Assessing the Influence of Digital Technology on the Academic Performance of Learners

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DOI: https://doi.org/10.47772/IJRISS.2026.100300220

Received: 13 March 2026; Accepted: 21 March 2026; Published: 01 April 2026

ABSTRACT

This study examined the relationship between digital technology use and learners' academic performance in the San Fernando II District, Division of Bukidnon, during the School Year 2025–2026. A descriptive–correlational research design was employed using a researcher-developed questionnaire administered to 159 teachers. Digital technology use was measured by total screen time, type of technology used, multitasking across multiple media devices, and frequency of video game play. At the same time, academic performance was assessed across five core subjects.

Findings revealed a high extent of digital technology use among learners, while academic performance was generally rated as very satisfactory. Correlation analysis indicated a statistically significant but weak relationship between total screen time and academic performance (r = .166, p = .036), as well as a weak overall relationship (r = .161, p = .043). Other variables, including device type, multitasking, and video game frequency, were not significantly related to academic performance.

These results suggest that the use of digital technology is only minimally associated with learners' academic outcomes. The weak effect sizes indicate that other factors, such as instructional practices, learner engagement, and home support, may play a more substantial role in shaping academic performance. The findings highlight the importance of focusing not only on access to technology but also on the quality and purpose of its use in educational contexts.

Keywords: Assessing, Influence, Digital Technology, Academic Performance, Learners, Core Subjects

INTRODUCTION

In the contemporary digital era, technology has become an essential component of children's lives, particularly for those in early elementary grades. Although technology offers various educational advantages, there is growing concern among educators about its potential to harm young learners' attention spans. Classroom observations indicate that certain Grade 2 students demonstrate diminished attention spans during lessons, potentially attributable to their regular engagement with quickly evolving digital media. This problem challenges conventional teaching approaches that require prolonged attention and focus, making it an urgent educational concern to understand how technology affects attention span during this crucial developmental phase.

While previous studies have examined the overall correlation between screen usage and attention in children, there is a deficiency of targeted research specifically addressing young learners in Grade 2. Most research focuses on broader age groups or older children, leaving a gap in understanding of how early elementary learners engage cognitively with different types of technology. Moreover, there is less empirical information regarding the differential impact of various forms of technology use, educational versus entertainment, on attention spans within classroom environments. This gap underscores the necessity to evaluate and measure the impact of technology on Grade 2 learners' attention to guide focused interventions and pedagogical approaches.

Numerous studies offer insights pertinent to this investigation. Supriyanto (2025) found a substantial negative association between excessive gadget use and learning attention among primary pupils, whereas academic-oriented gadget use showed favorable effects with appropriate parental supervision. Vedechkina and Borgonovi (2021) similarly found that technology use affects children's cognitive abilities and attention, partly due to the activation of dopamine pathways by digital media. Moreover, Dr. Gloria Mark's research revealed a significant 66% reduction in attention span among those interacting with digital devices over two decades (Oaten, 2024). These studies highlight the intricate and subtle impacts technology has on the attention of young learners.

This study is essential for addressing emerging educational issues arising from the increasing use of technology in elementary classrooms. Understanding the precise impact of technology on the attention spans of Grade 2 learners will enable educators to develop effective teaching techniques that balance technological advantages with the need for sustained concentration. This understanding is essential for shaping regulations on technology use in educational institutions, parental oversight, and classroom management strategies, thereby enhancing learning outcomes. Furthermore, the findings may address existing study limitations by providing empirical evidence on the complex effects of technology on early childhood education, thereby informing future interventions in literacy and cognitive development.

This study was anchored on Cognitive Load Theory (CLT) developed by John Sweller (1988). The theory explains how the human mind processes information and emphasizes the limitations of working memory during learning. According to CLT, learning is most effective when the cognitive demands placed on working memory do not exceed its capacity. Sweller classified cognitive load into three types: intrinsic load, which refers to the complexity of the learning material; extraneous load, which refers to distractions caused by instructional design or external factors; and germane load, which involves the mental processes that support learning and schema formation. In the context of learners, Cognitive Load Theory provides a useful framework for understanding how technology influences attention span and academic performance. Excessive exposure to digital devices may introduce high levels of extraneous cognitive load through notifications, rapid stimuli, and frequent task switching. These distractions can overload working memory, making it difficult for learners to sustain attention and process information effectively.

Variables such as total screen time, the type of technology used, multitasking across multiple media devices, and the frequency of video game play may influence cognitive load and attention span. When cognitive overload occurs, learners may struggle to maintain focus and retain information, which may negatively affect their academic performance.

Figure 1 presents the schematic diagram of the study. The independent variables include learners' digital technology use, measured by total screen time, type of technology used, multitasking across multiple media devices, and frequency of video game play. The dependent variable is learners' academic performance in the five core subjects.

To ensure conceptual clarity, this study focuses on the relationship between digital technology use and academic performance. Attention span is not directly measured as a primary variable but is considered a related cognitive factor that may help explain how technology use is associated with learning outcomes. This alignment ensures consistency between the measured variables and the study's objectives.

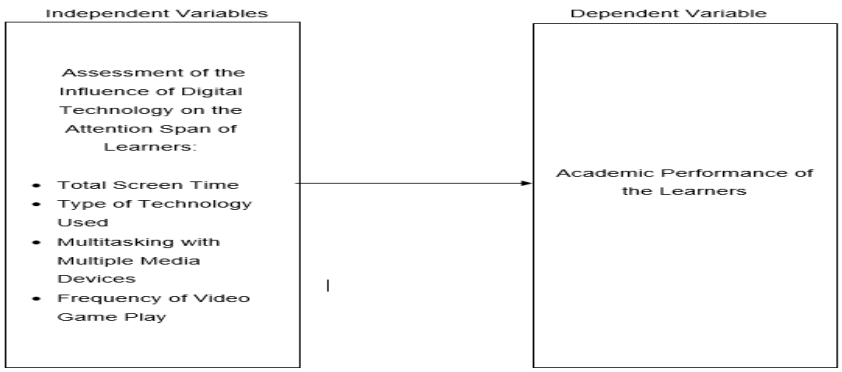

Figure 1. Schematic Diagram showing the Relationship of the Independent and Dependent Variables of the Study

This study was conducted to assess the influence of digital technology on the academic performance of learners in San Fernando II District, Division of Bukidnon, SY 2025-2026.

Specifically, this study answered the following questions:

1. What is the level of influence of digital technology among learners in terms of total screen time, type of technology used, multitasking with multiple media devices, and frequency of video game play?

2. What is the academic performance of the learners in the five core subjects?

3. Is there a significant relationship between the level of influence of digital technology on learners in terms of total screen time, type of technology used, multitasking with multiple media devices, and frequency of video game play, and the academic performance of the learners in the five core subjects?

Hypothesis of the Study

The hypothesis was tested at a 0.05 level of significance.

Ho. There is no significant relationship between the level of influence of digital technology among learners in terms of total screen time, type of technology used, multitasking with multiple media devices, and frequency of video game play, and the academic performance of the learners in the five core subjects.

METHODS

Research Design

This study employed a quantitative descriptive–correlational research design to examine the relationship between digital technology's influence on learners' attention span and their academic performance. The design allowed the researcher to describe the extent of digital technology influence and determine whether a significant relationship exists between technology-related variables and learners' academic outcomes.

Data on the influence of digital technology on learners' attention spans were collected using a researcher-developed questionnaire that measured total screen time, the types of technology used, multitasking across multiple media devices, and the frequency of video game play. The academic performance of learners was determined using their average grades in the five core subjects during the First Quarter of School Year 2025–2026.

Research Locale

The study was conducted in San Fernando II District, Division of Bukidnon, Philippines, during the School Year 2025–2026. San Fernando is a municipality in the southeastern part of Bukidnon province, characterized primarily by agricultural communities and rural educational settings.

The participating schools included Bonacao Elementary School, Bugca Elementary School, Bulalang Elementary School, Cabuling Elementary School, Cayaga Integrated School, Dao Elementary School, Durian Elementary School, Iglugsad Elementary School, Kalagangan Central Elementary School, Kibongkog Integrated School, Mahayag Elementary School, Matupe Elementary School, Namnam Integrated School, Palacpacan Elementary School, and San Jose Elementary School.

Respondents of the Study

The respondents of the study consisted of 159 teachers currently assigned to the San Fernando II District, Division of Bukidnon, during the School Year 2025–2026. These teachers served as respondents because they directly observe learners' classroom behavior and academic performance, making them qualified to evaluate the influence of digital technology on learners' attention spans.

Sampling Procedure

The study utilized complete enumeration (census sampling). All teachers within the identified schools in the San Fernando II District were included as respondents. This approach ensured comprehensive representation of the population and eliminated sampling error, allowing the findings to reflect the characteristics of teachers within the district accurately.

Research Instrument

The primary instrument used in the study was a researcher-made survey questionnaire consisting of two parts.

Part I measured the extent of digital technology's influence on learners' attention span in terms of total screen time, type of technology used, multitasking across multiple media devices, and frequency of video game play. Responses were measured using a five-point Likert scale.

Part II collected data on learners' academic performance in the five core subjects using their recorded grades.

Validity and Reliability of the Instrument

The research instrument underwent both content and construct validation. Content validity was established through expert evaluation by three specialists in educational technology and elementary education, ensuring that the items were relevant, clear, and appropriate for measuring digital technology use in relation to academic performance.

Construct validity was examined through pilot testing with 30 non-sample respondents, followed by item analysis to confirm that the questionnaire items accurately represented the intended dimensions of technology use.

The instrument's reliability was assessed using Cronbach's alpha, which yielded a coefficient of 0.929, indicating high internal consistency. These results confirm that the instrument is both valid and reliable for use in the study.

Validity and Reliability of the Instrument

The instrument underwent validity and reliability testing to ensure its accuracy and consistency. A pilot test was conducted with 30 non-sample respondents from a comparable population. The responses were analyzed to assess the clarity and relevance of the questionnaire items.

The instrument's reliability was assessed using Cronbach's Alpha, which yielded a coefficient of 0.929, indicating high internal consistency and confirming its reliability for use in the study.

Data Gathering Procedure

Prior to data collection, the researcher secured approval from the Dean of the Graduate School. The endorsement was then submitted to the Schools Division Superintendent of Bukidnon for official authorization. After receiving approval, permission was obtained from the Public Schools District Supervisor of San Fernando II District and the principals of the participating schools.

Once all necessary approvals were obtained, the questionnaires were distributed to the identified teacher respondents. After completion, the questionnaires were collected, coded, and prepared for statistical analysis.

Scoring Procedure

The assessment of the influence of digital technology was scored on a 5-point Likert scale, with higher scores indicating greater influence.

Scale	Range	Indicator	Qualifying Statement
5	4.20-5.00	Very High Extent	Influence is observed 9-10 times out of ten situations

4	3.40-4.19	High Extent	Influence is observed 7-8 times out of ten situations
3	2.60-3.39	Moderate Extent	Influence is observed 5-6 times out of ten situations.
2	1.80-2.59	Low Extent	Influence is observed 3-4 times out of ten situations
1	1.00-1.79	Very Low Extent	Influence is observed 0-2 times out of ten

Learners' academic performance in the five core subjects was interpreted using the Department of Education grading scale, with ratings categorized as Outstanding, Very Satisfactory, Satisfactory, Fairly Satisfactory, and Did Not Meet Expectations.

Final Rating	**Qualitative Description**
90 and Above	Outstanding Performance
85-89	Very Satisfactory
80-84	Satisfactory
75-79	Fairly Satisfactory
74 and below	Did Not Meet Expectations

Statistical Treatment of Data

The following statistical tools were used in the analysis of the data:

The mean and standard deviation were used to assess the extent of digital technology's influence on learners' attention span, considering total screen time, type of technology used, multitasking across multiple media devices, and frequency of video game play.

Frequency and percentage were used to describe learners' academic performance in the five core subjects.

The Pearson Product–Moment Correlation Coefficient (Pearson r) was used to assess the relationship between digital technology's influence on learners' attention spans and their academic performance.

Ethical Consideration

Ethical principles were strictly observed throughout the study. All respondents provided informed consent, which explained the purpose of the research, the procedures involved, and their right to voluntary participation and to withdraw at any time.

Confidentiality was maintained by assigning identification codes to the questionnaires and ensuring that all data were stored securely and used solely for research purposes. The study also adhered to the principle of non-maleficence, ensuring that no psychological or professional harm was caused to the participants or their respective institutions.

RESULTS AND DISCUSSION

Influence of Digital Technology on Learners

The study examined the influence of digital technology on learners in terms of total screen time, type of technology used, multitasking with multiple media devices, and frequency of video game play. The results indicate that teachers generally observed a great degree of digital technology's influence on learners.

Table 1. Overall Assessment of the Influence of Digital Technology on Learners

Variable	**Mean**	**SD**	**Interpretation**
Total Screen Time	4.19	0.57	High Extent

Type of Technology Used	4.11	0.53	High Extent
Multitasking with Multiple Media Devices	3.80	0.75	High Extent
Frequency of Video Game Play	3.99	0.99	High Extent
Overall Mean	**4.02**	**0.71**	**High Extent**

Among the four indicators, total screen time had the highest mean (M = 4.19, SD = 0.57), suggesting that teachers frequently report that prolonged use of digital devices affects learners' attention spans and classroom engagement. In contrast, multitasking with multiple media devices yielded the lowest overall mean (M = 3.80, SD = 0.75), although it is still interpreted as a substantial influence.

These findings suggest that digital technology has become a significant factor shaping learners' cognitive engagement and classroom behavior. Prolonged screen exposure may influence students' ability to sustain attention, while constant interaction with digital media may alter learners' learning habits and focus during instruction.

The result supports Muppalla et al. (2023), who found that excessive exposure to digital media may contribute to cognitive fatigue and reduced attention span among learners. Similarly, King (2021) explained that frequent digital stimulation and multitasking increase cognitive load, which can affect learners' ability to concentrate on academic tasks.

Academic Performance of Learners

The academic performance of learners was examined across the five core subjects: English, Mathematics, Science, Filipino, and Araling Panlipunan. The results reveal that the majority of learners achieved Very Satisfactory ratings (85–89) across all subject areas.

Table 2. Academic performance of the learners in English

Subject	**Outstanding (90–100)**	**Very Satisfactory (85–89)**	**Satisfactory (80–84)**	**Fairly Satisfactory (75–79)**	**Did Not Meet Expectations**
English	4 (2.52%)	90 (56.60%)	65 (40.88%)	0	0
Mathematics	5 (3.14%)	89 (55.97%)	65 (40.89%)	0	0
Science	5 (3.14%)	98 (61.64%)	55 (34.59%)	1 (0.63%)	0
Filipino	29 (18.2%)	94 (59.2%)	36 (22.6%)	0	0
Araling Panlipunan	12 (7.6%)	104 (65.4%)	43 (27.0%)	0	0

Among the subjects, Araling Panlipunan recorded the highest percentage of very satisfactory performance (65.4%), followed by science (61.64%) and Filipino (59.2%). Meanwhile, English recorded the lowest percentage of outstanding performance (2.52%), indicating that although learners generally perform well, only a few achieve the highest level of academic excellence.

The findings indicate that learners generally maintain satisfactory academic performance despite the influence of digital technology. This indicates that exposure to technology does not necessarily lead to academic decline when learners receive appropriate instructional guidance and support.

The result supports Soriano (2025), who reported that technology integration can have a moderate positive relationship with academic performance when used strategically in learning. Similarly, Frontiers (2022)

emphasized that digital competence may enhance learners' academic outcomes when technology is utilized for educational purposes.

Relationship Between Digital Technology Influence and Academic Performance

The test of the significant relationship between digital technology influence and academic performance revealed that total screen time is significantly related to academic performance ($r = .166$, $p = .036$). However, the type of technology used, multitasking with multiple media devices, and frequency of video game play were not significantly related to academic performance.

Table 3. Correlation Analysis between the Influence of Digital Media and Academic Performance

Variable	r	p-value	Interpretation
Total Screen Time	.166	.036	Significant
Type of Technology Used	.116	.145	Not Significant
Multitasking with Multiple Media Devices	.147	.065	Not Significant
Frequency of Video Game Play	.087	.275	Not Significant
Overall	.161	.043	Significant

The results revealed that total screen time is statistically significantly associated with academic performance ($r = .166$, $p = .036$). However, the strength of this relationship is weak, indicating that screen time explains only a small portion of the variation in learners' academic outcomes. Similarly, the overall correlation ($r = .161$, $p = .043$) suggests a weak association between digital technology use and academic performance.

The weak effect size implies that while digital technology use may be associated with academic performance, it is not a strong predictor of learners' academic success. This finding highlights the importance of interpreting statistical significance alongside effect size to avoid overestimating the practical impact of the results.

Furthermore, the non-significant relationships observed in device type, multitasking, and video game frequency suggest that not all forms of digital engagement are directly related to academic performance. These findings indicate that the quality, purpose, and context of technology use may be more important than the type or frequency of use alone.

The results also suggest that other factors, such as instructional strategies, classroom environment, learner motivation, and parental support, may play a more substantial role in influencing academic performance. These contextual variables may interact with technology use and should be considered in future studies to provide a more comprehensive explanation of learners' academic outcomes.

CONCLUSION

The findings indicate that digital technology use is prevalent among learners and that academic performance remains generally satisfactory. However, the relationship between digital technology use and academic performance is weak, suggesting that technology is only minimally associated with learners' academic outcomes.

Among the variables, total screen time showed a statistically significant but weak relationship with academic performance. At the same time, other factors, such as device type, multitasking, and video game frequency, were not significantly associated with the outcome. These results highlight that digital technology alone does not strongly determine academic success.

Overall, the findings suggest that multiple interacting factors beyond technology use, including instructional practices, learner engagement, and home support, influence academic performance. Therefore, educational

efforts should focus not only on managing technology use but also on improving the quality of learning experiences.

Limitations of the Study

This study has several limitations. First, the data were based on teacher perceptions rather than direct learner data, which may introduce subjective bias. The absence of triangulation through learner responses, observations, or performance-based measures limits the depth of the findings.

Second, the study employed a cross-sectional design, which does not allow for causal conclusions. The findings only indicate associations between variables.

Third, other potentially influential variables, such as instructional practices, learner motivation, socio-economic status, and home learning environment, were not included in the analysis.

Future studies are encouraged to incorporate multiple data sources and adopt longitudinal or experimental designs better to understand the effects of digital technology on learning outcomes.

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