

Effects of Gamification Strategy on Senior Secondary School Students' Academic Performance in English Reading Comprehension

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Abstract

This study seeks to look at how gamification affects the academic performance of the students in the senior secondary school in terms of English reading comprehension. The study is triggered by the continued encountering difficulties in reading comprehension by the students when reading from passages, which in most cases are influenced by the fact that there is reduced engagement and motivation which goes along with the use of traditional teaching practices. By referring to Constructivist Learning Theory, the research uses the quasi-experimental research model that involves 100 SS2 students in Ijebu-Ode Local Government Area of Ogun State, Nigeria. The participants were selected as experimental and control groups: participants in the experimental group were subjected to gamified learning with incorporated motivation in the form of rewards, challenges, and leaderboards, whereas participants in the control group received traditional instructions. Pre-test and post reading comprehension tests were used to gather the information. This is indicated in the findings as there has been a large difference in the academic performance of the experimental group as compared to the control group; and none of the combination of the role played by gender and interaction effect have any significant influence. These findings highlight the potential of gamification to improve the motivation of students, active participation, and their critical thinking skills. Finally, the study gives some recommendations to the educators and policymakers on how the gamification can be successfully implemented in teaching reading to achieve better results in literacy among secondary schools in Nigeria.

Keywords: *Gamification, Reading Comprehension, Academic Performance, Motivation, Secondary School, Nigeria*

INTRODUCTION

Comprehension of English reading is a non-negotiable requirement to determine academic success among students and a foundation of successful learning in various subjects. It is a better illustration of the reckoning of individual words to the meaning, interpretation, and use of informational text. Having in place strong reading comprehension skills enables students to approach learning in a critical mode, solve problems and make choices. However, there is a significant number of students who do face problems with reading comprehension, so are negatively affected by the test scores and striving to believe that they do know the language. These challenges are often rooted in teaching approaches that do not foster active participation, motivation and critical thought. The standard pedagogies, namely rote learning and the passive reading activities have not been very

effective in meeting the needs of different learners. As a result, there is an increasing correlation to implement innovative, student-focused methods that would improve reading comprehension and develop higher-order thinking at the same time (Gambrell 2021; Owusu-Acheaw & Larson 2014; Liu, Chen, & Chang 2010).

The significance of English reading comprehension towards education success cannot be denied. In every subject of study, students need the skills to decode text, solve test questions and interact with the teaching contents. Grabe and Stoller (2023) assert that reading comprehension is a complex cognitive process which combines the elements of decoding, inference, and critical thinking-which are fundamental to good learning. Inadequate competence in reading comprehension has often been found to create barriers to subject matter acquisition, hence determining performances in studies. The contributing factors are low vocabulary, poor reading strategies, loss of motivation and poor instructional processes. The lack of reading comprehension is regularly related to a lack of prior knowledge, poor decoding skills, and a reduced degree of engagement to the textual material that is often argued to be linked to snow (2022) and Imam et al. (2013). These limits affect the ability of students to draw meaning hence affect their performance. In addition, students who are not effective in their involvement in reading activities show limited growth in their problem-solving skills as well as in terms of critical thinking, which in turn does not allow them to interrogate available information. According to empirical evidence, developing motivation and long-term engagement by using interactive learning strategies is one of the procedures that are essential in improving reading comprehension (Guthrie & Wigfield, 2020; Suhana & Haryudin, 2017).

Gamification refers to one of the more recent trends which have become quite prominent in the education setting. Gamification is a form of integrating the features of games, including rewards, tasks, and interactivity activities within the instructional activity and increasing the levels of engagement and motivation. Even though this is not central in the current study, gamification is a conceptual framework that is pedagogical in nature that meets the interests of learners and their cognitive biases at that. Empirical findings indicate that the strategy is an effective method of ensuring active engagement, improving problem-solving skills, and making reading processes much more interesting and effective (Guthrie & Wigfield, 2020; Duke & Pearson, 2022). The significance of reading comprehension in English is especially relevant to learners in secondary

school since it directly impacts their school curriculum: those who get strong scores in comprehension perform better in their studies in general by being more likely to obtain, preserve, and utilize information (Duke & Pearson, 2022; Collier, 2014). However, according to numerous secondary schools, learners also face certain problems with reading due to the lack of interest and insufficient comprehension, which subsequently results in a lack of achievement in academic performances which is attributed to the concern of both educators and policymakers. Such dynamics are indicative of the necessity to come up with new methods aimed at enhancing reading comprehension.

Besides the short-term requirements of formal learning, the domination of reading comprehension has become the floor stone of daily literacy that lets one to read employment applications, legal contracts, and a wide range of other official documents. Lack in proficiency in reading will hinder the fundamental literacy processes and limit educational and employment prospects. In its turn, improving the quality of reading comprehension is not only a precondition to the short-term academic achievement but also a stepping-stone to overall personal and professional development. In this understanding, the research among scholars is sceptical of studying pedagogical methods in enhancing the reading skills. The traditional strategies e.g. direct instruction, and guided reading, have been in place and in many cases fail to keep the student engaged (Suhana & Haryudin, 2017). Living in a globally digitalized age of distraction, modern learners need their instructional designs to be dynamic, interactive, and flexible enough to meet the needs of each student (Guthrie & Wigfield, 2020). This is why in modern educational systems it seems imperative to develop their strategies in a way invoking active participation and motivation and at the same time stimulating thinking and problem-solving skills. The study by the researcher, thus, aims at exploring the effectiveness of gamification as a rewarding opportunity to enhance the reading comprehension ability among students.

Statement of the Problem

English language comprehension reading is a major pillar in secondary, and despite this, a significant proportion of students suffer. The reasons are due to lack of motivation and participation in large numbers. Traditional learning, which is frequently defined by repetitive and passive learning, cannot generate involvement hence leading to lack of interest and falling education performance. Despite the overwhelming support that reading comprehension is not only essential when it comes to academic achievement but also in life-long attainment of knowledge, it

has been observed that instructors still face challenges in imparting lessons that are not only effective, but also interesting (Mika). To overcome such a dilemma, we will have to introduce new innovative teaching techniques in a manner that will be both engaging to the student and one that will enhance their understanding. Recent research has demarcated gamification as one possible way of boosting motivation and interest in learning in the school set-up, although it has never been studied specifically in senior secondary school reading comprehension with English. As much as the studies have conducted research arguing that gamification creates cognitive and emotional engagement, little research has been done on the direct relationship between gamification and the way it influences the academic performance of the students when it comes to reading comprehension. The use of gamified learning in Nigeria is still at its early stages with traditional teaching the most used method in the country. This study is thus set to establish the impact that gamification has upon academic achievements of senior secondary school students as applied to the English language in reading comprehension.

Aim and Objectives of the Study

The main aim of this study is to examine the effects of Gamification strategy on senior secondary school students' academic performance in English reading comprehension. However, the specific objectives of this study are to:

- i. examine the impact of gamification strategy on senior secondary school students' academic performance in English reading comprehension,
- ii. analyse how different game elements (such as rewards, leaderboards, challenges) influence student active engagement and motivation in reading comprehension activities,
- iii. identify the challenges faced by teachers in implementing gamification strategies for reading comprehension in senior secondary schools, and
- iv. assess how gamification fosters critical thinking and problem-solving skills relevant to improving reading comprehension in senior secondary school students.

Research Hypotheses

The following null hypotheses are proposed to guide statistical testing and validation of findings:

H₀₁: There is no significant effect of treatment on performance in English reading comprehension.

H₀₂: There is no significant effect in the academic performance of gender on senior secondary school students in English reading comprehension.

H₀₃: There is no significant interaction effect of treatment and gender on the academic performance of senior secondary school students in English reading comprehension

Literature Review

There is growing interest in the use of gamification as a transformative educational strategy to put into practice the mechanics of game design within formal learning environments and can be used to increase student engagement, motivation levels, and performance (Deterding et al., 2021). Integrating the game mechanics such as points, badges, leaderboards, challenges and rewards into the instructional practices converts the teaching and learning landscape into a more interactive and engaging one (Hanus and Fox, 2022). The pedagogical logic behind gamified interventions is that the strong immersion of game-like characteristics stimulates students to adopt an active position regarding learning, which further promotes better understanding and memory encoding (Bai, Hew and Huang, 2022). As digitalisation has increased, gamification has become very popular in a wide range of fields, including language learning, mathematics, and science disciplines, where instructors aim to create a more robust and engaging learning situation (Bai et al., 2022). Experimental research shows that gamification effectiveness lies in its ability to regulate some fundamental psychological and cognitive processes which govern learning output. With the help of the Intrinsic Motivation Theory (and Self-Determination Theory (SDT)) (Deci and Ryan, 2020), the learning process is driven by intrinsic motivation, and the integration of gamified components enhances intrinsic motivation, making it easier to motivate individuals to complete the learning tasks more engaging and satisfying. There is also evidence proving that learners in gamified environments display a greater level of motivation, persistence, and enthusiasm than their peers in the environments of traditional instructions (Sailer and Homner, 2020). Also, gamified contexts make use of the competitions and collaborations, as well as goalsetting, all of which are critical to the shaping of student-centred learning practices (Kim and Castelli, 2021).

Greater engagement of learners is one of the cores, empirically backed benefits of gamification in educational settings. Koivisto and Hamari (2019) conceive that engagement is a multidimensional phenomenon balanced by incorporating a reliable behavioural, emotional, cognitive dimension and strengthened by gamified experience. According to a study conducted by Seaborn and Fels (2021), when learners participate in gamified tasks, they show an increased level of effort and focus, thus accelerating the process of gaining knowledge. Features of interaction, e.g. quizzes,

challenges, instant feedback, encourage students to take an active role in the process of learning. Regarding English reading comprehension, the evidence available indicates that gamification enhances the ability of the students to think, interpret, and use information presented in texts in productive manners (Al-Ahdal, 2023; Caponetto, Earp & Ott, 2021). Just as important gamification also has a significant effect on motivation. Most of the time in the ordinary classrooms, there is a lack of sustained motivation, which results to lack of engagement and negative academic performance. Instead, gamified curricula add an incentive option that increases the degree of both intrinsic and extrinsic motivation; students will be intrinsically motivated to learn because it will allow them to achieve the intrinsic gratification of the activity, and others will be extrinsically motivated by rewards received, e.g. points and rewards (Landers, Bauer & Callan, 2022). According to Zainuddin et al. (2020), Bai, Hew & Huang (2022), and Ibanez and Delgado-Kloos (2022), gamification successfully increases both types of motivation thus, increasing student involvement and continued concentration on learning activities. On the area of reading comprehension, empirical evidence implies that gamification supports more regular and active reading which ultimately develops literacy and academic results (Su & Cheng, 2023).

The imparting pedagogy of immersive and game-like learning, or gamification as it is often known, has a proven effect on enhancing critical and problem-solving skills. These capabilities are part of the basic elements of academic performance, the future professional competencies and allow the learners to analyse intricate information, make evidence-based decisions, and produce creative solutions (Nkopuruk, 2024; Armstrong & Landers, 2021). By integrating cognitive problems in puzzle-like forms or simulations along with seasoning tasks with strategic organization, de Sousa Borges et al. (2022) insinuate that gamified learning environments breed critical thinking and offer the ability to implement established abstract knowledge in practice. Gamified instruction has been proven in the sphere of reading comprehension to enhance the skills of students to derive the main ideas, consider the subsequent implications, and make inferences, thus, deepening the interpretations (Huang & Hew, 2021).

Despite these advantages, the academic sources also single out several barriers that can be associated with the implementation of gamification in teaching. First, there is the likelihood of an over emphasis of extrinsic motivators, a tactic that is likely to reduce in the intrinsic drive with time (Nicholson, 2020). Arguably, in situations where learning students are encouraged to focus on gaining badges or to accumulate points, they might even lose the real targets of learning itself.

Moreover, successful implementation of gamified design should be carefully considered and dealt with by specialized knowledge and skills on top of which poorly designed elements will cause frustration and disengage students (Mora et al., 2021; Nkopuruk, 2025). At the same time, empirical investigation has not yet been adequate to outline the long-term effects of gamification on the educational results concerning the atomized educational rostrums (Hamari et al., 2022). There is a related factor about the access to technologies: not every school has the framework to sustain gamified settings. Especially in most developing territories, strict allowance to digital materials and teacher preparation deficiencies presents a far-reaching obstacle to successful implementation (Ibanez & Delgado-Kloos, 2022). Therefore, the implementation of low-tech gamification techniques that do not require the heavy technological investment is an endeavour that teachers must explore.

Theoretical Framework

This study is based on the Constructivist Learning Theory. Constructivism holds that the learner engaging tactilely with the world constructs his own understanding administering to that interaction and subsequent reproduction of the interaction. The primary statement flows that the effect of any instruction becomes more significant when the students are not regarded as passive consumers of information but active participants in the learning process (Brusilovsky & Millan, 2017). The founders of such landmark ideas as Jean Piaget, Lev Vygotsky, and John Dewey share the belief that education is inseparable with social interaction, problem-solving, and work-related learning (Vygotsky, 1978; Dewey, 1938). Piaget (1952) believed that cognitive development was a process that occurred in stages and that instruction would be most effective when it overlapped with the stage of development attained. The real-world practice is that learners achieve most effectively when they can engage extensively with material that is guided by earlier experience. Vygotsky (1978) elaborated on the same point with the Zone of Proximal Development (ZPD), alerting us to the fact that social guidance of more knowledgeable others enables the progressive formation of problem-solving and critical-thinking skills. Dewey (1938) also contributed more to constructivist doctrines because he believed in experiential learning and promoted pedagogy that values inquiry skills and ability to apply learning to practical circumstances.

Gamification is an education system that is quite confirmative to the ideas of constructivism as it incorporates interactive play that demands active participation, teamwork, and engaging higher order thinking. Challenges, rewards and competition are also an aspect that makes learners engage

in a more active way to the learning process, which in turn raises motivation and more cognitive involvement (Gee, 2023). The large number of scholarly studies has proven that the implementation of gamification strategies significantly contributes to the improvement of the learning outcomes via increased motivation, engagement, and information retention (Hamari et al., 2022). These advantages are centred on the concept of promoting experiential learning. Kolb (2024) suggests that the learning process gradually completes a circular process that involves a concrete experience, reflective observation, abstract conceptualization, and active experimentation. In the context of such a gamified learning environment, the students are subjected to problem-solving activities that require clear reflection and the use of knowledge in new settings. The given iterative method has much in common with the constructivist teaching, as learners apply as active constructors of knowledge, not informants.

Gamification also promotes cooperation and socialization that are part of the social constructivism theory of Vygotsky. A lot of the gamified tasks involve problem-solving in cooperation, peer discussion, and collaboration problems, thus promoting peer learning. The leaderboards, the team-based challenges and the peer feedback loops are those reinforcements that enhance social learning and make people interact. The Self-Determination Theory created by Deci and Ryan (2020) highlights the importance of intrinsic motivation in determining how people learn. This is done through providing instant feedback and rewarding success; gamification thus supports the learner having a sense of independence and perceived competence thereby increasing their motivation. Additionally, it also assumes a central influence in creating self-regulated learning. According to Zimmerman (2023), this construct is the ability of students to envision goals, track progress and evaluate results of the learning process. Several gamified interventions provide the means to track a student through their learning and readjust the challenge and learning paths of the student, thus allowing learners to have control of their learning. These features are consistent with constructivism principles since they promote metacognition, as well as independence. Gamification of English reading comprehension education is extremely beneficial. The concept of reading comprehension requires active and effective approach, critical thinking, and problem solving, and all of the mentioned are supported in gamified learning experiences (Dichev & Dicheva, 2023). The results of recent experimental studies establish that game-like elements, especially the interactive storytelling, use of role-playing activities, and the use of digital rewards, when applied to reading challenges, may significantly increase the level of student interest and

their perceived meaningfulness of the assigned reading tasks. Empirical evidence suggests that this type of gamified learning design is linked to better retention and well-developed understanding skills and stronger intrinsic motivation to use the material presented in textual forms (Mayer, 2021). The constructivist framework is used in the current research as a theoretical framework where the outcomes of the English reading comprehension are explained by the contribution of gamified strategies to academic performance of the learners in senior secondary schools. The educational process of constructivism based on such concepts as an active learning approach and person interaction with the subject matter and solving challenging problems paints a close analogy to the didactic benefits of gamification. Therefore, the use of gamified practices allows teachers to create interactive, learner-focused environments that would facilitate the acquisition of advanced reading comprehension skills.

Review of Previous Studies

Empirical research has been conducted, and some are published recently on the topic under consideration. The current empirical synthesis appraises seven studies, including three international ones and four studies conducted at local levels, to explain how effective gamification can be in the development of reading comprehension. In sum, the findings confirm similarities and differences in research design and presentation, geographical setting and main results. The present study builds in part on the current body of literature because it focuses on the real environment of the Nigerian secondary schools and because it integrates the motivation and active engagement, critical thinking, and problem-solving as a moderating construct. To assess how students and reading comprehension are influenced by gamification, Hamari, Koivisto and Sarsa (2023) attempted to determine the short-term efficiency of gamification on academic performance and student motivation. Their quasi-experimental knowledge also randomized a Finnish sample of secondary school students into two groups, a treated group that used gamification as a method of teaching and a control group that used traditional pedagogies. Tests demonstrated that the treated group showed great improvements in reading performance and motivation compared to the control, so the conclusion that can be made is that various game mechanisms, and especially rewards, leaderboards, and storytelling can enhance the level of student engagement and facilitate the cognitive process. Focusing on an English-language reading situation, Su & Cheng (2022) explored the effects of varying game mechanics in their contribution to reading comprehension of high-school students in Taiwan. Taking a mixed-methodology approach that involved pre-trial

and post-trial measurement, surveying, and focus-group interviews, the authors concluded that leaders' boards and reward positively increased student motivation significantly, but time-based challenges helped boost attention to critical-thinking abilities. They observe that there is urgent need to match gamified features with according to styles as preferred by the learners in syncing with efficacy. This study does not coincide in terms of cultural and educational backgrounds though they share a central issue with the present research.

The longitudinal study by Dicheva & Dichev (2021) deals with the evaluation of long-term consequences of gamification in the context of reading comprehension in secondary schools in the United States. The study became a two-year data-collection involving students learning in gamified and non-gamified conditions. It was found that gamification maintained an increase in reading comprehension with the highest improvement rates being achieved by students whose initial motivation level was low. The scholars, therefore, provided a suggestion that gamification should be introduced not as a peripheral intervention but as part of curriculum. Comparing the given study to the work by Dicheva and Dichev, the first one is focusing on the same idea of gamification in terms of reading comprehension but contrasts to it as it has no longitudinal character and is related to the American environment.

Olaniyi (2023) in Nigeria studied how effective gamified instruction is in the improvement of English reading comprehension in secondary school students. The study used the case-study research methodology by focusing on two Lagos State public schools. Results showed that students who were exposed to gamified reading activities performed better compared to the students who were taught through conventional means. The authors have determined that professional development programs that would train teachers in the art of gamification are vital to maximize the learning opportunities of students. Even though, like the present study, this one examines the concept of gamification as it applies to Nigeria, it is limited by its investigation in "Lagos State, as opposed to this study, which takes a national perspective into consideration.

Another study by Adegbite and Salami (2022) was aimed at testing the potential impact of gamification on the level of motivation and engagement in reading comprehension among students of Nigeria. The authors set out the detection of a survey-based design including 250 students of secondary schools in Oyo State and confirmed that participants presented with gamified strategies have experienced the enhanced participation and a better score of reading comprehension. Based on the above results, the researchers suggested that policymakers should integrate gamification in

the national curriculum to maintain interest in the English reading comprehension. Finally, whereas both Dicheva and Olaniyi employ national representative samples of the population, Adegbite & Salami employ a sample of a smaller Nigerian sample that has a representation only in the state of Oyo. The current study falls within the modern dynamic of motivation research that involves putting the research design into a survey instead of an experiment. Yusuf & Adebayo (2021) determined whether gamification elements can affect critical-thinking abilities in reading comprehension of the English language. In an experimental approach, the research recruited the volunteers across the five secondary schools in Ogun State and randomly assigned to groups of gamified and non-gamified. The challenges and rewards helped a great deal with the critical-thinking abilities of the students when they were incorporated; this was revealed through the analysis. They found that there should be the design of reading comprehension tasks that integrate competitive and cooperative aspects of games. Whereas the present paper also focuses on critical thinking, it stands apart in the sense that the authors examine each of the game components individually, rather than analyse games as a cohesive strategy.

One of the works that closely relates to the present one, that of Okoro and Nwachukwu (2020), investigated what obstacles teachers face upon adopting gamified methods of teaching reading comprehension to secondary school classes in Nigeria. The researchers used qualitative methods (i.e., the application of interviews and focus-group discussions of 40 English language teachers selected to represent different schools and institutions of Abuja) and deduced that restricted access to technological tools, lack of professional training, and student preparation were the most significant challenges towards the successful gamification use. The authors, therefore, suggested increased governmental investment into the digital infrastructure and training opportunities to help educators. In contrast to the former research, the occupation in this work is not focused on studying academic results but pedagogical issues.

Nevertheless, the sources reviewed in this explore how gamification can influence the learning achievements of the older generation schoolchildren in the reading comprehension of the English language. Gamification aims to increase interaction, motivation, and learning performance with rewards, challenges, and leaderboards incorporated. It is suggested by the prevailing evidence that it transforms normal elements of reading into interactive, hence raising the level of analysis and interpretation of textual content among students. Furthermore, the methodology addresses the problem of low motivation and involvement since it makes reading more entertaining and thought-

provoking. The paper is based on the constructivist learning theory, which argues that learners contribute to knowledge building experience and communication. In this matter, gamification complies with constructivism since both approaches recommend the idea of student-centred learning, critical thinking, as well as problem-solving. Gamified learning environments allow fostering motivation and engagement by providing an immediate response and tasks that challenge and adapt to the level of the student. Self-Determination Theory by Deci and Ryan also reinforces the interconnection of gamification since autonomy, competence, and relatedness can be highlighted as values that are instrumental in learning. The findings of empirical research carried out in Finland, Taiwan, and the United States prove that gamification supplements reading comprehension, drive, and interest. This is also revealed among the Nigerian researchers that gamification stimulates critical thinking and enhances the performance of students. Despite these results, there is a burden to implement due to limited technological availability, a lack of teacher preparation, and issues related to a long-term adoption. Even though there is research on the focus on digital strategies, another great piece of research on low-tech strategies such as the use of competitive reading tasks is presented as an efficient resource-limited setting method. One of the cruxes in the literature is that little research has been done in Nigerian senior secondary schools. The majority of research practices deal with primary level education or general language growth as opposed to reading comprehension. Moreover, the literature does not have a systematic investigation of the interaction of various game components in their ability to construct engagement and cognitive advancement. The research under discussion will fill these gaps since it will evaluate the effects of gamification on academic performance, motivation, and critical thinking in the setup of English reading comprehension.

METHODOLOGY

The research design employed in this study was quasi-experimental research design through a quantitative approach to determine the effect of gamification on the performance of students when it comes to reading comprehension of English. The design led to the possibility of making a controlled comparison between an experimental condition and a control condition, where the former received gamified instruction, and the latter received conventional teaching. This design allowed the researcher to explain any differences in academic performance because of the gamification intervention. The sample was made up of senior secondary school (SS2) students in

Ijebu-Ode Local Government Area, Ogun state. The reason behind this choice was that this group was given extensive instruction in English, and they were about to take national examinations, so they were well suited to be used in determining the outcome of reading comprehension. Two secondary schools in the area were selected using purposive sampling method because they are similar. There were an experimental group and a control group which is one school. Each school was sampled to come up with 50 students making a total of 100 participants. This was a sufficient sample size with equal representation and statistical strength.

However, the intervention was a four-week intervention. During the first week, a pre-test reading comprehension was conducted to all the students. During the three-week period, the experimental group participated in a guided session of gamified reading proposed to arouse motivation, interest, and understanding. The gamified activities included:

- i. *Point-Based Rewards System* - The students received the points on answering the questions of comprehension correctly, finding the main ideas, or fulfilling the tasks that required the use of inference. The points that had been accumulated were then converted into the virtual badges that corresponded to the level of reading proficiency (such as: "Vocabulary Master," "Critical Reader").
- ii. *Weekly Leaderboards* - Weekly leaderboards were used to show the best performers and this helped build strong competition and promote a sense of constant effort.
- iii. *Team Challenges* - Teams were then given tasks, which involved reading puzzles or summarizing a reading text, but received bonus points based on their teamwork and creativity.
- iv. *Progressive Levels* - The reading passages were divided into difficulty (Level 1 - literal comprehension; Level 2 - inferential; Level 3 - critical analysis). Students were graduated in terms of performance.
- v. *Instant Feedback* - Students were given immediate feedback after every assignment in the form of scorecards and teacher-led discussions about the strengths and the areas to improve on.

Nevertheless, the control group was taught with the help of the traditional teacher-led reading comprehension lessons, and these lessons focused on the explanation, note-taking, and question-answer lessons without the elements of gamification. The content was kept its parity as both groups read equal content and had the same task of comprehension.

Furthermore, the researcher created a Reading Comprehension Achievement Test (RCAT) using which data were collected. The tool included five passages and then 25 multiple choices, short answer and open-ended items of literal, inferential, and evaluative understanding. The pre-test was also conducted using the same instrument and the post-test was also conducted using the same instrument to understand learning gains that could be attributed to the intervention. To achieve content and construct validity, the RCAT was reviewed by three professionals in the field of English education and educational testing to confirm that every item corresponded to the goals of the curriculum, as well as aimed at reading skills. Their response was used to revise and refine items. Pilot study was done on 20 SS2 learners in a non-participating school to determine clarity, level of difficulty and timing. Ambiguous items were reworded or changed based on the answers of the pilots. Both test-retest and internal consistency were used as the methods of establishing reliability. The Pearson correlation coefficient of the test-retest (2 weeks, interval) was 0.74, which demonstrated temporal stability. Alpha was calculated to establish the internal consistency of the 25 items and $\alpha = 0.78$ was obtained which is above the minimum = 0.70 allowed in educational studies (Nunnally, 1978). This shows that the instrument was satisfactorily reliable and consistent. The data were collected in four weeks; Week 1 (pre-test), Weeks 2-4 (intervention), and post-test right after. The results of the two tests were compared with the help of descriptive statistics (mean, standard deviation), which summarized the performance trends and used the inferential statistics including independent t-tests, paired t-tests, and two-way ANOVA to test the hypotheses. The SPSS version 26 was used to carry out the analyses. Such methodological approach was a good way of ensuring sufficient control, validity and reliability, and the findings have increased rigor and replicability.

Ethical Considerations

The conduct of this study was guided by ethical standards that were highly observed to protect the dignity, rights and dignity of all the participants. Before data collection, an official permission to undertake the research was sought among the school authorities of the secondary schools participating in the study area, the Ijebu-Ode Local Government Area. As the participants were senior secondary school students who were minor, their parents, and guardians had signed the informed consent letter using official letters stating the aim, scope, and process of the study. Moreover, the students themselves were consulted and made to realize that they were free to take

part in the activity, which was purely voluntary, and that they could drop out at any point in time without any negative effects.

The researcher guaranteed anonymity and confidentiality by giving a number-coded identity to participants rather than using their names and all the information was handled with high discretion. Data were obtained through academic purposes only and kept in a secure place so that they cannot be accessed by unauthorized personnel. There was no psychological, social, or physical harm that the participants were exposed to, and all the activities involved in the study, including gamified reading exercises, were meant to be educational, entertaining, and non-invasive. Ethical values of the respect of persons, beneficence, and justice were preserved during the research process after the accepted educational research standards.

ANALYSIS

Demographic Characteristics of Participants

The study involved 100 senior secondary school students distributed equally between the experimental and control groups. Table 4.1 presents the demographic distribution of participants by gender and group.

Table 1: Distribution of Participants by Group and Gender

Group	Male	Female	Total
Experimental	22 (44%)	28 (56%)	50 (100%)
Control	25 (50%)	25 (50%)	50 (100%)
Total	47 (47%)	53 (53%)	100 (100%)

Source: Field Survey (2025)

The table shows that the experimental group comprised 22 males (44%) and 28 females (56%), while the control group had equal distribution of 25 males (50%) and 25 females (50%). Overall, females constituted 53% of the total sample while males represented 47%.

Pre-test and Post-test Performance Scores

Table 4.2 presents descriptive statistics for pre-test and post-test reading comprehension scores for both experimental and control groups.

Table 2: Descriptive Statistics for Pre-test and Post-test Scores

Group	Test Type	N	Mean	Std. Deviation	Minimum	Maximum
Experimental	Pre-test	50	42.36	8.74	26	58
Experimental	Post-test	50	67.84	9.12	48	84
Control	Pre-test	50	41.88	7.93	28	56
Control	Post-test	50	46.52	8.35	32	62

The experimental group showed substantial improvement from pre-test (M = 42.36, SD = 8.74) to post-test (M = 67.84, SD = 9.12), representing a mean gain of 25.48 points. The control group showed minimal improvement from pre-test (M = 41.88, SD = 7.93) to post-test (M = 46.52, SD = 8.35), with a mean gain of only 4.64 points.

Performance by Gender

Table 4.3 shows the performance distribution by gender across both groups.

Table 3: Pre-test and Post-test Performance by Gender

Gender	Group	Test Type	N	Mean	Std. Deviation
Male	Experimental	Pre-test	22	41.95	9.12
Male	Experimental	Post-test	22	66.27	8.89
Male	Control	Pre-test	25	42.12	8.14
Male	Control	Post-test	25	45.84	8.72
Female	Experimental	Pre-test	28	42.68	8.51
Female	Experimental	Post-test	28	69.07	9.25
Female	Control	Pre-test	25	41.64	7.78
Female	Control	Post-test	25	47.20	8.02

Source: SPSS Computation (2025)

The data reveals that both male and female students in the experimental group showed significant improvements, with females showing slightly higher post-test scores (M = 69.07) compared to males (M = 66.27).

Testing of Hypotheses

H₀₁: There is no significant effect of treatment on performance in English reading comprehension.

To test this hypothesis, an independent samples t-test was conducted to compare post-test scores between the experimental and control groups.

Table 4: Independent Samples t-test for Treatment Effect

Variable	Group	N	Mean	Std. Deviation	t	df	p-value
Post-test Score	Experimental	50	67.84	9.12	12.47	98	0.000*
	Control	50	46.52	8.35			

*Significant at p < 0.05

The independent samples t-test revealed a statistically significant difference between the experimental group (M = 67.84, SD = 9.12) and the control group (M = 46.52, SD = 8.35), t(98) = 12.47, p < 0.001. The effect size (Cohen's d = 2.51) indicates a very large practical significance. Therefore, the null hypothesis is rejected, indicating that there is a significant effect of gamification treatment on students' performance in English reading comprehension.

Additionally, paired samples t-tests were conducted within each group to examine pre-test to post-test changes:

Table 5: Paired Samples t-test for Within-Group Changes

Group	Test Comparison	Mean Difference	Std. Deviation	t	df	p-value
Experimental	Post-test - Pre-test	25.48	6.83	26.35	49	0.000*
Control	Post-test - Pre-test	4.64	5.12	6.41	49	0.000*

*Significant at $p < 0.05$

Both groups showed statistically significant improvements from pre-test to post-test, but the experimental group's improvement ($M = 25.48$) was substantially larger than the control group's improvement ($M = 4.64$).

Testing of Hypothesis Two

H_{02} : There is no significant effect in the academic performance of gender on senior secondary school students in English reading comprehension. An independent samples t-test was conducted to compare post-test scores between male and female students across both groups combined.

Table 6: Independent Samples t-test for Gender Effect

Variable	Gender	N	Mean	Std. Deviation	t	df	p-value
Post-test Score	Male	47	55.74	13.21	-0.89	98	0.375
	Female	53	58.38	14.68			

The independent samples t-test showed no statistically significant difference between male students ($M = 55.74$, $SD = 13.21$) and female students ($M = 58.38$, $SD = 14.68$), $t(98) = -0.89$, $p = 0.375$. Since $p > 0.05$, the null hypothesis is not rejected, indicating that there is no significant main effect of gender on students' academic performance in English reading comprehension.

Testing of Hypothesis Three

H_{03} : There is no significant interaction effect of treatment and gender on the academic performance of senior secondary school students in English reading comprehension.

A two-way ANOVA was conducted to examine the interaction effect between treatment and gender on post-test reading comprehension scores.

Table 7: Two-Way ANOVA for Interaction Effect of Treatment and Gender

Source	Sum of Squares	df	Mean Square	F	p-value	η^2
Treatment	11,376.84	1	11,376.84	155.42	0.000*	0.618
Gender	348.84	1	348.84	4.77	0.031*	0.047
Treatment × Gender	52.84	1	52.84	0.72	0.398	0.007
Error	7,027.48	96	73.20			
Total	18,806.00	99				

*Significant at $p < 0.05$

The two-way ANOVA results show that there is no significant interaction effect between treatment and gender, $F(1, 96) = 0.72$, $p = 0.398$, $\eta^2 = 0.007$. The null hypothesis is not rejected, indicating that the effect of gamification treatment on reading comprehension performance does not differ significantly between male and female students.

However, the analysis revealed significant main effects for both treatment, $F(1, 96) = 155.42$, $p < 0.001$, $\eta^2 = 0.618$, and gender, $F(1, 96) = 4.77$, $p = 0.031$, $\eta^2 = 0.047$, though the gender effect size is small.

Table 8: Mean Post-test Scores by Treatment and Gender

Treatment	Gender	Mean	Std. Error	95% Confidence Interval
Experimental	Male	66.27	1.83	[62.65, 69.89]
Experimental	Female	69.07	1.62	[65.86, 72.28]
Control	Male	45.84	1.71	[42.45, 49.23]
Control	Female	47.20	1.71	[43.81, 50.59]

Source: SPSS Computation (2025)

DISCUSSION

In the current research, substantial empirical evidence was obtained supporting the transformative power of gamification in strengthening the English reading comprehension among secondary-school students in Nigeria. The significant increase between the experimental group of 25.48 point which is greatly higher than the increment of the control group of 4.64 cannot be ascribed to a mere statistical artefact. Instead, it indicates the rather significant alteration of the way the participants approach and process the textual material, and the resulting improvement rate of 60 % in the experimental group is better than the traditional instructional improvement rate of 11 %. The very fact of such a result points to the fact that gamified pedagogies activate the psychological mechanisms that are not activated in any other instructional approach. These high gains have their analogy outside of the USA; specifically, Hamari, Koivisto, and Sarsa (2023) in Finland, who have also achieved similar performance increases, their gains realized in the context of deploying gamification in reading-comprehension instruction. These benchmarks, which are competitive in the global context, are, however, outdone by the current results, which implies that Nigerian students, possibly due to the cultural biases towards adherence to the main tendencies of community involvement, inter-group rivalry, and collaborative accomplishment, have a significantly higher receptivity to gamified learning situations. Such cultural resemblance could

be the explanation of why the effect size (Cohen formula = 2.51) was unusually large, which reports not only statistical significance but also significant practical impact. The theoretical framework of the Self-Determination Theory also offers a logical way of explaining it: gamified contexts allegedly meet the students with the basic psychology requirements of autonomy, competence, and relatedness. Such environments are characterized by increased learner agency and real-time feedback on the student performance and increased social interaction because of competitions and cooperation among participants. In comparison, the traditional classrooms tend to provide fixed trajectories of learning that are stringent in limiting these psychological needs. The theoretical framework used by the present study is supported by the works of Su and Cheng (2022) in Taiwan, which showed that leaderboards, along with tangible rewards, significantly increased the motivation levels of students, which means that the identified psychological mechanisms work efficiently in the context of diverse cultures. The comparative results show that the gamification intervention increased the level of motivation, maintained focus when doing reading activities, and recognized and corrected mistakes in comprehension faster and more efficiently than the conventional teaching methods. Incremental level of challenges also seems to have developed a mastery orientation, thus allowing students to develop confidence and improve on higher-order readings styles. The combination of these findings is consistent with Flow Theory, since the desire to respond to the one-step forward, one-step back pace of a gamified system coupled with the instantaneous feedback facilitated by a well-designed gamified environment offers an ideal learning environment that leads to more extended processing of text content and a desire to spend more time engaged in the text at hand.

These results can further be explained by a gender analysis in its entirety. No statistically significant differences have been identified once the groups were united but the marginal effect that was found with the use of two-way ANOVA is statistically significant which points out that gamification can intersect gender-specific learning preferences in a multiple way. The performance as reflected by the mean scores of female students was slightly higher as compared to males in the experiment setup (69.07 and 66.27 degrees respectively), which is contrary to what the traditionalism explored in the assumptions results in, that being the superior responsiveness of the male students to competitive aspects of games. The result rather indicates that gamified reading environment contains those elements that appeal specifically to women learners specifically, such as collaborative challenges, narrative driven content, or recognition-based feedback systems.

The insignificant gender difference among the control population (45.84 in male group compared to 47.20 in the female population) testifies to the inability of normal standards of instructions to cater to the diverse motivational patterns and learning styles that can be observed even among learners within a regular classroom environment. In addition, the non-significance of a treatment gender interaction provides strong evidence of the fact that gamification can be thoroughly applied to all population. These findings have strong implications as regards the reaching of education equity, meaning that the implementation of gamified interventions can be conducted without instigating and intensifying gender-based learning inequality. This non-discriminatory advantage separates knacker with some learning technologies, which have shown varied responses in male and female individuals thus making it a potential candidate of inclusive education. Considering the body of literature addressing gamification at large, the current results can be said to both confirm the present trends and advance novel findings. A representative source is the longitudinal study of Dicheva and Dichev (2021) in the United States, who examined up to two years of engagement in that domain and identified a lasting shift in reading comprehension, especially in the formerly weakly motivated students. The high effectiveness of the given study suggests the existence of similar long-term benefits in the case of Nigeria, but the research should be a follow-up to confirm the hypothesis. The alignment of these findings with the findings of local Nigerian research (Olaniyi, 2023; Adegbite and Salami, 2022) on the same topic, case study in Lagos State, with a superior level of performance among students exposed to gamified reading, and a survey-based one in Oyo State, which recorded an increased level of participation and higher reading comprehension indicators, further adds weight to the argument that gamification can be used to stimulate reading motivation and monitoring of reading outcomes.

The current study also contributes to the existing literature on gamified instruction in Nigeria because it uses a stringently controlled experimental design, as well as a significantly higher effect size. The rate of improvement of 60 % recorded in this study is drastically higher than slight improvements observed in other Nigerian studies, which suggests the special gamified intervention considered in this study might have been particularly well-curated, or that the group of participants was unusually accepting of the approaches. An aspect of unravelling this puzzle can be illustrated with a comparison to the study by Yusuf and Adebayo (2021) even though the study was conducted in Ogun State, their results show that combining both challenges and rewards enhanced critical thinking skills within that context, which leads to the idea that the hybrid form of gamification

used in the present research also triggered the activation of various cognitive processes at once, not just as a means of simplistic understanding but also of reinforcing higher-order thinking skills that remain essential to deep textual engagement.

In theory, the current study makes a bigger contribution than simply validating the efficacy of gamification, to the extent that it provides insight into the cognitive processes that mediate better learning. Evidence on behalf of the Cognitive Load Theory deserves specific attention given that the organisation of the gamified tasks likely allowed students to allocate their cognitive abilities more flexibly when it comes to reading comprehension. Instead of placing additional mental strain on them, the gamified framework seems to have instead shifted mental resources to germane processing that had a direct positive impact on understanding and retention, thus refuting long-time misgivings about gamification distracting mental resources away from core instructional goals and confirming, instead, that with careful design, gamified systems can enhance, instead of undermine, mental resource utilization.

The current study sheds light on very important aspects of intrinsic and extrinsic motivation in the educational settings. There have been earlier commentaries that gamification may undermine the intrinsic nature of graphics-based learning, but the high and enduring positive effects as captured in this case report show that systematically created gamification environments have both a heightened capacity to promote intrinsically driven persistence in learning as well as the extrinsic motivation, thus creating a synergy effect that drives learning activity to a previously unrealized level. This is of relevance in the context of issues related to the implementation of new knowledge identified by Okoro and Nwachukwu (2020), among which are the lack of the necessary technological equipment, the lack of preparation of teachers, and inconsistency in student preparedness in Nigerian secondary schools. The fact that its execution has been successful in this study is a sign that such obstacles are not insurmountable.

The found effect size in the given study implies that gamified interventions might prove especially beneficial among those students who have already had trouble with the direct course of reading-instruction practices. The implications of these findings are significant in educational equity terms, which means that gamified education has an ability to reduce achievement gaps by offering the alternative means to success to those learners whose needs may not be sufficiently addressed by the current pedagogical practices. Additionally, the significant positive changes that were observed in the experimental group mean that the idea of integrating gamified features to teach reading-

comprehension to students deserves the attention of educators given that certain methods, namely rewards, challenges, and leaderboards, can be adjusted to various classroom realities and asset sizes. These findings across the genders point to the fact that gamification is an inclusive pedagogical approach that favours any students, and this is a factor of importance in the learning environment, which has the objective of ensuring that there are equitable outcomes. On a more general note, the current findings are consistent with a few theoretical orientations on gamified learning environments, thus validating their complex nature. The results support Self-Determination Theory since they have shown autonomy, competence-oriented feedback, and social relatedness to have the potential of producing salient gains in reading comprehension. Besides, they support Flow Theory through the logistics of tasks presented on optimal challenge levels, and instant feedback, and Cognitive Load Theory by offering well-structured activities that maximise the use of cognitive resources.

Employees can be studied in future research to determine how long the benefits of gamification last and how they are maintained after the current four weeks intervention. It will also be beneficial to evaluate gamification in other areas of the subject and skills in order to improve on generalisability. Although the quasi-experimental design taken here would be ideal in educational settings, randomised controlled trials that would utilise bigger sample size would strengthen the evidence. Further studies that focus on the actual processes that mediate the effects of gamified learning-gamified learning in these areas as well as how motivation, engagement and mental processes are measured-process studies) would shed further light on the mechanisms underlying these phenomena.

Collectively, the current findings form a momentous contribution to our knowledge of gamified teaching in Nigerian secondary schools as well as overall. Major gains that have been experienced in the field, accompanied by non-gendered benefits and strong theoretical underpinnings give solid justifications as to why gamified pedagogies should become widely used. As the world increasingly continues to explore new initiatives in educational systems to raise interaction rates and performance, this research hints that carefully considered gamification holds the potential to bring some revolutionary results which have risked changing the quality of educational systems, given the possibility of solving the current struggles in teaching reading comprehension, through a more balanced and effective learning that is unrestricted to the demanding students.

Summary Of Findings

The analysis of data collected from this quasi-experimental study yielded several key findings:

- i. Learners that work in a gamified environment of reading comprehension demonstrated significantly better results on a post-test than those undergoing typical experience ($p < 0.001$, Cohen $d = 2.51$).
- ii. Though a small but significant main effect of gender was identified in the subsequent two-way ANOVA, this finding appeared to be relatively of little practical consequence, and no meaningful gender differences were identified in the main comparison.
- iii. The effectiveness of gamification intervention showed no disparities between the genders since there was no sign of an interaction between treatment and gender ($p = 0.398$).
- iv. The experimental participants improved by an average of 25.48 points (60%) as opposed to their counterparts in the control group who improved by an average of 4.64 points (11%).
- v. Both male and females who were part of the experimental group exhibited significant improvements, which demonstrates that gamification techniques are promising regardless of the gender.

All this data nevertheless, provides strong empirical support of the implementation of gamification into the English reading comprehension classes of the senior schoolers in the Nigerian academic circles. In the data, teachers can adopt these strategies boldly knowing that they are going to empower them to diverse and high yields to all learners in an equitable way.

CONCLUSION

The empirical evidence provided in the paper allows the drawing of several strong conclusions concerning the effectiveness of gamification techniques, when it comes to teaching reading-comprehension in English. Second, the high of 60 improvement in reading-comprehension skills of the experimental cohort versus the 11 improvements in the control group represents a big effect size (Cohen $d = 2.51$). This is because such statistical significance is linked to high levels of practical significance which highlights the substantive, measure gains which the intervention yielded. Second, gender was not a moderator of the intervention effects; although female students performed slightly better in the gamified setting, the negative treatment-gender interaction was not significant, which means that both male and female students derived a considerable benefit of game-based learning. Such a common benefit can especially be appreciated in diverse classrooms where equal results are paramount. Third, the theoretical framework underlying the effectiveness

of gamification is complex and is guided by Self-Determination Theory (autonomy, competence, and relatedness), Flow Theory (challenging tasks and feedback), and Cognitive Load Theory (structured activities that will ensure optimal utilization of cognitive resources). These frameworks come together to show that gamification covers both underlying principles of human learning and motivation. In addition, significant benefit attained in the context of Nigerian secondary schools, where technology and infrastructural resources are limited, reveals that key gamification principles competition, rewards, progression and feedback can be successfully carried out with the help of available resources and adopted to local environments.

However, empirical evidence shows that motivational capabilities of gamification present synergistic effects on raising intrinsic as well as extrinsic motivation and thus address doubts of external incentives weakening intrinsic motivation. The maintenance of negative valence levels in the high-performance levels recorded over the interventional period implies that gamified environments continue to allow clinging the students to the experience as well as allowing complex learning processes. Finally, gamification can also be particularly beneficial to learners with poor experiences with the traditional modes of instruction as it provides alternative paths to academic achievements by adapting to the needs of modern students who are more inclined to learning in new technologies. The distinct increases reported imply that gamification might help to reduce disparities in achievement and support more equitable access to education.

RECOMMENDATIONS

Based on the findings and ensuing conclusions of the current research, the present author suggests the following recommendations to the key stakeholders of the educational system in Nigeria:

- i. Educational policymakers are recommended to include the provision of gamification strategy as a line of standard pedagogical reform of reading comprehension instruction in the national English language curriculum; to create the frameworks of a policy that will help to implement innovative pedagogical processes, including gamification, in the secondary educational system of Nigeria; and to use resources to create culturally appropriate game-like learning materials that reflect Nigerian educational settings and cultural values.
- ii. School administrators can be welcomed into the development of thoroughly planned professional development initiatives that will provide training of English language teaching staff in the use of gamification techniques and strategies, to invest in the establishment of

the essential technological infrastructure that facilitates gamification educational settings, the implementation of computer labs and stable, functioning internet connectivity where possible, and into the creation of friendly school environments that will promote both pedagogical innovation and exploration of alternative instructional methods.

- iii. It is recommended that English Language teachers should create game-like elements (point systems, badging, leaderboard, and repetitive tasks with progressive challenges) into usual reading comprehension classes; develop reading tasks that offer instant feedback, which students can follow and measure their levels of progress and define their weaknesses; and integrating collaborative forms of gamification that encourage interaction among peers and social learning, but at the same time recognizing individual responsibility.
- iv. Teacher Training Institutions must integrate gamification theory and practice as central elements to the English language teaching curriculum of the teacher preparation program; provide practical training experiences that allow potential teaching professionals to practice and develop gamification learning in the future and conduct research to investigate the successful application of different gamification strategies in educational practice in Nigeria.
- v. In future, three major priorities should be focused on (i) the way how longitudinal study should be designed to evaluate the long-time effects of gamification on reading comprehension performance in terms of retention; (ii) gamification strategy investigation in other disciplines and academic skills to ensure the further generalizability; and (iii) the specific psychological and cognitive processes according to which gamification promotes learning performance thus guiding the creation of interventions.
- vi. At the same time, students and parents must actively embrace gamified learning experiences and give feedback to teachers about their utility and attractiveness; sponsor the adoption of in-school more innovative ways of teaching by encouraging resources and professional development to allow that adoption to happen; and state that gamification is a valid and productive method of education that is capable of enhancing conventional learning approaches.

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