

## **The Effects of Online Gaming on Student Achievement: A Meta-Analytical Review**

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### **Abstract**

Various aspects of life, including education, have been significantly impacted in the rapidly evolving technological era. A notable phenomenon within this context is the use of online games among elementary school students and its potential impact on academic achievement. This study aims to investigate the relationship between online game usage and academic performance in elementary school students through a meticulous and comprehensive approach. Utilizing meta-analysis and systematic observation with JASP 0.18.3.0 software, this research identified 50 articles through an extensive search, from which six articles were selected based on predefined criteria. Data extracted from these selected articles included sample size (N) and correlation values (r), which were then used to analyze the effect size. The results indicated an effect size of -0.120, classified as medium, with a 95% confidence interval ranging from -0.790 to 0.550. The findings of this meta-analysis are consistent with previous research and reinforce existing theories, leading to the conclusion that there is a not relationship between online game usage and academic achievement among elementary school students.

**Keywords:** Online Games; Achievement; Elementary School

### **INTRODUCTION**

In this era of technology, various aspects of life, including education, are rapidly developing (Solehudin, 2023). One phenomenon that has attracted attention in this context is the use of online games among elementary school students and its potential impact on academic achievement (Aisyah et al., 2023). The education sector has been one of the areas most affected by technological advances, especially with the rise of online gaming (Akbar & Noviani, 2019). Online games are no longer considered just entertainment but also potential learning tools (Abidin, 2024). However, research regarding the relationship between online game use and elementary school students' academic achievement still needs to be completed (Darmawan, 2023). Thus, a deep

understanding of the influence of online games on children's education is crucial, both to maximize the benefits of technology in learning and to overcome potential risks that may arise.

Although educational literature has recognized the potential of online games as an innovative learning tool, research exploring the relationship between online game use and elementary school students' academic achievement still needs to be improved (Ariani et al., 2023). In the context of primary education, where the foundations of academic skills are being formed, a better understanding of the influence of online games is critical to establishing more effective learning practices (Nugraha, 2020). However, concerns about the negative impact on students' study time and concentration among elementary school children are still a significant concern, mainly due to the lack of thorough understanding of the impact of online games on academic achievement (Prananto, 2022). Thus, there is a need for further research efforts to explore the relationship between online game use and elementary school students' academic achievement, as well as to understand contextual factors that may influence this impact.

In the context of continuously developing education, understanding the impact of online games on the academic achievement of elementary school (SD) students is becoming increasingly important (Ammar, 2023). Several studies have explored the educational potential of online games and their impact on cognitive skills. Most existing literature tends to focus on older populations or needs to differentiate between game types. However, amidst the diversity of research on online games in education, there still needs to be a gap in understanding how the use of online games explicitly affects the academic achievement of elementary school students (Meldawati, 2022). Thus, a better understanding of how the use of online games explicitly affects elementary school students' academic achievement can direct learning practices towards being more effective and adaptive in facing the growing technological reality among elementary school students.

In an educational environment that continues to develop, technology and innovation are becoming increasingly important in shaping students' learning experiences (Ardiansyah & Nana, 2020). In this context, the use of online games as a learning tool has attracted the attention of educators and researchers because of its potential to increase student engagement and learning outcomes (Suyuti, 2023). Although their potential benefits have been recognized in the literature, more research needs to be focused on online game use and student achievement. This study uses a careful and detailed approach to investigate the relationship between online game use and elementary school students' academic achievement.

## **METHODS**

This research uses quantitative research, which examines a phenomenon by changing data into statistically analyzed numbers. In this case, the phenomenon in question is the impact of online games on student achievement. According (Sugiyono, 2013), quantitative research is based on positivism; that is, it is used to examine a specific population or sample. This research uses a meta-analysis approach. The techniques used include summarizing research data and reviewing and analyzing data from several relevant research results that have been published. In addition, a meta-analysis approach was carried out to combine and evaluate quantitative statistical data based on research findings, namely the relationship between online games and the academic achievement of elementary school students.

Research data is collected via the page <https://www.researchrabbit.ai/> with the verbs "online games" and "student achievement". The search for research data was limited to the last five years, namely between 2023 and 2019. Based on the search, 50 articles were obtained, with six articles according to predetermined characteristics. These characteristics include online game analysis, student achievement, sample size, r-value, madrasa level, including *Madrasah Ibtidaiyah* (MI), research location, standard error, and effect size. Effect size is a standard measure used by meta-analyses to determine the strength and direction of correlation (Borenstein et al., 2021). Data analysis in this study used JASP 0.18.3 software.

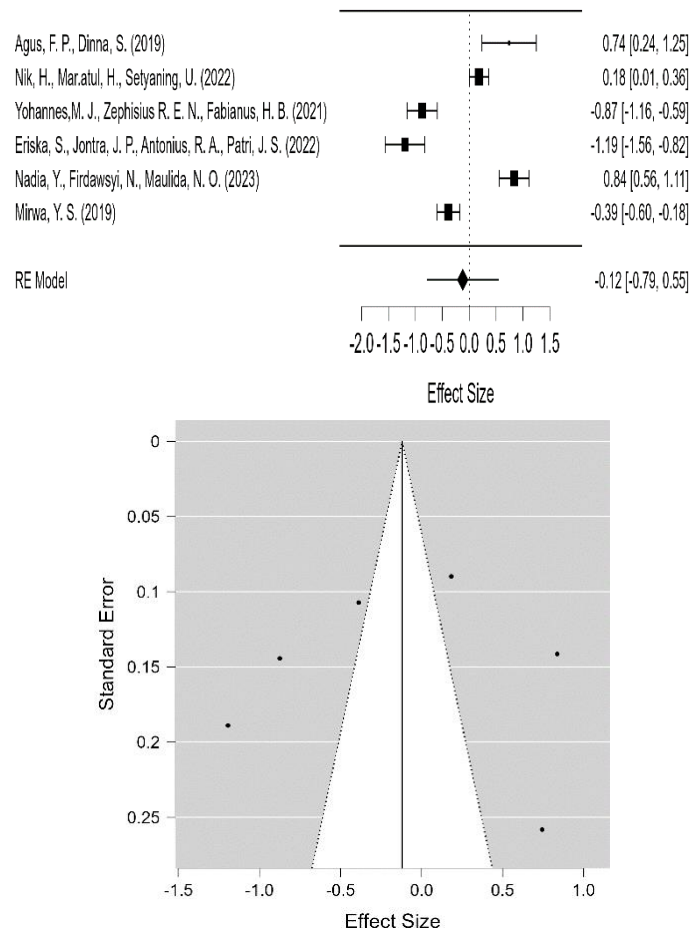
## RESULTS AND DISCUSSION

The period specified in the literature search scope phase is 2019-2023, according to the article publication requirements, namely the last five years with the verbs "online games" and "student achievement." Based on the determined characteristics, the research results can be seen in Table 1 below.

**Table 1. The Impact of Online Games on Achievement in the 2019-2023 Time Range**

| Writer   | Level             | Regency/city   | Province      | N   | r      |
|--|-------------------|----------------|---------------|-----|--------|
| Agus, FP, Dinna, S. (2019)                             | MI                | Tuban          | East Java     | 18  | 0.074  |
| Nik, H., Mar'atul, H., Setyaning, U. (2022)            | MI                | Tulungagung    | East Java     | 127 | 0.181  |
| Yohannes, MJ, Zephisius REN, Fabianus, HB (2021)       | elementary school | Langke Rembong | NTT           | 51  | -0.087 |
| Eriska, S., Jontra, JP, Antonius, RA, Patri, JS (2022) | elementary school | Deli Serdang   | North Sumatra | 31  | -0.832 |
| Nadia, Y., Firdawsyi, N., Maulida, NO (2023)           | elementary school | Wonorejo       | East Java     | 53  | 0.083  |
| Mirwa, Y.S. (2019)                                     | elementary school | Yogyakarta     | Yogyakarta    | 90  | -0.369 |

Based on Table 1 above, several researchers chose SD/MI education levels according to their characteristics. The highest sample size was in research conducted in East Java Province (N=127), while the lowest was in North Sumatra Province (N=31). The results of Haryanti et al. (2022) show the highest Ni r-value (0.181), while the lowest r-value (-0.087) is shown by the results of Jamun et al. (2023).



**Figure 1. Research results based on forest plots and funnel plots**

The effect size value is -0.120, with a standard error of 0.341. The average confidence interval (M) is 95%, from -0.790 to 0.550. In summary, the results of the effect size analysis of online games and student achievement can be seen in Figure 1, forest plots and funnel plots.

Next, determine whether the hypothesis is rejected or accepted. Based on calculations, the Z-value is (-0.352), and the P-value (**0,725**)>**0,05** is at the 95 percent significance level. So, the hypothesis is rejected, which means that online games are no significantly correlated with the academic achievement of elementary school students. Thus, the effect size analysis of the two variables shows a significant relationship between the use of online games and the academic achievement of elementary school students. Based on the research conducted by (Haryanti et al, 2022; Prasetyo, 2019; Siburian, 2022), it has been noted that online games don't have a significant impact on student

performance. However, according to studies by (Jamun, 2023; Setyaningrum, 2019; Siburian, 2022), there is no significant influence of online game usage on the academic performance of elementary school students. Susanti, as cited in (Abdullah., 2022) defines academic achievement as the ability to overcome difficulties, master, excel, and meet high standards. Every child has different achievements. A decline in student performance is often attributed to online gaming addiction, which diminishes seriousness and active participation in learning (Haidar & Antika, 2022). On the other hand, according to (Marta et al., 2022), playing online games can enhance creative thinking skills and broaden foreign language proficiency. Online games help students hone their analytical abilities, problem-solving skills, and boost creativity and imagination (Doni, 2018). Research indicates that there is no relationship between online gaming and student performance.

The effect size value resulting from the relationship between the two variables is -0.120, with the medium category at the 95 per cent confidence level in the range of -0.790 to 0.550. It is consistent with previous studies stating that online games can affect focus and study time, although the effects are only sometimes significant or immediate. Time spent playing online games reduces study time and other academic activities, which ultimately affects student achievement. Research by (Zendrato, 2022) also concluded that addiction to online games can make students forget about assignments and studying, reducing seriousness and activeness in learning. Several factors influence online game addiction. First, family factors that provide freedom without control can cause students to neglect their obligations. Second, environmental factors encourage students to join in playing games (Meutia, 2020).

Apart from that, Detria in (Irawan, 2021) mentions two factors that cause online game addiction: internal and external. Internal factors include a strong desire to achieve high game scores, inability to set priorities, boredom, and lack of self-control. External factors include an uncontrolled environment and a lack of good social relationships. Research shows that online game addiction hurts student achievement. (Marta et al., 2022) also found that online game addiction has an impact on learning, health, and personality, as well as the family and community environment. Therefore, paying attention to the duration and type of games students play is essential to maintain their academic performance.

## **CONCLUSION**

The impact of online gaming on elementary school students' academic performance tends to be negative and is not always significant or immediate. Students who are addicted to online games contribute to a decline in academic achievement and face issues with time management. The findings indicate that students who spend excessive time playing online games tend to experience a decrease in their ability to recall and understand learning materials, resulting in a decline in academic quality. While online games offer some benefits, the problems associated with online gaming are not the

sole variables affecting students' performance. Efforts to mitigate the negative impact on students' academic performance include collaboration between schools and parents to establish healthy time limits for online gaming. The use of online games should be monitored and controlled to ensure that students do not spend excessive time gaming, which could interfere with their studies.

In summary, this meta-analysis concludes that there is a negative correlation between elementary school students' academic performance and online gaming. The study recommends further research on the impact of online gaming on students at various educational levels, including elementary school.

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