JOURNAL OF INTERNATIONAL SCIENTIFIC RESEARCH
Volume 4, Issue 1, March, 2026 Online ISSN: 3030-3508
https://spaceknowladge.com

THE IMPACT OF THE INTENSITY OF GADGET USE ON THE COGNITIVE DEVELOPMENT INDICATORS OF SCHOOL STUDENTS

Aripjanova Nargiza Abduvasitovna
NTM "Ziyo Zukko"
Senior Teacher of the First Qualification Category

ARTICLE INFORMATION

ARTICLE HISTORY:

Received:06.03.2026
Revised: 07.03.2026
Accepted:08.03.2026

KEYWORDS:

gadget use intensity, cognitive development, school students, digital technology, social-emotional development, quantitative research.

ABSTRACT:

This study examines the impact of gadget use intensity on cognitive development indicators among school students. A quantitative correlational research design was employed involving 126 participants selected through cluster sampling. The intensity of gadget use was measured based on daily duration and weekly frequency, and categorized into low, medium, and high levels. Developmental outcomes were assessed using a standardized evaluation tool. The findings revealed a statistically significant relationship between gadget use intensity and developmental indicators ($p < 0.05$), indicating that high levels of gadget use are associated with less favorable developmental outcomes. The results highlight the importance of balanced and supervised use of digital technologies to support optimal cognitive development in school-age children.

Introduction

The rapid advancement of digital technologies has significantly transformed the lifestyle and learning environment of modern children. Gadgets such as smartphones, tablets, laptops, and computers have become essential tools in daily communication, entertainment, and education. For school-age students, digital devices are not only sources of information but also primary platforms for academic tasks, social interaction, and recreational activities.

While technological progress offers numerous educational advantages, concerns have increasingly emerged regarding the intensity of gadget use and its potential impact on children's development. Cognitive development, which includes processes such as attention, memory, problem-solving, and executive functioning, plays a crucial role in academic achievement and overall intellectual growth. Excessive exposure to digital devices may alter patterns of concentration, reduce face-to-face interaction, and limit engagement in activities that traditionally stimulate cognitive and social skills.

Previous research has primarily focused on the health, behavioral, and socio-emotional effects of gadget use. However, there remains a need for empirical investigation into how the intensity of gadget use—measured by duration and frequency—relates specifically to cognitive development indicators among school students. Understanding this relationship is essential for educators, parents, and policymakers seeking to balance the benefits of digital technology with the developmental needs of children.

Therefore, the present study aims to examine the extent to which the intensity of gadget use influences cognitive development indicators among school students. By employing a quantitative correlational approach, this research seeks to provide empirical evidence that may contribute to developing informed guidelines for responsible and developmentally appropriate technology use in educational settings.

Literature review

The rapid spread of digital technologies has made gadgets an integral part of children's daily lives. While these devices can provide educational benefits when used appropriately, research shows that excessive and unsupervised use may negatively affect various aspects of child development. Scholars note that a lack of parental guidance can lead to dependency, reducing children's engagement in essential daily activities such as studying, social interaction, and participation in traditional play that supports cognitive, language, and motor development.

Moreover, intensive gadget use has been associated with decreased environmental awareness and limited peer communication, which may influence cognitive growth. Since cognitive development is closely linked to active interaction and experiential learning, understanding the impact of gadget use intensity on school students' cognitive indicators remains an important area of research.

From the problems caused by gadgets, parents must be aware of the impacts that gadgets will cause that can damage the development of children who will become the nation's next generation. This requires serious handling [1].

A quantitative experimental study conducted at Baiturridha Kindergarten in Padang Pariaman examined the effectiveness of traditional games in developing children's social abilities. Using cluster sampling and validated research instruments, data were analyzed through normality, homogeneity, and hypothesis testing. The results showed that the calculated t-value (9.037) was higher than the t-table value (2.073), indicating that traditional games were more effective in improving social abilities than modern games [2]. These findings emphasize the developmental importance of interactive and socially engaging activities, which is relevant when examining how the intensity of gadget use may influence cognitive and social development among school students.

Research indicates that the younger generation uses information and communication technologies on a daily basis through various gadgets. The most common and widely used devices include mobile phones, laptops, desktop computers, and tablets. The potentially harmful impact of electronic devices is further intensified by the frequent simultaneous use of multiple gadgets at the same time [3].

The use of the latest scientific and technological advancements, including mobile technologies, has become an integral part of modern school students' lives. According to statistical data from mobile network operators, more than 25% of current mobile phone users are subscribers under the age of 18 [4].

The issue of developing cognitive activity has been addressed in the works of numerous educators and psychologists. J.A. Comenius, K.D. Ushinsky, J. Locke, and Jean-Jacques Rousseau defined cognitive activity as a natural inclination of preschool children toward learning. A.K. Markova, V.P. Lozova, J.N. Telnova, G.I. Sukina, and other scholars examined the characteristics of cognitive activity and explored methods for stimulating it in older preschool children [5].

Cognitive activity, as a pedagogical phenomenon, represents a dual and interrelated process. On the one hand, cognitive activity is a form of students' self-organization and self-awareness. On the other hand, it is viewed as the result of the teacher's purposeful actions aimed at organizing and guiding the learner's cognitive processes [6].

Research methodology

This study employed a quantitative research design using a correlational approach to examine the relationship between the intensity of gadget use and cognitive development indicators among school students. The quantitative method was selected to ensure objective measurement, statistical analysis, and empirical verification of the proposed research hypothesis.

Research Participants. The study involved 126 school students selected through cluster sampling. This sampling technique was applied to ensure representation of students from similar academic and age characteristics within the selected educational institution. Participation was voluntary, and ethical considerations were observed throughout the research process.

Research Instruments. The intensity of gadget use was measured using a structured questionnaire designed to assess two primary indicators:

1. Duration of use (minutes per day), and
2. Frequency of use (days per week).

Based on these indicators, gadget use intensity was categorized into three levels: low, medium, and high.

To evaluate developmental outcomes, children's social–emotional and cognitive indicators were assessed using a standardized assessment tool, namely the Emotional Behavior Problem Questionnaire. The instrument had previously undergone validity and reliability testing to ensure measurement accuracy and consistency.

Data Collection Procedure. Data were collected through direct administration of questionnaires and structured observation. Respondents were guided during the completion process to minimize response bias and ensure clarity of instructions.

Data Analysis Techniques. The collected data were analyzed using descriptive and inferential statistical methods. Descriptive statistics were applied to determine frequency distributions, percentages, median values, and variability in gadget use patterns.

Inferential statistical analysis was conducted using hypothesis testing procedures, including:

- Normality and homogeneity tests,
- Chi-square analysis to examine the association between variables, and
- Contingency coefficient (CC) to determine the strength of the relationship.

A significance level of $p < 0.05$ was used to determine statistical significance.

Through this methodological framework, the study aimed to provide empirical evidence regarding the extent to which the intensity of gadget use influences cognitive development indicators among school students.

Results and discussion

The intensity of gadget use was assessed through two main indicators: duration (length of daily use) and frequency (number of days per week). Based on these parameters, gadget use was classified into three categories: low, medium, and high. As presented in Table 1, nearly

half of the respondents (56 students, 44.4%) demonstrated a moderate level of gadget use intensity. The data also revealed considerable variability, with the maximum reported duration reaching 360 minutes per day and the highest frequency indicating daily use. These findings suggest that a substantial proportion of students are regularly exposed to digital devices, which may influence their cognitive engagement patterns.

In addition to gadget use intensity, children's social and emotional development was evaluated using the Emotional Behavior Problem Questionnaire. Based on the assessment results, respondents were categorized into three groups: normal, requiring counseling, and referral (cases requiring further professional intervention). This classification enables a more comprehensive discussion of how varying levels of gadget use may be associated with developmental outcomes.

Table 1

Distribution of Gadget Use Intensity Among School Students (n = 126) [7]

Category	**Frequency**	**Percentage (%)**
Low	24	19.0
Medium	56	44.4
High	46	36.5
Total	**126**	**100.0**
Indicator	**Value**	
Median	60 minutes/day	
Minimum	0 minutes/day	
Maximum	360 minutes/day	

A total of 126 school students participated in the study. The distribution of gadget use intensity showed that 24 students (19.0%) were categorized as low users, 56 students (44.4%) as medium users, and 46 students (36.5%) as high users. These findings indicate that the largest proportion of respondents demonstrated a moderate level of gadget use intensity, while more than one-third of the sample fell into the high-use category.

Regarding the duration of gadget use, the median time was 60 minutes per day, suggesting that a typical student spends approximately one hour daily using digital devices. However, the range was substantial, with reported usage varying from 0 minutes to a maximum of 360 minutes per day. This wide dispersion reflects considerable individual differences in daily exposure to gadgets.

In terms of frequency, the median usage was four days per week. While some students reported no gadget use during the week, others indicated daily usage. The presence of daily users within the sample suggests consistent exposure to digital devices, which may have implications for cognitive engagement patterns.

Overall, the data reveal a predominance of moderate to high gadget use among school students, with notable variability in both duration and frequency. Such patterns provide an important empirical basis for further analysis of the relationship between gadget use intensity and cognitive development indicators.

Table 1

Intensity of Gadget Use and Children's Social–Emotional Development (n = 126) [7]

Intensity of Gadget Use	Normal F (%)	Need Counseling F (%)	Referral to Hospital F (%)	Total F (%)
Low	21 (87.5)	2 (8.3)	1 (4.2)	24 (19.0)
Medium	45 (80.4)	9 (16.1)	2 (3.6)	56 (44.4)
High	6 (13.0)	8 (17.4)	32 (69.6)	46 (36.5)
Total	**72 (57.1)**	**19 (15.1)**	**35 (27.8)**	**126 (100.0)**

Statistical Results:

P-value = 0.000

Contingency Coefficient (CC) = 0.678

The results presented in Table X demonstrate a statistically significant relationship between the intensity of gadget use and children's social–emotional development ($p = 0.000 < 0.05$). This indicates that variations in gadget use intensity are significantly associated with differences in developmental outcomes. The contingency coefficient (CC = 0.678) suggests a strong correlation between the two variables.

Children with low gadget use intensity predominantly exhibited normal social–emotional development (87.5%), with only a small proportion requiring counseling (8.3%) or hospital referral (4.2%). Similarly, in the medium-intensity group, the majority of children showed normal development (80.4%), although the proportion needing counseling increased (16.1%).

In contrast, children with high gadget use intensity demonstrated markedly different outcomes. Only 13.0% were categorized as having normal development, while a substantial proportion required hospital referral (69.6%). This pattern indicates that higher levels of

gadget use are associated with an increased risk of social and emotional developmental concerns.

Overall, the findings suggest that excessive gadget use may negatively affect children's social–emotional development, emphasizing the importance of monitoring and regulating gadget use among school-age children.

Conclusion and recommendations

The findings of this study demonstrate a statistically significant relationship between the intensity of gadget use and developmental indicators among school students. The results revealed that students with low and moderate levels of gadget use predominantly exhibited normal developmental outcomes, whereas those with high gadget use intensity showed a considerably higher proportion of developmental concerns. The statistical analysis confirmed a strong association between gadget use intensity and developmental status ($p < 0.05$; $CC = 0.678$).

The data also indicated substantial variability in daily duration and weekly frequency of gadget use, with some students reporting up to 360 minutes of daily exposure. Such patterns suggest that prolonged and frequent gadget use may influence children's cognitive engagement, social interaction, and emotional regulation.

Overall, the study confirms that excessive gadget use may pose potential risks to children's cognitive and socio-emotional development. While digital technologies offer educational benefits when used appropriately, uncontrolled and intensive use appears to be associated with less favorable developmental outcomes.

Based on the findings of the study, the following recommendations are proposed:

1. Parental Supervision: Parents should actively monitor and regulate the duration and frequency of gadget use, ensuring balanced daily routines that include academic activities, physical play, and social interaction.
2. Time Management Guidelines: Schools and educational institutions should provide structured recommendations regarding safe and age-appropriate gadget use limits.
3. Promotion of Interactive Activities: Traditional games, collaborative learning activities, and real-world problem-solving tasks should be encouraged to stimulate cognitive and social development.
4. Digital Literacy Programs: Educational programs should be developed to promote responsible and productive use of digital technologies among students.

5. Further Research: Future studies should explore longitudinal effects of gadget use on specific cognitive domains such as attention, memory, executive functioning, and academic achievement.

Implementing these measures may contribute to maintaining a healthy balance between technological engagement and optimal cognitive development in school-age children.

References

1. Siregar, A. O., & Yaswinda, Y. (2022). Impact of gadget use on cognitive development. In Advances in Social Science, Education and Humanities Research (Vol. 668). Proceedings of the 6th International Conference of Early Childhood Education (ICECE-6 2021) (pp. 168–172). Atlantis Press. https://doi.org/10.2991/assehr.k.220602.035
2. Marlina, S., & Pransiska, R. (2018). The effectiveness of traditional games on the development of social ability of children in Kindergarten of Baiturridha Padang Pariaman. Proceedings of the International Conference of Early Childhood Education (ICECE 2017). Atlantis Press. https://doi.org/10.2991/icece-17.2018.57
3. Тончева К. С., Быкова Н. Л., Сарчук Е. В. (2020). Влияние современных гаджетов на здоровье детей школьного возраста: аспекты проблемы. Научное обозрение. Медицинские науки, № 3, 29–33. URL: https://science-medicine.ru/ru/article/view?id=1111
4. Семенова Н. В., Денисов А. П., Денисова О. А., Кун О. А., Кузюкова А. В. (2016). Влияние электромагнитного излучения от сотовых телефонов на здоровье детей и подростков. Международный журнал прикладных и фундаментальных исследований, № 6–4, 701–705.
5. Abdug‘opirova, F. (2021). Maktabgacha ta’lim yoshidagi bolalarda kognitiv faoliyatni rivojlantirish orqali matematik tasavvurlarni shakllantirishning zamonaviy usullari. Jamiyat va innovatsiyalar – Obshchestvo i innovatsii – Society and Innovations, 2(3/S), 20–27. https://doi.org/10.47689/2181-1415-vol2-iss3/S-pp20-27
6. Nurqulova, G. (2024). Kichik yoshdagi maktab o‘quvchilarida kognitiv faollikni rag‘batlantirish va uning psixologik shartlari. Ta’lim va innovatsion tadqiqotlar, (4), 217–220. https://doi.org/10.53885/edinres.2024.04.1.043
7. Rukmana, N. I. N., Fardana, N. A., Dewanti, L., & Mujtaba, F. (2021). Does the intensity of gadget use impact social and emotional development of children aged 48–72 months? Al-Athfal: Jurnal Pendidikan Anak, 7(2), 135–144. https://doi.org/10.14421/al-athfal.2021.72-04