

Examining Parents' Attitudes Toward Video Games in Children's English Language Learning: An ANOVA and Regression Analysis

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Abstract. This study investigates the role of video games in supporting English language learning among primary school students aged 7–14, based on survey data from 45 parents in Stip. Statistical analyses conducted in IBM SPSS showed no significant gender differences in parental attitudes toward the educational value of video games. Regression analysis identified children's affinity for learning English through games as a significant predictor of vocabulary development ($R^2 = 0.394$, $\beta = 0.468$, $p < 0.001$). An extended regression model confirmed that both affinity and perceived usefulness of video games significantly contributed to vocabulary progress ($R^2 = 0.505$). Correlation analysis demonstrated a moderate positive relationship between motivational influence and vocabulary development ($r = 0.509$). The findings suggest that video games can serve as a supportive tool for enhancing vocabulary acquisition and learner motivation in English language teaching.

Keywords. ANOVA test, video games, technology, children, English language.

Introduction

The relentless advancement of recent technologies across all segments of modern life has led to the integration of innovative tools in creative and professional activities across all age groups and settings. One such tool frequently used in everyday life and educational contexts is engaging digital video games [3]. With over two billion players worldwide and an average player age of 16, gaming extends far beyond children and teenagers [4]. Video games have emerged as an effective and enjoyable tool for learning English. By integrating games into language learning, students can experience immersive and interactive environments that facilitate vocabulary expansion [10], improve grammar, practice pronunciation, and enhance overall language proficiency. With the wide range of games available, students can select options that align with their interests and learning styles. While learning a new language can be challenging, incorporating games into the process can make it not only more enjoyable but also highly effective [11]. In the context of English language learning, games provide an interactive environment that engages students, enriches their vocabulary, improves grammar and pronunciation, and enhances overall linguistic competence [9] [12].

The influence of video games on students' English language learning has understandably attracted the attention of researchers in the educational field. Numerous surveys and studies in this area highlight potential benefits, prompting the need for systematic and professional verification of research findings. For this purpose, statistical software tools are increasingly used to analytically validate research outcomes. The IBM SPSS software, incorporating descriptive statistics and variable calculations, most commonly through ANOVA analyses is widely employed by researchers [6]. ANOVA is typically applied

when data are experimental in nature. Variance analysis can be used even without access to specialized statistical software, while ANOVA provides its own framework for calculating data. It is simple to use and particularly suitable for small samples involving participants and test groups, as in the present study. ANOVA analysis is noted for reducing errors by grouping differences through comparisons of group means and partitioning variance across diverse sources [9].

The versatility of ANOVA and its ability to manage multiple variables make it a valuable tool for researchers and analysts across diverse fields. By comparing means and partitioning variance, ANOVA provides a robust method for understanding relationships between variables and identifying significant differences between groups. Partitioning variance into distinct sources allows researchers to detect meaningful differences and identify significant relationships among variables [5]. Its adaptability and capacity to manage multiple factors make it an indispensable tool for any field that relies on statistical analysis, including educational research. Regarding the validity of the derived variables and their functionalities, questions often arise as to whether ANOVA relies on specific assumptions. Indeed, ANOVA assumes that the data are normally distributed, that the variance across groups is approximately equal, and that all observations are made independently. Understanding the principles, forms, and applications of ANOVA is crucial for the effective use of this technique, whether employing one-way or two-way ANOVA. As with any statistical method, careful interpretation of results, considering both the context and limitations of the analysis, remains essential.

Methods

The application of professional statistical software in analysing data obtained from structured surveys on the perceived impact of recent technologies on English language learning requires a more complex methodological approach. Such an approach ensures both the verification of the research objectives and the validity of the obtained and expected results. This is particularly important given the study's design, which involves both indirect actors (students) and direct respondents (parents) in assessing the effects of video games on English language learning. In this context, the study employs a mixed-methods approach, integrating quantitative and qualitative methodologies to examine the effect of gamification on motivation and English language learning, consistent with the approach and findings of [8]. The quantitative component focused on assessing academic performance through standardized survey instruments, while the qualitative component relied on semi-structured interviews [13]. The integration of these methods facilitates a comprehensive analysis of gamification's impact on students' English language learning [1] [2]. For statistical analysis, this study used the survey data collected by [13], which focused on evaluating the effectiveness of mediation in English language learning through video games. The surveys targeted the parents of primary school students (aged 7–14) in Stip who are learning English as a second language. The primary aim was to assess the role of video games in improving language skills, with parents playing a key role in the process. Data collection was conducted in phases, beginning with parental consent, followed by a 13-item online survey via Google Forms, involving a total of 45 parents

(32 women, 13 men) aged 30 to over 45 years. The collected survey data were analysed using the IBM SPSS statistical software, incorporating ANOVA test analysis. ANOVA is a statistical method used to assess differences between the means of one or more groups. Essentially, it allows arithmetic means to be compared across multiple groups simultaneously, providing a mechanism to determine whether the observed differences are due to chance or they reflect significant variations. Its versatility and ability to manage multiple factors make ANOVA an essential tool across various fields that rely on statistical analysis, including educational research.

Results and Discussion

The statistical analysis conducted through ANOVA provided a wide range of information of both descriptive and regression nature, expressed through absolute numbers, correlation coefficients, and unequivocal confirmatory responses regarding parents' attitudes on the most significant questions related to the improvement of vocabulary and motivation for learning English in their children through the use of video games. The following section presents the key findings from the applied statistical analysis.

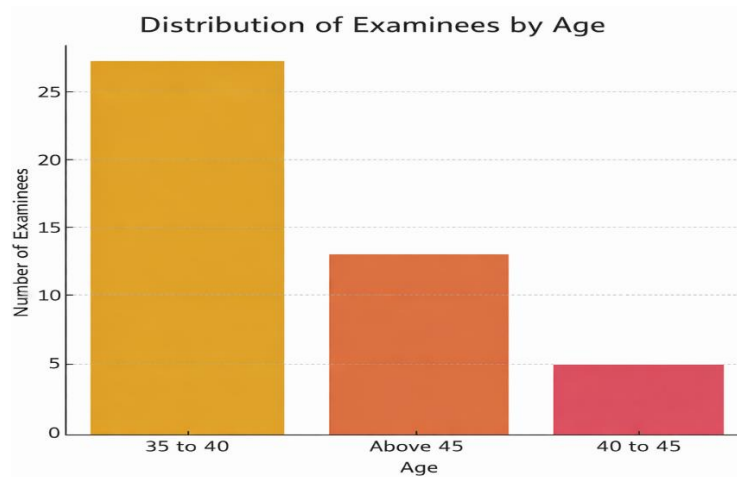


Figure 1. *Distribution by age*

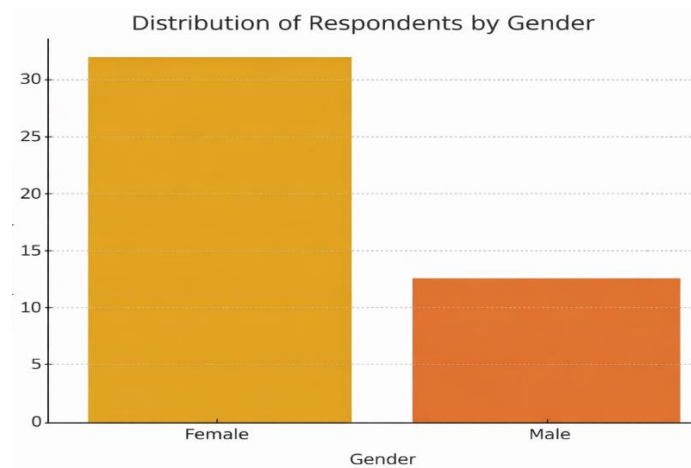


Figure 2. *Distribution by gender*

The results of the descriptive analysis indicate that respondents are predominantly distributed according to gender and age, as illustrated in the graphs. The findings of the ANOVA analysis ($F = 0.7036$, $p = 0.4062$) reveal that there is no statistically significant difference in the responses between male and female participants regarding whether playing video games can be beneficial for learning a foreign language, which is consistent with the findings reported by authors at [7] and [2].

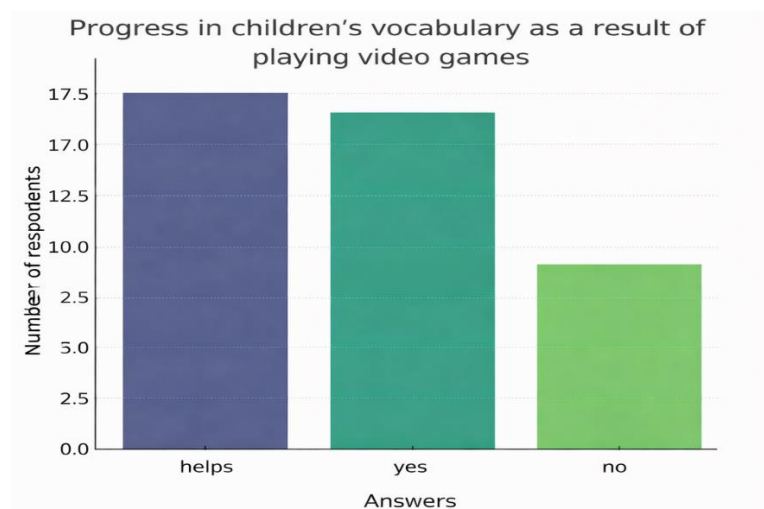


Figure 3. *Graphical representation of progress as a result of playing VG*

The graph illustrates the distribution of responses regarding whether parents have observed progress in their children's foreign language vocabulary because of playing

video games. The responses “yes,” “sometimes,” and “no” reflect the differing parental perspectives on this issue.

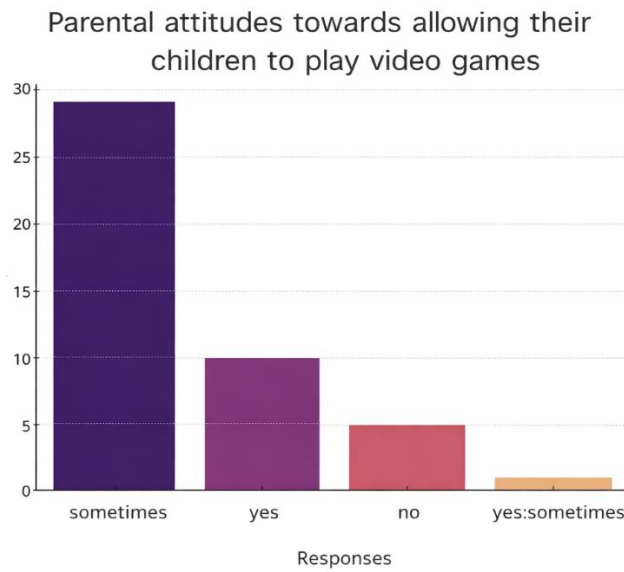


Figure 4. Graphical representation of parental attitudes towards VG

The graph presents parents' attitudes about whether they would allow their children to play video games. The responses include diverse options such as “yes,” “sometimes,” and others, providing insight into the diversity of viewpoints among parents.

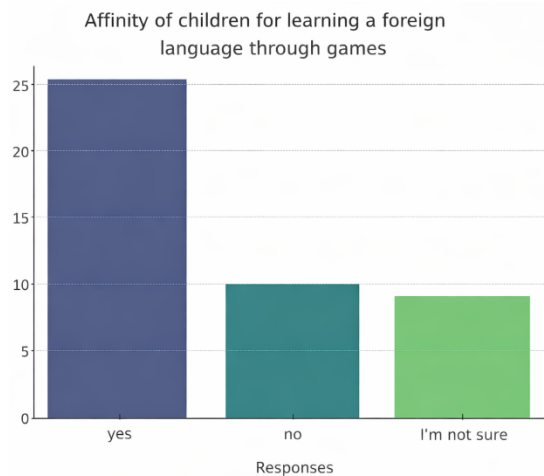


Figure 5. Graphical representation of affinity of children for learning through VG

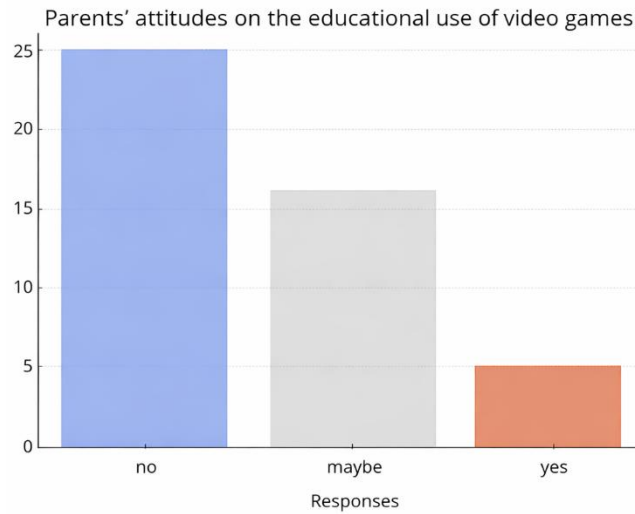


Figure 6. *Graphical representation of parental attitudes on the educational use of VG*

The first visualization presents parents' attitudes toward the use of video games in education, revealing a range of perspectives: some parents support the idea, others remain neutral ("maybe"), while a third group disagrees with such an approach. The second visualization indicates whether children demonstrate an affinity for learning and improving a foreign language through games. This provides insight into whether children perceive gameplay as an opportunity for learning or solely as a form of entertainment. The correlation between children's affinity for learning a foreign language through games and the observed progress in vocabulary is approximately 0.599.

This positive correlation suggests a moderate relationship between children's inclination toward learning through games and improvement in foreign language vocabulary. In other words, children who show a stronger affinity for learning through games are also more likely to achieve vocabulary gains.

What is the correlation with attitudes toward learning?

This indicates that parents who hold positive attitudes toward the educational use of video games tend to have children who demonstrate a slightly greater affinity for learning a foreign language through games.

Can regression analysis be conducted?

The regression analysis models the effects of parents' attitudes toward the educational use of video games and children's affinity for learning a foreign language through games on vocabulary progress.

Key findings from the regression analysis:

- **$R^2 = 0.394$:** This suggests that approximately 39.4% of the variance in vocabulary progress can be explained by attitudes toward educational use and affinity for learning through games.
- **Affinity (coefficient = 0.468, $p < 0.001$):** Children's affinity for learning through games has a positive and statistically significant effect on vocabulary progress.
- **Education Attitude (coefficient = 0.212, $p = 0.122$):** Parents' attitudes toward the use of video games in instruction do not have a statistically significant effect ($p > 0.05$) on vocabulary progress.

This indicates that children's affinity for learning through video games has a significant effect on their vocabulary improvement, whereas parents' attitudes toward the educational use of games are not sufficiently influential on their own.

Could we include comparisons with other variables?

Comparison with additional variables:

- Other factors from the survey can also be included as predictors in the model, such as parents' views on whether they would allow their children to play video games, whether they believe games are beneficial for learning, and similar variables.

A multiple regression model can be developed to determine how each of these additional variables influences children's vocabulary progress.

Visualization of the regression results:

- **Residual plot:** This shows how far the predictions deviate from the actual values and may indicate whether the model provides a good fit.
- **Predicted versus actual values:** A graph can be created to display the extent to which predictions align with the observed values, thereby offering insight into the quality of the predictions.
- **Parallel presentation of different regressions:** Various regression models can be compared through their R^2 values and through visualization of their predictions.

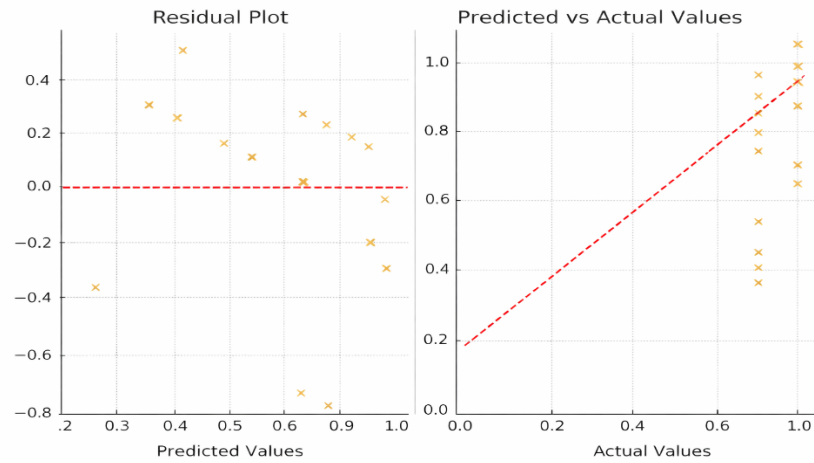


Figure 7. Visualization of predicted versus actual values

Residual plot: The graph indicates that the residuals are distributed around zero, which is a positive sign regarding the adequacy of the model.

Predicted versus actual values: The line of ideal prediction (red line) suggests that the model performs relatively well in estimating the observed values.

Key findings from the extended regression:

- **$R^2 = 0.505$:** The extended model explains 50.5% of the variance in vocabulary progress, indicating that the inclusion of the new predictors improved the model's performance.
- **Affinity (coefficient = 0.273, $p = 0.031$):** Children's affinity for learning through games continues to demonstrate a significant positive effect on vocabulary progress.
- **Usefulness (coefficient = 0.440, $p = 0.007$):** Parents who believe that games are beneficial for learning tend to have children who show greater vocabulary gains. This effect is also statistically significant.
- **Education_Attitude** and **Allow_Gaming** do not exhibit significant effects, meaning that attitudes toward permitting gameplay and toward its educational use are not statistically significant predictors of vocabulary progress.

An additional analysis will be conducted to determine whether there is a significant difference between male and female parents with respect to their attitudes toward learning through video games and children's vocabulary progress. For this purpose, the following steps will be undertaken:

1. **Grouping data by gender:** Mean values for male and female respondents will be compared across the relevant questions.
2. **Testing differences using a t-test:** An independent-samples *t*-test will be applied to determine whether statistically significant differences exist between the two groups.
3. **Visualization of the differences:** A graph will be produced to illustrate the distribution of responses by gender.

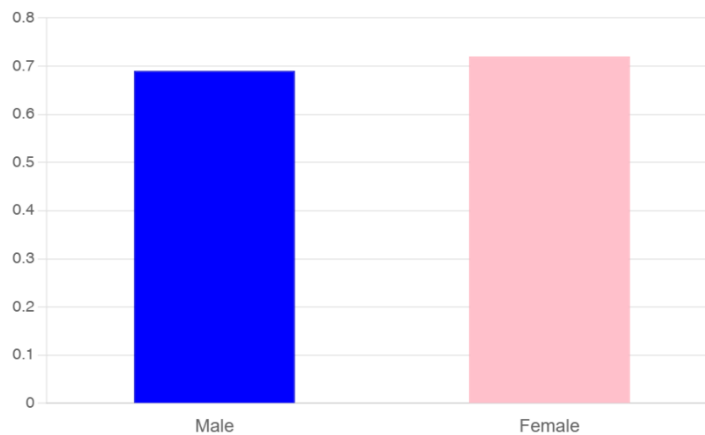


Figure 8. *Graphical comparison between male and female respondents*

Analysis of the effects of gender:

- **t-test results:**
 - $t = -0.290$, $p = 0.774$. These results indicate that ($p > 0.05$) children's vocabulary progress did not differ significantly according to parental gender.
- **Mean vocabulary progress:**
 - The graph demonstrates that the average vocabulary progress of children is remarkably similar for male and female parents, which is consistent with the t-test findings.

These results suggest that parental gender does not have a significant influence on children's vocabulary development.

It will be further examined how video games influence children's motivation to learn a foreign language. This will be conducted through the following steps:

1. **Selection of relevant data:** Data will be drawn from the survey item asking, “Do you think computer video games positively influence your children’s motivation to learn a language?”
2. **Conversion into numerical values:** Responses (“yes,” “no,” “maybe,” etc.) will be transformed into numerical values in order to enable statistical analysis.
3. **Correlation and visualization:** A correlation between motivation and vocabulary progress will be calculated, and a graphical representation will be produced to provide a clearer understanding of the effect.

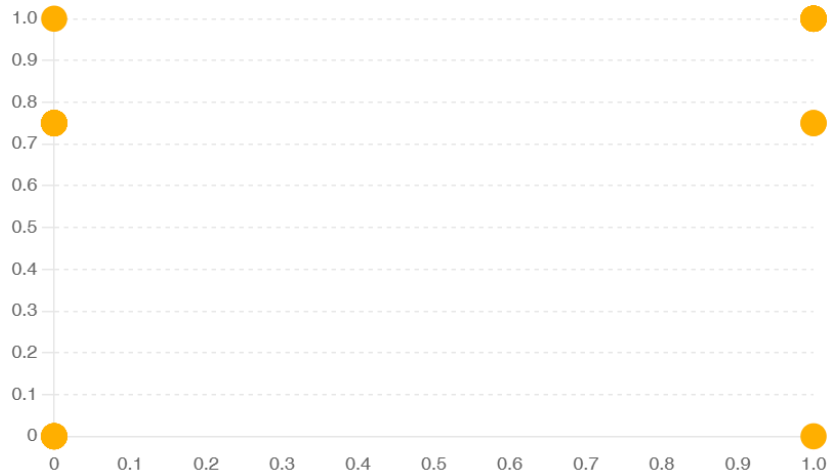


Figure 9. *Motivation vs. Vocabulary Progress*

Analysis of the impact of video games on motivation:

- **Correlation (coefficient = 0.509):** This positive correlation indicates a moderately strong relationship between the positive influence of video games on children’s motivation and vocabulary progress. In other words, children who are motivated through video games tend to demonstrate greater improvement in foreign language.
- **Visualization:** The graph shows that as motivation derived from video games increases, there is also a tendency for vocabulary progress to increase.

These findings suggest that video games can exert a positive effect on children’s motivation to learn, which in turn contributes to the improvement of their vocabulary.

We will also examine whether there is a significant difference between male and female parents regarding the influence of video games on their children’s motivation. The following steps will be undertaken:

- **Grouping data by gender:** The data will be divided into male and female respondents.
- **Testing for differences:** A *t*-test will be employed to determine whether a significant difference exists between male and female parents with respect to motivation.
- **Visualization:** A graph will be created to present the differing attitudes according to gender.

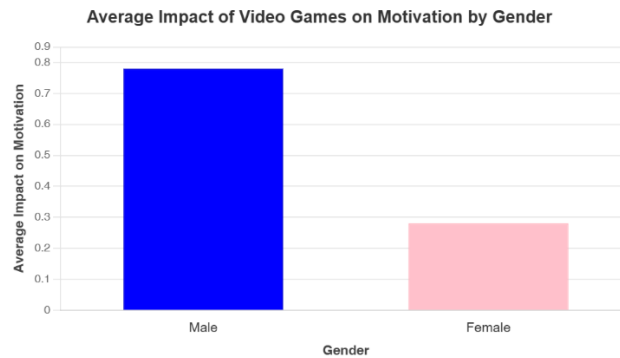


Figure 10. *Average impact of video games on motivation by gender*

Analysis of the impact of video games on motivation by gender:

- **t-test results:**
 - $t = 2.694$, $p = 0.012$. These results indicate that there is a statistically significant difference ($p < 0.05$) in perceptions of motivational impact between male and female parents.
- **Average motivational impact:**
 - The graph demonstrates a difference in how the influence of video games on motivation is perceived. Female parents generally report a higher mean rating of the motivational benefits of video games.

This suggests that female parents are more likely than male parents to believe that video games exert a stronger positive influence on motivation for language learning.

Conclusion

Numerous studies, including our findings, indicate that digital or, more popularly, computer-based video games represent an innovative technological tool that acts as a magnet for younger generations [3]. At first glance, these games may appear purely entertaining; however, in essence, they play a significant role in the education of young people, particularly students. Our findings primarily highlight the positive contributions that video games provide in the learning of the English language and the enhancement of

cognitive abilities. Research from scholars around the world frequently emphasizes the importance of video games in English language acquisition and in fostering higher intellectual development among children. The influence and attitudes of parents regarding the practice of video gaming by their children have been established through numerous research surveys and verified findings. More recently, confirmation of these attitudes has also been sought through statistical data analysis. Our condensed dataset of parent responses regarding children who play video games, analysed using professional statistical methods such as ANOVA, serves as a positive example confirming the successful implementation of research. This analysis corroborates the fundamental postulate that video games have a positive impact on children's acquisition of the English language.

Moreover, the increase in vocabulary and motivation among children who play video games distinguishes them from those who do not. The statistical analysis also revealed that, in general, there is no significant difference between the attitudes of parents of different genders regarding their children's video gaming; however, female parents demonstrated a stronger influence in terms of motivation.

References

- [1] Chirboga, S., Alvarez, J., Pozo, D., Caisalitin, J., Chingo, M., Quinauco, C., & Parraga, A. (2025). Gamification and English learning: Innovative strategies to motivate students in the classroom. *Vitalia*, 6(1), 1608–1633. <https://doi.org/10.61368/r.s.d.h.v6i1.549>
- [2] Eldoao, G. J. (2023). *The effects of playing online video games on the academic performance of Grade 12 HUMSS students of Guimbal National High School* (Thesis proposal).
- [3] Fadilah, F. E., Nasrullah, N., & Mut'im, A. (2023). The use of video games in vocabulary learning in an English as a second language context. *IDEAS: Journal of Language Teaching and Learning, Linguistics, and Literature*, 11(2), 1876–1885.
- [4] ICLS. (2024). Video games turn into language learning games—How? *ICLS Blog*. <https://www.icls.edu/blog/video-games-help-people-to-learn-a-new-language>
- [5] Kenton, W. (2025). *What is analysis of variance (ANOVA)?* Investopedia. <https://www.investopedia.com/terms/a/anova.asp>
- [6] Luo, T., Hickman, C., & Muljana, P. (2022). Examining the impact of online math games on student performance and attitudes. *Journal of Educational Multimedia and Hypermedia*, 31(1), 17–41. <https://www.learntechlib.org/p/217523/>
- [7] Manero, B., Torrente, J., Fernández-Vara, C., & Fernández-Manjón, B. (2017). Investigating the impact of gaming habits, gender, and age on the effectiveness of an educational video game: An exploratory study. *IEEE Transactions on Learning Technologies*, 10, 236–246. <https://doi.org/10.1109/TLT.2016.2572702>
- [8] Mertens, D. M. (2020). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (5th ed.). SAGE.
- [9] Neagu, T., Eklof, H., Laukaityte, I., & Wednam, J. (2025). Reading, watching and gaming: Exploring the relationships between extramural English activities and academic L2

- English reading comprehension in a Swedish university admissions test context. *Taylor & Francis Online*. <https://www.tandfonline.com/doi/full>
- [10] Qiao, J., Woodward, J., & Alam, A. (2024). Effectiveness of educational video games in English vocabulary acquisition: One case in China classroom context. *Cogent Education*, *11*(1).
- [11] Rankin, Y., McNeal, M. K., Shute, M., & Gooch, B. (2008). User-centered game design: Evaluating massive multiplayer online role-playing games for second language acquisition. *ResearchGate*, 43–50.
- [12] Sain, Y. H., Nasrullah, R., & Rusli, I. T. (2025). The effect of traditional game to improve students' vocabulary mastery among junior high school. *Journal of English Learning and Education*, *10*(5), 431–439. <https://doi.org/10.31004/jele.v10i5.1408>
- [13] Serafimovska, S., Alagjovska, N. J., & Serafimovski, D. (2025). The impact of video games on English language acquisition among primary school children: A case study from North Macedonia. *European Journal of Contemporary Education and E-Learning*, *3*(6), 1–5. [https://doi.org/10.59324/ejceel.2025.3\(6\)](https://doi.org/10.59324/ejceel.2025.3(6))

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