involvement with the topic of learning concentration and gadget use, representation of a role distinct from other informants, and the presence of substantive statements in the core segment of the transcript. Exclusion criteria applied to the interviewer or moderator, whose role was to facilitate the dialogue and who was therefore not treated as a substantive data source in the thematic analysis, as summarized in Table 2.

**Table 2. Inclusion Criteria for Informants in the Unit of Analysis**

| <b>Data obtained</b>                                                                                            | <b>Informant</b> | <b>Role/Position</b>       | <b>Basis for Inclusion in the Unit of Analysis</b>                                                                       |
|-----------------------------------------------------------------------------------------------------------------|------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Classroom-level observations of student concentration and in-class gadget-management practices</b>           | RW               | Senior High School Teacher | Represents the perspective of the educational institution and direct classroom observation                               |
| <b>First-person accounts of concentration difficulties, procrastination, and personal coping strategies</b>     | AF               | Grade 11 Student           | Represents the perspective of the subject directly experiencing the phenomenon                                           |
| <b>Home-based supervision practices and behavioral observations outside the school environment</b>              | DP               | Parent of a Student        | Represents the perspective of the family environment outside school                                                      |
| <b>Theoretical and clinical interpretation of digital addiction, nomophobia, and self-regulation mechanisms</b> | MK               | Educational Psychologist   | Represents a theoretical-clinical perspective as a counterpoint to the three practical perspectives above                |
| <b>Not applicable; role limited to facilitating dialogue rather than providing substantive data</b>             | DS               | Interviewer/Moderator      | Excluded from the informant unit of analysis; served to facilitate the dialogue rather than as a substantive data source |

The size of the data corpus in this study is one interview transcript with four substantive informants. The conceptual equivalent in qualitative research is the principle of information power and data saturation: data sufficiency is judged by the depth and diversity of perspectives it contains. Four distinct informant roles within a single dialogic event provided an adequate level of information power for this study's aims of thematic mapping and cross-role triangulation.

The primary instrument in this qualitative study was the researcher, functioning as a human instrument, supported by a codebook developed through a deductive-inductive process. Initial categories were structured around the research questions and subsequently revised inductively as patterns emerged from the data.

The trustworthiness of this study was assessed using Lincoln and Guba's (1985) four criteria for qualitative rigor. Credibility was strengthened through source triangulation, cross-checking thematic patterns across the four informant roles to confirm that findings were not artifacts of a single perspective. Transferability was supported by providing thick description of informant roles, context, and illustrative quotations, allowing readers to judge the applicability of the findings to comparable settings. Dependability was maintained through a structured, staged coding procedure documented in a codebook, enabling an audit trail of how codes evolved from initial descriptive labels to final thematic categories. Confirmability was addressed by grounding every theme in direct informant statements and by having the researcher reflexively distinguish between informants' narrative accounts and the researcher's own interpretive commentary throughout the analysis.

The data collection procedure was organized into stages to allow replication by other researchers working with similar transcript data. The first stage was document acquisition, namely obtaining the complete interview transcript and verifying its completeness, covering five segments and five speakers. The second stage was recording informant characteristics, namely documenting each speaker's role, position, and segment of contribution in a characteristics table to establish analytical context. The third stage was segmentation, namely dividing the transcript into units of meaning following the original segment structure of the text. The fourth stage was familiarization, namely reading the entire transcript repeatedly, at least twice, to build a holistic understanding before line-by-line coding began.

The fifth stage was open coding, namely assigning each unit of meaning an initial descriptive code representing the content of the statement. The sixth stage was grouping codes into provisional thematic categories based on similarity of meaning. The seventh stage was cross-informant theme review, namely comparing thematic categories across roles to assess patterns of convergence and divergence, which formed the basis for source triangulation in the Results section. The final stage was finalization, namely naming and operationally defining the final themes and selecting the most representative illustrative quotations for each.

Data analysis followed the six phases of thematic analysis proposed by Braun and Clarke (2006): data familiarization, initial code generation, theme searching, theme review, theme definition and naming, and report production. Coding was conducted manually using a structured spreadsheet worksheet. At the familiarization stage, the researcher processed the complete interview transcript, comprising five segments and five speakers. Repeated readings built a holistic understanding of the data before line-by-line coding began. At the initial code generation stage, the researcher processed discrete units of meaning drawn from the four substantive informants' statements. Each unit received a descriptive code, recorded systematically in the spreadsheet worksheet. At the theme-searching stage, the researcher processed the resulting set of descriptive codes. Codes sharing similar meaning were grouped into provisional thematic categories. At the theme-review stage, the researcher processed these provisional categories by comparing them across the four informant roles. This comparison revealed patterns of convergence and divergence, which later informed source triangulation in the Results section. At the theme-definition-and-naming stage, the researcher processed the reviewed categories into final themes. Each theme received an operational definition and the most representative illustrative quotations from the transcript. Finally, at the report-production stage, the researcher processed the finalized themes, supporting quotations, and cross-informant triangulation patterns. These elements were synthesized into a coherent narrative addressing the study's research questions.

## RESULTS AND DISCUSSION

### Research Results

This section presents the results of the thematic analysis of an interactive interview transcript on "The Impact of Gadget Use on Students' Learning Concentration." The primary data consist of one structured interview session involving four substantive informants holding different positions within the educational ecosystem, guided by a single interviewer. In response to the question of how the decline in learning concentration is perceived by parties in direct contact with students, the teacher, as the informant closest to daily learning activities, stated that this issue is not merely a concern but has already been consistently observed in the field. As RW, a senior high school teacher, explained, *"this phenomenon is not merely a concern shared by parents or teachers; it has already been demonstrated through daily observation. In this all-digital era, students' capacity to focus has become quite rare."* This statement served as a starting point for the subsequent findings, and it also indicated that classroom observation, not merely opinion, underlies the claim that a concentration problem exists.

To avoid presenting one-sided results, positive findings regarding the role of gadgets are presented alongside the negative findings. The teacher informant affirmed that gadgets still make a genuine

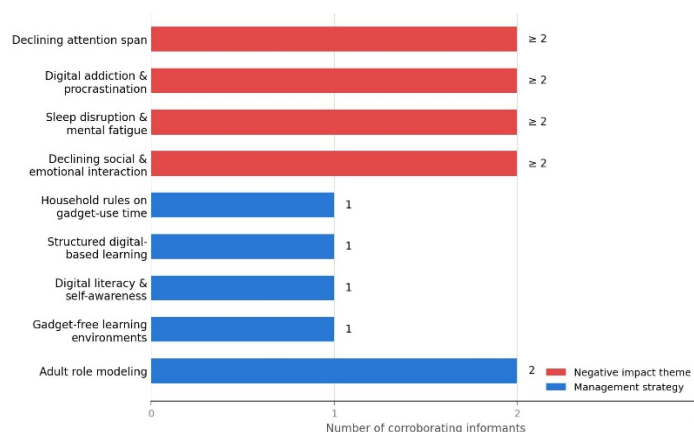
contribution to the learning process when used appropriately, stating that *"gadgets have many benefits in supporting the learning process. Various educational applications, learning videos, and e-learning platforms allow students to learn in a more interactive and engaging way."* This finding is important to note because it indicates that the problems identified in subsequent findings do not lie in the device itself but in the pattern of its use, a nuance that becomes relevant when management strategies are discussed toward the end of this section.

Four negative impact patterns emerged consistently across the four informants, each corroborated from more than one perspective. The first pattern concerns declining focus and attention span, which, according to MK, the educational psychologist, occurs because *"excessive gadget use trains the brain to shift rapidly from one thing to another. As a result, students find it difficult to sustain concentration while studying or reading."* The second pattern is digital addiction and academic procrastination, reflected in the direct experience of one student, AF, who admitted that *"sometimes assignments pile up because I got absorbed in playing games first."* This student statement is consistent with the broader clinical literature on nomophobia and task delay (Tülübaşı et al., 2023), indicating alignment between the student's subjective experience and established psychological explanations of digital dependency.

The third pattern concerns sleep disruption and mental fatigue, observed directly by the teacher in class: *"I have also often found students dozing off in class. After asking, it turned out they had been using their gadget all night."* The fourth pattern is declining social and emotional interaction, which, according to the parent informant, DP, is evident in changes in the child's behavior at home: *"at home, my child now spends more time alone holding a phone, rather than talking or spending time with the family."*

In response to the research question on solutions, five management strategies were identified from the teacher, parent, and psychologist informants, each targeting a different actor: establishing household rules on gadget-use time, proposed by parents; adopting structured digital-based learning methods, from the school's side; strengthening students' digital literacy and self-awareness; building gadget-free learning environments at school; and modeling responsible daily gadget use among parents and teachers. Regarding this last strategy, the educational psychologist emphasized that *"children imitate what they see. If parents and teachers use gadgets wisely, students will learn to do the same."* This point was reinforced by a spontaneous reflection from the parent informant, who acknowledged that *"sometimes we as parents also need to reflect, so that we are not the ones absorbed in our phones while telling our children not to use theirs."* The alignment between the psychologist's proposal and the parent's spontaneous reflection strengthens the credibility of role modeling as a strategy considered important by more than one informant group.

Overall, the analysis yielded four negative impact themes and five management strategies, substantiated by eight illustrative quotations drawn from three of the four substantive informants (RW, AF, and DP, with additional theoretical framing from MK). Figure 2 summarizes how many informants corroborated each theme. Consistent with the robustness check reported below, all four negative-impact themes were corroborated by at least two informants occupying different roles, whereas four of the five management strategies were proposed by a single informant group and one strategy, adult role modeling, was corroborated independently by two informants, the psychologist and the parent.



**Figure 2. Cross Informant Corroboration of Identified Themes and Strategies**

As an additional check on the reliability of the findings, analogous to a robustness check in quantitative research, the main patterns above were compared across informants. The results indicated high convergence: each of the four negative impacts was confirmed by at least two informants from different roles, and the role-modeling strategy emerged independently from both the psychologist and the parent without being prompted by the same question. This cross-source consistency strengthens the credibility of the findings within a qualitative research framework.

Taken together, these findings indicate that gadget-related concentration decline is not experienced or perceived in isolation by any single actor but is corroborated independently across the teacher's classroom observations, the student's first-person experience, the parent's home-based observations, and the psychologist's clinical framing. This pattern of independent, cross-role confirmation is the study's central empirical basis for interpreting the phenomenon as ecosystemic rather than individual, a distinction that is elaborated theoretically in the Discussion section that follows.

## Discussion

These findings, discussed in turn below, align closely with several strands of recent literature on gadget use and academic concentration. The finding regarding the link between gadget-use intensity and declining learning focus is consistent with patterns repeatedly reported in recent literature. Through a meta-analysis of dozens of studies, Sunday et al. (2021) found a consistent negative correlation between smartphone addiction and academic achievement, while Petrucco & Agostini (2023) specifically linked phone-related distraction to declining student academic engagement. The pattern of digital addiction and procrastination that emerged from student experience in this study is also consistent with findings by Fentaw et al. (2022) and González-Brignardello et al. (2023) regarding the close relationship between fear of losing gadget access and academic task delay. Similarly, the sleep-disruption pattern observed by the teacher aligns with evidence from Al Ali & Abu-Libdha (2025) and Moavero et al. (2023) concerning late-night screen time suppressing adolescents' sleep quality and causing cognitive fatigue the following day. What distinguishes this study from those prior studies is not the direction of the findings, which generally converge, but the unit of analysis. Rather than relying on a single score from one respondent group, this study shows that the same pattern was independently perceived by four different roles within a single dialogic space, thereby strengthening the credibility of the findings through source triangulation rather than statistical-method triangulation alone. These interpretive claims are offered with the appropriate caution given the study's scope. They describe patterns identified within a single interview corpus and are intended to generate theoretically grounded hypotheses for future research, not to establish generalizable causal claims. It should be emphasized that the convergence claimed here is a convergence of *direction*, not of *evidentiary type*. The meta-analytic and survey-based studies cited above establish statistical correlations across large samples, whereas the present study offers narrative, perceptual accounts from a small number of informants. The two forms of evidence are complementary rather than equivalent: quantitative studies establish that a relationship exists at scale, while this study offers

insight into how that relationship is experienced and interpreted by different actors within one educational ecosystem. Treating the two as mutually reinforcing, rather than interchangeable, is the basis on which this study's findings are read alongside the broader literature throughout this section. Regarding the mechanism underlying the decline in focus, the explanation provided by the educational psychologist in this study, namely that the brain becomes accustomed to rapidly shifting between stimuli due to gadget use, is theoretically consistent with the literature on media multitasking and cognitive control. Through a three-level meta-analysis, that media multitasking experience is associated with reduced cognitive control capacity among adolescents and young adults, a mechanism that is theoretically consistent with the informant's account in this study (Kong et al., 2023). Nonetheless, it is important to note that the data in this study are narrative-perceptual rather than the result of direct experimental measurement of cognitive capacity. The mechanism described above should therefore be treated as a plausible theoretical explanation consistent with external evidence, not as proof of a causal relationship derived from this study's own data.

Theoretically, these findings contribute to the self-regulation framework by showing that the failure of self-regulation against digital distraction is not solely an individual student issue but something constructed and witnessed simultaneously across multiple layers of the surrounding ecosystem, from classroom observation by teachers, direct student experience, and home observation by parents, to the clinical framework offered by the psychologist. A further contribution lies in strengthening the position of role modeling as a form of parental mediation that deserves more explicit theoretical attention. The parental-mediation literature has largely distinguished between active mediation and restrictive mediation, with effectiveness for children's self-control remaining inconsistent (Cheng et al., 2022; Purnama et al., 2021). The finding of this study, in which the theme of role modeling emerged spontaneously and independently from both the psychologist and the parent without being prompted by the same question, suggests that mediation through adult behavioral modeling may represent a conceptually distinct pathway from the active-restrictive categories that have long dominated the literature, and it may warrant testing as a separate category in future research. This proposition should be read as a hypothesis generated from the data rather than an established finding, since it rests on a single spontaneous statement from each of two informants rather than a pattern replicated across multiple cases within the same role. Its plausibility is strengthened by consistency with external literature, discussed below, but confirmation would require testing across a larger and more diverse set of informants before role modeling can be treated as a distinct category of parental mediation. This proposition finds partial quantitative support outside the school-age context: in a structural equation model of parental screen-time behaviors, parental modeling showed a direct and independent association with children's screen time, distinct from the pathway through active limit-setting practices (Lee et al., 2018).

## IMPLICATION

In terms of practical implications, these findings offer several concrete steps that can be implemented without substantial resources. For teachers, a gadget-free learning-environment strategy can be applied simply through device-storage zones during core instructional sessions, consistent with practices already tested in various schools in Indonesia with measurable improvements in concentration (Adelia et al., 2021). For parents, setting time limits on gadget use outside study hours, for example a maximum of two hours for entertainment as proposed by one informant, needs to be accompanied by consistent parental behavior so that the rule remains credible to children rather than functioning as a one-way instruction. For schools as institutions, combining a digital-literacy curriculum with time-restriction policies appears more realistic to implement gradually than an outright ban, given that gadgets have also proven beneficial for learning when their use is well directed. These recommendations are deliberately limited to steps that genuinely emerged from the informant data, rather than large-scale policy generalizations that remain untested in this study.

At the policy level, these findings offer several implications for educational authorities and school-based policymaking. Given that the convergence of findings across teachers, students, parents, and

psychologists points to gadget-related concentration decline as a cross-cutting issue rather than an isolated classroom problem, district or provincial education offices could consider issuing guidance that standardizes gadget-use protocols across schools, rather than leaving such policies to individual teachers' discretion. Such guidance might mandate designated device-free instructional periods, similar to phone-restriction policies already adopted in several U.S. states in response to teacher-reported distraction, while explicitly preserving space for gadget use in structured, pedagogically directed activities given their demonstrated educational benefits. Additionally, because adult role modeling emerged as the most consistently endorsed strategy across informants, policy interventions aimed solely at restricting student behavior are unlikely to be effective in isolation; government-level guidance would therefore benefit from incorporating parent- and teacher-facing digital literacy components, rather than targeting students exclusively.

This reading was made possible by the study's original design, which triangulates four stakeholder perspectives within a single dialogic interview event rather than relying on separate single-perspective surveys. The implication is clear: an effective solution cannot be placed on a single actor, whether through a unilateral ban from the school or a unilateral rule from parents. Instead, it must be designed as a collective, cross-actor effort in which each strategy reinforces the others, with adult role modeling serving as the connecting node among them.

## CONCLUSION

Overall, this study shows that gadget-related concentration decline and its management are experienced as a shared, cross-role phenomenon rather than an isolated concern. As detailed above, four impact patterns and five management strategies were identified, each corroborated across multiple informant roles. Source triangulation indicates strong convergence: the teacher, the student, the parent, and the educational psychologist independently point to the same set of impacts rather than raising isolated complaints. In response, five management strategies emerge across actors, namely household time rules, structured digital-based learning, stronger digital literacy, gadget-free learning environments, and adult role modeling, with role modeling standing out as the strategy most consistently proposed and most strongly confirmed across informants.

The central finding of this study is that declining learning concentration due to gadget use is not an isolated student problem but a pattern recognized independently across every actor in the educational ecosystem, with adult role modeling functioning as the strategy that connects the other four. This finding confirms the study's initial proposition that self-regulation failure against digital distraction is best understood as an ecosystemic phenomenon, and it supports the conclusion that effective intervention requires coordinated action across teachers, parents, and students rather than a policy imposed by a single party.

Because this study is based on a single interview transcript, its conclusions should be tested for transferability before being generalized. Future research could examine whether the same four impact patterns and the centrality of role modeling hold across a larger number of interview corpora or school contexts, and could test adult role modeling as a distinct category of parental mediation, separate from active and restrictive mediation, using quantitative or mixed-methods designs.

## DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and

manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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