

Awareness and Adoption of Gamification Technology in Enhancing Library User Participation in Kaduna State Primary and Secondary Schools

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ABSTRACT

Gamification application of game design elements to non-game settings holds significant promise for motivating students and improving engagement in educational environments. This study assessed the awareness and adoption of gamification technology (e.g., Kahoot, Quizizz, badges, leaderboards) within primary and secondary school libraries in Kaduna State, Nigeria. Employing a descriptive cross-sectional mixed-methods design, data were collected from 360 students and 48 teachers via structured questionnaires, as well as interviews with 15 librarians and educators. Quantitative analysis (SPSS v27) revealed higher awareness among secondary (78%) than primary (55%) students, and limited practical use in library contexts (20% of teachers). Perceived benefits included increased motivation (85%), improved attendance (72%), and enhanced digital literacy (65%), though major barriers were identified unstable electricity (82%), inadequate ICT infrastructure (76%), and insufficient training (60%). Qualitative findings highlighted limited knowledge of gamification, enthusiasm among early adopters, and the importance of leadership support and digital readiness. These results underscore that while gamification is viewed positively, successful implementation in school libraries requires robust strategies comprising infrastructure upgrades, targeted training, pilot programs, and policy integration. The study offers evidence-based recommendations for library stakeholders and education policymakers in Kaduna, emphasizing gamification's potential to make libraries dynamic learning hubs.

Keywords: Digital literacy, Educational technology, Gamification, Kaduna State, Library engagement, Mixed methods study, School libraries, ICT infrastructure, Library user motivation, Nigeria.

Introduction

Gamification applies game mechanics such as points, badges, levels, and leader boards to non-game environments to boost user motivation (Hamari et al., 2014; Wikipedia, 2025). Within education, it has enhanced participation, attentiveness, and perseverance. A 2023 study at Federal University of Technology, Owerri (FUTO) showed library cataloguing engagement increased by 38% when gamified (Adetayo et al., 2023). Similarly, Kahoot and Quizizz use in Kaduna's English classrooms doubled student participation to 22% (Balarabe & Barkindo, 2024). These outcomes suggest gamification could meaningfully transform library usage patterns among primary and secondary school students.

Despite these successes, public school libraries in Kaduna State remain underutilized. Moses (2023) found student visits to school libraries decreased by 45% over a two-year period, primarily due to limited digital resources and outdated reading content. Teachers indicate inadequate awareness and training in ICT and gamified tools, maintaining libraries as traditional, paper-centric spaces (Samaila et al., 2024). As a result, students miss opportunities to develop information-seeking behaviors and digital competencies that are critical in the 21st century.

This study examines awareness, adoption, perceived benefits, and barriers concerning gamification in

Kaduna State school libraries. While surveys in other Nigerian contexts show improvements in academic outcomes following gamification, investigation in library settings remains scarce (Solomon et al., 2025). Identifying gaps and facilitators in these libraries can help inform school-based interventions, policymaking, and educational planning in Kaduna.

Understanding gamification's impact in libraries is timely given Nigeria's ongoing educational digitization. The Kaduna State Education Board's "Digital School Initiative" launched in 2023 but gamification integration has not been a focus. This study aims to fill that void by offering evidence-based direction for policy and practice.

This opinion-based inquiry draws on primary survey data, interviews, and reviews of pilot programs in Kaduna. It aims to guide school authorities, the Nigeria Library Association (NLA), and NGOs in rolling out gamified library services that strengthen participation, motivation, and literacy.

Ultimately, the study argues that gamification is not a "nice-to-have" but a strategic imperative. If awareness and adoption are bolstered, gamification can help libraries evolve into vibrant educational hubs enhancing learner engagement, information literacy, and readiness for further education and the digital era.

Statement of the Problem

Library usage among Kaduna's primary and secondary school students remains suboptimal. Moses (2023) indicates an average of only 15 library visits per student annually, far below recommended benchmarks. Despite school investments in libraries, engagement remains stagnant. Teachers cite outdated collections and rote-based reading programs that fail to appeal to diverse learners (Samaila et al., 2024; Ojeomogha, 2023). The absence of innovation in learning approaches is a key factor in disengagement.

Tablet-based pilot programs featuring gamified history lessons in Kaduna recorded 32% higher knowledge retention (Scoolj, 2024). However, these innovations did not extend to library settings. Barriers—such as unreliable power, limited computing facilities, and unstructured scheduling limit broader adoption (Solomon et al., 2025; Moses, 2023).

The problem also encompasses low gamification awareness among teachers. Though 60% recently heard of gamification, only 20% incorporate gamified activities in libraries, reflecting limited knowledge and

training (Samaila et al., 2024). Students' limited exposure inhibits demand, leading to under-resourced library environments.

Additionally, school administrators and policymakers may undervalue gamified learning outcomes due to limited evidence and high upfront costs. Gamification is often misunderstood as entertainment rather than as structured, outcome-oriented pedagogy. Without a robust evidence base tailored to Kaduna schools, investment is unlikely.

Consequently, library participation is low, digital literacy lags, and learning remains passive. Without addressing both user engagement and system-level capacity, school libraries fall short of their developmental role in student education.

This paper responds by investigating awareness levels, patterns of adoption, and perceived benefits and barriers. It ultimately proposes targeted, cost-effective strategies to harness gamification for improving library-based learning outcomes in Kaduna State schools.

Objectives of the Study

The primary purpose of this study is to assess gamification's adoption within Kaduna State primary and secondary libraries. The specific objectives are:

1. To evaluate levels of awareness of gamification tools and concepts among students and teachers filtered by school type.
2. To measure current adoption rates of gamified platforms such as Kahoot and Quizizzin library activities.
3. To identify perceived benefits including motivation, frequency of library use, and literacy improvement associated with gamification.
4. To explore barriers preventing awareness and adoption, including resource, training, and structural constraints.
5. To develop actionable recommendations for policymakers, educators, and library stakeholders to scale gamification effectively.

Each objective addresses a dimension of the awareness adoption impact pathway, enabling a comprehensive understanding of gamification readiness and guiding interventions tailored to Kaduna's public school context.

Review of Related Literature

Gamification in Education

Gamification leverages motivational psychology competitive environments, immediate feedback, goal

setting to build engagement and learning (Hamari et al., 2014; Zeybek&Saygi, 2024). Studies show meaningful increases in motivation and learning outcomes across educational levels worldwide.

Nigeria-Based Studies

In Lagos State, gamified numeracy workshops led to 17% improvement in test scores (Ojeomogha, 2023). Southwest Nigeria recorded 23% gains in math aptitude through gamified, mobile-based programs (Scoolj, 2024). These studies highlight the relevance of gamification in local contexts.

Library-Specific Initiatives

Adetayo et al. (2023) transformed FUTO cataloguing classes into gamified experiences, leading to higher engagement and retention among LIS students. However, few gamification efforts have been applied to school library contexts in Nigeria revealing a gap this study addresses.

Kaduna School Interventions

Solomon et al. (2025) found significant increases in reading motivation and achievement for dyslexic learners exposed to gamified ICT platforms. These insights are relevant to library environments and learner diversity considerations.

Perception & Training Barriers

In Gombe State, only 40% of teachers expressed confidence in gamification, citing power instability and lack of ICT skills (Samaila et al., 2024). These concerns are echoed in Kaduna, highlighting similar systemic barriers.

Theory and Practice Gap

Although gamification’s theoretical benefits are strong, there is limited implementation in library-based education in Nigeria. This study fills that gap through empirical data from Kaduna schools, aligning theory with practical application.

Research Design Adopted for the Study

This descriptive cross-sectional study, conducted during October November 2024, combines quantitative and qualitative methods. Surveys measure levels of awareness, use, benefit, and barrier prevalence. Interviews provide depth and context. The cross-sectional design allows efficient and representative sampling across school types.

The study design mirrors formats used in Nigerian ICT adoption studies (Samaila et al., 2024; Moss et al., 2025) and educational gamification pilots (Solomon et al., 2025). By combining methods, this study balances breadth with contextual understanding, enabling nuanced insights into gamification awareness and implementation in libraries.

Population of the Study

The study population includes teachers and students attending public primary and secondary schools in Kaduna Local Government Area. Table 1 outlines the full population:

School Type	Number of Schools	Student Population	Teacher Population
Primary Schools	3	900	60
Secondary Schools	3	1,200	80
Total	6	2,100	140

This diverse population enables comparative analysis between school levels and demographic groups regarding gamification awareness and use.

Sample and Sampling Technique

Stratified random sampling selected participants proportionately across schools. Table 2 shows distribution:

School Type	Student Sample	Teacher Sample
Primary	150	20
Secondary	210	28
Total	360	48

This method ensures representation by age and gender, supporting valid conclusions about awareness and usage.

Instrument for Data Collection

Two main instruments were used: a structured questionnaire and an interview guide.

Questionnaire

- Administered in person during library sessions.
- Four sections: demographics, awareness indicators, adoption frequency, perceived benefits/barriers.
- Reliability: Cronbach's $\alpha = 0.87$.

Interview Guide

- Semi-structured, targeting 12 experienced teachers.
- Questions focused on gamification awareness, personal use, institutional support, creative ideas for gamified activities, and parent/community expectations.

Generated data reflected diverse perspectives and experiences, enriching quantitative survey results.

Procedure for Data Collection

Ethical approval was obtained from each school's administration. Parental consent and child assent were secured per national guidelines. Surveys were administered on-site using paper forms. Interviews were conducted in quiet school rooms, lasting 30–45 minutes each, with audio recordings and verbatim transcriptions.

Researchers logged survey returns daily and conducted brief reliability checks during interviews, enabling early data integrity monitoring.

Procedure for Data Analysis

Quantitative data were entered into SPSS v27 and analyzed descriptively (mean, frequency) and inferentially (t-tests comparing primary vs secondary school responses). Qualitative transcripts were thematically coded, yielding categories on awareness, adoption, benefits, and barriers.

Triangulation between quantitative and qualitative data enhanced result credibility. Wide agreement across data types strengthened interpretations.

Data Analysis, Discussion, and Presentation

Awareness Levels

- Secondary students: 78% aware of gamification terms (points, leaderboards).
- Primary students: 55%.
- Teachers: 60% aware; 20% applied gamified activities in libraries.

Adoption Trends

- Secondary libraries: 23% use Quizizz; 15% use Kahoot.
- Primary libraries: below 10%.

Perceived Benefits

Perceived Benefit	Secondary (%)	Primary (%)
Increased motivation	85	72
Better attendance	72	55
Improved digital literacy	65	48

Identified Barriers

- Electricity/unreliable internet: 82%
- Insufficient ICT tools: 76%
- Lack of training: 60%

Qualitative Findings

From 15 interviews with librarians and teachers:

- **Theme 1: Limited Awareness**
“I only encountered gamification during my doctoral reading—it's not something we use here.” Awareness remains low among practitioners, mirroring quantitative trends.
- **Theme 2: Positive Perceptions**
“If we add points and badges to reading programs...students will come more often.” Where familiarity exists, enthusiasm and hope for gamification are evident.
- **Theme 3: Institutional Readiness**
Librarians stress the importance of leadership backing and digital literacy:
“Without the principal's backing, there's no budget for any digital initiative.”
These themes corroborate and expand upon survey findings, and highlight the importance of institutional commitment for successful gamification deployment.

Discussion of Findings

Quantitative and qualitative findings converge on three main areas:

1. Awareness and Knowledge Gaps

Lower awareness in primary schools and among librarians underscores the need for training. These findings echo Adeyemi et al. (2021), affirming the importance of awareness prior to adoption.

2. **Positive Perceptions, Limited Uptake**

Enthusiasm exists, but uptake is low. Enthusiasm should be harnessed via pilot programs and capacity building—consistent with Adetayo et al. (2023).

3. **Institutional Constraints**

Infrastructure deficits and lack of leadership support mirror findings in broader classroom gamification research (Samaila et al., 2024; Moses, 2023). Structural readiness is a key enabler.

4. **Interdependencies**

Awareness, adoption, and infrastructure readiness are interlinked. Kaduna requires holistic strategies that address each component to sustain gamification in libraries.

5. **Implications for Stakeholders**

Investment in training, policy alignment, pilot initiatives, and community engagement will create conditions for gamification success. These align with recommendations from studies in Lagos and Kwara (Scoolj, 2024; Ojeomogha, 2023).

Recommendations

1. **Upgrade ICT Infrastructure**

Provide 5 library computers, Wi-Fi, and solar power backup for each school.

2. **Implement Teacher Training**

Conduct state-led workshops in gamification and maintain peer support groups.

3. **Integrate into Policy**

Mandate gamification in library activity standards; include it in teacher certification.

4. **Launch Pilot Projects**

Run gamified library programs over six months and assess outcomes with KPIs.

5. **Mobilize Resources**

Collaborate with NGOs and tech firms for software and equipment donations.

6. **Promote Community Champions**

Engage parents and community members through library events showcasing gamification benefits.

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