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ORIGINAL RESEARCH ARTICLE

The Effect of Chromebook Usage and Learning Interest on Islamic Religious Education Literacy among Elementary School Students

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ABSTRACT

This study examines the influence of Chromebook usage and learning interest on Islamic Religious Education (PAI) literacy among fifth and sixth-grade students at SD Negeri 8 Metro Barat. Employing a quantitative causal-correlational ex post facto design, data were collected from 49 students selected through simple random sampling from a population of 140. Instruments included a 45-item Likert-scale questionnaire validated through expert judgment and reliability testing (Cronbach's Alpha 0.842–0.875). Results from multiple regression analysis revealed three key findings: (1) Chromebook usage significantly and positively affects PAI literacy ($\beta = 0.348$, $p = 0.009$); (2) learning interest significantly and positively affects PAI literacy ($\beta = 0.430$, $p = 0.001$); and (3) both variables simultaneously explain 45.2% of the variance in PAI literacy ($R^2 = 0.452$, $F = 18.456$, $p = 0.000$). These findings demonstrate that technology integration and students' internal motivation collectively enhance religious literacy. The study contributes theoretical insights into technology-based PAI learning models and offers practical recommendations for schools, teachers, and policymakers to optimize Chromebook utilization and foster learning interest in Islamic education.

Keywords: Chromebook, Learning Interest, Islamic Religious Education Literacy



ABSTRAK

Penelitian ini mengkaji pengaruh penggunaan Chromebook dan minat belajar terhadap literasi Pendidikan Agama Islam (PAI) pada siswa kelas V dan VI SD Negeri 8 Metro Barat. Menggunakan pendekatan kuantitatif dengan desain korelasi kausal ex post facto, data dikumpulkan dari 49 siswa yang dipilih melalui simple random sampling dari populasi 140 siswa. Instrumen berupa angket skala Likert 45 butir yang telah divalidasi oleh ahli dan diuji reliabilitasnya (Cronbach's Alpha 0,842–0,875). Hasil analisis regresi berganda menunjukkan tiga temuan utama: (1) penggunaan Chromebook berpengaruh positif dan signifikan terhadap literasi PAI ($\beta = 0,348$, $p = 0,009$); (2) minat belajar berpengaruh positif dan signifikan terhadap literasi PAI ($\beta = 0,430$, $p = 0,001$); dan (3) kedua variabel secara simultan menjelaskan 45,2% varians literasi PAI ($R^2 = 0,452$, $F = 18,456$, $p = 0,000$). Temuan ini menunjukkan bahwa integrasi teknologi dan motivasi internal siswa secara kolektif meningkatkan literasi keagamaan. Penelitian ini memberikan kontribusi teoretis bagi pengembangan model pembelajaran PAI berbasis teknologi serta rekomendasi praktis bagi sekolah, guru, dan pembuat kebijakan untuk mengoptimalkan pemanfaatan Chromebook dan menumbuhkan minat belajar dalam pendidikan Islam.

Kata Kunci: Chromebook, Minat Belajar, Literasi Pendidikan Agama Islam

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1. INTRODUCTION

Islamic Religious Education (PAI) plays a fundamental role in shaping the character, morality, spirituality, and behavioral patterns of students from an early age. Beyond merely transferring knowledge about Islamic teachings, PAI functions to internalize the values of faith and piety in students' daily lives. As education in the 21st century evolves, PAI instruction is required not only to be cognitively effective but also adaptive to the dynamics of modern societal development. The integration of technology in learning has been shown to increase student engagement and the quality of instruction when implemented appropriately and aligned with curriculum needs.

Social changes and technological developments have transformed how students access information and construct knowledge. In the digital era, digital literacy skills, critical thinking, and collaborative abilities have become essential aspects of the learning process. At SD Negeri 8 Metro Barat, PAI instruction has been systematically implemented following curriculum guidelines. Teachers plan materials sequentially, conduct learning activities from apperception to closing, and perform periodic evaluations. Interaction between teachers and students remains intensive, and the habituation of religious values is applied in the school's daily life.

Prior to Chromebook usage, PAI instruction at this school predominantly employed traditional approaches. Interactive lectures, oral question-and-answer sessions, group discussions, demonstrations of worship practices, and activities using Student Worksheets (LKPD) were common methods. Learning media remained simple—chalkboards, printed textbooks, Qur'an manuscripts, and written evaluation sheets. Although these approaches were adequate for building basic understanding, limited variation in learning resources made instruction less capable of

meeting students' digital literacy needs. This aligns with research findings that conventional media limitations can hinder the development of 21st-century skills.

One innovative initiative being evaluated is the use of Chromebooks in elementary schools such as SDN 8 Metro Barat. The school has provided Chromebooks to students, including those participating in PAI classes. Chromebooks, equipped with Google Search, Google Docs, digital Qur'an applications, Quizizz, Canva, Microsoft for Education, YouTube, Artificial Intelligence (AI), and numerous other supporting applications, have been utilized by PAI teachers. This trend aligns with digital-based learning, which is said to be more contextual and engaging for students, strengthening global literacy principles in general and PAI literacy specifically. This is consistent with the learning needs of the Society 5.0 and Industrial Revolution 4.0 era.

The researcher found that Chromebooks, previously used only during the Computer-Based National Assessment (ANBK), can be utilized in this context. The government donated 15 Chromebooks used in the school laboratory, but these devices were merely stored after ANBK completion and had not been fully utilized for learning purposes. However, Chromebooks possess features and an environment that substantially support contemporary digital learning, particularly in the Industrial 4.0 and Society 5.0 eras, which demand changes in contextual, adaptive, and comprehensive learning approaches.

Furthermore, the researcher observed that students' learning interest changed significantly when PAI was taught using Chromebooks. Children appeared happier, more challenged, and more engaged in their education. They produced innovative educational products, such as AI-based learning content or Islamic dakwah posters created with Canva. Student learning interest increased as a result, and they demonstrated better comprehension of Islamic teachings in a comprehensive, modern, and contextual manner. With this digital approach, religious principles are fulfilled in the form of 21st-century skills such as creativity, critical thinking, and communication, beyond mere intellectual understanding.

The challenge in PAI learning is not merely delivering religious content but also ensuring that the material is accessible to students effectively, interestingly, and relevantly to their realities in the digital age. Digital literacy skills have become an essential aspect for students to understand religious messages more broadly and critically. Research confirms that integrating digital technology into religious education curricula can strengthen student engagement and increase their learning motivation.

Several previous studies have produced contradictory findings. Setiawan et al. (2021) found that Chromebook usage increased elementary school students' interest in mathematics. Kamba et al. (2024) examined the integration of Chromebooks with the Let's Read application in enhancing student enthusiasm and reading focus. Albataineh, Warren, and Al-Bataineh (2024) investigated how Chromebook usage in one-to-one classrooms increased student engagement and focus. Endhang Suhilmiati et al. (2024) analyzed the contribution of digital literacy to improving PAI learning quality. Nurdiah (2025) examined how digital literacy in PAI instruction affects students' religious literacy. Nanda Amelia and Ahmad Sudi Pratikno (2025) investigated the role of Chromebooks in enhancing PAI learning effectiveness. Ahmad Lutfi et al. (2025) examined the effectiveness of Chromebooks as a multiliteracy learning tool for elementary school students.

The literature review suggests that further research is specifically needed to highlight the combined impact of learning interest and Chromebook usage on PAI literacy, particularly at the elementary school level where digital learning remains relatively underdeveloped. This study is unique because it explicitly examines the effects of Chromebook usage in the context of PAI learning—a field that remains relatively unexplored. Until now, Chromebook usage has largely been studied in language, science, and mathematics classrooms. Additionally, this study combines two important variables in PAI literacy: an internal factor (learning interest) and an external aspect (technology usage). This research is expected to provide theoretical and practical contributions to the development of PAI learning models that are adaptive to technological advancement.

A preliminary survey conducted by the researcher obtained documentation data on PAI learning outcomes for fifth and sixth-grade students. The results revealed three important conditions: (1) PAI literacy achievement remained low, with 32 students (65.3%) below the Minimum Mastery Learning Standard (SKBM); (2) Chromebook utilization as a digital learning medium was suboptimal, with 31 students (63.3%) rarely or never using it in PAI learning; and (3) student learning interest in PAI remained at a moderate to low level, as indicated by 28 students (57.1%) showing low enthusiasm in following the learning process. These findings indicate a gap between the great potential of Chromebooks as a digital learning tool in the Industrial Revolution 4.0 and Society 5.0 era and the reality of their minimal utilization, as well as the suboptimal learning interest of students toward PAI. Therefore, this research investigates the influence of Chromebook usage and learning interest on PAI literacy among elementary school students.

2. RESEARCH METHODS

This research employed a quantitative approach with a causal-correlational design using the ex post facto method. The causal-correlational design was chosen because it examines the causal relationships between variables, where the independent variables (Chromebook usage and learning interest) are believed to influence the dependent variable (PAI literacy). The ex post facto approach was appropriate as data were collected after the events had naturally occurred, allowing the researcher to trace back and analyze the relationships and significance of the variables.

The research was conducted at SD Negeri 8 Metro Barat, located on Jalan Nusa Indah No. 6, Kelurahan Ganjar Agung, Kecamatan Metro Barat, Kota Metro, Lampung, during the even semester of the 2025/2026 academic year. The population comprised all fifth and sixth-grade students, totaling 140 individuals. Based on Arikunto's (1997) principle that if the subject exceeds 100, 10-15% or 20-25% can be taken, the researcher determined a sample of 49 students, approximately 35% of the total population. Simple random sampling was employed to select participants, ensuring each student had an equal chance of being included.

Three variables were examined in this study. Chromebook usage (X_1) was defined as the utilization of Chromebook devices to facilitate digital learning activities requiring quick access to information, interactive learning materials, and real-time teacher-student collaboration. Indicators included: frequency of Chromebook usage, types of learning activities using Chromebooks, ease of access and usage, interactivity and collaboration through Chromebooks, support for digital learning materials and resources, and usage for assignments and evaluations. Learning interest (X_2) was defined as students' tendency to pay attention and enjoy learning activities, characterized by

active participation, enjoyment, and attention. Indicators encompassed: attention, interest, engagement (desire for active participation), persistence (desire to continue learning), and intrinsic and extrinsic motivation. PAI literacy (Y) was defined as students' ability to understand Islamic teachings through religious texts such as the Qur'an and Hadith, as well as through real religious practices in daily life. Indicators included: knowledge of Islamic teachings, ability to read and understand sacred texts, practice of worship and Islamic principles, religious attitudes in social life, and religious awareness and moral responsibility.

Data collection employed a questionnaire method using a Likert scale with four response options: Strongly Agree (score 4), Agree (score 3), Disagree (score 2), and Strongly Disagree (score 1). The instrument consisted of 45 items: 15 items for Chromebook usage, 15 for learning interest, and 15 for PAI literacy. Documentation methods were also used to obtain data about students and school profiles. The instrument underwent content and construct validity testing through expert judgment by two competent validators: Dr. Jaenullah, M.Pd (PAI expert) and Dr. Rina Mida Hayati, M.Pd (education expert). Both validators concluded that the questionnaire was suitable for use with minor revisions to item phrasing. Reliability testing using Cronbach's Alpha yielded values of 0.875 for Chromebook usage, 0.842 for learning interest, and 0.858 for PAI literacy, all categorized as highly reliable.

Data analysis proceeded through several stages. Preliminary assumption testing included normality tests (Kolmogorov-Smirnov), multicollinearity tests (VIF and Tolerance), and heteroscedasticity tests (Glejser). The main analysis employed multiple linear regression to examine both partial and simultaneous effects. The regression equation was $Y = a + b_1X_1 + b_2X_2 + e$. Hypothesis testing used t-tests for partial effects and F-tests for simultaneous effects, with a significance level of $\alpha = 0.05$. All statistical analyses were performed using SPSS version 26.

3. RESULTS AND FINDINGS

3.1 Descriptive Statistics and Sample Characteristics

The research sample consisted of 49 students from grades V and VI at SD Negeri 8 Metro Barat. The sample composition included 26 students from grade V (53.1%) and 23 students from grade VI (46.9%). In terms of gender, female students dominated with 27 individuals (55.1%), while male students numbered 22 (44.9%), reflecting a representative proportion of the school's population.

Table 1. Descriptive Statistics of Research Variables (N = 49)

Statistic	Chromebook Usage (X_1)	Learning Interest (X_2)	PAI Literacy (Y)
Mean	51.02	51.14	50.71
Median	51.00	51.00	50.00
Mode	50	45	45
Std. Deviation	4.28	4.61	5.01
Variance	18.32	21.25	25.10

Statistic	Chromebook Usage (X_1)	Learning Interest (X_2)	PAI Literacy (Y)
Range	17	16	16
Minimum	43	44	44
Maximum	60	60	60
Sum	2500	2506	2485

The descriptive analysis reveals that Chromebook usage scores ranged from 43 to 60 with a mean of 51.02 ($SD = 4.28$), indicating that students had utilized Chromebooks moderately well in PAI learning. Learning interest scores ranged from 44 to 60 with a mean of 51.14 ($SD = 4.61$), suggesting students' interest in PAI was in the high category. PAI literacy scores ranged from 44 to 60 with a mean of 50.71 ($SD = 5.01$), indicating moderate to high literacy levels among students.

3.2 Implementation of Chromebook-Based PAI Learning

The implementation of Chromebook-based PAI learning at SD Negeri 8 Metro Barat followed a structured approach grounded in constructivist theory. At the planning stage, teachers designed learning activities integrating Chromebooks for material delivery, student exploration, and evaluation. The Chromebooks, totaling 15 units donated by the government, were distributed to students in groups of three per device due to the 1:3 ratio.

During the learning process, students utilized Chromebooks to access digital Qur'an applications (Quran.com and Kemenag Qur'an), watch educational videos about prophetic stories through YouTube Education, complete interactive quizzes via Quizizz and Google Forms, and create digital presentations using Google Slides and Canva. The flipped classroom technique was applied, where students previewed materials at home via Chromebooks, then engaged in deeper discussions during class time. Collaborative learning was facilitated through Google Docs and Google Jamboard, enabling students to work together on projects about Islamic teachings.

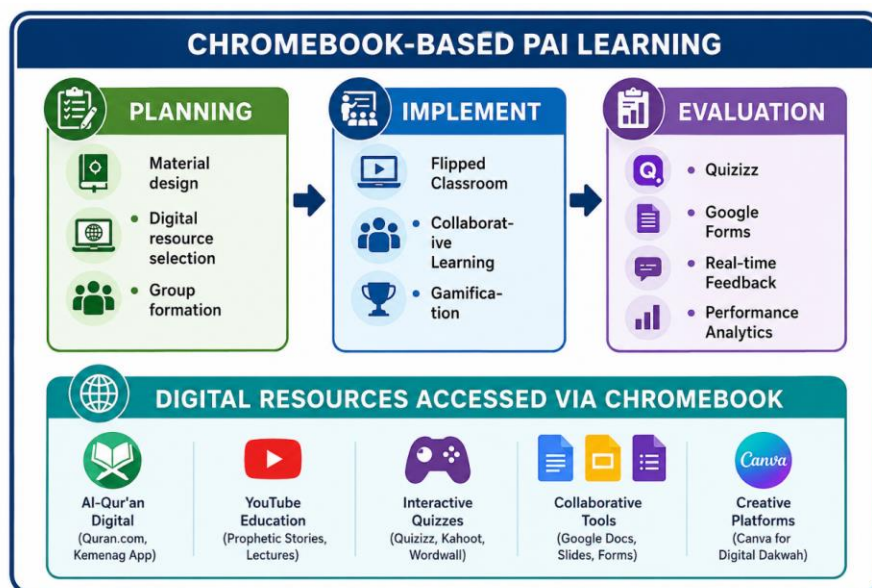


Figure 1. Chromebook-Based PAI Learning Implementation Model

The gamification technique proved particularly effective, with students showing increased enthusiasm when completing quiz-based evaluations. Assessment data from Google Forms enabled teachers to track student progress in real-time and provide immediate feedback. Students also developed digital literacy skills by creating Islamic content, such as dakwah posters and educational videos, demonstrating the integration of religious values with 21st-century competencies.

3.3 Hypothesis-Testing Results

Prior to hypothesis testing, assumption tests confirmed data normality (Kolmogorov-Smirnov $p > 0.05$ for all variables), absence of multicollinearity ($VIF = 1.355 < 10$, $Tolerance = 0.738 > 0.10$), and absence of heteroscedasticity (Glejser test $p > 0.05$). Multiple linear regression analysis was then conducted.

Table 2. Multiple Linear Regression Results

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	12.512	4.762		2.628	0.012
Chromebook Usage (X_1)	0.348	0.128	0.298	2.719	0.009
Learning Interest (X_2)	0.430	0.119	0.396	3.613	0.001

The regression equation obtained was: $Y = 12.512 + 0.348X_1 + 0.430X_2 + e$

The coefficient for Chromebook usage ($b_1 = 0.348$) indicates that each one-unit increase in Chromebook usage score increases PAI literacy by 0.348 units, holding learning interest constant. The coefficient for learning interest ($b_2 = 0.430$) indicates that each one-unit increase in learning interest score increases PAI literacy by 0.430 units, holding Chromebook usage constant.

Partial Effect Testing (t-test):

Chromebook Usage $\rightarrow$ PAI Literacy: $t = 2.719$, $p = 0.009$ (< 0.05). This confirms a significant positive effect of Chromebook usage on PAI literacy. H_1 is accepted.

Learning Interest $\rightarrow$ PAI Literacy: $t = 3.613$, $p = 0.001$ (< 0.05). This confirms a significant positive effect of learning interest on PAI literacy. H_2 is accepted.

Table 3. Simultaneous Effect Test (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	612.845	2	306.422	18.456	0.000
Residual	746.155	46	16.221		
Total	1359.000	48			

The F-test yielded $F = 18.456$ with $p = 0.000$ (< 0.05), confirming that Chromebook usage and learning interest simultaneously and significantly affect PAI literacy. H_3 is accepted.

Table 4. Coefficient of Determination (R^2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.672	0.452	0.428	4.028

Predictors: (Constant), Learning Interest (X_2), Chromebook Usage (X_1) Source: Primary Data Processed with SPSS, 2026

The R value of 0.672 indicates a moderately strong correlation between the independent variables and PAI literacy. The R^2 value of 0.452 demonstrates that Chromebook usage and learning interest collectively contribute 45.2% to PAI literacy variance, with the remaining 54.8% influenced by other factors outside this research.

4. DISCUSSION

4.1 Effect of Chromebook Usage on PAI Literacy

The finding that Chromebook usage significantly and positively affects PAI literacy ($\beta = 0.348$, $p = 0.009$) confirms that technology integration in religious education enhances students'

understanding and application of Islamic teachings. This result aligns with research by Lutfi et al. (2025), who found that Chromebooks as multiliteracy learning media support the creation of more innovative, participatory, and meaningful PAI learning processes. Similarly, Sari and Farida (2024) demonstrated that digital literacy plays a significant role in improving student learning outcomes in PAI subjects at the elementary level.

The effectiveness of Chromebooks can be attributed to several operational mechanisms observed during implementation. First, Chromebooks facilitate access to diverse and authentic digital resources. Students accessed digital Qur'an applications, watched educational videos about prophetic stories through YouTube Education, and explored interactive Islamic content that enriched their understanding beyond traditional textbooks. Second, Chromebooks enabled interactive and engaging learning experiences through gamification platforms such as Quizizz and Kahoot!, which increased student participation and made learning more enjoyable. Third, collaborative tools like Google Docs and Google Slides allowed students to work together on projects, developing both religious understanding and 21st-century skills.

From a theoretical perspective, these findings strongly support Piaget's constructivist theory, which posits that knowledge is actively constructed through interaction with the environment. Students at the concrete operational stage (ages 7-11) benefit significantly from visual and interactive media that bridge abstract religious concepts with concrete experiences. Chromebooks serve as this bridge, enabling students to "experience" abstract Islamic teachings—such as the concepts of heaven, hell, and sincerity—through visual animations, simulations of worship practices, and interactive games about the pillars of faith.

Furthermore, Vygotsky's sociocultural theory provides additional explanatory power. The Zone of Proximal Development (ZPD) concept is actualized through Chromebook-facilitated collaboration, where students work together and receive scaffolding from teachers and peers. The Google Workspace for Education ecosystem enables real-time collaboration, peer feedback, and teacher guidance, allowing students to achieve higher levels of understanding than they could independently. This social construction of knowledge is particularly relevant in PAI learning, where understanding religious values often develops through discussion, reflection, and shared meaning-making.

However, the contribution of Chromebook usage, while significant, was relatively modest compared to learning interest. This suggests that technology alone is insufficient; its effectiveness depends on how it is integrated into pedagogical practices. Teacher competence in Technological Pedagogical Content Knowledge (TPACK) is crucial. Teachers must not only be proficient in using Chromebooks but also understand how to align technology with PAI content and appropriate pedagogical strategies. The finding that Chromebooks contributed 29.8% (standardized beta) to PAI literacy indicates that while technology is an important enabler, it is not the sole determinant of religious literacy outcomes.

4.2 Effect of Learning Interest on PAI Literacy

The finding that learning interest exerts a stronger influence on PAI literacy ($\beta = 0.430$, $p = 0.001$) than Chromebook usage underscores the primacy of internal motivation in religious education.

This result is consistent with Romdhon, Hidayat, and Mulyadi (2023), who found that students with higher learning interest typically achieve better academic outcomes. The research by Aldya et al. (2025) further confirms that learning interest, as an internal factor, significantly determines student engagement and learning success.

The indicators of learning interest measured in this study—attention, interest, engagement, persistence, and intrinsic/extrinsic motivation—all showed high scores, with "desire to obtain good learning outcomes" ranking highest. This finding aligns with Ryan and Deci's Self-Determination Theory, which distinguishes between intrinsic motivation (learning for internal satisfaction) and extrinsic motivation (learning for external rewards). Students with high learning interest demonstrated several observable characteristics: they actively asked questions during PAI lessons, sought additional information beyond the provided materials, engaged in discussions about Islamic topics, and applied religious values in their daily lives.

The stronger influence of learning interest compared to Chromebook usage suggests that internal psychological factors are more fundamental determinants of religious literacy than external technological factors. This finding resonates with the Islamic educational tradition, which emphasizes the importance of *niyyah* (intention) and *ikhlas* (sincerity) in seeking knowledge. The Qur'anic verse (Q.S. Al-Mujādalah: 11) states that Allah elevates those who believe and those who are given knowledge—implying that faith and sincere pursuit of knowledge are prerequisites for true understanding.

From a pedagogical perspective, this finding has important implications for PAI instruction. While technology can enhance learning, it cannot substitute for cultivating students' genuine interest in religious education. Teachers must employ strategies that foster intrinsic motivation: connecting PAI content to students' lives, using contextual and relevant examples, providing choice and autonomy in learning activities, and creating a supportive and engaging classroom environment. The integration of storytelling approaches, as highlighted by Nabihasnah et al. (2025), has proven effective in increasing students' understanding and inspiration to live according to Islamic teachings.

The finding also underscores the importance of addressing the 57.1% of students identified in the preliminary survey as having moderate to low learning interest. This group represents a significant opportunity for intervention. Strategies such as gamification, project-based learning, and the use of varied media—including Chromebooks—can help spark situational interest, which, with consistent reinforcement, can develop into sustained interest over time. Schools and teachers must therefore adopt a holistic approach that simultaneously addresses both cognitive and affective dimensions of learning.

4.3 Simultaneous Effect of Chromebook Usage and Learning Interest on PAI Literacy

The significant simultaneous effect of Chromebook usage and learning interest on PAI literacy ($F = 18.456$, $p = 0.000$, $R^2 = 0.452$) demonstrates that technology integration and internal motivation work synergistically to enhance religious literacy. This finding supports Bandura's Social Cognitive Theory, which posits that individual behavior (PAI literacy) results from the interaction between personal factors (learning interest) and environmental factors (Chromebook usage).

The 45.2% contribution of both variables to PAI literacy variance indicates a substantial but not exhaustive influence. The remaining 54.8% can be attributed to other factors identified in the literature: family environment and parental roles, teacher pedagogical competence, availability of PAI learning resources, peer influence, students' spiritual and emotional intelligence, school policies, religious culture, and structured literacy programs.

The synergy between Chromebooks and learning interest can be understood through the concept of reciprocal determinism. Chromebooks, when used effectively, can stimulate situational interest through interactive and engaging content. This increased interest, in turn, motivates students to utilize Chromebooks more purposefully for deeper exploration of Islamic teachings. Students with high learning interest are more likely to use Chromebooks for self-directed learning—accessing additional materials, watching educational videos, and engaging in reflective activities—thereby reinforcing and deepening their religious literacy.

The practical implementation at SD Negeri 8 Metro Barat provides concrete examples of this synergy. Students with high learning interest demonstrated greater engagement with Chromebook-based activities: they created digital dakwah posters using Canva, participated actively in Quizizz competitions, and collaborated on Google Slides presentations about prophetic stories. These activities not only enhanced their understanding of Islamic content but also developed digital literacy, creativity, and collaboration skills—competencies essential for the 21st century.

The school's structured religious habituation activities further reinforced this synergy. Daily practices such as reciting Asmaul Husna, morning murojaah (repeating memorized verses), Friday morning charity boxes, tahsin and tahfidz Al-Qur'an sessions twice weekly, congregational Dhuha and Dhuhur prayers, and opening/closing prayers created a religious culture that complemented the digital learning experience. These activities provided practical spaces where theoretical knowledge gained through Chromebooks was transformed into daily habits and lived values.

The integration of Chromebooks, learning interest, and religious habituation addresses all three learning domains. Cognitively, students understand Islamic concepts more deeply, broadly, and contextually through diverse digital resources. Affectively, students demonstrate religious attitudes—honesty, justice, care, and discipline in worship—internalized through consistent practice. Psychomotorically, students become skilled in performing worship practices (ablution, prayer, adhan), reading the Qur'an fluently, memorizing short surahs, and exhibiting commendable behavior in daily life.

This holistic approach aligns with the goals of Islamic education as articulated by Indonesian Ministry of Religious Affairs: to develop students who are faithful, pious, and of noble character. The 45.2% contribution of Chromebook usage and learning interest to PAI literacy suggests that when technology and motivation are effectively combined, they can significantly advance these goals. However, the remaining 54.8% reminds us that religious literacy is a complex, multifaceted construct that requires comprehensive, sustained efforts across multiple domains.

4.4 Theoretical Implications

This study makes several theoretical contributions. First, it extends the application of constructivist theory (Piaget and Vygotsky) to the context of technology-enhanced religious education. The findings demonstrate that Chromebooks serve as effective tools for active knowledge construction, facilitating both individual cognitive development (Piaget) and social learning through collaboration (Vygotsky). This expands the theoretical understanding of how digital tools can support religious literacy development.

Second, the study contributes to the TPACK framework by demonstrating the importance of integrating technology, pedagogy, and content knowledge in PAI instruction. The effectiveness of Chromebooks depended not merely on their availability but on how teachers designed learning activities that aligned technology with PAI content and appropriate pedagogical strategies. This finding underscores the need for teacher professional development that addresses all three TPACK components.

Third, the study provides empirical support for Bandura's Social Cognitive Theory in the context of religious education. The interaction between personal factors (learning interest) and environmental factors (Chromebook usage) in shaping PAI literacy validates the reciprocal determinism concept and highlights the importance of addressing both internal and external factors in educational interventions.

Fourth, the research contributes to the growing body of literature on digital religious literacy. By demonstrating that Chromebooks can enhance PAI literacy, the study provides evidence that technology can support religious education goals, countering concerns that digital media may undermine religious values. This finding is particularly relevant in the Indonesian context, where religious schools are increasingly integrating technology into their curricula.

4.5 Practical Implications

The findings offer several practical implications for various stakeholders. For school principals, the study recommends optimizing Chromebook utilization beyond ANBK to support daily PAI learning. Given the current 1:3 Chromebook-to-student ratio, efforts to increase device availability and provide ongoing teacher training in digital pedagogy are essential. Developing an inclusive and sustainable digital learning ecosystem that integrates digital and religious literacy should be a priority.

For PAI teachers, the study suggests developing creative Chromebook-based learning methods—videos, online quizzes, virtual discussions, and digital dakwah content. Teachers should provide motivation and personalized attention through contextual approaches to foster intrinsic learning interest. Regular diagnostic assessments to identify students' PAI literacy levels and design appropriate interventions are also recommended. Establishing good communication with parents can create continuity between school learning and home habituation.

For students, the findings encourage active utilization of Chromebooks for religious knowledge exploration—digital Qur'an applications, educational videos, and prophetic stories. Developing

intrinsic learning interest by recognizing PAI as a life guide is crucial. Students should maintain digital ethics and use technology only for positive purposes, actively participating in learning and discussions to deepen understanding through collaboration.

For future researchers, the study identifies several avenues for further investigation. The 54.8% of unexplained variance invites exploration of other factors influencing PAI literacy, such as family environment, teacher competence, learning resources, religious culture, and peer influence. Experimental designs could test the effectiveness of specific Chromebook-based learning models. Expanding the sample across educational levels (elementary, junior high, senior high) would enhance generalizability. Mixed-method approaches combining quantitative and qualitative data could provide more comprehensive understanding. Longitudinal studies could track the development of influence over extended periods.

4.6 Limitations and Future Research Directions

This study has several limitations that should be acknowledged. First, the causal-correlational ex post facto design cannot establish strong causal relationships between Chromebook usage, learning interest, and PAI literacy. While the regression analysis demonstrates significant associations, experimental or quasi-experimental designs would provide stronger evidence of causality. Second, the sample was limited to 49 students from a single school, limiting generalizability to broader populations. Future research should include larger, more diverse samples across multiple schools and regions.

Third, the instruments relied solely on self-report questionnaires, which are susceptible to social desirability bias and may not fully capture actual Chromebook usage or genuine learning interest. Incorporating objective measures—such as teacher observations, performance assessments, or digital usage analytics—would strengthen validity. Fourth, the study only included two independent variables, leaving 54.8% of variance unexplained. Future research should include additional variables such as teacher competence, parental support, peer influence, and school religious culture.

Fifth, the Chromebook-to-student ratio (1:3) may have limited the intensity of Chromebook usage. Schools with one-to-one Chromebook programs might show different results. Future research should examine how device availability and usage frequency moderate the relationship between Chromebooks and PAI literacy. Despite these limitations, the study provides valuable empirical evidence and theoretical insights that contribute to understanding technology-enhanced religious education.

5. CONCLUSION AND SUGGESTIONS

This research examined the influence of Chromebook usage and learning interest on Islamic Religious Education (PAI) literacy among fifth and sixth-grade students at SD Negeri 8 Metro Barat. Based on the analysis of data from 49 students using quantitative causal-correlational methods, three main conclusions emerge.

First, Chromebook usage has a positive and significant influence on PAI literacy ($\beta = 0.348$, $p = 0.009$). Students who more frequently and effectively utilize Chromebooks in PAI learning demonstrate higher levels of religious literacy. Chromebooks facilitate access to diverse digital resources—digital Qur'an applications, educational videos, interactive quizzes, and collaborative tools—that enrich understanding of Islamic teachings. This finding supports constructivist theories (Piaget and Vygotsky) and confirms that technology, when pedagogically integrated, can enhance religious education outcomes.

Second, learning interest has a positive and significant influence on PAI literacy ($\beta = 0.430$, $p = 0.001$), and its contribution is greater than that of Chromebook usage. Students with higher interest in PAI—characterized by attention, engagement, persistence, and intrinsic motivation—demonstrate stronger religious literacy. This finding underscores the primacy of internal psychological factors in religious education and highlights the importance of fostering genuine interest through contextual, meaningful, and engaging learning experiences.

Third, Chromebook usage and learning interest simultaneously and significantly influence PAI literacy ($F = 18.456$, $p = 0.000$, $R^2 = 0.452$). Together, they contribute 45.2% to PAI literacy variance, with the remaining 54.8% influenced by other factors. This synergistic effect confirms that technology integration and internal motivation work collectively to enhance religious literacy. The combination of digital tools (external factor) and learning interest (internal factor) creates optimal conditions for developing cognitive, affective, and psychomotor dimensions of religious education.

In conclusion, this study provides empirical evidence that both Chromebook usage and learning interest are significant determinants of PAI literacy among elementary school students. The findings contribute to theoretical understanding of technology-enhanced religious education and offer practical guidance for schools, teachers, and policymakers seeking to improve PAI outcomes in the digital age. By optimizing Chromebook utilization and simultaneously fostering learning interest through innovative, contextual, and student-centered approaches, educators can enhance students' understanding, appreciation, and application of Islamic teachings in their daily lives.

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