

Predicting Academic Performance and Socio-Emotional Skills from Digital Game Engagement among Elementary School Learners

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Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.	
Citation: Averilla, Jamaica Jorge B., Robinos, John Robby O., Evangelista, Arman Luis L., Ingente, Merry Grace B., Orejas, Allen Paul A., Pangan, Andrei M., Severino, Jaycee Joy F., Tuazon, Maria Rose Anne C., & Lalim, Melanie M. (2026). Predicting academic performance and socio-emotional skills from digital game engagement among elementary school learners. <i>UKR Journal of Arts, Humanities and Social Sciences</i> , 2(9), 36-45.	<i>Digital games have become increasingly embedded in children's everyday experiences, yet their implications for academic performance and socio-emotional development remain context-dependent, particularly among elementary learners. This study examined the extent of digital game engagement among elementary learners and determined whether engagement predicts academic performance and socio-emotional skills. A quantitative predictive-correlational research design was employed using total population sampling involving 103 elementary learners. Data were gathered through researcher-developed survey instruments with acceptable internal consistency for digital game engagement (Cronbach's $\alpha = 0.81$) and socio-emotional skills (Cronbach's $\alpha = 0.79$), while academic performance was based on learners' academic grades. Ethical standards were observed throughout the study, including the securing of parental consent. Descriptive statistics and linear regression analyses were employed. Results showed that learners demonstrated a moderate extent of digital game engagement ($M = 2.93$, $SD = 0.94$), characterized by enjoyment, curiosity, persistence, and cognitive involvement. Socio-emotional skills were demonstrated at a high extent ($M = 3.302$), particularly in self-awareness and relationship skills, while responsible decision-making was comparatively less developed. Academic performance was predominantly at the Satisfactory level (36.9%). Digital game engagement did not significantly predict academic performance ($R = 0.127$, $R^2 = 0.0162$, $p = .200$). In contrast, digital game engagement significantly and positively predicted socio-emotional skills ($R = 0.509$, $R^2 = 0.259$, $B = 0.454$, $p < .001$). These findings suggest that the potential contribution of digital games may be more evident in socio-emotional development than in academic achievement. Anchored in the Social-Emotional Learning perspective, the study highlights the potential of purposeful and balanced digital gameplay to provide opportunities for reflection, decision-making, interaction, and self-regulation. The findings support the intentional integration of developmentally appropriate digital games as supplementary learning environments, guided by teachers and parents.</i> Keywords: Academic Performance, Digital Game Engagement, Socio-emotional Skills, Predictive-correlational, Elementary School Learners.

Introduction

The increasing integration of digital technology into children's everyday lives has transformed how elementary school learners learn, communicate, and engage with information (Robinos et al., 2024a). Among these technologies, digital games have become a significant part of children's experiences, providing interactive

environments that may extend learning beyond conventional classroom instruction. Digital game engagement (DGE) can provide learners with opportunities to explore tasks, receive immediate feedback, solve problems, make decisions, and interact with peers, potentially supporting academic and developmental

outcomes (Greipl et al., 2020; Li et al., 2024). These features may enhance attention, motivation, memory, problem-solving, and active participation in learning activities. Barz et al. (2023) and Wang et al. (2022) similarly reported that digital game-based activities can enhance learner motivation, engagement, problem-solving, and learning outcomes, particularly when games are appropriately designed and aligned with learning objectives. Al-Houssein (2024) likewise emphasized the potential of digital game-based learning to promote engagement, motivation, and academic performance through meaningful and interactive learning experiences. However, digital gaming does not consistently produce positive outcomes. Excessive or unstructured gaming may compete with study time and contribute to distraction, fatigue, and other behaviors associated with poorer academic outcomes (Paulich et al., 2021). These contrasting findings suggest that the relevance of digital games to learners' academic development may depend not merely on whether children play games, but on the extent, nature, purpose, and context of their engagement.

Beyond academic outcomes, DGE has also been considered in relation to children's social and emotional development. Interactive and collaborative gaming environments may provide opportunities for learners to practice communication, cooperation, self-regulation, decision-making, and social interaction. Toh & Kirschner (2022) and Saleme et al. (2021) emphasized that developmental outcomes associated with digital gaming may vary according to player characteristics, duration of engagement, and game design. Saleme et al. (2023) further recognized the potential of digital games to support children's knowledge, skills, behaviors, and broader developmental outcomes, while noting that evidence concerning their effectiveness in developing socio-emotional competencies and prosocial behaviors remains limited. This issue is particularly relevant during the elementary years, when learners are developing the capacity to understand and regulate themselves, recognize others' perspectives, establish relationships, and make responsible decisions. Although digital games may create opportunities for practicing these competencies, their contribution cannot be assumed to be consistently positive across different gaming experiences. Thus, examining DGE alongside socio-emotional skills may provide a more comprehensive understanding of the developmental outcomes associated with children's digital gaming.

The potential predictive relationship between DGE and these learner outcomes can be understood through complementary theoretical perspectives. Kiili's (2005) Experiential Gaming Model, grounded in Csikszentmihalyi's (1975) Flow Theory, proposes that effective gaming experiences involve clear goals,

immediate feedback, and appropriately challenging tasks that sustain attention and intrinsic motivation. These characteristics may encourage sustained cognitive engagement and problem-solving, which can be relevant to academic performance. Similarly, Piaget's (1962) Constructivist Learning Theory views learners as active constructors of knowledge who develop understanding through interaction, exploration, experimentation, and reflection. Digital games may provide opportunities for these processes through interactive tasks, challenges, and problem-solving experiences. Meanwhile, the Social and Emotional Learning (SEL) framework of CASEL (2020) identifies five core competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. Digital game experiences involving collaboration, communication, goal setting, emotional regulation, and decision-making may provide contexts in which these competencies are practiced. Taken together, these perspectives provide a theoretical basis for examining whether the extent of learners' engagement with digital games can statistically predict differences in their academic performance and socio-emotional skills.

Despite the growing literature on digital gaming, important gaps remain. Existing studies have frequently focused on digital game-based learning, motivation, engagement, or specific cognitive outcomes, while fewer studies have examined academic performance and socio-emotional skills simultaneously as outcomes associated with learners' digital game engagement. Although Barz et al. (2023), Wang et al. (2022), and Li et al. (2024) provide evidence concerning the academic potential of digital games, the predictive contribution of learners' overall engagement with digital games to their actual academic performance remains insufficiently examined. Similarly, while Saleme et al. (2023) highlighted the potential of digital games for developing socio-emotional competencies, evidence regarding their relationship with the broader set of SEL competencies remains limited. Furthermore, much of the existing literature has been generated in international contexts, which may not fully capture the experiences of Filipino elementary learners whose digital gaming behaviors are shaped by their particular family, school, cultural, and technological environments. In the Philippine context, where children's access to digital technologies continues to expand, localized evidence examining whether DGE can predict both academic performance and socio-emotional skills remains limited (Robinos et al., 2024a). This gap highlights the need for empirical research that examines not only whether these variables are related but also whether the extent of digital game engagement significantly predicts learners' academic and socio-emotional outcomes.

Addressing this gap is important because schools increasingly encounter learners whose educational and social experiences occur alongside regular engagement with digital technologies and games. Determining the predictive contribution of DGE may help educators and school administrators better understand whether particular levels of gaming engagement are associated with differences in learners' academic performance and socio-emotional development. Such evidence may also help schools develop more informed approaches to digital technology use rather than treating gaming as either inherently beneficial or harmful. In this regard, a predictive approach provides a basis for identifying whether DGE is a meaningful statistical predictor of learner outcomes while recognizing that prediction does not establish a direct causal relationship.

Thus, this study aims to determine whether digital game engagement predicts the academic performance and socio-emotional skills of elementary school learners. Specifically, it seeks to determine the extent of learners' engagement with digital games, assess their academic performance based on their official school records, determine their perceived socio-emotional skills in terms of self-awareness, self-management, social awareness, relationship skills, and responsible decision-making, examine the relationships between digital game engagement and academic performance and between digital game engagement and socio-emotional skills, and determine whether digital game engagement significantly predicts each of these outcomes. Based on the findings, the study also seeks to provide evidence that may inform general guidelines for the safe and purposeful management of digital game engagement in elementary education. The study is expected to contribute localized evidence to the literature on digital gaming and child development and provide educators and school administrators with an empirical basis for making informed decisions regarding learners' digital gaming experiences and their potential relationship with academic and socio-emotional development.

Methodology

Research Design

This study employed a quantitative, non-experimental research design using a correlational-predictive approach. The design was appropriate for determining the extent of learners' digital game engagement, describing their academic performance and socio-emotional skills, examining the relationships among these variables (Robinos et al., 2025b), and determining whether digital game engagement significantly predicts academic performance and socio-emotional skills. No variable was manipulated, and data were gathered within the learners' natural educational setting. Pearson Product-Moment

Correlation was used to examine the relationships among the variables, while simple linear regression was employed to determine the predictive contribution of digital game engagement to academic performance and socio-emotional skills.

Research Locale

The study was conducted in one selected public elementary school in Biñan, Laguna. The school was selected based on its accessibility, learner population, and suitability for examining digital game engagement among elementary learners. The setting provided an appropriate context for investigating the relationship and predictive role of digital game engagement in learners' academic performance and socio-emotional skills within an urban Philippine educational environment.

Research Participants and Sampling Technique

The participants were 103 Grade 6 learners enrolled in the selected public elementary school in Biñan, Laguna. Grade 6 learners were selected because their developmental level allows for relatively independent and measurable engagement with digital technologies and games. Novitasari et al. (2023) reported developmental experiences associated with digital device and game use among children, supporting the relevance of examining digital engagement among learners in the elementary years.

The study employed total enumeration sampling, wherein all eligible Grade 6 learners in the identified population were invited to participate. This approach was considered appropriate because the population of 103 learners was manageable and allowed the researchers to include the entire accessible population rather than selecting a smaller sample.

Research Instrument

The primary instrument was a researcher-made survey questionnaire developed based on the objectives and theoretical foundations of the study. The instrument underwent face and content validation by three experts with expertise in educational management, educational technology, and psychometrics.

The questionnaire consisted of four parts. Part I presented the study information, purpose, participant rights, parental consent requirements, and relevant ethical considerations. Part II measured the extent of digital game engagement using a four-point scale interpreted as 1.00–1.75 (*Not Engaged at All*), 1.76–2.50 (*Slightly Engaged*), 2.51–3.25 (*Moderately Engaged*), and 3.26–4.00 (*Highly Engaged*). Part III obtained the learners' academic performance based on their official third-quarter general average, retrieved from school records with appropriate authorization from the school administration. Part IV assessed the learners' perceived socio-emotional

skills in terms of self-awareness, self-management, social awareness, relationship skills, and responsible decision-making using a four-point Likert-type scale interpreted from 1.00–1.75 (*Strongly Disagree/Not Evident*) to 3.26–4.00 (*Strongly Agree/Highly Evident*).

The internal consistency of the questionnaire was assessed using Cronbach's alpha. The digital game engagement scale obtained a coefficient of 0.81, while the socio-emotional skills scale obtained 0.79, indicating acceptable internal consistency.

Data Gathering Procedure

Before data collection, the researchers secured the necessary institutional endorsements from the research adviser, Head of Academic Programs, Research and Development Center Head, and Campus Director, followed by formal permission from the administration of the selected public elementary school in Biñan, Laguna. The request included the purpose of the study, scope, data-gathering procedures, ethical safeguards, and proposed schedule. The research proposal and instrument were also submitted to and reviewed by the University Research Ethics Committee (UREC) to ensure compliance with institutional ethical standards for research involving human participants.

Upon approval, the researchers coordinated with the Grade 6 class advisers regarding the administration schedule. Parent or legal guardian consent was secured before the participation of the learners. The researchers explained the study and its procedures to the learners using age-appropriate language and emphasized that participation was voluntary. The questionnaire was administered to the eligible learners under the supervision of the researchers. Participants were given sufficient time to accomplish the instrument, and clarification was provided when necessary without influencing their responses. The learners' official third-quarter general averages were obtained from authorized school records and were matched with the corresponding survey responses using appropriate coding procedures.

After retrieval, the accomplished questionnaires and academic records were coded, organized, and encoded for statistical analysis. All data were handled confidentially and stored securely throughout the research process.

Data Analysis

Descriptive and inferential statistical procedures were employed to analyze the collected data. Frequency, percentage, and mean were used, as appropriate, to describe the participants and determine the extent of digital game engagement, academic performance, and socio-emotional skills. Prior to inferential analysis, the assumptions for Pearson Product-Moment Correlation and simple linear regression were examined. Normality was assessed using the Shapiro-Wilk test, supplemented by visual inspection of histograms and Q-Q plots. Linearity and homoscedasticity were examined using scatterplots and residual plots. Pearson Product-Moment Correlation was used to determine the relationships between digital game engagement and academic performance and between digital game engagement and socio-emotional skills. Simple linear regression was employed to determine whether digital game engagement significantly predicts academic performance and socio-emotional skills. Separate regression models were conducted for each outcome variable. The level of significance was set at 0.05.

Ethical Considerations

The study adhered to established ethical standards for research involving minor human participants. Prior to data collection, the research proposal and instrument were reviewed by the University Research Ethics Committee (UREC). Parent or legal guardian consent was obtained before the participation of the Grade 6 learners, and the learners were informed about the study in an age-appropriate manner. Participation was voluntary, and learners were informed of their right to decline or withdraw from the study without penalty. No personally identifiable information was included in the presentation of the results. Learners' academic records and survey responses were treated confidentially and accessed only by authorized members of the research team. Data were securely stored and handled in accordance with the Data Privacy Act of 2012 (Republic Act No. 10173) and applicable institutional policies on the protection of minors and research data.

Results and Discussion

Extent of Engagement on Digital Games

Table 1. *Perceived Extent of Engagement on Digital Games among Elementary Learners*

Statements	x	SD	Interpretation
1. I play digital games many times a week.	2.49	0.94	Disagree
2. I use some of my free time to play digital games.	3.03	0.91	Agree
3. Playing digital games is part of my usual activities at home.	2.89	0.95	Agree
4. I like playing digital games	3.05	0.88	Agree
5. I get excited when I am about to play a digital game.	2.89	0.93	Agree

6. I am interested in trying different digital games.	3.08	0.90	Agree
7. I try my best to do well in the game.	3.06	0.97	Agree
8. I keep playing even when the game is hard.	2.75	1.04	Agree
9. I think first before I make a move in the game.	3.15	0.96	Agree
Overall	2.93	0.94	Moderately Engaged

Interpretation Scale: 1.00 – 1.75 = Not Engage at all/Strongly Disagree; 1.76 – 2.50 = Fairly Engage/Disagree; 2.51 – 3.25 = Moderately Engaged/Agree; and 3.26 – 4.00 = Highly Engaged/Strongly Agree **Legend:** $\bar{x}$ = mean and SD – Standard Deviation

The results indicate that elementary learners demonstrate a moderate extent of engagement with digital games, as shown by the overall mean of 2.93 (SD = 0.94). This suggests that digital gaming is present in learners’ routines and interests, but their engagement does not appear to be excessive or overly frequent.

Among the indicators, the highest mean was recorded for “I think first before I make a move in the game” ($\bar{x}$ = 3.15, SD = 0.96), followed by “I am interested in trying different digital games” ($\bar{x}$ = 3.08, SD = 0.90) and “I try my best to do well in the game” ($\bar{x}$ = 3.06, SD = 0.97). These findings suggest that learners’ engagement is not limited to simply spending time playing. Rather, they demonstrate cognitive involvement, curiosity, and effort while playing. The relatively high rating for thinking before making a move particularly indicates that digital games may encourage learners to process information, consider possible actions, and make decisions during gameplay.

Similarly, learners agreed that they like playing digital games ($\bar{x}$ = 3.05, SD = 0.88) and use some of their free time to play digital games ($\bar{x}$ = 3.03, SD = 0.91). They also reported that playing digital games is part of their usual activities at home ($\bar{x}$ = 2.89, SD = 0.95) and that they become excited before playing ($\bar{x}$ = 2.89, SD = 0.93). These results reflect the affective and behavioral dimensions of engagement, as learners demonstrate enjoyment, anticipation, and willingness to allocate some of their leisure time to digital games.

The finding that learners keep playing even when the game is difficult ($\bar{x}$ = 2.75, SD = 1.04) further suggests a degree of persistence. Although this received one of the

lower mean scores, it was still interpreted as “Agree,” indicating that many learners are willing to continue engaging with challenging gameplay rather than immediately abandoning the activity. This persistence may be particularly relevant to learning contexts because well-designed digital games can provide opportunities for learners to encounter challenges, receive feedback, and attempt strategies repeatedly.

Interestingly, the only indicator interpreted as “Disagree” was “I play digital games many times a week” ($\bar{x}$ = 2.49, SD = 0.94). This result is important because it provides context for the overall finding. While learners generally enjoy digital games, use some of their free time for gaming, and demonstrate interest and effort during gameplay, they do not necessarily play very frequently. Thus, the findings point toward engagement that is meaningful but relatively balanced, rather than excessive involvement in digital gaming.

These findings strengthen the literature emphasizing that learners engage with digital games not only behaviorally but also through enjoyment, interest, persistence, and cognitive decision (Li et al., 2024; Mayer, 2019). The agreement across most indicators demonstrates At the same time, the overall moderate level of engagement and the disagreement regarding playing many times a week suggest that learners’ gaming behavior remains within a relatively balanced range. Overall, the findings support the view that digital games can serve as engaging environments for elementary learners while not necessarily resulting in excessive gaming.

Academic Performance

Table 2. Respondents Academic Performance

Performance	Frequency	Percentage
Outstanding (90-100)	26	25.2
Very Satisfactory (85-89)	25	24.3
Satisfactory (80-84)	38	36.9
Fairly Satisfactory (75-79)	14	13.6
Total	103	100.00

Source of Descriptors and Grading Scale; DepEd order No. 8, series of 2015

The distribution of learners' academic performance shows that the largest proportion falls under the Satisfactory level, with 38 learners or 36.9% obtaining grades within the 80–84 range. This is followed by learners classified as Outstanding, with 26 learners or 25.2%, and Very Satisfactory, with 25 learners or 24.3%. Meanwhile, 14 learners or 13.6% were classified as Fairly Satisfactory. Overall, the results indicate that most of the learners demonstrated at least satisfactory academic performance, although a considerable proportion did not reach the outstanding level.

The predominance of the Satisfactory category suggests that learners generally meet the expected academic standards but may still have opportunities to further improve their achievement (Robinos et al. 2025). The presence of 25.2% of learners in the Outstanding category, however, demonstrates that a substantial group is capable of attaining a high level of academic performance. This distribution may indicate differences in learners' study habits, learning experiences, motivation, and exposure to other factors that may influence academic achievement.

The findings may also be viewed in relation to the dual-edged nature of technology discussed in the literature. Ani et al. (2023) and Kus (2025) emphasize that technology can provide valuable opportunities for learning and engagement, but its effects may vary depending on how it is used. In the context of the present findings, digital technology and gaming may potentially support learners' motivation and cognitive engagement; however, these benefits do not automatically translate into outstanding academic performance. The fact that the largest proportion

of learners remains at the Satisfactory level suggests that technology use alone may not be sufficient to produce higher academic achievement.

Moreover, the relatively smaller proportion of learners classified as Fairly Satisfactory (13.6%) warrants attention, particularly when considering the possible effects of excessive or unregulated technology use. Paulich et al. (2021) noted that excessive screen time may be associated with minimal gains in academic performance. This reinforces the importance of balanced and purposeful technology use, particularly among elementary learners. Digital games and other forms of technology may contribute positively to learning when appropriately integrated, but excessive or poorly regulated use may limit the academic benefits that learners could otherwise obtain.

Overall, the results reveal that academic performance among the learners is generally satisfactory, with more than half achieving either Satisfactory, Very Satisfactory, or Outstanding performance. However, the concentration of learners in the Satisfactory category suggests that there remains considerable room for academic improvement. Consistent with Ani et al. (2023), Kus (2025), and Paulich et al. (2021), the findings highlight that technology should be approached as a potentially beneficial but not inherently positive influence. Its contribution to academic achievement depends largely on the manner, frequency, and purpose of its use, underscoring the need for appropriate guidance and regulation in learners' technology-related activities.

Extent of Socio-emotional Skills

Table 3. *Perceived Extent of Socio-emotional Skills among Elementary Learners*

Dimensions	x	SD	Interpretation
Self-awareness	3.34	0.79	High Extent
Self-management	3.26	0.82	High Extent
Social Awareness	3.32	0.86	High Extent
Relationship Skills	3.34	0.85	High Extent
Responsible Decision-making	3.25	0.85	Moderate Extent
Overall Mean	3.302	0.57	High Extent

Interpretation Scale: 1.00 – 1.75 = No Extent/Strongly Disagree; 1.76 – 2.50 = Low Extent/Disagree; 2.51 – 3.25 = Moderate Extent/Agree; and 3.26 – 4.00 = High Extent/Strongly Agree. **Legend:** x = mean and SD – Standard Deviation

Table 3 shows that elementary learners possess socio-emotional skills to a High Extent, as reflected by the overall mean of 3.302. This indicates that respondents generally demonstrate positive competencies in understanding themselves, managing their emotions and behaviors, interacting with others, and making decisions.

The highest ratings were obtained for self-awareness and relationship skills, both with a mean of 3.34, followed by social awareness (3.32) and self-management (3.26), all interpreted as High Extent. These findings suggest that learners are generally aware of their

strengths, weaknesses, and areas for improvement and are capable of developing positive relationships and responding appropriately to social situations. Responsible decision-making received the lowest mean of 3.25, interpreted as Moderate Extent, suggesting that this area may still require further development and guidance.

The findings support studies emphasizing that socio-emotional learning strengthens self-awareness, reflective thinking, and decision-making skills among learners (Toh & Kirschner, 2022; Chandran, 2025; Saleme et al., 2021; De La Barrera et al., 2021). While Palma and Barberan

(2025) reported moderate socio-emotional skills among learners aged 9–11, the present findings show comparatively higher levels in most dimensions. Similarly, the results are consistent with Gomez (2026), who found high levels of self-awareness, self-regulation, self-motivation, social awareness, and social competence among Grade 6 pupils.

Overall, the results indicate that learners have well-developed socio-emotional competencies, particularly in self-awareness and relationship skills, while responsible decision-making remains an area that could be further

strengthened through appropriate classroom activities and interventions.

Relationships and Prediction Model Equations

The assumption checks indicated that the residuals were normally distributed, as shown by the Shapiro–Wilk test ($W = 0.981, p = .138$), while the residual plot showed no pronounced pattern or funnel-shaped distribution. Therefore, the regression assumptions were reasonably satisfied. Given that total population sampling was employed, these findings describe the defined population included in the study.

Table 4. Result of Linear Regression for Prediction Equation Model between Academic Performance and the Level of Digital Game Engagement among Elementary Learners

Model Fit Measures

Model	R	R^2
1	0.127	0.0162

Note: Models estimated using N=103

Model Coefficients – Academic Performance

Predictor	Estimate	SE	t-value	p-value	Significant?
Intercept	82.04	2.503	32.77	<.001	---
Level of Digital Game Engagement	1.08	0.835	1.29	.200	No

The linear regression analysis showed a weak positive relationship between learners’ level of digital game engagement and academic performance, with an R value of 0.127 and an R^2 of 0.0162. This indicates that the level of elementary learners’ engagement in digital games explains only 1.62% of the variance in academic performance. Although the regression coefficient was positive ($B = 1.08$), the effect was not statistically significant ($t = 1.29, p = .200$). Thus, the findings do not provide sufficient evidence that digital game engagement significantly predicts learners’ academic performance. This finding suggests that while digital games may provide learning-related benefits, such as reducing mathematics anxiety and increasing learners’ self-confidence through interactive and visually stimulating environments (Juniarmi, 2025), these benefits may not necessarily translate into measurable improvements in overall academic performance. Moreover, the findings are consistent with the caution raised by Goktenturk and Oluşan (2026), whose large-scale analysis of PISA 2018 data involving 606,627 learners across 79 countries found that extracurricular

digital gaming was negatively associated with reading achievement. The authors suggested that compulsive gaming patterns, limited text-rich content, and interference with study routines may contribute to this negative association. Taken together, the present findings reinforce the view that the academic effects of digital gaming are context-dependent and may depend on how frequently, purposefully, and appropriately digital games are used. While digital games can support motivation and confidence in specific learning contexts, engagement in gaming alone may not be sufficient to improve learners’ overall academic performance.

The assumption checks showed no multicollinearity concern, with VIF and tolerance values of 1.00. However, the Shapiro–Wilk test indicated a significant departure from normality of the residuals ($W = 0.953, p < .001$), which was also reflected in the Q-Q plot. Despite this limitation, the regression demonstrates a meaningful positive association between learners’ engagement and their socio-emotional skills.

Table 5. Result of Linear Regression for Prediction Model Equation between Perceived Overall Extent of Socio-emotional Skills and Level of Digital Games Engagement among Elementary Learners

Model Fit Measures

Model	R	R ²
1	0.509	0.259

Note: Models estimated using N=103

Model Coefficients – Socio Emotional Skills

Predictor	Estimate	SE	t-value	p-value	Significant?
Intercept	1.969	0.2290	8.60	<.001	---
Level of Digital Game Engagement	0.454	0.0763	5.95	<.001	Yes

The linear regression analysis revealed a moderate positive relationship between learners' level of digital game engagement and their overall socio-emotional skills, with an *R* value of 0.509 and an *R*² of 0.259. This indicates that digital game engagement explains 25.9% of the variance in learners' overall socio-emotional skills. The regression coefficient for Level of Engagement was positive and statistically significant ($B = 0.454$, $SE = 0.0763$, $t = 5.95$, $p < .001$), indicating that higher levels of digital game engagement significantly predict higher socio-emotional skills. Specifically, a one-unit increase in engagement corresponds to an estimated 0.454-unit increase in overall socio-emotional skills. Thus, the regression equation is: *Overall Socio-emotional Skills* = $1.969 + 0.454(\text{Level of Digital Game Engagement})$.

This finding is supported by literature emphasizing the potential of digital games to promote socio-emotional development, emotional regulation, social interaction, and reflective thinking (Toh & Kirschner, 2022; Seleme et al., 2021; Wols et al., 2024). Toh and Kirschner (2022) particularly highlight the potential of appropriately designed digital games to support social-emotional learning, while Seleme et al. (2021) and Wols et al. (2024) similarly demonstrate their potential to develop competencies related to self-regulation, empathy, anxiety management, and social skills. These findings provide a plausible explanation for the significant positive relationship observed in the present study.

Furthermore, the results are consistent with Ani et al. (2023), who reported that educational games can contribute to the development of learners' motivation and decision-making skills. This is particularly relevant to the present findings, as the learners demonstrated relatively high engagement in thinking carefully before making decisions during gameplay. Such engagement may provide opportunities for learners to practice reflection, problem-solving, self-control, and decision-making in an interactive environment. The findings also support the broader observation of Kus (2025) and Chandran (2025) that digital learning experiences may contribute to learners' socio-

emotional and motivational development, although their effects depend on how technology is designed and used.

Overall, the findings suggest that digital game engagement may be more strongly associated with socio-emotional development than with academic performance. While the previous regression analysis showed that engagement did not significantly predict academic performance, the present analysis demonstrates a significant positive relationship with socio-emotional skills. This distinction reinforces the view that the value of digital games may extend beyond academic achievement, particularly when games are intentionally designed to promote social-emotional learning, reflection, interaction, and responsible decision-making. However, because the present study is correlational/predictive in nature, the findings should be interpreted as evidence of a significant predictive relationship rather than proof that digital games directly cause improvements in socio-emotional skills.

Conclusion

The study concludes that digital game engagement among elementary learners is moderate and relatively balanced, characterized by enjoyment, curiosity, persistence, effort, and cognitive involvement. This suggests that learners do not merely participate in gaming for entertainment but may also engage in processes involving attention, decision-making, problem-solving, and persistence. From the perspective of Self-Determination Theory, these characteristics reflect the potential of digital games to provide opportunities for autonomy, competence, and meaningful engagement, particularly when learners are given opportunities to make choices, overcome challenges, and experience a sense of mastery.

The findings further show that learners generally possess well-developed socio-emotional competencies, particularly in self-awareness and relationship skills. More importantly, digital game engagement demonstrated a significant predictive relationship with socio-emotional

skills, supporting the Social-Emotional Learning framework underlying the study. Digital gameplay can provide contexts where learners practice self-management, social awareness, relationship skills, persistence, emotional regulation, and responsible decision-making. This is consistent with the view that games can provide opportunities for learners to practice socio-emotional competencies through interaction, reflection, challenges, and feedback.

However, the findings indicate that digital game engagement does not necessarily translate into improved academic performance. This distinction reinforces the dual nature of digital technology: its educational value depends not simply on exposure or engagement but on the purpose, design, context, and manner of use. Digital games may therefore be more appropriately viewed as supplementary environments for engagement and socio-emotional development rather than standalone mechanisms for improving academic achievement.

Overall, the study contributes to the understanding of digital games as potential tools for the holistic development of elementary learners. Their value is maximized when games are intentionally selected or designed to support learning, socio-emotional development, reflection, collaboration, and responsible decision-making. Accordingly, teachers and parents should promote purposeful and balanced digital game use, while future research may examine how specific game features and theory-informed designs can more effectively support children's socio-emotional development and learning.

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