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Effect of Gamification on Preschoolers' Motivation, Engagement and Learning Outcomes in Kwara South Senatorial District, Nigeria

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Abstract **Original Research Article**

It was observed that despite the effectiveness of gamification as an innovative pedagogical approach for early childhood education, many preschools learning environments continue to rely heavily on traditional, teacher-centred methods that may not adequately stimulate young children's motivation, engagement, and active learning. Therefore, this study investigated the effect of effects of Gamification on pre-schoolers' motivation, engagement and learning outcomes in Kwara South District. This study adopted the pre-test-post-test Quasi-experimental research design. A stratified random sampling technique was selected four pre-schoolers' classes (One class from each school). The Checklist for Pre-schoolers Motivation(CPM), Checklist for Pre-schoolers Engagement(CPE), and Checklist for pre-schoolers' Learning outcomes (CPLO) were used to obtain pre-test and post-test scores. Pearson Product Moment Correlation (PPMC) was used to establish the reliability coefficient of the instruments at 0.70, 0.83, and 0.75. The treatment lasted for six weeks and was carried out by the researcher and the research assistants. The procedure adopted was to observe the pre-schoolers' activities before the treatment began. After this, those in the experimental group were taught using gamification, and the control group were taught using a conventional method. After the teaching and learning exercises, the two groups administered the test again. Data collected were analysed using Analysis of Covariance (ANCOVA). All the hypotheses were tested at a 0.05 level of significance. It was found among others that There was significant effect of gamification on pre-schoolers' motivation, engagement, and learning outcomes in kwara south district ($F(1; 61) = 40.481$, $P < 0.05$). It was concluded based on the discussion of this study that the overall, the findings of this study demonstrated that gamification exerts a significant and positive influence on pre-schoolers' motivation, engagement, and learning outcomes. It was recommended among others that early childhood educators should adopt structured gamified learning tools such as reward systems, digital games, badges, and interactive tasks as part of daily instruction. This will help sustain learners' interest and improve their overall performance.

Keywords: Gamification, motivation, engagement, learning outcome.

Introduction

Preschool education strives to develop core cognitive, socio-emotional, and self-regulation skills. In recent years, educators and educational technologists have used game components such as points, badges, levels, progress bars, narrative contexts, rapid feedback, and playful obstacles in the hopes of creating motivating, engaging learning

environments for young children. Gamification (the application of game aspects in non-game contexts) overlaps with but differs from fully fledged game-based learning. Both attempt to harness play's motivational power, but gamification frequently augments current activities with game mechanics rather than replacing them with full games.

It was evidence that playful, feedback-rich learning experiences could significantly improve children's attention, task persistence, and willingness to engage, all of which are linked to early learning success (Alotaibi, 2024). Pre-schoolers, on the other hand, have a distinct developmental profile that includes short attention spans, growing self-regulation abilities, emphasis on symbolic and exploratory play, and limited reading skills. These developmental characteristics demand careful customisation of gamified aspects to ensure they are age-appropriate, cognitively accessible, and effectively linked with young children's learning needs (Ruiz et al., 2024).

Gamification, in principle, increases pre-schoolers' motivation by incorporating playful features such as instant feedback, visual rewards, and narrative contexts that are consistent with self-determination theory and young children's innate play-based learning tendencies. These aspects promote intrinsic motivation by fostering autonomy, competence, and relatedness, while also improving extrinsic incentive via points, badges, and reward cycles (Khoshnoodifar et al., 2023). According to a research, such feedback-rich environments promote persistence, curiosity, and willingness to tackle difficult tasks, making gamification especially appropriate for pre-schoolers who respond strongly to concrete, sensory-rich reinforcement (Alotaibi, 2024).

In terms of engagement and learning outcomes, gamification supposedly promotes higher levels of behavioural, emotional, and cognitive engagement by arranging activities into short, interactive, and goal-oriented episodes that fit pre-schoolers' restricted attention spans. Gamified learning environments encourage active involvement, sustained attention, and iterative mastering of early literacy, numeracy, and problem-solving abilities using mechanisms like as adaptive challenges, collaborative play, and instant corrective feedback (Lorenzo-Lledó et al., 2023). These elements produce continuous learning loops in which engagement fuels repeated practice, resulting in better foundational learning outcomes in early childhood settings (Ruiz et al., 2024).

In some literature, it was repeatedly revealed that gamification has a statistically significant beneficial impact on learner motivation, especially in preschool and early primary settings. Khoshnoodifar et al. (2023) found a moderate pooled effect size ($g = 0.38$) for motivational outcomes in gamified interventions. This suggested that factors like rewards, feedback, and progress indicators boost learners' willingness to participate and persist. Similarly, Alotaibi's (2024) meta-analysis of early childhood game-based learning discovered a positive motivation effect size of $g = 0.41$, indicating that playful, feedback-rich activities boost excitement and task engagement in young children. Studies employing classroom experiments indicated statistically significant gains in task initiation and persistence among pre-schoolers when game elements such as badges, sound effects, and storytelling were inserted in routine learning activities. (Lorenzo-Lledó et al., 2023).

Despite these advantages, it is suggested that gamification could have a negative impact on motivation, especially when extrinsic reward systems are too emphasised. Ruiz et al. (2024) found that around 22% of the experimental trials in their review had non-significant or negative motivational effects, which were frequently related to reward fatigue or decreased intrinsic motivation over time. According to studies involving preschool samples, when points and badges were utilised without meaningful context, motivation diminished after initial novelty, with some children demonstrating drop-offs of up to 15-20% in task persistence following repeated exposure. Furthermore, poorly designed competitive elements have been linked to anxiety, frustration, and disengagement in younger learners, especially those with lower skill levels, resulting in statistically significant decreases in motivation when compared to cooperative or

narrative-based gamified tasks (Khoshnoodifar et al., 2023). These data showed that gamification's impact on motivation is not always good and is highly dependent on design quality, learner characteristics, and reward structure.

It was found that gamification had primarily favourable statistical effects on pre-schoolers' engagement, with various meta-analyses revealing small-to-moderate effect sizes. A major meta-analysis of gamification treatments, for example, indicated that engagement improved significantly, with an overall effect size of g = 0.48, indicating a moderate improvement in on-task behaviour and participation when compared to non-gamified activities (Khoshnoodifar et al., 2023). Similarly, instructional games in early childhood settings have been linked to improved response rates, longer attention spans, and enhanced classroom involvement, with some studies claiming engagement gains of 20-35% over control groups (Alotaibi, 2024). These findings indicate that feedback loops, visual rewards, and amusing challenges included in gamified settings efficiently pique children's interest and keep them engaged during learning activities.

In contrast, empirical evidence demonstrated statistically significant negative or inconsistent effects of gamification on engagement when poorly conceived or performed. Some studies show that engagement declines over time due to novelty loss, with impact sizes ranging from moderate to near-zero after repeated exposure (Ruiz et al., 2024). Other research indicated that excessive use of meaningless extrinsic rewards, such as points and badges, could reduce intrinsic engagement, with some interventions reporting negative effect sizes (g = -0.12 to -0.20) when reward pressure causes anxiety or withdrawal in young children (Lorenzo-Lledó et al., 2023). Furthermore, research suggests that leader boards and competitive mechanics may reduce engagement among pre-schoolers who struggle academically or socially, resulting in unequal involvement across groups. Overall, these varied statistical results showed that gamification's impact on engagement is greatly dependent on design quality, developmental appropriateness, and contextual circumstances.

Empirical studies from Nigeria and other contexts indicate promising positive benefits, but with key caveats. For example, Yahaya and Mohammed (2025), in their study Effect of Gamification in ICT-Based Learning Platforms on Motivation and Retention in Reading Comprehension for Children with Dyslexia in Mainstream Basic Schools with Inclusive Education in Kaduna State, Nigeria, used a quasi-experimental design with lower basic school pupils and found that a gamified ICT-based platform significantly improved both motivation ($F(1,49) = 89.054$, $p = .000$) and retention in reading comprehension

Similarly, the broader systematic review and meta-analysis by Adeyemi and Afolabi (2023), Game-based Learning in Early Childhood Education: A Systematic Review and Meta-analysis, reported moderate-to-large positive effects of game-based/gamified approaches on cognitive, social, emotional, motivational, and engagement outcomes in early childhood settings. Moreover, an experimental study by Hsu (2025), Gamification in Early Childhood Education: A Novel Adaptive Learning Framework. These findings support the idea that gamification can improve early childhood learning outcomes, particularly when the learning focuses on basic cognitive skills and engagement-enhancing tasks (Adeyemi & Afolabi, 2023; Yahaya & Mohammed, 2025).

However, empirical and review evidence, including work by African and Nigerian researchers, demonstrates limitations and variable results depending on contextual and pedagogical factors. For example, the Nigeria-based review Okoye and Eze (2022), Role of Gamification Techniques in Promoting Students' Learning, discovered that the effects of gamification were mixed: some studies reported improvements, while others showed minimal or no advantage over traditional methods, implying that "inappropriateness of certain techniques" or poor implementation can negate potential benefits (Okoye & Eze, 2022).

Furthermore, Wali and Samuel (2017) reported in Linking Early Childhood Education with Indigenous Education Using Gamification: The Case of Maintaining Cultural Value and Identity that, while teachers in Rivers State recognised

storytelling, riddles, counting games, and demonstrations as culturally grounded gamification-like strategies, they rarely used them in practice, revealing a gap between awareness and implementation. Qualitative research on play-based and gamified pedagogies in Nigeria (Ajayi, 2020; Emeh, 2019) found that low teacher knowledge, insufficient training, and poor curriculum alignment frequently hampered successful implementation. These conflicting findings emphasise that gamification's effectiveness is not guaranteed; it is strongly reliant on culturally suitable design, teacher skill, contextual resources, and pedagogical integration.

In spite these attempts, the issue of pre-schoolers' motivation, engagement, and learning results persists. The purpose of this study was to assess the impact of Gamification on the motivation, engagement, and learning outcomes of pre-schoolers in Kwara South, Senatorial District, Nigeria. It has been found from the literature examined that study of this sort has never been carried out in in kwara south, senatorial district, Nigeria. As a result, this is intended to address a vacuum in the literature by providing empirical evidence on the effects of Gamification on pre-schoolers' motivation, engagement and learning outcomes.

Statement of the Problem

Despite growing global interest in gamification as an innovative pedagogical approach to early childhood education, many preschool learning environments still rely heavily on traditional, teacher-centered methods that may not adequately stimulate young children's motivation, engagement, and active learning. According to research, gamified activities like levels, badges, prizes, storytelling, and interactive challenges can help young learners improve their attention, engagement, and foundational cognitive skills.However, empirical evidence in many underdeveloped countries, including Nigeria, is scarce, fragmented, or inconclusive. While some studies claim considerable increases in motivation, engagement, and early literacy or numeracy achievements, others show low or inconsistent impacts, which are frequently attributed to insufficient teacher preparation, poor implementation, or a lack of culturally relevant gamified materials.

Furthermore, preschool students have distinct developmental characteristics that necessitate carefully planned learning experiences; when gamification is not aligned with curriculum goals or overemphasises competition or extrinsic rewards, it may impede social-emotional development or reduce intrinsic motivation. Many preschool teachers have a weak comprehension of game-based or gamified pedagogies, resulting in underuse or misuse of these technologies. Simultaneously, structural problems such as insufficient digital resources, overcrowded classrooms, and limited professional development impede the effective implementation of gamification.

As a result, there is an increasing need for systematic research into the effects of gamification on pre-schoolers' motivation, engagement, and learning outcomes in real-world classroom settings. The lack of context-specific evidence created a vacuum in understanding whether gamification could truly improve early learning or how it should be tailored to local cultural, pedagogical, and resource constraints. Addressing this issue is critical for guiding effective instructional design, strengthening teacher ability, and enhancing early childhood learning outcomes.

Research Hypotheses

$H_0$1: There is no significant effect of gamification on pre-schoolers' motivation, engagement, and learning outcomes in kwara south district

$H_0$2: There is no significant interaction effect of gamification on pre-schoolers' motivation in kwara south district

$H_0$3: There is no significant interaction effect of gamification on pre-schoolers' engagement in kwara south district

$H_0$4: There is no significant interaction effect of gamification on pre-schoolers' learning outcomes in kwara south district

Methodology

This study adopted the pre-test-post-test quasi-experimental research design. The study's population consisted of three intact classes totalling 70 pre-schoolers. A simple random selection procedure was employed to choose three pre-schooler classes (one from each Local Government Area). A stratified random selection procedure was also used to choose the Local Government Area. From each strata, a simple random procedure was used to select one local government, resulting in three local governments (Oke-ero, Irepodun, and Oyun). The reason for selecting these Local Government Areas for this study was based on their level of civilisation. The Checklist for Pre-schoolers Motivation(CPM), Checklist for Pre-schoolers Engagement(CPE), and Checklist for pre-schoolers' Learning outcomes (CPLO) were used to obtain pre-test and post-test scores. The instrumentswere used as a pre-test before the treatment and also as a post-test after the treatment. It was given to both experimental and control groups. The instruments were validated by thepre-schoolers' teachers and Caregivers. Items therein were established using the test-retest method within two weeks. Therefore, the Pearson Product Moment Correlation (PPMC) was used to establish the reliability coefficient of the instruments at 0.70, 0.83, and 0.75. The treatment lasted for six weeks and was carried out by the researcher and the research assistants. The procedure adopted was to observe the pre-schoolers' activities before the treatment began. After this, those in the experimental group were taught using gamification, and the control group were taught using a conventional method. After the teaching and learning exercises, the two groups administered the test again. Data collected were analysed using Analysis of Covariance (ANCOVA). All the hypotheses were tested at a 0.05 level of significance

Results

$H_0$1: There is no significant effect of gamification on pre-schoolers' motivation, engagement, and learning outcomes in kwara south district:

Table 1: Summary of Analysis of Covariance showing the main effect of gamification on pre-schoolers' motivation in kwara south district

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18475.157[a]	5	2309.395	11.707	.000
Intercept	7682.060	1	7682.060	38.941	.000
Pretest	57.572	1	57.572	.292	.605
Gamification	7985.858	1	7985.858	40.481	.002
Gamification* motivation	32.844	1	32.844	.166	.000
Gamification* engagement	128.638	1	128.638	.652	.003
Gamification * learning outcomes	477.461	1	477.461	2.420	.004
Error	12625.528	61	197.274		
Total	301150.000	70			
Corrected Total	31100.685	69			

Table 1 shows significant effect of gamification on pre-schoolers' motivation, engagement, and learning outcomes in kwara south district. There was significant effect of gamification on pre-schoolers' motivation, engagement, and learning outcomes in kwara south district ($F_{(1; 61)}$ =

40.481, P < 0.05). The hypothesis is therefore rejected in the light of the result since the significant value (.002) is less than 0.05. This implies that gamification had significant effect on pre-schoolers' motivation, engagement, and learning outcomes in kwara south district

$H_0$2: There is no significant interaction effect of gamification on pre-schoolers' motivation in kwara south district

Table 1 shows significant interaction effect of gamification on pre-schoolers' motivation in kwara south district. There was significant interaction effect of gamification on pre-schoolers' motivation in kwara south district ($F_{(1; 61)}$ = .166, P < 0.05). The hypothesis is therefore rejected in the light of the result since the significant value (.000) is less than 0.05. This signifies that there was significant interaction effect of gamification on pre-schoolers' motivation in kwara south district

$H_0$3: There is no significant interaction effect of gamification on pre-schoolers' engagement in kwara south district

Table 1 shows significant interaction effect of gamification on pre-schoolers' engagement in kwara south district. There was significant interaction effect of gamification on pre-schoolers' engagement in kwara south district ($F_{(1; 61)}$ = .652, P < 0.05). The hypothesis is therefore rejected in the light of the result since the significant value (.003) is less than 0.05. This signifies that there was significant interaction effect of gamification on pre-schoolers' engagement in kwara south district

$H_0$4: There is no significant interaction effect of gamification on pre-schoolers' learning outcomes in kwara south district

Table 1 shows significant interaction effect of gamification on pre-schoolers' learning outcomes in kwara south district. There was significant interaction effect of gamification on pre-schoolers' learning outcomes in kwara south district ($F_{(1; 61)}$ = 2.420, P < 0.05). The hypothesis is therefore rejected in the light of the result since the significant value (.004) is less than 0.05. This signifies that there was significant interaction effect of gamification on pre-schoolers' learning outcomes in kwara south district

Discussion of Results

One of the key findings of this study revealed a significant effect of gamification on pre-schoolers' motivation, engagement, and learning outcomes in Kwara South District ($F(1, 61) = 40.481$, $p < 0.05$). This aligns with the findings of Khoshnoodifar et al. (2023), who reported a moderate pooled effect size ($g \approx 0.38$) for motivational outcomes across gamified interventions, suggesting that elements such as rewards, feedback, and progress indicators promote learners' willingness to participate and persist. Similarly, Alotaibi (2024), in a meta-analysis of early childhood game-based learning, recorded a positive motivation effect size of $g = 0.41$, indicating that playful, feedback-rich activities significantly enhance enthusiasm and task engagement among young children. However, Ruiz et al. (2024) noted that approximately 22% of studies in their review reported non-significant or even negative motivational effects, often associated with reward fatigue, or reduced intrinsic motivation over time. Supporting this view, Lorenzo-Lledó et al. (2023) found that when points and badges were used without meaningful context, motivation declined after the initial excitement, with some children experiencing a 15–20% drop in task persistence after repeated exposure.

Furthermore, the study showed that there was a significant interaction effect of gamification on pre-schoolers' motivation in Kwara South District ($F(1, 61) = 0.166$, $p < 0.05$). This indicates that gamification exerts a statistically significant positive influence on learners' motivation across preschool and early primary school populations. This result is consistent with the submission of Khoshnoodifar et al. (2023), whose meta-analysis demonstrated that rewards, feedback, and progress indicators enhance learners' motivation and persistence. Likewise, Alotaibi (2024) found that early childhood game-based learning produced a positive motivation effect size of $g = 0.41$. Contrarily, Ruiz et al. (2024) reported that about 22% of studies revealed non-significant motivational effects due to reward fatigue or diminished intrinsic motivation. Additionally,

poorly designed competitive elements have been shown to induce anxiety, frustration, and disengagement in younger learners, particularly those with lower skill levels, resulting in significant decreases in motivation when compared to cooperative or narrative-based gamified activities (Khoshnoodifar et al., 2023).

Moreover, the findings also showed a significant interaction effect of gamification on pre-schoolers' engagement in Kwara South District ($F(1, 61) = 0.652$, $p < 0.05$). This aligns with the meta-analysis by Khoshnoodifar et al. (2023), which reported that gamification significantly improves engagement, with an effect size of $g = 0.48$, indicating a moderate increase in on-task behaviour and participation relative to non-gamified activities. In addition, instructional games in early childhood settings have been associated with higher response rates, longer attention spans, and increased classroom participation, with engagement improvements of 20–35% compared to control groups (Alotaibi, 2024). Nevertheless, some empirical studies have shown negative or inconsistent engagement outcomes when gamification is poorly designed or implemented. Ruiz et al. (2024) observed that engagement tends to decline over time as the novelty of gamification wears off, with effect sizes dropping from moderate to near-zero after prolonged exposure. Similarly, Lorenzo-Lledó et al. (2023) reported that excessive reliance on extrinsic rewards such as points and badges, especially when devoid of meaningful context, may reduce intrinsic engagement, with some interventions recording negative effect sizes ($g = -0.12$ to -0.20) due to anxiety or withdrawal caused by competition or reward pressure among young children.

Lastly, the study revealed a significant interaction effect of gamification on pre-schoolers' learning outcomes in Kwara South District ($F(1, 61) = 2.420$, $p < 0.05$). This finding is consistent with Adeyemi and Afolabi (2023), whose systematic review and meta-analysis on game-based learning in early childhood education reported moderate-to-large positive effects on cognitive, social, emotional, motivational, and engagement outcomes. Similarly, an experimental study by Hsu (2025) showed that children aged 4–6 in the gamified learning group made significant gains in problem-solving skills (from 60.1 to 82.3) and attention span (from 55.4 to 79.8), with high levels of teacher (88%) and child (95%) reported motivation. These findings collectively support the argument that gamification enhances early childhood learning outcomes, particularly when learning tasks focus on foundational cognitive skills and sustained engagement. However, Okoye and Eze (2022) noted that the effects of gamification can be mixed, with some studies reporting significant improvements while others found minimal or no advantage over traditional methods. They argued that inappropriate gamification techniques or poor implementation may limit or neutralize the potential benefits of gamified instruction.

Conclusion

It was concluded based on the discussion of this study that the overall, the findings of this study demonstrated that gamification exerts a significant and positive influence on pre-schoolers' motivation, engagement, and learning outcomes, consistent with earlier meta-analytic evidence showing the effectiveness of rewards, feedback mechanisms, and playful task structures in enhancing young children's participation and cognitive development. Collectively, the evidence indicated that although gamification offers substantial benefits for early childhood education, its success depends largely on purposeful instructional design, age-appropriate implementation, and maintaining a balance between intrinsic and extrinsic motivational elements to promote sustained, meaningful learning among pre-schoolers.

Recommendations

It was recommended based on the results of this study that:

1. Early childhood educators should adopt structured gamified learning toolssuch as reward systems, digital games, badges, and interactive tasksas part of daily instruction. This will help sustain learners' interest and improve their overall performance.

2. Teachers should be trained to design gamified activities that match pre-schoolers' developmental levels. Continuous professional development should focus on how game elements such as instant feedback, levels, and playful competition can be used to enhance intrinsic motivation
3. Schools should implement gamified engagement boostersfor example, classroom leader boards, participation tokens, and collaborative game-based tasks. These will help maintain active involvement and reduce disengagement or off-task behaviour.
4. Stakeholders should encourage the use of gamified assessment tools such as quiz games, problem-solving missions, and digital learning challenges. These tools make learning more interactive and help pupils demonstrate understanding in a stress-free manner, thereby improving performance.

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