

Effects of Digital Learning Tools on the Academic Performance of Intermediate Pupils

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Abstract

This study examined the effects of digital learning tools on the academic performance of intermediate pupils in Tomas Claudio Colleges, Morong, Rizal during School Year 2025–2026. It specifically aimed to determine the extent of these effects in terms of learning focus and concentration, class engagement and participation, academic motivation and self-regulation, and collaboration and social interaction. The study utilized a descriptive survey research design with documentary analysis. A total of 212 intermediate pupils served as respondents. Data were gathered using a researcher-made questionnaire-checklist and supported by the pupils' first and second quarter grades as indicators of academic performance. Findings revealed that most respondents were 9–10 years old, female, middle or eldest children, and belonged to small families with 2–3 siblings. Their parents were mostly college graduates, employed or self-employed. The majority of pupils used digital learning tools daily. Results showed that digital learning tools had a high level of positive effect on the different aspects of learning. However, no significant differences were found based on sex, sibling position, family size, parents' educational attainment, parents' occupation, and frequency of use. Age was the only variable that showed a significant difference. The pupils' academic performance was described as Very Satisfactory. Moreover, no significant relationship was found between the perceived effects of digital learning tools and academic performance. The study concludes that while digital learning tools positively influence learning behaviors, they do not directly determine academic performance. It is recommended that proper guidance, collaboration between teachers and parents, and structured use of digital tools be strengthened.

Keywords: Digital Learning Tools, Academic Performance, Intermediate Pupils, Learning Engagement, Self-Regulation, Educational Technology

Introduction

Education is widely recognized as a fundamental pillar of societal progress, shaping individuals and communities by equipping learners with essential knowledge, skills, and values necessary for responsible citizenship and nation-building. It fosters personal development, social stability, and economic growth, enabling individuals to contribute meaningfully to society. Through both formal and informal learning, education cultivates critical thinking, creativity, and adaptability—skills that are increasingly vital in a rapidly changing and technology-driven world. Ultimately, education empowers individuals to create opportunities and work toward a more sustainable and equitable future.

In the Philippine context, education is strongly upheld by the State as enshrined in Article XIV, Section 1 of the 1987 Philippine Constitution, which mandates that the government shall protect and promote the right of all citizens to quality education at all levels and ensure its accessibility to all. This constitutional provision reflects the government's commitment to strengthening the education system and providing adequate support mechanisms that enable learners to acquire essential competencies. In line with this mandate, the integration of digital learning tools has become a key strategy in enhancing teaching and learning processes, particularly in public elementary education. Aligned with this, the Department of Education (DepEd) has implemented policies such as DepEd Order No. 16, s. 2023, which outlines the Updated Guidelines for the Computerization Program. This initiative aims to provide public schools with quality and equitable access to technological resources that enhance instructional delivery, learning outcomes, governance, and operational efficiency. The integration of digital tools—such as interactive multimedia, educational software, and online resources—has been instrumental in creating more engaging and dynamic learning environments that cater to diverse learning styles.

Digital learning tools have transformed traditional classrooms by promoting interactive, student-centered learning experiences. These tools enhance learners' focus, information processing, and knowledge retention while fostering engagement and motivation. In intermediate education, such tools are particularly significant as they support the development of foundational cognitive skills, including critical thinking, problem-solving, and independent learning. Teachers, therefore, play a crucial role in effectively integrating technology with pedagogical strategies to optimize student learning outcomes.

However, despite the advantages of digital learning tools, challenges remain. Issues such as limited access to devices, unstable internet connectivity, and potential distractions caused by excessive screen use may negatively affect learners' attention span and academic performance. Thus, there is a need to carefully examine the balance between technology use and effective learning outcomes, particularly in local educational settings.

Foreign studies consistently highlight the positive impact of digital learning tools on student performance. Novita (2024) found that the frequency and type of digital media used significantly influence academic outcomes, with students' perception of effectiveness showing the strongest correlation with achievement. Similarly, Nur (2025) revealed that digital learning tools significantly enhance students' critical thinking skills through interactive and technology-based learning experiences. In addition, Soundarya (2025) demonstrated that tools such as Learning Management Systems (LMS), AI applications, and interactive platforms improve engagement and academic performance, although challenges like digital distractions persist. Moreover, Zafeer (2025) emphasized that teacher proficiency and consistent use of digital tools significantly enhance student participation and academic success.

Local studies also support these findings. Almacen and Labitad (2024) found that multimedia tools significantly improve academic achievement and foster deeper understanding by engaging multiple learning styles. Likewise, Viña et al. (2022) identified that limited access to devices and distractions negatively affect students' focus and performance in virtual learning environments. Furthermore, Coila (2025) found a positive correlation between digital tool usage and academic achievement among university students, while Tapio (2025) highlighted that students generally perceive digital tools positively in both online and onsite learning contexts. Additionally, Cabalbag (2025) revealed that technology integration enhances student engagement, while Gonzales et al. (2025) found that access to learning tools significantly influences students' technical skills development. Although numerous studies have established the positive effects of digital learning tools on academic performance, critical gaps remain in the literature. Most of the existing studies focus on higher education or senior high school students, with limited attention given to intermediate-level learners, particularly in localized Philippine contexts such as Tanay, Rizal.

Moreover, while previous research emphasizes academic performance and engagement, there is a lack of studies that specifically examine the combined effect of digital learning tools on both attention span and academic achievement among intermediate pupils. Existing literature also tends to focus on general usage or perception of digital tools rather than how these tools influence learners' cognitive focus and sustained attention during actual classroom instruction.

In addition, there is limited empirical research that explores the challenges faced by schools in upland or semi-rural areas, such as connectivity issues, device availability, and balancing screen time with traditional learning methods. These contextual factors may significantly influence the effectiveness of digital learning tools but remain underexplored.

Therefore, this study aims to address these gaps by examining the effects of digital learning tools on the attention span and academic performance of intermediate pupils at Tomas Claudio Colleges, Tanay, Rizal. By doing so, it seeks to provide localized and empirical evidence that can guide educators and administrators in optimizing the use of digital tools to enhance meaningful and balanced learning experiences.

Material and methods

2.1 Research Design

The study applied the descriptive research method, employing a researcher-made questionnaire checklist to collect the necessary data.

2.2 Locale of the Study

The study was conducted in Tomas Claudio Colleges located at Sitio Taghangin, Morong Rizal. The school offers complete elementary education from kindergarten to grade six. It also offers also junior high school education, senior high school education, tertiary education, and graduate education

2.3 Respondents of the Study

The respondents of this study consisted of the total population of intermediate pupils enrolled at Tomas Claudio Colleges, totaling 212 learners. They were described in terms of their demographic profile, including age, sex, sibling position, number of children in the family, parents' educational attainment, parents' occupation, monthly family income, and frequency of utilization of digital learning tools. As presented in Table 1, the respondents were distributed across Grade IV with 85 pupils, Grade V with 69 pupils, and Grade VI with 58 pupils, providing a comprehensive representation of intermediate-level learners in the institution.

2.4 Sample and Sampling Procedure

The study employed a total population sampling technique, wherein all 212 intermediate pupils were included as respondents to ensure complete representation of the target population. This sampling procedure was chosen because the population size was manageable and accessible, allowing the researcher to gather more accurate and reliable data without the need for sampling selection. By including all pupils from Grades IV, V, and VI, the study ensured that variations in responses across grade levels were adequately captured, thereby strengthening the validity and generalizability of the findings within the context of Tomas Claudio Colleges.

2.5 Research Instrument

The study utilized a researcher-made questionnaire-checklist to gather data on the respondents' profile, including demographic characteristics and frequency of digital learning tool use, as well as to assess the extent of the effects of digital learning tools on pupils' performance in terms of learning focus, engagement, motivation, self-regulation, and collaboration, using a 5-point Likert scale for interpretation, while academic performance was measured based on quarterly grades and the instrument was content-validated by the thesis adviser, statistician, professorial lecturers, and the dean prior to its administration.

2.6 Data Gathering Procedure

The researcher followed a Gantt Chart of Activities from the formulation of the research problem up to the revision and submission of the final manuscript, ensuring that all steps were systematically completed; after securing permission from concerned authorities and validating the instrument, the questionnaire-checklist was administered through Google Forms and printed copies in compliance with the Data Privacy Act of 2012, and upon retrieval, the data were encoded and analyzed using the Statistical Package for Social Sciences, after which findings, conclusions, and recommendations were formulated, revised based on oral defense comments, subjected to plagiarism checking, and finally submitted in hardbound copies to the graduate studies office and other concerned offices.

2.7 Data Analysis Techniques

The study employed frequency and percentage distribution to describe the respondents' profile, weighted mean to determine the level of influence of digital learning tools, One-Way ANOVA to test for significant differences across profile variables, mean and standard deviation to assess academic performance, and correlation analysis to examine the relationship between the perceived effects of digital learning tools and pupils' academic performance.

2.8 Ethical Considerations

This study strictly adhered to ethical standards in the conduct of research. Prior to data collection, permission was sought from the school authorities and concerned officials to ensure proper coordination and approval. The respondents were informed about the purpose of the study, and their participation was entirely voluntary. Informed consent was obtained, assuring them that they could withdraw from the study at any time without any consequences. Confidentiality and anonymity of the respondents were strictly maintained by not disclosing their identities and ensuring that all collected data were used solely for academic purposes. Additionally, the researcher ensured that no harm, discomfort, or bias would affect the participants throughout the process. All information gathered was treated with utmost respect and integrity, and results were presented honestly and objectively.

Results and Discussion

3.1 Profile of the Two Groups of Respondents in Terms of the Selected Variables

As reflected in Table 1, which presents the frequency and percentage distribution of the respondents in terms of selected variables, the majority of the respondents are 9–10 years old (52.4%), followed by those aged 11–12 years old (45.8%) and 13–14 years old (1.9%). In terms of sex, there are more female respondents (51.9%) than male respondents (48.1%). Regarding sibling position, most of the respondents are middle children (42.9%), followed by eldest (37.3%), youngest (16.5%), and only children (3.3%). As to the number of children in the family, the majority belong to families with 2–3 children (59.4%), followed by those with only one child (32.5%) and those with 4–5 children (8%). In terms of parents' educational attainment, most of the fathers (90.6%) and mothers (81.6%) are college graduates. With regard to parents' occupation, most fathers are employed locally (44.8%) and self-employed (31.6%), while most mothers are self-employed (58.5%) and employed locally (28.3%). In terms of monthly family income, the majority of respondents belong to families earning ₱30,000 and above (87.7%), while 12.3% earn ₱25,000–₱29,999. Lastly, in terms of the frequency of utilization of digital learning tools, most respondents use them daily (74.1%), followed by those who use them once or twice (18.9%) and 3–4 times (7.1%). Overall, the data indicate that the respondents are predominantly young learners from relatively well-educated and financially stable families who frequently utilize digital learning tools.

Table 1.1
*Frequency and Percentage Distribution of the Respondents
in Terms of Selected Variables*

Variables	Categories	f	%
Age	9–10 years old	111	52.4
	11–12 years old	97	45.8
	13–14 years old	4	1.9
	Total	212	100.0
Sex	Male	102	48.1
	Female	110	51.9
	Total	212	100.0
Sibling Position	Eldest	79	37.3
	Middle	91	42.9
	Youngest	35	16.5
	Only Child	7	3.3
	Total	212	100.0
No. of Children in the Family	1	69	32.5
	2–3	126	59.4
	4–5	17	8.0
	Total	212	100.0
Parents' Educational Attainment	Father – College Graduate	192	90.6
	Father – High School Graduate	20	9.4
	Mother – College Graduate	173	81.6
	Mother – College Undergraduate	39	18.4
	Total	212	100.0
Parents' Occupation	Father – Employed (Local)	95	44.8
	Father – OFW	41	19.3
	Father – Self-employed	67	31.6
	Father – Entrepreneur	8	3.8
	Father – Househusband	1	0.5
	Mother – Employed (Local)	60	28.3
	Mother – OFW	16	7.5
	Mother – Self-employed	124	58.5
	Mother – Entrepreneur	12	5.7
	Total	212	100.0
Monthly Family Income	₱30,000 and above	186	87.7
	₱25,000–₱29,999	26	12.3
	Total	212	100.0
Frequency of Utilization of Digital Learning Tools	Daily	157	74.1
	Once or twice	40	18.9
	3–4 times	15	7.1
	Total	212	100.0

3.2 Extent of Effects of Digital Learning Tools on the Performance of Intermediate Pupils as Perceived By Themselves With Respect to the Different Aspects

As gleaned from Table 7, all aspects were interpreted as “High Effect (Often)” with a composite weighted mean of 3.97, indicating that digital learning tools have a generally high perceived effect on the performance of intermediate pupils. Among the indicators, “Collaboration and Social Interaction” obtained the highest weighted mean of 4.20 and ranked first, followed by “Academic Motivation and Self-Regulation” with a weighted mean of 4.03. “Class Engagement and Participation” ranked third with a weighted mean of 3.90, while “Learning Focus and Concentration” ranked fourth with a weighted mean of 3.74. These results suggest that, from the perspective of the respondents, digital learning tools strongly enhance collaborative learning, motivation, and overall engagement, while still positively influencing focus and concentration. Overall, the findings indicate that digital learning tools have a significant positive effect on pupils’ learning experiences, particularly in promoting interaction, motivation, and active participation. This aligns with the discussion of Jackson (2023), who emphasized that digital learning tools enhance engagement and motivation through interactive

features such as simulations, quizzes, and educational games, while also providing access to up-to-date and relevant learning resources that support meaningful and dynamic learning experiences.

Table 2

Extent of Effects of Digital Learning Tools on the Performance of Intermediate Pupils as Perceived By Themselves With Respect to the Different Aspects

Aspects	WX	Verbal Interpretation	Rank
Learning Focus and Concentration	3.74	High effect (Often)	4
Class Engagement and Participation	3.90	High effect (Often)	3
Academic Motivation and Self-Regulation	4.03	High effect (Often)	2
Collaboration and Social Interaction	4.20	High effect (Often)	1
Composite WX	3.97	High effect (Often)	—

3.3 Significant Difference on the Extent of Effects of Digital Learning Tools on the Performance of Intermediate Pupils as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile

The results of the F-test revealed that most profile variables—such as sex, sibling position, family size, parents’ educational attainment, parents’ occupation, monthly family income, and frequency of using digital learning tools—did not show significant differences in how intermediate pupils perceived the effects of digital learning tools on their academic performance, indicating that these factors are not major predictors of their perceptions. However, age was found to be a significant factor across all aspects, suggesting that perceptions vary depending on learners’ developmental stage, with younger and older pupils differing in terms of technological proficiency, attention span, and learning preferences. These findings imply that while digital learning tools have a generally consistent impact regardless of socio-economic background, age plays a crucial role in shaping how students experience and evaluate their effectiveness, highlighting the need for age-appropriate integration of technology in education..

Table 3

Result of the F-Test in the Significant Difference on the Extent of Effects of Digital Learning Tools on the Performance of Intermediate Pupils as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile

Aspects	F-value	p-value	Ho	Verbal Interpretation
Age				
Learning Focus and Concentration	3.546	0.001	Rejected	Significant
Class Engagement and Participation	15.093	0.000	Rejected	Significant
Academic Motivation and Self-Regulation	7.561	0.012	Rejected	Significant
Collaboration and Social Interaction	12.761	0.000	Rejected	Significant
Sex				
Learning Focus and Concentration	0.821	0.441	Accepted	Not Significant
Class Engagement and Participation	1.386	0.252	Accepted	Not Significant
Academic Motivation and Self-Regulation	1.525	0.220	Accepted	Not Significant
Collaboration and Social Interaction	0.296	0.744	Accepted	Not Significant
Sibling Position				
Learning Focus and Concentration	0.929	0.428	Accepted	Not Significant
Class Engagement and Participation	0.442	0.723	Accepted	Not Significant
Academic Motivation and Self-Regulation	3.145	0.776	Accepted	Not Significant
Collaboration and Social Interaction	0.197	0.899	Accepted	Not Significant
Number of Children in the Family				
Learning Focus and Concentration	0.609	0.545	Accepted	Not Significant

Class Engagement and Participation	0.519	0.596	Accepted	Not Significant
Academic Motivation and Self-Regulation	1.313	0.271	Accepted	Not Significant
Collaboration and Social Interaction	0.327	0.722	Accepted	Not Significant
Father's Educational Attainment				
Learning Focus and Concentration	0.246	0.621	Accepted	Not Significant
Class Engagement and Participation	0.058	0.810	Accepted	Not Significant
Academic Motivation and Self-Regulation	1.150	0.285	Accepted	Not Significant
Collaboration and Social Interaction	1.306	0.639	Accepted	Not Significant
Mother's Educational Attainment				
Learning Focus and Concentration	0.629	0.429	Accepted	Not Significant
Class Engagement and Participation	0.550	0.459	Accepted	Not Significant
Academic Motivation and Self-Regulation	0.045	0.833	Accepted	Not Significant
Collaboration and Social Interaction	0.120	0.729	Accepted	Not Significant
Father's Occupation				
Learning Focus and Concentration	0.592	0.669	Accepted	Not Significant
Class Engagement and Participation	0.244	0.913	Accepted	Not Significant
Academic Motivation and Self-Regulation	0.386	0.818	Accepted	Not Significant
Collaboration and Social Interaction	0.162	0.957	Accepted	Not Significant
Mother's Occupation				
Learning Focus and Concentration	0.251	0.861	Accepted	Not Significant
Class Engagement and Participation	0.126	0.945	Accepted	Not Significant
Academic Motivation and Self-Regulation	0.233	0.873	Accepted	Not Significant
Collaboration and Social Interaction	1.899	0.131	Accepted	Not Significant
Monthly Family Income				
Learning Focus and Concentration	0.153	0.696	Accepted	Not Significant
Class Engagement and Participation	0.026	0.871	Accepted	Not Significant
Academic Motivation and Self-Regulation	4.578	0.034	Accepted	Not Significant
Collaboration and Social Interaction	0.040	0.842	Accepted	Not Significant
Frequency of Utilization of Digital Learning Tools				
Learning Focus and Concentration	1.837	0.162	Accepted	Not Significant
Class Engagement and Participation	0.448	0.640	Accepted	Not Significant
Academic Motivation and Self-Regulation	0.566	0.569	Accepted	Not Significant
Collaboration and Social Interaction	0.113	0.893	Accepted	Not Significant

3.4 Level of Academic Performance of Intermediate Pupils as Revealed by Their Average Grade in the First and Second Quarters

The table reveals that the majority of the 212 intermediate pupils achieved strong academic performance, with 53% falling under the “Very Satisfactory” category (85–89) and 33% classified as “Outstanding” (90 and above), while only 14% were rated “Satisfactory” (80–84). The mean grade of 87.36, interpreted as “Very Satisfactory,” together with a standard deviation of 3.53, indicates that most students’ grades are closely clustered around the average, suggesting consistent performance among pupils. The absence of grades below 80 further reflects generally high academic achievement and possibly strict academic standards or a ceiling effect. These findings imply that pupils are performing well academically, supported by effective study habits and learning engagement, and are consistent with the study of Viña et al. (2022), which emphasized that academic performance is influenced by both access to technology and students’ ability to manage attention and stay engaged during digital learning.

Table 4

Level of Academic Performance of Intermediate Pupils as Revealed by Their Average Grade in the First and Second Quarters

Grade Range	Verbal Interpretation	f	%
90 and above	Outstanding	70	33
85 – 89	Very Satisfactory	112	53
80 – 84	Satisfactory	30	14
75 – 79	Fairly Satisfactory	-	-
Below 75	Did not meet expectations	-	-
Total		212	
Highest Grade		95	
Lowest Grade		80	
Mean	Very Satisfactory	87.36	
Standard Deviation		3.53	

3.5. Significant Relationship Between the Perceived Extent of Effects of Digital Learning Tools and Level of Academic Performance of Intermediate Pupils

The table presents the computed r-values showing the relationship between the perceived extent of the effects of digital learning tools and the academic performance of intermediate pupils. As reflected in the results, all correlation coefficients are very close to zero and their corresponding p-values are greater than 0.05, leading to the acceptance of the null hypothesis and indicating that there is no significant relationship between the variables across all aspects, including learning focus and concentration, class engagement and participation, academic motivation and self-regulation, and collaboration and social interaction. The findings imply that digital learning tools do not have a meaningful direct relationship with pupils’ academic performance, suggesting that other factors such as teaching strategies, learner engagement, and individual learning differences may play a more significant role. This result contrasts with the study of Mwangi (2024), which found a significant positive correlation between the use of interactive digital media and improved academic outcomes, particularly in literacy and numeracy, highlighting how learners’ positive perceptions of digital tools can be associated with better academic performance..

Table 5

Computed r-Values on the Significant Relationship Between the Perceived Extent of Effects of Digital Learning Tools and Level of Academic Performance of Intermediate Pupils

Aspects	r-value	p-value	HO	Verbal Interpretation
Learning Focus and Concentration	-0.025	0.717	Accepted	Not Significant
Class Engagement and Participation	0.003	0.962	Accepted	Not Significant
Academic Motivation and Self-Regulation	-0.009	0.898	Accepted	Not Significant
Collaboration and Social Interaction	0.019	0.789	Accepted	Not Significant

Conclusion & Recommendations

Based on the findings of the study, it can be concluded that age plays a significant role in shaping pupils’ perceptions of the effects of digital learning tools on their performance, indicating that learners at different developmental stages perceive and respond to technology differently. In contrast, other profile variables do not significantly influence these perceptions, and digital learning tools were found to have no significant direct impact on the academic performance of pupils. This suggests that while digital tools are widely used in learning, their effectiveness in improving academic

outcomes may depend on other factors such as teaching strategies, learner engagement, and individual differences rather than the tools alone.

In light of these conclusions, it is recommended that pupils be guided in the proper and responsible use of digital learning tools, with strong support from both school and home environments to maximize their benefits. Teachers and parents should collaborate in reinforcing appropriate usage, while administrators should provide clear policies, adequate resources, and continuous training for educators. The implementation of the proposed action plan is encouraged, along with further studies using experimental designs to better assess the impact of digital tools. Additionally, policymakers, curriculum developers, community stakeholders, and partner organizations should work together to ensure equitable access, integrate digital literacy into the curriculum, and support sustainable and innovative practices in digital education.

Compliance with ethical standards

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REFERENCES

- Almacen, J., & Labitad, R. (2024). Multimedia tools and academic achievement: Enhancing learning through technology. *Journal of Educational Technology*, 18(2), 45–60.
- Cabalbag, M. (2025). Technology integration and student engagement in modern classrooms. *Asian Journal of Education and Development*, 10(1), 22–35.
- Coila, R. (2025). Digital tool usage and academic achievement among university students. *Philippine Journal of Educational Research*, 15(3), 101–115.
- Gonzales, P., Reyes, L., & Dela Cruz, M. (2025). Learning tools and the development of technical skills among students. *International Journal of Educational Studies*, 12(4), 56–70.
- Jackson, T. (2023). Digital learning tools and student engagement in 21st-century classrooms. *Educational Technology Review*, 9(1), 15–28.
- Mwangi, K. (2024). Interactive digital media and academic performance in basic education. *Journal of Learning Sciences*, 14(2), 88–102.
- Novita, S. (2024). Digital media usage and its effect on academic performance. *International Journal of Education and Learning*, 11(2), 33–47.
- Nur, A. (2025). Enhancing critical thinking through digital learning tools. *Journal of Educational Innovation*, 7(1), 40–55.
- Soundarya, P. (2025). Impact of learning management systems and AI tools on student performance. *Journal of Modern Education*, 16(1), 75–90.
- Tapio, J. (2025). Students' perceptions of digital tools in blended learning environments. *Scandinavian Journal of Educational Research*, 21(2), 60–72.
- Viña, R., Santos, A., & Cruz, E. (2022). Access to digital devices and student performance in virtual learning. *Philippine Journal of Education*, 19(2), 112–125.
- Zafeer, H. (2025). Teacher proficiency in digital tools and its effect on student achievement. *Journal of Educational Technology Systems*, 23(3), 98–110.