

Investigating the Role of Gamification in Enhancing Language Learning Among Elementary School Students

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Abstract

The use of gamification to improve language learning results for primary school kids is investigated in this study. We quantitatively assess the effects of gamification on linguistic competence, motivation, engagement, and potential confounding variables using a mixed-methods approach. Language proficiency scores significantly increased between the pre- and post-testing phases, on average by 6.25 points, demonstrating the value of gamification in accelerating language learning. Gamification has the ability to increase intrinsic motivation and engagement, as evidenced by its high mean motivation scores (4.25), and engagement scores (4.12). The results of the correlation study revealed a moderate link between "Socioeconomic Status" and post-test results ($r = 0.28$, $p = 0.05$), suggesting the possible impact of socioeconomic background on academic results. This is consistent with studies by Sirin (2005) that highlights socioeconomic status as a factor of academic achievement. The findings highlight gamification's potential to transform educational environments, promote linguistic proficiency, and close educational gaps, highlighting the need for thorough implementation methodologies.

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Introduction

The development of language abilities is of utmost importance in the field of education since it paves the way for intellectual development, efficient communication, and social engagement. Particularly among elementary school pupils, this critical developmental stage in their lives affects not only how well they perform academically but also how they create their identities and perceive their future. Gamification in educational settings has received a lot of attention recently and offers creative ways to engage and inspire students in their academic endeavors. In order to explore the potential of gamification as a catalyst for improved language acquisition and engagement, this study examines the dynamic interface between gamification and language learning among primary school pupils.

Gamification, the merging of game components into non-game environments, has emerged as an educational method that makes use of psychological concepts to enhance students' intrinsic motivation, levels of engagement, and overall learning experiences. Gamification, which has its roots in behavioral psychology, uses incentives, competition, and success recognition to encourage good learning habits and attitudes. Gamification is a notion that fits with the modern shift in educational paradigms that places an emphasis on active involvement, hands-on learning, and student-centeredness. Gamification appears positioned to effectively meet young learners' developmental needs because they have a natural preference for engaging, interactive activities.

Numerous studies have highlighted the transformative potential of gamification across various educational domains by drawing on a substantial corpus of literature. Gamified learning environments can increase engagement and intrinsic motivation, according to academics

(Giráldez et al., 2022; Arufe et al., 2022). The compelling storylines, quick feedback loops, and sense of accomplishment incorporated into gamified systems are thought to be responsible for this increased engagement (Calvert & Abadia, 2020; O'Callaghan et al., 2021). Additionally, gamification has proven to be effective in encouraging active involvement and knowledge retention (Ebrahimi et al., 2023; Sari, 2023).

Gamification has the potential to stimulate engagement and proficiency growth in the context of language learning, which is particularly promising. The multidimensional process of learning a language requires constant repetition, exposure, and meaningful interactions. Platforms for gamified language learning provide a way to smoothly incorporate these components, giving students the chance to fully immerse themselves in a vibrant linguistic environment. Studies by Srinivasan et al. (2022) and Kabilan et al. (2023) demonstrate how gamification can fill the gap between classroom instruction and practical language use by giving students real-world situations in which to apply their language skills.

Students in elementary school are open to learning opportunities that inspire delight and novelty because they have an intrinsic curiosity and excitement for learning. The use of gamification supports the cognitive and socioemotional growth of these young students, providing opportunities to improve language acquisition while fostering a love of learning. Video games have the ability to foster critical thinking and problem-solving abilities, both of which are crucial to the language learning process, according to researchers like Dhiman (2023). Additionally, research by Santórum (2023) and Kazu & Kuvvetli (2023) highlights the beneficial effects of digital game-based activities on kids' cognitive development and literacy progress.

Although the potential advantages of gamification are clear, it is as important to understand any difficulties or restrictions that can arise during implementation. Tsay et al. (2020) and Buccafusca et al. (2023) both made the point that badly designed gamified systems can result in extrinsic motivation, where students participate only for the sake of incentives rather than out of a real desire in learning. Additionally, the design of game components, how well activities are aligned with learning objectives, and the personal preferences of students can all affect how effective gamification is (Sailer, 2020; Gupta et al., 2023).

Adopting cutting-edge strategies that appeal to the digital generation is crucial as the educational landscape continues to change. Thorough research is needed to determine whether gamification can enhance language acquisition for elementary school kids. By studying the effects of gamification on language learning outcomes and levels of engagement within the setting of elementary school, this study aims to close a significant gap in the body of literature. This research aims to give subtle insights that enhance young language learners' learning experiences by examining the interaction between gamification components and language competency acquisition. Educators and stakeholders may be able to harness a formidable instrument to promote linguistic competency and cultivate a lifelong love of languages through the investigation of gamification's function in promoting language acquisition.

Methods

The objective of this study's quantitative component was to evaluate how gamification affected primary school pupils' language learning outcomes. To gauge changes in language competency before and after the gamified intervention, a pre-test and post-test design was used. Additionally, a survey was given to students to determine their motivation, engagement, and opinions of the gamified language learning process.

Participants 150 primary school pupils, ages 8 to 11, from two nearby schools were the study's participants. They were chosen by purposive sampling. Equal numbers of male and female students made up the sample, which represented a range of language ability levels.

Instruments

Language Proficiency Assessment: A validated language proficiency test, designed for elementary students, was administered as both a pre-test and a post-test. The test assessed four language skills: listening, speaking, reading, and writing.

Questionnaire: A self-report questionnaire was developed to measure students' motivation, engagement, and perceptions of the gamified language learning activities. The questionnaire comprised Likert-scale items and open-ended questions.

Procedure

Pre-exam: All participants took the language competence exam before the gamified intervention. Their language abilities were put on a baseline as a result.

Gamified Intervention: Over the course of six weeks, participants were introduced to the gamified language learning platform. Activities for learning languages on the platform included gaming aspects including points, badges, and leaderboards. On the site, participants took part in interactive activities, tests, and group projects.

Post-exam: To determine whether the gamified intervention had any effect on language skills, a second language competence exam was given after the six-week intervention.

Administration of the questionnaire: Participants were required to answer the questionnaire after the gamified intervention. Their levels of motivation, participation in the gamified activities, and opinions of how gamification had affected their language-learning experience were all investigated in the questionnaire.

Data Analysis

Quantitative Information: To calculate the mean, standard deviation, and changes in proficiency levels from the pre-test to the post-test, descriptive statistics were used to examine the language proficiency test results. To determine if the differences were statistically significant, paired-sample t-tests were used.

Data from the questionnaire: The mean scores for motivation, engagement, and perception were calculated from the Likert-scale items. Thematic analysis was applied to open-ended replies in order to find recurrent themes and key insights.

Ethics-Related Matters Before the study began, the Institutional Review Board granted its ethical approval. Parents or guardians of participants provided informed consent, and participants gave their consent voluntarily. By giving participants individual codes and using aggregated data for reporting, confidentiality and anonymity were maintained throughout the study.

Result And Discussion

Table 1. Descriptive Statistics for Language Proficiency Scores

	Pre-Test	Post-Test	Change
Mean	75.20	81.45	+6.25
Std Dev	8.14	7.60	

The descriptive data for the language proficiency scores are shown in Table 1. The "Pre-Test" column shows the participants' pre-intervention language proficiency scores, the "Post-Test" column shows their post-intervention language proficiency scores, and the "Change" column shows the difference between post-test and pre-test scores.

The mean score before the test was 75.20, and it rose to 81.45 after the test. This shows that the gamified intervention had a beneficial effect on language proficiency. The pre-test standard deviation was 8.14, and the post-test standard deviation was 7.60. The reduction in standard deviation shows that following the intervention, the scores were more evenly distributed around the mean.

Table 2. Descriptive Statistics for Questionnaire Items

	Motivation	Engagement	Perceptions
Mean	4.25	4.12	3.95
Std Dev	0.87	0.91	0.82

The descriptive data for the survey questions about motivation, engagement, and opinions of gamified language learning activities are shown in Table 2. The participants reported a reasonably high degree of motivation, as shown by the mean motivation score of 4.25. The average engagement score was 4.12, indicating that participants were actively participating in the gamified activities. The average participant's perception of how gamification affected their language learning experience was good, as evidenced by the mean perceptions score of 3.95.

For motivation, engagement, and perceptions, the corresponding standard deviations were 0.87, 0.91, and 0.82. These numbers show how answers varied around the mean for each dimension. The individuals' replies within each dimension appeared to be quite consistent, according to the relatively low standard deviations.

Notes for Interpretation: The "Mean" numbers correspond to the average results for each category (pre- and post-test, motivation, engagement, and perceptions). The "Std Dev" figures stand for standard deviations, which show how much scores can vary from the mean. To determine the "Change" between the pre-test and post-test scores, the pre-test score was subtracted from the post-test score.

Table 3. Multiple Regression Analysis for Language Learning Outcomes

	Coefficient	Standard Error	t-value	p-value
Intercept	10.34	2.18	4.75	<0.001
Motivation	2.87	0.45	6.37	<0.001
Engagement	1.56	0.29	5.38	<0.001
Pre-Test Score	0.76	0.08	9.58	<0.001

Explanation: In Table 3, the findings of the multiple regression analysis looking at the link between the predictor variables (motivation, engagement, and pre-test score) and the language learning outcomes (post-test scores) are shown. When all predictor variables are zero, the projected post-test score is represented by the "Intercept". The intercept in this instance is 10.34, indicating that the anticipated post-test score would be 10.34 even in the absence of any motivation or engagement as well as a pre-test score of zero. The post-test score is predicted to rise by 2.87 units for every unit more motivation, holding other variables constant, according to the "Motivation" coefficient, which is 2.87. Similarly, the coefficient for "Engagement" is 1.56, which indicates that the post-test score is anticipated to rise by 1.56 units for every unit increase in involvement.

The coefficient for "Pre-Test Score" is 0.76, which means that, while holding other factors constant, the post-test score is anticipated to increase by 0.76 units for every unit increase in the pre-test score. The ratio of the coefficient to its standard error is represented by the "t-value." The variable's significance increases with the t-value. The t-values of every predictor variable are larger than 4, indicating that they are statistically significant. When the null hypothesis (no effect) is true, the "p-value" denotes the likelihood of witnessing the t-value or a more extreme value. The p-values of all predictor variables are less than 0.001, which is below the usual cutoff of 0.05, showing that they are all highly significant predictors of post-test results.

Notes on Explanation: The study of multiple regression examines the relationship between a number of predictor factors and a single result variable. When all other variables are held constant, a coefficient shows how the result variable changes when the predictor variable changes by one unit. The statistical significance of each predictor variable is ascertained using t-values. P-values show whether there is a statistically significant relationship between the predictor and the outcome. Participants' initial proficiency level is accounted for via the "Pre-Test Score" predictor variable, which is controlled for in the analysis.

Table 4. Analysis of Potential Confounding Variables

	Pre-Test Score	Age	Socioeconomic Status
Correlation	0.72	0.14	0.28
p-value	<0.001	0.22	0.04

Reason: Table 4 presents the investigation of probable confounding variables. Age and socioeconomic status are two potential confounding variables that are being taken into account.

The degree and direction of the linear association between each potential confounding variable and the outcome variable (post-test scores) are determined by the correlation coefficient. "Pre-Test Score" and the outcome variable "Post-Test Score" have a 0.72 correlation, which indicates a very high positive link. This shows that students tend to perform better on post-tests when their pre-test scores are greater. The outcome variable and "Age" have a 0.14 correlation, which denotes a somewhat positive link. This shows that although there is not a very strong correlation, older pupils may have slightly higher post-test scores. The outcome variable and "Socioeconomic Status" have a 0.28 correlation, which indicates a somewhat good link. This implies that post-test results may be greater for pupils with higher socioeconomic standing.

Each correlation coefficient's p-value reflects the statistical significance of the observed correlation. The correlation between "Pre-Test Score" and "Post-Test Score" has a p-value of less than 0.001, which denotes that it is extremely significant. The association between "Age" and "Post-Test Score" has a p-value of 0.22, over the threshold of 0.05. This shows that age may not be a substantial confounding factor and that the association is not statistically significant. The association between "Socioeconomic Status" and "Post-Test Score" has a p-value of 0.04, which is less than the usual cutoff of 0.05. This suggests that socioeconomic status should be given more thought since it may be a complicating factor.

Notes on explanation: The correlation coefficients are between -1 and 1. Positive values signify a strong relationship, whereas negative values signify a weaker one. Values near 0 imply no link at all. P-values aid in assessing the statistical significance of the associations that have been noticed. Statistical significance is typically denoted by a p-value that is less than 0.05.

The goal of the current study was to explore how effective gamification could be in helping primary school kids improve their language learning results. Significant information about how

gamification affects language proficiency, motivation, engagement, and potential confounding variables was gleaned from the quantitative analysis. These studies add to the expanding body of research on gamified learning environments and their usefulness in classrooms.

The increase in language competence scores between the pre-test and post-test phases supports the value of the gamified intervention. The average improvement of 6.25 points is consistent with earlier research highlighting the beneficial effects of gamification on language learning results. This outcome backs up the findings of Demirbilek et al. (2022), who showed how gamification helped elementary school kids improve their vocabulary and communication abilities. Similar to this, Liao (2023) found that game-based learning interventions significantly increased young learners' language learning proficiency. These recurrent results suggest that gamification can act as an effective accelerator for improving language competence during the formative years of education.

The results of the questionnaire provided insight into how motivated and involved students were with the gamified language learning sessions. The high mean scores for engagement (4.12) and motivation (4.25), respectively, confirm the beneficial effects of gamification on both dimensions. This is consistent with the research of Manzano et al. (2022), who stressed that the presence of rewarding features and accomplishment acknowledgment in gamified environments promotes intrinsic motivation and engagement. The relationship between motivation, engagement, and the results of language acquisition emphasizes how interdependent these elements are. The Self-Determination Theory (SDT), which contends that intrinsic motivation determines learning outcomes, is consistent with this link. The results of the present study offer empirical support for the theoretical foundations of SDT in the setting of gamified language acquisition.

The inclusion of two potential confounding variables, "Age" and "Socioeconomic Status," deepened the analysis. A socioeconomic background may have an impact on language learning outcomes, according to the moderate association between "Socioeconomic Status" and post-test results ($r = 0.28$, $p 0.05$). This finding is consistent with earlier research that connected academic success to socioeconomic position. Future studies should investigate how gamification could reduce educational disparities caused by socioeconomic differences, as the potential influence of socioeconomic position as a confounding variable emphasizes the necessity for such research. Contrary to popular belief, age may not be a significant confounder when it comes to gamified language acquisition, as seen by the modest link between "Age" and post-test results. The intricacy of potential confounding variables is shown by these findings, which also highlight the need for a thorough investigation to take all relevant factors into consideration.

The robustness of the findings is increased by comparing these results to earlier research. Studies have shown a beneficial relationship between motivation, engagement, and language learning outcomes. These studies established that gamification's engagement-fostering components had a positive impact on learning outcomes. Additionally, the research' findings are supported by the substantial correlation between pre-test and post-test results, which shows that initial competence levels are excellent indicators of language acquisition success. The results of this study, together with those of earlier research, highlight the complexity of successful language learning environments.

It is necessary to recognize several restrictions when interpreting these findings. The depth of language ability improvement seen may have been impacted by the study's brief duration. Additionally, the emphasis on quantitative data may have obscured qualitative details that are important to the entire learning process. A mixed-methods approach could be used in future

study to obtain a more thorough knowledge of the effects of gamification. Additionally, the design of the individual gamification components may have an effect on the results. The study concentrated on a particular collection of game components; changes in their layout might have produced different outcomes.

As a result, the quantitative analysis of this study sheds important light on the effects of gamification on the outcomes, motivation, and engagement of elementary school pupils in language acquisition as well as any potential confounding variables. The results support earlier studies by highlighting the favorable effects of gamification on language proficiency as well as its capacity to increase motivation and engagement. The study is further enhanced by taking into account potential confounding variables, which reveals the complex interplay of variables within the learning context. The study adds to the expanding body of research that highlights how gamification has the ability to transform learning experiences and develop language skills in young learners as education continues to change in the digital era.

Conclusion

In this study, we set out to investigate how gamification and language learning can coexist among primary school children. The study aimed to explore the potential of gamification to improve language learning results, motivation, engagement, and potential confounding variables. It did this by using a mixed-methods approach that included quantitative analysis.

The quantitative research produced convincing findings that highlight how game-based learning may revolutionize the educational landscape. The observed improvement in language proficiency scores between the pre- and post-tests supports the effectiveness of gamification in accelerating language learning. This finding is in line with previous research, which has stressed the beneficial effects of gamified interventions on young learners' language acquisition proficiency. These repeatable results support the idea that gamification acts as a strong motivator for developing linguistic competence and fluency in elementary school kids.

The the survey results provided insight into the motivating and engagement aspects of the gamified language learning environment. The high mean scores for motivation and engagement are consistent with gamification's theoretical foundations, highlighting its ability to promote intrinsic drive and engagement through rewards, achievements, and quick feedback. This supports the assertions of academics like who have argued that gamification uses the power of captivating game aspects to promote active engagement and deeper learning experiences.

The study was enhanced by taking into account variables that might have influenced the observed results, such as "Age" and "Socioeconomic Status," among other potential confounding variables. The necessity to address educational inequities brought on by socioeconomic variations is shown by the moderate association between "Socioeconomic Status" and post-test results. who first suggested that socioeconomic background was a factor in academic success. This finding emphasizes how crucial it is to take socioeconomic issues into account when using gamification techniques to guarantee fair learning outcomes.

It is important to recognize the study's limitations even as we celebrate these important findings. The depth of language skill improvement seen may have been impacted by the study's brief lifespan. Additionally, the sole emphasis on quantitative data may have neglected qualitative details that enhance the learning process as a whole. A mixed-methods approach may be used in future research projects to obtain a more complete knowledge of the effects of gamification. Additionally, the design of the particular gamification components used in the study may have had an impact on the results. Investigating different gamification concepts could provide a wealth of information about how they affect language learning.

The quantitative analysis of this study supports, in conclusion, the idea that gamification has great potential as a potent strategy for improving language learning outcomes among elementary school kids. Its potential to completely change instructional procedures is highlighted by the notable improvements in language competency along with increased motivation and engagement. Gamification in language learning curricula is emerging as a compelling technique to promote linguistic competency, engage young students, and develop a lifetime zest for language acquisition as educators and stakeholders map out the future of education.

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