



The Influence of Online Gaming on the Learning Outcomes of Grade V Students at UPT SD Negeri 064025 Flamboyan Raya

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ABSTRACT

This research aims to determine whether there is an influence of online games on the learning outcomes of class V students at UPT SD Negeri 064025 Flamboyan Raya Medan for the 2022/2023 academic year. The population is all class V students at UPT SD Negeri 064025 Flamboyan Raya Medan, totaling 158 students. Sampling used purposive sampling and the sample used was class V-D, totaling 28 students at UPT SD Negeri 064025 for the 2022/2023 academic year. The method used in this research is a quantitative survey type research method. The survey type quantitative research method used in this research was to find the effect of playing online games on the learning outcomes of class V students at UPT SD Negeri 064025 Flamboyan Raya Medan. Based on the results of statistical processing, it shows that the level of addiction to playing online games among students is included in the strong category with an average of 88.28. Meanwhile, student learning outcomes have not met the KKM that has been implemented with an average of 72.85. By using the test $t_{count} = 4,530$ while $t_{table} = 2,056$ because $t_{count} \geq t_{table}$ then H_0 is rejected and H_a is accepted. This proves that there is a significant influence between playing online games on the learning outcomes of class V students at UPT SD Negeri 064025 Medan Selayang for the 2022/2023 academic year.

Keywords: online games, learning outcomes

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INTRODUCTION

Education is defined as a platform for the development and formation of individuals through proper guidance and direction throughout life, carried out through various efforts within the family, school, and community environments. The criteria for whether a nation is considered advanced or not are determined by the quality of its human resources, which in turn is influenced by the level of education of its people. The higher the level of education, the better the human resources, and vice versa. This aligns with Law Number 20 of 2003 on the National Education System, which states that national education functions to develop capabilities and form the character and dignified civilization of the nation in order to educate the nation's life. It aims to develop the potential and preparedness of educational human resources involved in the process. According to Kaban et al. (2021:103), education is one of the efforts to build and improve the quality of human resources in facing the challenges of globalization. Therefore, education is fundamental for every individual and cannot be overlooked, especially in an increasingly competitive and demanding era.

Education aims to develop students' potential to become individuals who are faithful and devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. This is stated in Article 3 of Law No. 20 of 2003 concerning the national education system. Elementary education plays a crucial role in improving the quality of education as a foundation for the future. To achieve this, maximum effort from both teachers and students in the learning process is necessary. Teachers and students must work collaboratively to achieve educational goals.

Teachers play a vital role in the progress of education. The characteristics that a teacher must possess include hard work, self-confidence, and respect for others. The duties of a teacher are to educate, teach, facilitate, design, manage, and evaluate. According to Law Number 14 of 2005 on Teachers and Lecturers, Article 1 paragraph 1, a teacher is a professional educator whose main tasks are to educate, teach, guide, direct, train, assess, and evaluate students in early childhood education through formal education channels, as well as in primary and secondary education.

Technological developments in today's digital era are advancing rapidly. Various technological advancements are easily accessible. Along with the development of the times, information and communication between people can be conducted using various tools or media, including entertainment media such as online games. Online games have developed rapidly in recent years. They are increasingly exciting and enjoyable, from appearance, gameplay style, graphics, resolution, and so on. There is also a wide variety of game types, such as war games, adventure games, fighting games, and others that make the games more attractive. The more interesting the game, the more players it attracts. In recent years, electronic games or online games have progressed significantly, as evidenced by the increasing number of internet cafes or online game centers not only in big cities but also in smaller towns.

According to Rahyun, Yunus, and Hamid (2021:66), online games have grown rapidly and are becoming increasingly enjoyable in terms of design, gameplay, graphics, resolution, and other features. The variety of game types, such as war, adventure, and fighting games, also adds to their appeal. The more interesting a game is, the more it is played, especially by students ranging from elementary to university levels. This is evident from the number of internet cafes and game centers filled with students playing online games. Students who frequently play online games tend to become addicted.

Siburian et al. (2022:1349) stated, "Excessive addiction can affect students' academic performance. This addiction can lead to laziness in studying, which ultimately impacts their learning outcomes." Academic achievement itself is something every student must strive for so that teachers can assess the level of student competency in cognitive, affective, and psychomotor domains during the learning process at school.

Based on preliminary observations of the Grade V teacher at SD Negeri 064025 Flamboyan Raya Medan, who serves as the homeroom teacher of Class VD, it was revealed that there has been a decline in student learning outcomes. Students are less active in participating in the learning process, and some are even sleepy in the morning due to fatigue from excessive gaming at night on gadgets or mobile phones. Others spend time playing online games in internet cafes, losing track of time and spending their pocket money on gaming.

On Wednesday, February 7, 2023, the researcher interviewed several fifth-grade students at SD Negeri 064025 Flamboyan Raya Medan who admitted to playing online games. The students said they enjoyed playing online games because it made them happy and not bored, especially when playing with friends online. From these interviews, it was found that playing online games affected their academic performance. Their grades were not satisfactory, as seen in their low scores in the odd semester exams of the 2022/2023 academic year. The following is the data of the odd semester exam results of Class VD students at SD Negeri 064025 Flamboyan Raya Medan.

Table 1. List of Odd Semester Exam Scores for Grade 5 Students

Minimum Mastery Criteria (MMC)	Number of Students	Percentage	Description
> 70	9	34%	Achieved
< 70	19	19.66%	Not Achieved
Total	28	100%	

Based on the data from Table 1, which presents the odd semester exam scores for Theme 5 Subtheme 1 of Grade V students at SD Negeri 064025, out of 28 students, only 9 students scored above the Minimum Mastery Criteria (MMC), while the remaining 19 students scored below the standard. In terms of learning

outcome percentages, 34% of the students achieved scores above the MMC, whereas 66% did not meet the minimum criteria. This indicates that the learning outcomes for Theme 5 Subtheme 1 among Grade V students at SD Negeri 064025 Flamboyan Raya Medan have not yet met the expected standard.

Based on observations conducted by the researcher on Thursday, January 26, 2023, the classroom activity of Grade VD students at SD Negeri 064025 revealed that 4 students were very active, 5 were active, 9 were moderately active, and 10 students were less active. This suggests that student learning interest in Grade V at SD Negeri 064025 Medan remains relatively low, with many students preferring to play and focus their attention on gadgets or mobile phones.

LITERATURE REVIEW

Online Games

According to the Kamus Besar Bahasa Indonesia (KBBI or the Great Dictionary of the Indonesian Language), the term "game online" consists of two words: "game" and "online." In Indonesian, "game" means a game or play, while "online" refers to something connected to the internet. Thus, a game is something used for playing, and "online" means being connected via a network. Therefore, an online game can be defined as a game program that is connected to the internet and can be played anytime and anywhere. Online games can be played simultaneously or in groups around the world, and the games typically feature visually appealing graphics supported by internet connectivity.

Affandi (2013:117) defines online games as computer games that can be played by multiple players via the internet. These are usually provided as additional services by online service providers or can be accessed directly by visiting certain websites or systems provided by the game companies. Similarly, Azis (in Kustiawan & Utomo, 2019:50) states that online games are games in which many people can play at the same time through online communication networks. Multiplayer online games are an evolution of single-player games.

To play online games, essential devices are required, such as a smartphone, computer, or other gadgets with specifications that support internet connectivity. In line with this, Harsan (2011:3) notes that online games are also commonly referred to as multiplayer online games because they involve many players interacting with each other in real time-this aspect is what makes online games engaging for players. Based on the above definitions, it can be concluded that online games refer to internet-based games designed for entertainment, where there are winners and losers. Online games are a type of game accessible through internet networks, consisting of a series of visually engaging games that players can control at will.

The Impact of Online Games on Students

Online games are often believed to have a negative impact on players, especially because most of the addictive games involve violence, battles, and fighting. The majority of parents and the media think and believe that these games damage children's minds and promote violent behavior among them. However, many psychologists, child experts, and scientists argue that such games can actually benefit children's development. Therefore, it can be concluded that playing online games has both positive and negative effects. On the positive side, according to Anhar (Putra, 2021), online games can help improve hand-eye coordination, motor skills, and spatial awareness. They also enhance a student's ability to analyze, make quick decisions, and think critically. On the negative side, these effects mostly arise because around 89% of online games contain violent content. According to Budiarti (2019), the negative impacts of online games on students include spending excessive time playing games outside school hours, decreased focus in class due to constant thoughts about games, falling asleep at school, neglecting school responsibilities, declining academic performance, lying about how much time is spent on games, preferring games over playing with friends, and withdrawing from social activities such as clubs or extracurricular programs. Based on these observations, it is clear that playing online games tends to bring more negative than positive impacts for students. This is understandable given that most online games involve violence, interfere with student concentration, reduce study time, and are generally unrelated to the school curriculum.

Online Game Indicators

According to Pangestika (2015:9), there are several indicators related to online gaming behavior. First is the place where online games are played. This refers to locations commonly used by students to spend their time playing online games, such as internet cafés (warnet), homes, cafés, and other public areas. In particular, internet cafés are specifically provided for accessing anything related to the internet. These places are accessible to everyone with relatively low costs and are usually open 24 hours, allowing users to play online games for extended periods without restriction.

The second indicator is the amount of time spent playing online games. Typically, gamers spend around 3 to 5 hours in a single online gaming session. For elementary school students, this gaming time often takes place after school, when they are supposed to rest or study at home. The third indicator involves the type of online games played, which commonly include games such as Point Blank, Ragnarok, and Mafia Wars. These games often require multiplayer interactions involving players from different parts of the world, and are frequently accessed through social media platforms like Facebook.

The fourth indicator is the tendency to complete assignments versus playing online games. Among students who are enthusiastic about online gaming, the tendency to complete schoolwork is relatively low. Elementary school gamers often prefer to play online games rather than do their homework or academic tasks. The relevance of these indicators in this research lies in their role as a foundation for identifying students' online gaming habits. This study specifically focuses on the influence of online gaming on students' academic achievement.

METHOD

Research Method

In conducting a research study, the researcher must determine the appropriate research method, as it plays a crucial role in validating the findings. According to Sugiyono (2018), quantitative research methods are based on the philosophy of positivism and are used to study specific populations or samples. Sampling techniques are generally conducted randomly, data collection involves research instruments, and data analysis is performed using quantitative or statistical methods aimed at testing established hypotheses.

This study adopts a quantitative research approach using a survey method. In line with Pakpahan and Manullang (2014:19), survey research is intended to collect data by examining a sample from a given population. Survey research generally does not explore the phenomenon in depth but instead uses techniques such as interviews, questionnaires, or direct observation of the research subjects. A research method refers to the systematic way or steps taken to gather, organize, and interpret data. Consistent with Sugiyono (2018), a research method is defined as a scientific approach to obtain data for specific objectives and purposes. The type of research used in this study is associative research, which aims to examine the relationship or influence between two or more variables. The study seeks to determine whether there is a significant effect between the independent variable and the dependent variable.

Research Design

According to Noor (2017), a research design illustrates the relationships among variables, methods of data collection, and data analysis. A well-constructed design provides both the researcher and interested parties with a clear understanding of the connections between variables within the research context and outlines what actions the researcher intends to take. In this study, there are two types of variables involved: independent and dependent variables. The independent variable (X) is the factor presumed to influence or affect the outcome, whereas the dependent variable (Y) is the result or response that is measured and affected by the independent variable. In this research, the independent variable is online gaming (X), while the dependent variable is the students' learning outcomes (Y). The study aims to assess the extent to which playing online games impacts students' academic performance.

Data Analysis Technique

In principle, data analysis can be carried out using two main approaches depending on the type of data: statistical analysis and non-statistical analysis. Statistical analysis is based on quantitative data and is further divided into descriptive statistics and inferential statistics. Meanwhile, non-statistical analysis is based on qualitative data, where the problems are observed from multiple perspectives, and data collection is not conducted randomly or mechanically but is instead controlled by the researcher.

One of the preliminary tests before hypothesis testing in parametric statistics is the normality test. This is essential because parametric statistical analysis assumes that the data are normally distributed. In this study, normality testing was conducted on both the independent variable (X) and the dependent variable (Y) using the SPSS software version 22.0. According to Arikunto (2018:333), the formula used in the Chi-Square (χ^2) test for normality is:

$$\chi^2 = \sum \frac{f_o - f_h}{f_h}$$

Where:

χ^2 = Chi-Square value

F = Observed frequency

Fh = Expected frequency

The criteria for normality are as follows: if the calculated Chi-Square value ($L_{\text{calculated}}$) is greater than or equal to the critical value (L_{table}), the data are considered normally distributed. Otherwise, if $L_{\text{calculated}}$ is less than L_{table} , the data are not normally distributed.

To determine whether there is a significant relationship between the independent variable (X) and the dependent variable (Y), a Product Moment Correlation test was conducted. The formula used, according to Arikunto (2018:213), is:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}$$

Where:

r_{xy} = Correlation coefficient between X and Y

$\sum XY$ = Sum of the product of X and Y

$\sum X$ = Sum of X scores

$\sum Y$ = Sum of Y scores

N = Number of samples

To test the hypothesis and determine whether the correlation coefficient (r) indicates a statistically significant effect, a t-test was applied. According to Sugiyono (2017:187), the t-formula is:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Where:

r = Correlation coefficient

n = Number of samples

The decision rule for this test is:

If $t_{\text{calculated}} \geq t_{\text{table}}$, the alternative hypothesis (H_a) is accepted, indicating a significant effect.

If $t_{\text{calculated}} < t_{\text{table}}$, the alternative hypothesis is rejected, implying that the independent variable does not significantly affect the dependent variable.

RESULTS AND DISCUSSION

Research Results in Class VD

This research was conducted in Class VD, which consisted of 30 students. The initial step taken by the researcher was to visit the school to carry out the data collection process. Upon arrival, the researcher

greeted the students and explained the purpose and objectives of the study. Following the introduction, the researcher gave clear instructions on how to fill out the questionnaire accurately, ensuring that the students understood each statement and responded based on their actual habits and experiences.

Once the students completed the questionnaires, they were collected and reviewed by the researcher. Afterward, the researcher expressed appreciation to the homeroom teacher of Class VD for the cooperation and permission granted during the research process, as well as to all the students who had participated by completing the questionnaire. The data obtained from the questionnaires were then analyzed to determine the frequency of students' online gaming habits.

Table 2. Frequency Distribution of Online Game Playing

X	F	FX	$X - \bar{X}$	X^2	FX^2
78.00	2.00	156.00	-10.28	105.68	2,113.57
80.00	2.00	160.00	-8.28	685.58	1,371.17
81.00	1.00	81.00	-7.28	529.98	529.98
82.00	1.00	82.00	-6.28	394.38	394.38
84.00	3.00	252.00	-4.28	183.18	549.55
85.00	2.00	170.00	-3.28	107.58	215.17
86.00	1.00	86.00	-2.28	51.98	51.98
87.00	1.00	87.00	-1.28	16.38	16.38
88.00	2.00	176.00	-0.28	0.08	0.16
90.00	2.00	180.00	1.72	29.58	59.17
91.00	1.00	91.00	2.72	73.98	73.98
92.00	2.00	184.00	3.72	138.38	276.77
93.00	1.00	93.00	4.72	222.78	222.78
94.00	1.00	94.00	5.72	327.18	327.18
95.00	3.00	285.00	6.72	451.58	1,354.75
98.00	2.00	196.00	9.72	944.78	1,889.57
99.00	1.00	99.00	10.72	1,149.18	1,149.18
Total	$\Sigma = 30$	$\Sigma FX = 2472$		$\Sigma X^2 = 636.413$	$\Sigma FX^2 = 1059.715$

Based on the results of calculations obtained from the data on teachers' professional competence, the mean score was 88.28, with a standard deviation of 6.151 and a standard error of 1.185. These results indicate a relatively high level of professional competence among the teachers involved in the study. Furthermore, the following table presents the frequency distribution of students' levels of online game addiction, which was analyzed based on their average academic performance over the past academic year.

Table 3. Frequency of Online Game Addiction Levels

No.	Score Range	Frequency	Percentage	Category
1	75–80	4	14%	Low
2	80–85	7	25%	Less
3	85–90	6	21%	Moderate

No.	Score Range	Frequency	Percentage	Category
4	90–95	8	28%	High
5	95–100	3	11%	Very High
	Total	28	100%	

Based on the table above, the highest percentage of students (28%) fall into the High category of online game addiction.

Table 4. Average Score of Student Learning Outcomes on Theme 5 Subtheme 1

No.	Score Range	Frequency	Percentage	Category
1	60–65	5	18%	Very Low
2	66–70	6	21%	Low
3	71–75	8	29%	Moderate
4	76–80	6	21%	High
5	81–85	3	11%	Very High
	Total	28	100%	

Based on the table above, the majority of students (29%) fall into the Moderate category of learning outcomes for Theme 5 Subtheme 1. This indicates that most students are achieving an average level of academic performance, with only a small percentage reaching the very high category.

Table 5. Frequency Distribution of Student Learning Outcomes at SD Negeri 064025 Medan Selayang

No.	Score Interval	Frequency	Percentage	Category
1	61–67	19	67%	Low
2	68–81	0	0%	Below Average
3	81–87	1	4%	Average
4	88–94	7	25%	High
5	95–101	1	4%	Very High
	Total	28	100%	

Based on the table above, the learning outcomes of students at SD Negeri 064025 Medan Selayang are predominantly in the Low category, with 19 out of 28 students (67%) scoring between 61 and 67. Only 7 students (25%) achieved High learning outcomes, and just 1 student each (4%) reached the Average and Very High categories. Notably, no students fell into the Below Average (68–81) category.

The average score (mean) is 72.85, with a standard deviation of 2.34, and a standard error of 0.45. These results indicate that the majority of students have not yet met the expected level of academic performance and suggest the need for improved instructional strategies and learning support to raise overall student achievement.

Assumption Test of Data Analysis

Normality Test

According to Noor (2017:174), the normality test is conducted to determine whether the data obtained comes from a population that is normally distributed or not. This test is carried out on both variables being studied, namely the independent variable (X) and the dependent variable (Y). The results of the normality test using the Kolmogorov-Smirnov method (via SPSS) are presented below:

Table 6. Normality Test

		Unstandardized Residual
N		28
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	9.85546074
Most Extreme Differences	Absolute	.083
	Positive	.072
	Negative	-.083
Test Statistic		.083
Asymp. Sig. (2-tailed)		.200 ^{c,d}

The normality test is used to determine whether the data in the study are normally distributed or not. After performing calculations using SPSS with the Kolmogorov-Smirnov (K-S) test, it was found that the significance value is greater than or equal to 0.05. Based on the results of the normality test, the significance value was $0.200 \geq 0.05$, which indicates that the data are normally distributed.

Data Processing and Analysis Techniques: Correlation Test

The correlation analysis using the Pearson Product-Moment formula (r_{xy}) aims to determine whether there is a significant relationship between variable X (independent) and variable Y (dependent). This test is intended to measure the strength and direction of the relationship between the two variables. The result of the correlation coefficient (r_{xy}) is then interpreted according to its interval value, which indicates the strength of the correlation.

Table 7. The interpretation of the correlation coefficient is categorized

Correlation Coefficient Interval	Strength of Relationship
0.00 – 0.199	Very Weak
0.20 – 0.399	Weak
0.40 – 0.599	Moderate
0.60 – 0.799	Strong
0.80 – 1.000	Very Strong

Thus, the closer the correlation coefficient value is to 1.000 or -1.000, the stronger the relationship between the two variables. A positive value indicates a direct relationship, while a negative value indicates an inverse relationship.

Table 8. Correlation between Online Gaming and Student Learning Outcomes

	Questionnaire	Learning Outcomes
Questionnaire	Pearson Correlation = 1	.664 (**)
	Sig. (2-tailed) = —	.000
	N = 28	N = 28
Learning Outcomes	Pearson Correlation = .664 (**)	1
	Sig. (2-tailed) = .000	—
	N = 28	N = 28

Based on the statistical analysis performed, the correlation coefficient (r_{xy}) or calculated r-value was found to be 0.664, with a significance level (Sig. 2-tailed) of 0.000 and a sample size of $n = 28$ students. Referring to the critical value table for Pearson correlation with $n = 28$ and a significance level of 5%, the r-table value is 0.374. Since $r\text{-calculated} (0.664) \geq r\text{-table} (0.374)$, it can be concluded that the alternative

hypothesis (H_a) is accepted. This indicates that there is a significant negative correlation between online gaming (X) and student learning outcomes (Y) at SD Negeri 064025 Flamboyan Raya Medan. Furthermore, based on the r-value interpretation scale, a correlation coefficient of 0.664 falls within the range of 0.60–0.799, which signifies a strong level of correlation. Therefore, it can be concluded that online gaming has a strong and significant negative influence on students' academic performance.

Hypothesis Testing

The hypothesis testing in this study was carried out using the t-test with the assistance of SPSS version 22.0. The t-test was used to determine whether there is a significant influence of the independent variable (online gaming) on the dependent variable (student learning outcomes). The hypothesis testing was conducted by comparing the t-calculated value with the t-table value. The criteria used in the t-test are as follows: if t-calculated value with the t-table value, then the alternative hypothesis (H_a) is accepted; otherwise, it is rejected. The hypotheses proposed in this study are:

H_0 : There is no significant effect of online gaming on students' learning outcomes.

H_a : There is a significant effect of online gaming on students' learning outcomes.

The following table presents the results of the hypothesis test based on the SPSS output:

Table 9. Hypothesis Test (t-Test Results)

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	-50.788	27.304		-1.860	.074
Questionnaire	1.398	.309	.664	4.530	.000

Based on the table above, the t-calculated value with the t-table value is 4.530, while the t-calculated value with the t-table value at the degree of freedom ($df = n - 2 = 28 - 2 = 26$)** is 2.056 (at a 5% significance level). Since t-calculated value (4.530) $\geq$ the t-table value (2.056), the alternative hypothesis (H_a) is accepted. This means there is a significant influence of online gaming (X) on student learning outcomes (Y). The positive value of the coefficient ($B = 1.398$) also indicates the direction of the relationship, although based on earlier interpretation, the effect has been identified as having negative implications for learning outcomes (due to high gaming intensity associated with lower scores).

Discussion

The research conducted at SD Negeri 064025 Flamboyan Raya Medan aimed to examine the extent to which online gaming influences the academic performance of fifth-grade students. This study employed a quantitative method with a questionnaire as the primary data collection instrument and involved 28 students selected through a saturated sampling technique. Based on data analysis, the result showed that the t-value t-calculated value 4.530 was greater than the t-table 2.056, and the correlation coefficient 0.664 falls within the range of 0.60–0.799, indicating a strong negative relationship. This means that the higher the frequency of online gaming, the lower the students' academic achievement, and vice versa.

These findings are consistent with previous studies. For instance, Prasetyo and Nugroho (2020) found that the habit of playing online games negatively correlates with students' academic performance. They reported that frequent gamers tend to experience reduced concentration, mental fatigue, and limited study time. Similarly, Firmansyah and Mulyani (2019) emphasized the negative effects of online gaming, including sleep disturbances, decreased motivation to learn, and increased gadget dependency. If left unmonitored, such habits may result in delays in academic information processing and a significant decline in students' grades. This demonstrates that online games can become a major distraction in the learning process, particularly for elementary school students who often lack time management and self-discipline.

From a theoretical perspective, these results align with B.F. Skinner's behaviorist theory, which posits that behavior is shaped by stimuli and responses. Online games provide strong stimuli in the form of

challenges, virtual rewards, and instant social interaction, which reinforce repeated gaming behavior. This phenomenon, known as positive reinforcement, encourages children to continue playing at the expense of other responsibilities, including studying. When academic tasks fail to provide comparable levels of stimulation or gratification, students are more likely to opt for engaging in online games that deliver immediate satisfaction.

Furthermore, learning outcomes are defined as changes in behavior encompassing the cognitive, affective, and psychomotor domains, as proposed by Bloom (1956). Effective learning enhances students' thinking ability, emotional control, and practical skills. When students spend excessive time playing games, they lack the opportunity and energy to fully develop these areas. Consequently, academic achievement suffers due to the absence of optimal internalization of instructional material. This study suggests that students' performance can decline significantly when academic activities are overshadowed by addictive, non-educational gaming behaviors.

In addition, from the perspective of child development, excessive gaming may hinder the formation of healthy learning habits. According to Piaget, elementary school students are in the concrete operational stage, where learning is most effective through hands-on experiences and repetition. If their study time is reduced due to gaming distractions, their cognitive and social development may be compromised. Moreover, Vygotsky (1978) emphasized the importance of social interaction and guidance from adults or peers in fostering the zone of proximal development (ZPD). However, interactions within online games are not always constructive or educational and may inhibit the scaffolding process that students require for formal learning.

In light of these supporting theories and previous research, it can be concluded that online gaming has a significant and negative impact on students' academic performance. Therefore, the active role of parents, teachers, and schools is crucial in limiting gadget usage and guiding students toward more productive and educational activities. Additionally, schools should seek to integrate technology into learning in more engaging and educational ways, so that students do not rely solely on online games for gratification. The results of this study are expected to serve as valuable input for all stakeholders in elementary education to respond appropriately to the growing digital phenomenon.

CONCLUSIONS AND RECOMMENDATION

Based on the analysis conducted on fifth-grade students at UPT SD Negeri 06405 Medan Selayang for the 2022/2023 academic year, it can be concluded that the intensity of online gaming among students is relatively high, with a percentage of 28% and an average score of 88.28. This high level of online gaming activity indicates that many students spend a significant amount of time engaged in such activities. This raises serious concerns, as excessive gaming habits may interfere with students' study time, reduce concentration, and lower their motivation to participate optimally in the learning process.

Furthermore, statistical testing revealed that the t -value 4.530 is greater than the t -table value 2.056, and the correlation coefficient 0.664. This indicates a strong and significant negative relationship between the variable of online gaming and students' academic performance. In other words, the higher the students' engagement in online gaming, the lower their academic achievement tends to be. Therefore, the alternative hypothesis (H_a) is accepted, confirming that there is a significant negative influence of online gaming on the academic performance of fifth-grade students at UPT SD Negeri 06405 Flamboyan Raya Medan. These findings serve as an important foundation for both schools and parents to pay closer attention to the duration and supervision of students' digital activities in order to maintain the quality of their learning and academic achievement.

Based on the research findings, which reveal a significant negative influence of online gaming on students' academic performance, it is recommended that schools take a more active role in providing and managing engaging and beneficial extracurricular activities. Programs such as sports, arts, scouting, or educational digital literacy can serve as positive alternatives to redirect students' attention away from excessive online gaming. Furthermore, schools are encouraged to establish strong collaboration with parents

to monitor students' device usage and study time at home in order to create a balanced and healthy learning environment.

For students, it is essential to develop an awareness of the impact that online game addiction may have on their academic achievement. Students are expected to gradually reduce their gaming intensity and cultivate a stronger motivation to learn in pursuit of their educational goals. Teachers also play a critical role in providing encouragement, guidance, and a supportive educational and emotional approach, helping students to use their time more productively.

Finally, future researchers in the field of Primary Teacher Education (PGSD) are advised to broaden the scope of the study by involving a larger sample size, diverse school locations, and additional variables such as parental involvement or students' learning habits. This will contribute to a more comprehensive understanding of the impact of online gaming on learning processes and academic outcomes at the primary school level.

Limitation

This research, while providing important insights into the relationship between online gaming and academic performance among elementary students, is subject to several limitations. First, the study used a purposive sampling method and was limited to a single class (Class VD) at UPT SD Negeri 064025 Flamboyan Raya Medan, with a sample size of only 28 students. This small and localized sample may not fully represent the broader population of elementary school students in different regions or educational settings. As a result, the generalizability of the findings is limited to similar contexts.

Second, the research employed a quantitative survey method, relying primarily on self-reported questionnaire data to assess students' gaming behavior and learning outcomes. Self-reported data can be subject to response bias, as students may underreport or overreport their gaming habits or academic difficulties. Additionally, the study did not explore qualitative aspects such as student motivation, emotional well-being, family environment, or teacher-student interactions that could provide a more holistic understanding of the factors influencing learning outcomes. Finally, the cross-sectional nature of the research captures data at a single point in time, thus limiting the ability to assess long-term effects of online gaming on academic performance.

Credit authorship contribution statement

Ruth Kesia Simatupang: Conceptualization, Methodology, Data Curation, Formal Analysis, Visualization, Writing – Original Draft, Writing – Review & Editing. Patri Janson Silaban (Advisor I): Supervision, Validation, Project Administration, Academic Review. Regina Sipayung (Advisor II): Methodology, Resources, Content & Language Review, Final Editing. Rumiris Lumban Gaol (Academic Supervisor/Program Coordinator): Project Administration, Final Evaluation, Validation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical Declaration

All participants provided informed consent prior to their involvement in the study. They were informed about the study's purpose, procedures, and their right to withdraw at any time without consequence.

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