

Assessing the Impact of Technology Integration on Intermediate Learners' Attention Span

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Abstract. This study investigated the impact of technology integration on the attention span of intermediate learners at Blingkong Central Elementary School, addressing a gap in understanding its cognitive effects within Philippine basic education. Using a descriptive-correlational quantitative approach, data were collected from 39 students and 20 teachers through validated questionnaires. Statistical analysis included frequencies, means, percentages, and Pearson correlation coefficients. Results revealed moderate positive correlations between technology use and learners' attention spans in behavioral ($r = 0.42, p < 0.01$), cognitive ($r = 0.36, p < 0.05$), and academic ($r = 0.38, p < 0.05$) domains. These findings suggest that while technology can enhance focus and engagement, its effectiveness depends on strategic implementation and teacher facilitation. The study highlights the importance of learner-centered digital integration to foster sustained attention and improved academic outcomes.

Keywords: Attention span; Classroom engagement; Educational technology; Intermediate learners; Technology integration.

1.0 Introduction

Technology integration in education has become a central focus of global research, particularly as educators and policymakers recognize the potential of digital tools to enhance learning experiences. As classrooms become increasingly digitized, understanding the effects of technology on students' cognitive development, particularly their attention span, has garnered substantial scholarly interest. Numerous studies worldwide have examined the impact of technology on young learners. In Asia, including the Philippines, technology integration is considered a vital component of educational reform. In China, Zhang (2022) employed a mixed-method approach in primary schools across Shanghai, revealing that technology-enhanced professional learning communities improved both student engagement and instructional practices. However, the study also underscored the need to balance screen use to mitigate potential negative effects on learners' attention and retention.

In the Philippine context, the growing presence of technology in schools has yielded mixed outcomes. Mayantao and Tantiado (2024) reported that the use of technology in classrooms increased student engagement and focus during lessons. In contrast, Pérez-Juárez et al. (2023) raised concerns about excessive screen time, noting that students struggled to maintain focus on non-digital tasks, which could negatively affect their attention span. Soriano (2023) emphasized that while digital tools can significantly improve learning outcomes, their success depends on practical teacher training and deliberate implementation strategies. Although local-level studies remain limited, emerging evidence suggests that educational technologies, when used strategically, can support both cognitive and behavioral engagement. Rothbart and Posner (2015) explored how multitasking and media-rich

environments influence brain development, highlighting that sustained attention and executive functioning can be nurtured through well-designed interventions. Nonetheless, Soriano (2023) cautioned that the benefits of educational technologies hinge on the appropriateness of content design and the ability of educators to integrate these tools effectively into their teaching practices. This study aims to evaluate the impact of technology integration on the attention span of younger learners in the Philippine context, building upon international and local findings while addressing the existing research gap. By analyzing both the strengths and limitations of technology use in education, this research seeks to inform educators, policymakers, and stakeholders as they navigate the digital transformation of Philippine education.

2.0 Methodology

2.1 Research Design

This study employed a correlational-descriptive research design to assess the relationship between technology integration and the attention span of intermediate learners. The design was selected to both describe the prevailing conditions and determine the extent of association between variables, without manipulating the educational environment. This approach enabled the identification of patterns, trends, and relationships between technology use and learners' attention span at Blingkong Central Elementary School during the 2024–2025 academic year.

2.2 Research Locale

This study was conducted at the Blingkong Central Elementary School in Baranangay Blingkong, Lutayan, Sultan Kudarat. This researcher conducted a study involving intermediate learners, focusing on technology integration and attention span. The school has implemented the use of educational tablets, interactive whiteboards, and a variety of educational apps in the classroom as part of its initiative to enhance student learning and engagement. Technology is integrated into all subjects, including mathematics, reading, and science. This school was selected due to their recent adoption of technology tools in the classroom, which aligns with the focus of this study. This school has been recognized within the district for actively promoting digital literacy and integrating technology into its teaching methods.

2.3 Research Participants

The study involved two groups of participants: intermediate learners (Grades 4 to 6) and their teachers. A purposive sampling technique was employed to select 39 students, consisting of 13 from each grade level: Grade 4 (7 girls, six boys), Grade 5 (6 girls, seven boys), and Grade 6 (7 girls, six boys). Inclusion criteria included enrollment in Grades 4–6 during the 2024–2025 school year and participation in technology-integrated instruction. Students with known attention-related disorders or special needs requiring individual interventions were excluded to control for external factors. Additionally, all 20 teachers handling intermediate-level classes (7 from Grade 4, 7 from Grade 5, and 6 from Grade 6) were included in the study. These teachers contributed their perspectives through surveys and brief interviews, sharing their experiences with technology integration and observations of student behavior.

2.4 Research Instrument

Data were collected using a researcher-developed survey questionnaire, which was adapted and modified based on existing studies on technology integration and student attention. The instrument was validated by two experts in educational technology, resulting in a content validity index (CVI) rating of 4.98, indicating it was very highly valid. Pilot testing was conducted with 10 intermediate learners from a nearby school not involved in the main study, yielding a Cronbach's alpha of 0.88, which indicates high internal consistency. The instrument included items measuring cognitive and behavioral dimensions of attention span, as well as perceived effectiveness of technology-enhanced instruction.

2.5 Data Collection Procedure

Permission to conduct the study was obtained from the school principal, followed by coordination with class advisers to ensure schedule alignment. Parental consent was obtained for all student participants, alongside assent from the learners themselves. Teachers also provided informed consent. Participants were informed of the research purpose, data confidentiality, and their right to withdraw at any point without consequence. Data collection was conducted entirely **face-to-face**, with questionnaires distributed and retrieved under teacher supervision in classrooms. Instructions were communicated, and students were guided to respond honestly.

Completed forms were collected, encoded, and prepared for analysis.

2.6 Data Analysis

Quantitative data were analyzed using IBM SPSS Statistics (version X). Descriptive statistics, including frequency, percentage, and mean, were employed to summarize the participants' responses. To examine the relationship between technology integration and learners' attention span, Pearson's correlation coefficient (r) was computed. The significance level (α) was set at 0.05, ensuring inferential results were statistically sound.

2.7 Ethical Considerations

The study adhered to standard ethical research protocols. Approval was obtained from the school administration, and consent was secured from both teachers and parents of the participating students. Learners' assent was also gathered to ensure voluntary participation. Confidentiality and anonymity were upheld throughout; no identifying information was recorded. Participation was voluntary, and respondents were informed of their right to withdraw at any time. All data were used solely for academic purposes and handled with integrity and care.

3.0 Results and Discussion

3.1 Technology Integration Among Teachers

Table 1 presents the mean distribution of teachers' performance regarding technology integration. Overall, the data reflect a "Moderately High" level of proficiency (grand mean = 4.29). Teachers most frequently reported using technology to streamline processes and enhance efficiency ($M = 4.55$), suggesting strong operational engagement with digital tools—an application aligned with the Technological Pedagogical Content Knowledge (TPACK) framework (Koehler et al., 2013; Ertmer & Ottenbreit-Leftwich, 2010). Conversely, the lowest mean ($M = 4.00$) pertains to basic troubleshooting skills, indicating a potential gap in technical self-efficacy. This highlights the need for targeted support in foundational digital competencies, particularly in resolving common technical issues (Tondeur et al., 2017; Krumsvik, 2014). While teachers are digitally engaged, strengthening technical resilience could support more seamless technology integration (Lawless & Pellegrino, 2007).

Table 1. Mean Distribution of Teachers' Performance in Terms of Technology Integration

Indicators	Mean	Interpretation
1. I effectively use digital tools and software to enhance my work performance.	4.40	Moderately high
2. I integrate technology to streamline processes and improve efficiency.	4.55	Moderately high
3. I am proficient in using online collaboration platforms for teamwork and communication.	4.05	Moderately high
4. I regularly utilize data analytics and digital reports to support decision-making.	4.10	Moderately high
5. I leverage automation tools to optimize repetitive tasks.	4.35	Moderately high
6. I continuously explore emerging technologies relevant to my field.	4.30	Moderately high
7. I am confident in troubleshooting fundamental technical issues related to my work.	4.00	Moderately high
8. I effectively adapt to new digital systems and software updates.	4.40	Moderately high
9. I incorporate cyber security best practices when handling digital information.	4.35	Moderately high
10. I actively seek professional development opportunities to enhance my technological skills.	4.40	Moderately high
Grand Mean	4.29	Moderately high

Table 2 reveals similarly high engagement with digital assessment tools (grand mean = 4.20). Teachers particularly excel in using digital portfolios ($M = 4.45$), which promote formative, individualized, and reflective learning experiences (Kay, 2006). However, multimedia-based assessments received the lowest rating ($M = 3.85$), suggesting limited familiarity or training in using innovative formats such as simulations or digital presentations. This highlights the need to increase teachers' exposure to diverse assessment modalities to promote inclusivity and creativity (Redecker & Johannessen, 2013). Findings indicate growing comfort in using digital tools for assessment; however, placing more emphasis on multimodal strategies can further enrich learning experiences (Soriano & Perez, 2023). A more dynamic approach to assessment may benefit diverse learners and foster student engagement.

Table 2. Mean Distribution of Teachers' Performance in Terms of Assessment Tools

Indicators	Mean	Interpretation
1. I utilize digital assessment tools (e.g., Google Forms, Kahoot, Quizizz) to evaluate learning outcomes.	4.15	Moderately high
2. I integrate learning management systems (e.g., Moodle, Canvas, Blackboard) for administering assessments.	4.20	Moderately high
3. I use online rubrics and automated grading tools to enhance assessment efficiency.	4.00	Moderately high
4. I apply technology to create and administer formative assessments (e.g., interactive quizzes, online polls).	4.40	Moderately high
5. I incorporate digital portfolios and e-portfolios for tracking student progress.	4.45	Moderately high
6. I analyze assessment data using technology to improve teaching strategies and student performance.	4.40	Moderately high
7. I use AI-driven tools or analytics for personalized assessment and feedback.	4.25	Moderately high
8. I ensure the security and integrity of online assessments by using anti-cheating measures.	4.20	Moderately high
9. I implement multimedia-based assessments (e.g., video submissions, digital presentations, simulations).	3.85	Moderately high
10. I continuously explore new digital tools to enhance the quality and fairness of assessments.	4.10	Moderately high
Grand Mean	4.20	Moderately high

Table 3 outlines the integration of digital tools in research methodology (grand mean = 4.11). The highest-rated item ($M = 4.45$) was the use of plagiarism detection tools, reflecting strong institutional emphasis on academic integrity (Prisacariu & Shah, 2016). On the other hand, the lowest-rated item ($M = 3.75$) was the use of statistical software for data analysis, signaling a skill gap in quantitative research methods. This result suggests that while ethical standards are prioritized, technical research competencies require development. Encouraging proficiency in data analysis tools (e.g., SPSS, R) can enhance the methodological rigor of teacher-conducted research (Hew et al., 2019). Such competencies, when cultivated, enable more data-driven instructional decision-making and promote scholarly output (Redecker, 2017).

Table 3. Mean Distribution of Teachers' Performance in Terms of Research Method

Indicators	Mean	Interpretation
1. I use digital tools and software (e.g., SPSS, NVivo, R, Python) for data analysis in research.	3.75	Moderately high
2. I utilize online databases (e.g., Google Scholar, Scopus, Web of Science) to gather literature for my studies.	4.00	Moderately high
3. I apply reference management software (e.g., Mendeley, Zotero, EndNote) for organizing citations and bibliographies.	4.00	Moderately high
4. I use online survey platforms (e.g., Google Forms, SurveyMonkey, Qualtrics) for data collection.	4.15	Moderately high
5. I incorporate plagiarism detection tools (e.g., Turnitin, Grammarly, Authenticate) to ensure research integrity.	4.45	Moderately high
6. I conduct virtual interviews and focus group discussions using video conferencing tools (e.g., Zoom, Microsoft Teams).	3.95	Moderately high
7. I employ artificial intelligence or machine learning tools to support data analysis and research insights.	4.10	Moderately high
8. I use cloud-based storage and collaboration tools (e.g., Google Drive, Dropbox) to manage research files and documents.	4.20	Moderately high
9. I apply digital visualization tools (e.g., Tableau, Power BI) to present research findings effectively.	4.15	Moderately high
10. I stay updated with emerging research technologies to enhance the accuracy and efficiency of my methodologies.	4.40	Moderately high
Grand Mean	4.11	Moderately high

3.2 Learners' Attention Span: Behavioral, Cognitive, and Academic Aspects

Table 4 shows behavioral aspects of sustained attention, with a grand mean of 3.77, indicating a "Moderately Good" level. The highest-rated behavior was the ability to avoid distractions during important tasks ($M = 4.20$), suggesting a strong self-regulatory capacity (Duckworth et al., 2009). In contrast, difficulty completing tasks without unnecessary breaks ($M = 3.35$) indicates susceptibility to digital or cognitive fatigue (Rosen et al., 2013). This points to the importance of developing time management and focus-enhancing strategies.

Table 5 highlights cognitive aspects of attention (grand mean = 3.85). Respondents showed the strongest performance in recalling details after focused work ($M = 4.12$), reflecting robust cognitive engagement. The lowest

score ($M = 3.58$) related to maintaining mental alertness during routine tasks, which aligns with challenges in sustaining vigilance in low-stimulation environments (Posner & Rothbart, 2018). Interventions such as mindfulness or cognitive training can help mitigate these effects (Mrazek et al., 2013).

Table 4. Mean Distribution of Respondents' Sustained Attention in Terms of Behavioral Aspects

Indicators	Mean	Interpretation
1. I can stay focused on a task without frequently checking my phone or social media. (Nagagawa kong manatiling nakatuon sa isang gawain nang hindi madalas sinusuri ang aking telepono o social media.)	4.05	Moderately Good
2. I complete tasks without feeling the need to take unnecessary breaks. (Natatapos ko ang mga gawain nang hindi nakakaramdam ng pangangailangang magpahinga nang walang dahilan.)	3.35	Moderately Good
3. I remain engaged in an activity even when it becomes repetitive or uninteresting. (Nanatili akong nakatuon sa isang aktibidad kahit na ito ay nagiging paulit-ulit o hindi kawili-wili.)	3.48	Moderately Good
4. I can resist distractions from my surroundings while working on a task. (Nagagawa kong labanan ang mga sagabal mula sa aking paligid habang nagtatrabaho sa isang gawain.)	3.53	Moderately Good
5. I can maintain focus on a task for extended periods without losing concentration. (Napapanatili ko ang aking atensyon sa isang gawain nang hindi nawawalan ng konsentrasyon.)	3.38	Moderately Good
6. I return to a task quickly after an interruption or distraction. (Mabilis akong bumabalik sa isang gawain matapos maabala o madistrak.)	3.94	Moderately Good
7. I can listen attentively in conversations or lectures without my mind wandering. (Nakikinig ako nang maayos sa mga pag-uusap o lektura nang hindi lumilipad ang aking isip.)	3.97	Moderately Good
8. I finish tasks efficiently without procrastinating due to distractions. (Natatapos ko ang mga gawain nang episyente nang hindi nagpapaliban dahil sa mga distraksyon.)	3.89	Moderately Good
9. I can follow multi-step instructions without losing track of the process. (Nasusunod ko ang mga sunod-sunod na tagubilin nang hindi nawawala sa proseso.)	4.00	Moderately Good
10. I actively avoid distractions when I need to concentrate on important work. (Sadyang iniitwasan ko ang mga distraksyon kapag kailangan kong magpokus sa mahalagang gawain.)	4.20	Moderately Good
Grand Mean	3.77	Moderately Good

Table 5. Mean Distribution of Respondents' Sustained Attention in Terms of Cognitive Aspects

Indicators	Mean	Interpretation
1. I can maintain focus on complex tasks without experiencing mental fatigue. (Napanatili ko ang pokus sa mahihirap na gawain nang hindi agad nakakaramdam ng pagkapagod sa pag-iisip.)	3.89	Moderately Good
2. I can process and retain information for extended periods without losing concentration. (Nagagawa kong iproseso at panatilihin ang impormasyon nang matagal nang hindi nawawalan ng konsentrasyon.)	3.94	Moderately Good
3. I can shift between different cognitive tasks without losing efficiency. (Kaya kong lumipat mula sa isang kognitibong gawain patungo sa iba nang hindi bumabagal ang aking kakayahan.)	3.61	Moderately Good
4. I can filter out irrelevant thoughts while working on a mentally demanding task. (Nagagawa kong iwasan ang hindi kaugnay na mga iniisip habang nagtatrabaho sa isang mahirap na gawain.)	3.94	Moderately Good
5. I can sustain deep concentration when reading or analyzing information. (Kaya kong manatili sa malalim na konsentrasyon kapag nagbabasa o nagsusuri ng impormasyon.)	3.84	Moderately Good
6. I can recall details from long periods of focused work without difficulty. (Madali kong naaalala ang mahahalagang detalye mula sa matagal na panahon ng pagtutok sa isang gawain.)	4.12	Moderately Good
7. I can solve problems methodically without being mentally sidetracked. (Nagagawa kong lutasin ang mga problema nang sistematiko nang hindi nadidistrak.)	4.02	Moderately Good
8. I can keep track of multiple pieces of information without losing focus. (Kayang-kaya kong subaybayan ang maraming piraso ng impormasyon nang hindi nawawala sa pokus.)	3.94	Moderately Good
9. I can sustain logical reasoning and critical thinking for extended periods. (Napapanatili ko ang lohikal na pag-iisip at kritikal na pagsusuri sa loob ng mahabang oras.)	3.71	Moderately Good
10. I can maintain a high level of mental alertness even in monotonous or routine tasks. (Nananatili akong alerto at mentally engaged kahit sa mga paulit-ulit o pangkaraniwang gawain.)	3.58	Moderately Good
Grand Mean	3.85	Moderately Good

Table 6 captures the academic dimension of attention (grand mean = 3.87). Respondents were most confident in staying engaged with academic tasks without procrastination ($M = 4.12$), suggesting adequate self-discipline. However, maintaining focus during extended reading ($M = 3.56$) remains a challenge, often due to cognitive load or lack of intrinsic interest. Active reading strategies—such as annotation or summarization—can improve

comprehension and focus. Overall, learners exhibit moderately strong attention spans across various domains, but benefit from targeted strategies to enhance focus, mitigate cognitive fatigue, and maintain engagement. Strengthening these skills can enhance academic performance and foster lifelong learning habits (Rothbart & Posner, 2007; Anderson & Ones, 2014).

Table 6. Mean Distribution of Respondents' Sustained Attention in Terms of Academic Aspects

Indicators	MEAN	Interpretation
1. I can stay focused during lectures or classroom discussions without getting distracted. (<i>Kayang-kaya kong manatiling nakatuon sa mga lektura o talakayan sa klase nang hindi nadidistrak</i>)	4.10	Moderate good
2. I can complete assignments and homework without frequently losing concentration. (<i>Natatapos ko ang mga takdang-aralin at gawain nang hindi madaling nawawala sa konsentrasyon</i>)	3.94	Moderate good
3. I can sustain attention while reading academic materials for an extended period. (<i>Kayang-kaya kong panatilihin ang atensyon habang nagbabasa ng materyal pang-akademiko nang matagal</i>)	3.56	Moderate good
4. I can focus on studying even in a distracting environment. (<i>Nakakapag-aral ako nang maayos kahit sa isang distraktibong kapaligiran</i>)	3.92	Moderate good
5. I can stay engaged in academic tasks without procrastinating. (<i>Nananatili akong engaged sa mga gawain sa paaralan nang hindi nagpapaliban</i>)	4.12	Moderate good
6. I can complete timed assessments or exams without losing focus. (<i>Natatapos ko ang mga pagsusulit o pagsusuri nang hindi nawawalan ng pokus</i>)	3.79	Moderate good
7. I can follow complex instructions in academic tasks without getting confused. (<i>Madali kong nauunawaan at nasusunod ang mga kumplikadong tagubilin sa mga akademikong gawain</i>)	3.74	Moderate good
8. I can actively participate in group discussions without mentally disengaging. (<i>Aktibo akong nakikilahok sa mga talakayan sa grupo nang hindi ako mentally disengaged</i>)	3.79	Moderate good
9. I can recall and apply information learned in class without difficulty. (<i>Kayang-kaya kong maalala at magamit ang impormasyon natutunan sa klase nang walang kahirapan</i>)	3.76	Moderate good
10. I can maintain concentration while writing academic papers or reports. (<i>Napapanatili ko ang aking konstentrasyon habang sumusulat ng akademikong papel o ulat</i>)a	4.02	Moderate good
Grand Mean	3.87	Moderate good

3.3 Inferential Results: Learner Profile and Attention

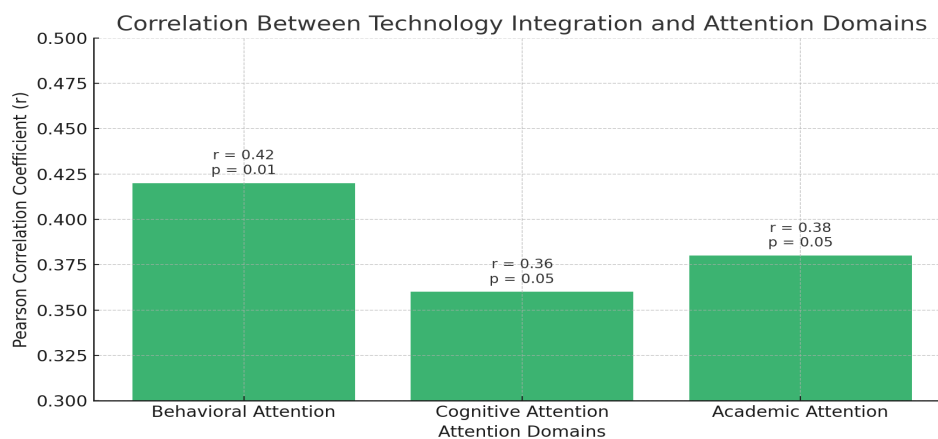


Figure 1. Correlation Between Technology Integration and Learners' Attention Span

The analysis revealed statistically significant, moderate positive correlations between learners' exposure to educational technology and their behavioral, cognitive, and academic attention. This indicates that students who frequently engage with digital tools—such as educational apps and multimedia platforms—tend to maintain stronger focus and task engagement across various learning contexts. Among the three domains, behavioral attention showed the strongest correlation ($r = 0.42$, $p < .01$), suggesting that educational technology enhances learners' self-control and reduces distractibility, particularly in managing classroom distractions (Duckworth et al., 2009; Mayantao & Tantiado, 2024).

Cognitive attention also demonstrated a meaningful relationship with technology use ($r = 0.36$, $p < .05$), reflecting improvements in mental endurance, information processing, and executive functioning. These findings support prior research showing that digital tools, when thoughtfully implemented, can enhance sustained cognitive focus (Mrazek et al., 2013; Valtonen et al., 2023). Similarly, academic attention was positively associated with technology exposure ($r = 0.38$, $p < .05$), indicating that learners who are digitally engaged are more likely to complete tasks and avoid procrastination. Soriano and Perez (2023) noted that platforms such as learning management systems and e-portfolios can strengthen academic persistence and focus.

4.0 Conclusion

This study underscores the significant role of technology integration in enhancing the attentional capacities of intermediate learners. By demonstrating that digital tools are associated with improved behavioral, cognitive, and academic focus, the research offers meaningful insight into how technology can support learner engagement when used purposefully and strategically. The findings contribute to the growing body of evidence that technology, when aligned with pedagogical intent, fosters not only instructional efficiency among teachers but also attentional control among students. From a policy and institutional perspective, the results highlight the importance of sustained investment in digital infrastructure, targeted teacher training, and the adoption of learner-centered digital practices such as e-portfolios and interactive assessments. Schools should also explore practices that mitigate potential drawbacks, such as screen fatigue, by promoting task variety, scheduling cognitive breaks, and developing digital well-being frameworks. For future research, longitudinal studies are recommended to examine the lasting effects of technology on learners' attention spans over time. Experimental designs could also be employed to establish better causal relationships between specific technological interventions and attentional outcomes. By advancing both policy and pedagogical innovation, this study offers a foundation for creating more focused, adaptable, and inclusive digital learning environments.

5.0 Contribution of Authors

Author 1 provided invaluable editing, writing, encoding, and conducting the data analysis for this research. Author 2 and Author 3 assisted in the review of related literature and supported the data analysis process.

6.0 Funding

Any external agencies do not fund the research.

7.0 Conflict of Interest

There is no conflict of interest associated with this research.

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