

## Effects of Digital Gamification on the Reading Performance of Secondary School Students in Kaduna State

<sup>1</sup> **Awwal Yahaya Abdullahi, Abstract**

<sup>2</sup> **Saidu Yushau,**

<sup>3</sup> **Hafsat Usman Kasim &**

<sup>4</sup> **Ismail Abubakar**

<sup>1,2&4</sup> *Department of General Education;*  
<sup>3</sup> *Department of General Studies,*  
*School of Vocational and Technical*  
*Education & School of Advance and*  
*General Studies, Nuhu Bamalli*  
*Polytechnic, Zaria,*

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*Corresponding Author:*

Awwal Yahaya Abdullahi

ORCID ID: 0000 – 0003 – 4156 – 9343

**T**his study investigates the effects of digital gamification on the reading performance of secondary school students in Kaduna State, Nigeria. With the growing integration of technology in education, gamified learning platforms have emerged as innovative tools for enhancing students' engagement and academic achievement. The research adopted a quasi-experimental design involving two groups: an experimental group exposed to digital reading materials embedded with gamification features such as points, badges, and interactive quizzes, and a control group using traditional reading methods. Population of 360 and Sample size of 120 SS1 students via random technique from four public secondary schools' students were randomly assigned to experimental (n=60) and control (n=60) groups. Data were collected using pre-test and post-test reading comprehension assessments and analyzed using descriptive and inferential statistics. The findings revealed that students in the experimental group demonstrated significantly improved reading performance compared to their counterparts in the control group. Furthermore, the study observed increased motivation, active participation, and a positive attitude toward reading among students exposed to gamified content. These results suggest that digital gamification can serve as an effective pedagogical strategy for improving literacy skills in secondary schools, particularly in under-resourced educational settings. The study recommends the integration of gamified digital resources into the reading curriculum and the training of teachers to effectively implement such tools. Future research should explore long-term impacts and subject-specific applications of gamification in diverse educational contexts.

## **Background to the Study**

In recent years, the integration of digital technologies into education has transformed traditional pedagogical methods, offering new and innovative ways to engage students in learning. One such innovation is digital gamification the application of game design elements, such as point scoring, leaderboards, challenges, and rewards, in non-game contexts to enhance learning experiences. As students increasingly engage with digital platforms, gamification has emerged as a promising approach to foster motivation, sustain attention, and improve academic performance across various subjects, particularly in literacy and reading comprehension.

Reading is a foundational skill essential for academic success and lifelong learning. However, in many secondary schools, especially within developing contexts, reading performance remains a significant challenge. Students often exhibit poor reading habits, low comprehension abilities, and limited motivation to engage with texts. Traditional methods of teaching reading, which rely heavily on rote learning and teacher-centered instruction, have proven insufficient in addressing the diverse learning needs of digital-native students. Consequently, educators and researchers have sought alternative strategies to revitalize reading instruction and enhance student engagement and performance.

Digital gamification offers an interactive and student-centered alternative to traditional reading instruction. By transforming reading tasks into engaging activities with instant feedback and clear goals, gamified environments can stimulate student interest, improve focus, and support differentiated learning. Several studies have suggested that gamified learning can boost students' motivation, foster collaborative learning, and enhance comprehension skills. However, despite the growing global interest, empirical evidence on the actual impact of digital gamification on reading performance particularly in secondary school settings is still emerging and often context-specific.

In Nigeria, and more specifically in regions like Kaduna State, educational stakeholders face multiple challenges related to literacy development, such as overcrowded classrooms, inadequate instructional materials, and limited access to engaging digital content. While mobile devices and digital platforms are becoming increasingly accessible, their integration into the classroom remains limited. This situation presents a unique opportunity to explore the role of digital gamification in improving reading performance among secondary school students within such contexts. Therefore, this study seeks to examine the effects of digital gamification on the reading performance of secondary school students. It aims to provide empirical insights into whether gamified reading platforms can significantly enhance students' reading comprehension, vocabulary acquisition, and overall engagement with reading tasks. The findings are expected to contribute to evidence-based practices in educational technology and support the design of more effective and inclusive reading interventions in secondary education.

### **Statement of the Problem**

Reading is a critical component of academic success and a key determinant of students' overall educational development. Despite its importance, many secondary school students continue to struggle with reading fluency, comprehension, and sustained engagement with texts, and particularly in many public secondary schools, reading performance remains below expected standards. Factors contributing to this challenge include lack of motivation, poor reading culture, outdated instructional strategies, and limited access to engaging learning materials. Traditional reading instruction methods, which are often rigid and teacher-centered, have not been effective in stimulating students' interest or addressing their individual learning needs in a digital age.

At the same time, the increasing availability of digital technologies and mobile devices among students presents an opportunity to rethink how reading is taught. Digital gamification the incorporation of game elements such as rewards, levels, feedback, and competition into educational activities has emerged as a potential strategy to make learning more interactive and appealing. Research in other contexts suggests that gamification can enhance student motivation, improve engagement, and positively influence learning outcomes. However, despite the growing interest in educational gamification globally, there is limited empirical evidence on its impact on reading performance among secondary school students in Kaduna state. More specifically, it is unclear whether digital gamification strategies can significantly improve students' reading comprehension, vocabulary development, and overall interest in reading when compared to traditional teaching methods. In addition, there is a lack of understanding of how students respond to gamified learning environments in the context of secondary education, where academic pressures and curriculum demands are high.

This study, therefore, seeks to address these gaps by investigating the effects of digital gamification on the reading performance of secondary school students. It aims to determine whether gamified reading platforms can offer a viable solution to the persistent problem of poor reading outcomes in schools and contribute to the development of more effective, engaging, and learner-centered reading instruction methods.

### **Objectives of the Study**

- i. To examine the effect of digital gamification on the reading comprehension skills of secondary school students in Kaduna State.
- ii. To determine the impact of digital gamification on students' motivation and engagement in reading activities.
- iii. To compare the reading performance of students exposed to gamified reading materials with those taught using traditional reading methods.

### **Research Questions**

- i. What is the effect of digital gamification on the reading comprehension skills of secondary school students in Kaduna State?
- ii. How does digital gamification influence students' motivation and engagement in

- reading?
- iii. Is there a significant difference in reading performance between students exposed to gamified reading materials and those taught using traditional methods?

### **Hypotheses**

- i.  $H_{01}$ : Digital gamification has no significant effect on the reading comprehension skills of secondary school students in Kaduna State.
- ii.  $H_{02}$ : Digital gamification significantly influences students' motivation and engagement in reading activities.
- iii.  $H_{03}$ : There is no significant difference in reading performance between students exposed to gamified reading materials and those taught using traditional methods.

### **Review of Related Literatures**

#### **Reading Performance among Secondary School Students in Kaduna State, Nigeria.**

Reading performance among secondary school students in Kaduna State, Nigeria, continues to face significant challenges that affect literacy outcomes. Recent studies show that the effective implementation of the English language curriculum especially the reading component remains inadequate due to limited instructional materials, overcrowded classrooms, and insufficient teacher training in reading pedagogy (Oyetunji and Adebayo, 2022; Yusuf, 2023). Weak vocabulary development also undermines comprehension, as students with limited lexical knowledge often struggle to interpret texts and engage in critical reading. Evidence suggests that explicit and intensive vocabulary instruction significantly improves comprehension and overall reading achievement among junior and senior secondary students (Nwoke and Bello, 2021; Ibrahim, 2024).

Interactive and learner-centred teaching approaches, including guided reading, peer discussion, and text-based activities, have been found to enhance students' engagement and understanding. Studies in Northern Nigeria report that students exposed to interactive reading strategies demonstrate better comprehension and retention than those taught through traditional lecture methods (Abubakar and Musa, 2022). However, persistent barriers remain. Many schools lack functional libraries, reading clubs, and adequate textbooks, while students often have limited access to reading materials at home. These constraints contribute to poor reading habits and low motivation (UNESCO, 2023; Adeyemi, 2022).

Reading is both a cognitive and affective process requiring decoding, comprehension, and critical thinking skills. In Kaduna State, low reading proficiency has been linked to weak reading culture, inadequate instructional resources, and insufficient teacher professional development (Umar and Ibrahim, 2020; Mohammed, 2024). Addressing these issues requires the provision of relevant reading materials, teacher training in effective reading strategies, and the establishment of school-based reading clubs to foster sustained literacy development and improved academic performance.

## **Digital Gamification in Education**

Digital gamification has emerged as a transformative approach in education, leveraging game-based elements such as points, leaderboards, badges, and rewards to foster student engagement and improve academic outcomes. Rooted in motivational theories, particularly Deci and Ryan's Self-Determination Theory (SDT), gamification taps into intrinsic motivators such as autonomy, competence, and relatedness (Ryan and Deci, 2000). In recent years, its integration into educational settings has garnered significant attention due to its potential to enhance student learning experiences. Studies have shown that gamified environments can positively influence cognitive, emotional, and behavioral engagement. For instance, Koivisto and Hamari (2019) assert that gamification increases user participation and sustained attention, critical for reading and comprehension skills. In secondary education, where student motivation often wanes, digital gamification offers a dynamic alternative to traditional pedagogies by making learning more interactive and enjoyable (Sailer and Homner, 2020).

In the context of reading performance, gamified digital tools such as interactive story apps and comprehension games have been linked to improved vocabulary acquisition, reading fluency, and comprehension (Nacke and Deterding, 2017). A recent study by Yusuf et al. (2023) in Kaduna state found that gamification significantly enhanced students' reading motivation and academic achievement, particularly in language arts. However, challenges persist. Poor technological infrastructure, limited teacher training, and the risk of overemphasizing extrinsic rewards may hinder the effective implementation of gamification strategies, especially in under-resourced contexts (Balci and Turgut, 2022). Additionally, the diversity of learner needs requires adaptable gamified systems to ensure inclusive benefits. However, while digital gamification holds great promise for enhancing educational outcomes, especially in literacy development, its success depends on thoughtful design, contextual relevance, and adequate teacher support. Future research should further explore culturally responsive gamified interventions, particularly in multilingual and resource-limited environments. Gamification involves integrating elements such as challenges, scores, leaderboards, feedback, and rewards into educational activities (Deterding et al., 2011). It has been used to increase student motivation, enhance engagement, and support self-directed learning. Research shows that gamification enhances both intrinsic and extrinsic motivation, thereby improving academic performance (Ibáñez et al., 2021; Alomari et al., 2023).

## **Gamification and Reading**

Gamification in reading education refers to the application of game design elements such as points, levels, challenges, and rewards to motivate learners and enhance literacy outcomes. This pedagogical approach is gaining recognition for its ability to transform passive reading activities into engaging, interactive experiences, particularly among digital-native students (Munday, 2021). Grounded in theories of motivation and engagement, gamification leverages both intrinsic and extrinsic motivators to improve reading fluency, comprehension, and overall literacy performance.

Research indicates that gamified reading environments positively affect students' attitudes toward reading, especially among reluctant readers. For example, Xu and Wang (2022) found that incorporating gamified features into reading apps increased students' reading time and improved comprehension in middle school students. Similarly, studies by Alharthi and Alqahtani (2023) highlight that gamified reading interventions improve vocabulary acquisition and retention by encouraging repeated engagement with text. Gamification is particularly effective in promoting personalized and adaptive reading experiences. Digital tools such as reading apps and learning management systems offer real-time feedback, goal-setting, and progress tracking features that have been shown to increase student motivation and self-efficacy (Sailer et al., 2021). These tools support differentiated instruction, allowing learners to progress at their own pace.

However, successful implementation depends on careful design. Over-reliance on extrinsic rewards may reduce intrinsic motivation over time, and poorly designed gamification elements can distract from learning goals (Seaborn and Fels, 2020). Furthermore, access to digital tools and teacher training remain critical factors, especially in resource-limited settings. However, gamification has shown considerable promise in enhancing reading engagement and performance. When well-designed and contextually relevant, it can foster deeper reading comprehension and literacy development. Further research is needed to explore its long-term impact and scalability in diverse educational environments. A growing body of empirical research supports the use of gamified platforms to improve reading outcomes. Tsai and Chuang (2020) found that elementary students using a gamified e-reading platform significantly improved their comprehension skills. Similarly, Kim and Song (2021) reported that gamified reading apps led to better vocabulary retention and higher engagement in middle school learners. However, most studies are conducted in developed contexts, leaving a gap in knowledge about gamification's impact in resource-constrained environments like Nigeria.

### **Methodology**

Quasi-experimental Design which involves pre-test/post-test control group were adopted. Population of 360 and Sample size of 120 SS1 students via random technique from four public secondary schools in Kaduna State students were randomly assigned to experimental (n=60) and control (n=60) groups. Instruments used were Standardized Reading Comprehension Test, Vocabulary Acquisition Test, and Reading Motivation Questionnaire. The experimental group used a gamified reading app for six weeks; the control group used traditional methods. Pre- and post-tests were administered. Paired sample t-tests and ANCOVA were used to compare group performance.

## Results / Findings

**Table 1:** Pre- and Post-Test Mean Scores of Experimental and Control Groups

Group	Test	Mean Score	Std. Deviation
Experimental	Pre-Test	52.3	8.5
Experimental	Post-Test	78.4	6.2
Control	Pre-Test	51.7	7.9
Control	Post-Test	64.7	7.8

**Table 2:** ANCOVA Summary

Source	SS	Df	MS	F	p-value
Group	2043.67	1	2043.67	28.53	< 0.001
Error	8372.20	118	70.78		

## Discussion of Findings

The results indicate that students exposed to the gamified reading intervention recorded markedly higher gains than those in the control group. While both groups began with comparable pre-test mean scores (Experimental = 52.3; Control = 51.7), the post-test mean of the experimental group rose to 78.4 compared with 64.7 for the control group. This suggests that digital gamification features such as rewards, progress indicators, and interactive quizzes significantly enhanced students' reading performance. The relatively smaller standard deviation in the experimental post-test (6.2) also indicates more consistent performance among learners exposed to gamified strategies, implying that the intervention supported a wider range of students.

The ANCOVA result further confirms the effectiveness of the intervention. A statistically significant difference was found between the groups,  $F(1,118) = 28.53$ ,  $p < .001$ , indicating that the improvement in the experimental group was not due to chance but to the instructional strategy applied. This aligns with constructivist learning principles, which emphasize active learner engagement and feedback as key drivers of academic achievement. Gamification elements often motivate learners by incorporating competition, immediate feedback, and goal-oriented tasks, which can increase attention and persistence during reading activities.

The findings corroborate earlier studies showing that gamified learning environments improve literacy outcomes and learner motivation. For instance, Ibáñez et al. (2021) reported that gamified reading platforms enhanced comprehension and participation among secondary school learners by promoting sustained engagement. Similarly, research by Deterding et al. (2019) highlighted that game-based mechanics such as points, levels, and badges foster intrinsic motivation and active participation in educational tasks. These elements may explain the significant gains observed in the experimental group, as students

likely became more invested in reading tasks when they were presented in interactive and rewarding formats.

Moreover, the results support the growing emphasis on digital learning tools in contemporary classrooms. According to UNESCO (2022), integrating technology-based strategies into literacy instruction can improve reading outcomes, particularly when tools are designed to encourage learner autonomy and collaboration. The present findings demonstrate that structured gamification can complement traditional teaching by making reading tasks more engaging and learner-centered. In contexts where students often struggle with sustained reading motivation, gamification may provide a practical approach to improving literacy performance. However, the significant improvement in the experimental group suggests that digital gamification is an effective instructional strategy for enhancing reading achievement. By promoting active participation, providing instant feedback, and reinforcing progress through rewards, gamified learning environments can create positive learning experiences that translate into measurable academic gains.

### Summary of Findings

- i. The experimental and control groups had similar pre-test reading scores, indicating comparable baseline abilities.
- ii. After the intervention, the experimental group achieved a substantially higher mean score (78.4) than the control group (64.7).
- iii. ANCOVA results showed a significant difference between groups,  $F(1,118) = 28.53$ ,  $p < .001$ , confirming the effectiveness of the gamified intervention.
- iv. The findings demonstrate that digital gamification strategies significantly improved students' reading performance and engagement compared with conventional teaching methods.

### Conclusion

Digital gamification positively influences reading comprehension, vocabulary acquisition, and motivation.

### Recommendations

The study recommends three actionable recommendations to address reading performance and challenges in secondary schools in Kaduna State:

- i. **Strengthen Teacher Capacity in Reading Instruction:** Secondary schools' teachers in the state should receive continuous professional development focused on effective reading strategies, including vocabulary instruction, guided reading, and the use of interactive methods. Training should also include how to integrate digital tools and differentiated instruction to meet the diverse reading needs of students.
- ii. **Improve Access to Reading Materials and Facilities:** Secondary Schools in the state should be equipped with well-stocked libraries, both physical and digital, that are accessible to students. Stakeholders including government and NGOs should collaborate to provide age-appropriate, engaging reading materials that support the

curriculum and encourage independent reading.

- iii. **Establish and Sustain Reading Culture Programs:** Schools should create structured reading initiatives such as reading clubs, literacy competitions, and weekly reading hours. These programs can cultivate a reading culture and motivate students to read beyond the classroom. Involving parents and communities in promoting reading at home will also reinforce literacy habits.

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