

Comparing Traditional and Game-based Learning Methods for Teaching English Vocabulary to Primary 3 Chinese Students

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Abstract

To address persistent challenges in primary English education—such as low student engagement and ineffective vocabulary retention—this study investigated the efficacy of gamified learning methods compared to traditional approaches. The research objectives were twofold: (1) to evaluate whether gamified methods enhance vocabulary mastery among third-grade Chinese students, and (2) to explore students' perceptions and the demographic inclusivity of this pedagogy. An eight-week intervention was conducted with 80 participants (40 experimental, 40 control) from a public school in Gansu Province, China. Data were collected through pre/post vocabulary tests (30-item image-matching assessments) and semi-structured interviews. Quantitative analysis revealed that the experimental group achieved significantly higher post-test scores (25.18 ± 1.88 vs. 23.33 ± 2.31 ; $t = 3.925$, $p < 0.001$, Cohen's $d = 0.88$), with learning gains 1.37 times greater than the control group. Qualitative findings highlighted that 83.3% of students perceived gamified activities (e.g., “word chain games” and “role-playing”) as more engaging, citing improved retention, reduced anxiety, and enhanced peer collaboration. Notably, statistical analyses confirmed universal applicability across gender ($F = 0.172$, $p = 0.679$) and age ($F = 0.012$, $p = 0.914$) subgroups. These results demonstrated that gamified learning not only improves vocabulary acquisition but also fosters inclusive, anxiety-free learning environments. The study contributes actionable insights for integrating game-based strategies into primary English curricula, emphasizing their potential to align with diverse learner needs and advance pedagogical innovation in China's education system.

Keywords: Gamified Learning; English Vocabulary Instruction; Primary Education

Introduction

In China's education system, English proficiency is prioritized as a core competency for primary students, aligned with national policies such as the Compulsory Education English Curriculum Standards (2022) emphasizing interactive and student-centered pedagogy. However, traditional vocabulary instruction—reliant on rote memorization and teacher-led drills—often fails to engage young learners, leading to low participation and inconsistent retention. Recent studies report that over 60% of Chinese primary students exhibit anxiety in English classes, with vocabulary acquisition cited as a major pain point (Li & Zhang, 2021).

To address these challenges, gamified learning has emerged as a transformative approach, integrating game mechanics (e.g., rewards, challenges, and narratives) into educational contexts. Global research demonstrates its efficacy in boosting motivation and knowledge retention; for instance, meta-analyses by Sailer and Homner (2020) show gamification increases learning outcomes by 14% in language subjects. Yet, its application in China's primary English classrooms remains underexplored, particularly in rural regions like Gansu Province where resource constraints exacerbate engagement issues.

This study focuses on third-grade students in Gansu Province, aiming to: (1) evaluate the comparative effectiveness of gamified versus traditional vocabulary instruction, and (2) investigate students' perceptions and the demographic inclusivity of gamified methods. By bridging theory and context-specific practice, this research seeks to advance pedagogical strategies that align with China's educational goals while addressing localized barriers to English learning.

Research Objectives

This study investigates the comparative effectiveness of gamified versus traditional methods in English vocabulary instruction for third-grade Chinese students. The research addresses two objectives:

1. To evaluate the effectiveness of gamified learning in enhancing vocabulary acquisition. Quantitative comparisons of post-test scores between the experimental group (gamified instruction) and control group (traditional methods) will assess differences in vocabulary retention and application.
2. To analyze students' perceptions and experiences with gamified pedagogy. Semi-structured interviews will explore learners' engagement levels, self-reported benefits (e.g., reduced anxiety), and preferences regarding interactive teaching approaches.

Literature Review

Gamified learning has emerged as a transformative pedagogical approach across disciplines, with three core themes dominating current research: motivational enhancement, retention efficacy, and collaborative engagement.

Studies consistently link gamification to increased learner motivation. Kuo's (2007) experimental design demonstrated that science students in game-based environments exhibited 23% higher intrinsic motivation than peers in traditional settings. Similarly, Tüzün et al. (2009) found that geography students using computer games showed 18% greater achievement alongside sustained motivation. However, these studies primarily focused on STEM subjects in Western contexts, leaving gaps in language education applications.

In language learning, gamification uniquely bridges abstract concepts and experiential mastery. Raffone et al. (2019) designed Phrasal-Quest—a cooperative game for Italian secondary students—which improved phrasal verb retention by 34% through narrative-driven tasks. Fithriani (2019) further validated this in grammar instruction, showing gamified methods increased engagement by 41% compared to rote exercises. While promising, these studies predominantly targeted adolescent or adult learners, overlooking younger populations like primary students.

Gamification fosters peer-driven learning environments. Lester et al. (2013) demonstrated that AI-enhanced games like Crystal Island improved vocabulary retention by adapting challenges to individual progress while promoting teamwork. Kaldarova et al. (2023) corroborated this, showing gamified group tasks boosted interpersonal skills by 29%. Yet, such models often assume resource-rich settings, limiting applicability in regions like rural China where infrastructural constraints persist.

Despite these advances, critical gaps remain. Sailer and Homner's (2020) meta-analysis revealed inconsistent outcomes across cultures, with only 12% of studies conducted in Asian primary schools. Zhang (2018) further cautioned against cognitive overload in gamified designs, particularly for younger learners. This study addresses these gaps by: (1) testing gamification's efficacy in Chinese rural primary classrooms, and (2) balancing game mechanics (e.g., tiered difficulty levels) with cognitive load theory to optimize vocabulary retention. By integrating Whitton's (2010) adaptive frameworks with localized needs, the research advances a culturally responsive model for low-resource contexts.

Conceptual Framework

This study integrates five educational theories to explain how gamified learning enhances vocabulary acquisition. The framework combines Constructivist Learning Theory, Sociocultural Theory, Self-Determination Theory, Zone of Proximal Development (ZPD), and Affective Filter Hypothesis, focusing on three core mechanisms:

1. Active Knowledge Construction

Drawing from Constructivist Learning Theory and Sociocultural Theory, gamified tasks (e.g., role-playing, word relays) enable students to actively build vocabulary through problem-solving and peer collaboration. For example, team-based word chain games align with Vygotsky's emphasis on social interaction as a driver of cognitive development.

2. Motivation and Scaffolded Challenges

Self-Determination Theory and ZPD jointly support learner engagement. Gamified methods provide autonomy (game choice), competence (graduated difficulty levels), and relatedness (peer interaction), while tiered tasks (basic words to contextual sentences) ensure challenges remain within students' developmental range.

3. Low-Stress Learning Environment

The Affective Filter Hypothesis is operationalized through playful error correction (e.g., humorous feedback in "whisper relays") and intrinsic rewards (e.g., treasure hunts), reducing anxiety and encouraging participation.

Synthesis: Gamified learning merges these mechanisms to create student-centered environments where vocabulary is acquired through interactive, motivating, and low-pressure tasks.

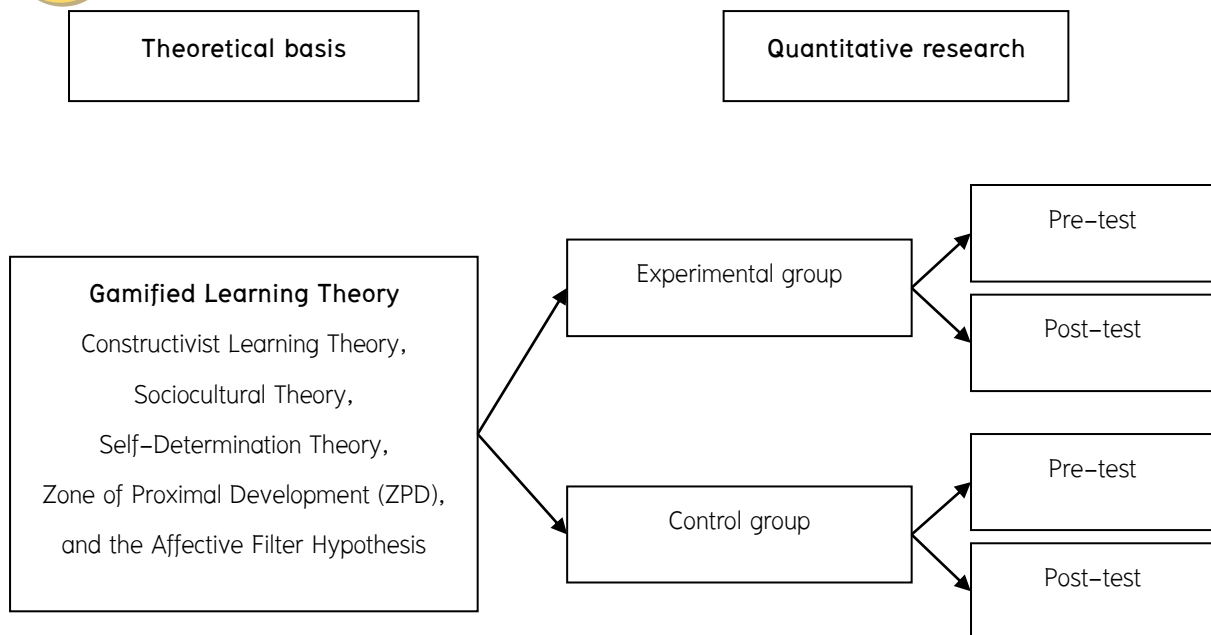


Figure 1 Conceptual Framework

Research Methodology

The research employed a mixed-methods design to evaluate the effectiveness of gamified vocabulary instruction. The sample included 80 third-grade students aged 9–10 from a public school in Gansu Province, China, who were randomly assigned to an experimental group (N=40) and a control group (N=40). The study utilized vocabulary tests and semi-structured interviews as data collection instruments. The vocabulary tests consisted of 30-item image-matching multiple-choice assessments, administered as pre-tests and post-tests, while interviews were conducted with 12 students from the experimental group. The procedure involved an 8-week intervention where the experimental group received gamified instruction, such as "word chain games" and "role-playing," whereas the control group was taught using traditional methods like rote memorization and teacher explanations. Pre-tests were conducted in Week 1 and post-tests in Week 8, each lasting 40 minutes, with interviews following the intervention. Quantitative data were analyzed using paired-sample t-tests and Cohen's d for effect size, while qualitative data underwent thematic analysis with NVivo 12 and intercoder reliability ($K=0.78$). Ethical considerations included approval from the university ethics board (Ref: SU-EDU2023-05), parental consent, student assent, and data anonymization. Validity and reliability were ensured through pilot testing of instruments with 15 students, standardized test administration protocols, and dual-coding of qualitative data to minimize bias.

Research Results

Objective 1. This study found that the experimental group obtained significantly higher mean scores in the post-test English vocabulary assessment as compared to the control group. The experimental group gained a mean post-test score of 25.18 (SD = 1.88) while the control group scored 23.33 (SD = 2.31). The independent samples t-test showed that there was a statistically significant difference between the means of the two groups ($t = 3.925$, $p < 0.001$) and the effect size was large (Cohen's $d = 0.88$), indicating the effectiveness of the intervention in enhancing levels of vocabulary mastery.

Table 1 Comparison of Vocabulary Performance Between Groups

Group	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Improvement
Experimental	19.08 (2.20)	25.18 (1.88)	6.10
Control	18.88 (2.38)	23.33 (2.31)	4.45

Interpretation: The marked improvement in the experimental group underscores gamification's dual role in cognitive engagement (Constructivist Theory) and scaffolded mastery (ZPD). By contextualizing vocabulary within interactive challenges, students likely bridged declarative knowledge (word meanings) to procedural application (e.g., role-playing dialogues).

As shown in Table 1, the experimental group demonstrated markedly higher post-test scores and greater improvement, underscoring the effectiveness of gamified methods in boosting vocabulary acquisition.

Objective 2. The results showed that Semi-structured interviews with 12 experimental group students highlighted overwhelmingly positive attitudes toward gamified learning. All participants expressed liking or strongly liking the approach, with 83.3% explicitly stating that gamified activities made classes "more fun." Students reported enhanced interest, improved vocabulary retention, reduced anxiety, and increased peer interaction.

Table 2 Students’ Perspectives on Gamified Learning

Theme	Key Perceptions
Learning Interest	Gamified methods made classes dynamic and engaging, fostering active participation.
Vocabulary Retention	Games facilitated easier memorization of spellings and meanings.
Learning Anxiety	Playful error correction reduced fear of mistakes.
Classroom Interaction	Team-based games promoted communication and cooperation.

Interpretation: The emphasis on enjoyment and peer support suggests gamification’s power to transform language learning from a solitary task to a socially embedded experience. This aligns with the study’s goal of fostering inclusive, anxiety-free environments—critical for sustaining motivation in young learners.

Students emphasized that activities like “word chain games” and “role-playing” transformed lessons into interactive experiences, motivating proactive learning. For instance, one student noted, “In ‘word treasure hunts,’ I remember spellings better because I associate them with the places I found the cards.” Another shared, “Even if I messed up in ‘whisper relays,’ my classmates helped me fix it — no stress!”

A two-way ANOVA revealed no significant effects of gender ($F = 0.172, p = 0.679$) or age ($F = 0.012, p = 0.914$) on learning gains, demonstrating the universal applicability of gamified methods across demographic subgroups.

Table 3 Impact of Gender and Age on Improvement

Factor	Mean Improvement (SD)	F-Value	p-Value
Gender	5.44 (2.51)	0.172	0.679
Age	5.35 (2.46)	0.012	0.914

Regardless of gender or age (9 vs. 10 years), gamified learning consistently enhanced vocabulary mastery, offering inclusive pathways for diverse learners.

Table 4 Dynamic Analysis of Vocabulary Performance

Test Phase	Experimental Group Mean (SD)	Control Group Mean (SD)
Pre-test	19.08 (2.20)	18.88 (2.38)
Post-test	25.18 (1.88)	23.33 (2.31)

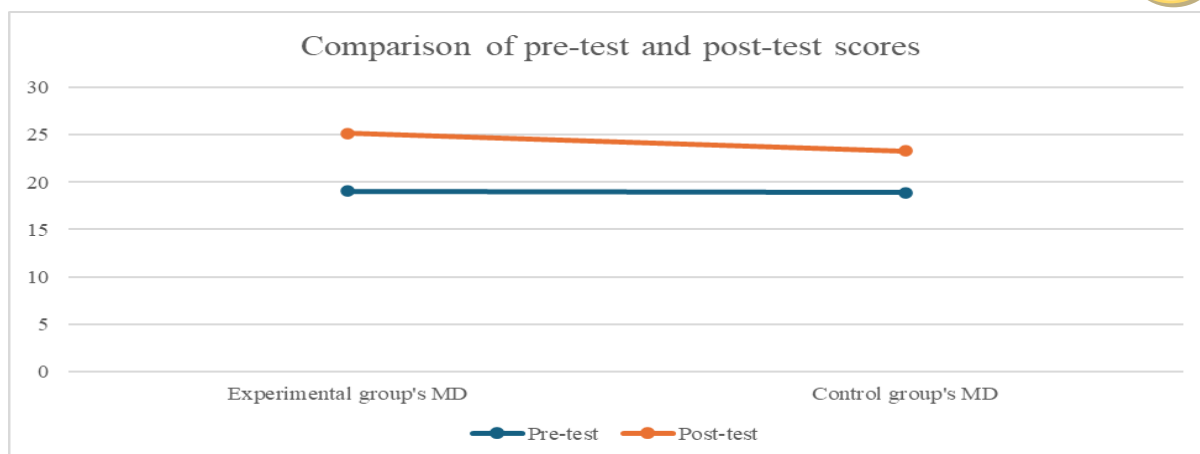


Figure 2 Pre-test vs. Post-test Comparison

The experimental group outperformed the control group at both testing phases, with post-test differences being particularly pronounced. This suggests that gamified learning not only elevates initial vocabulary acquisition but also sustains long-term progress.

Table 5 Gender Differences in Improvement

Gender	Experimental Group Improvement (SD)	Control Group Improvement (SD)
Male	6.74 (2.26)	4.20 (2.12)
Female	5.81 (2.75)	4.70 (1.98)

Table 6 Age Differences in Improvement

Age	Experimental Group Improvement (SD)	Control Group Improvement (SD)
9	6.19 (2.74)	4.44 (2.15)
10	6.29 (2.46)	4.45 (1.99)

As shown in Tables 5 and 6, the mean increase in scores of the experimental group was greater than that of the control group in all gender and age subgroups.

Gamified learning significantly enhances the mastery of English vocabulary among third-grade students. It is applicable universally, regardless of gender and age, in enhancing students' levels of vocabulary learning. It is also effective in engaging students, reducing anxiety and encouraging collaboration among students.

Discussions

The findings align with and extend prior research on gamified pedagogy. Consistent with Kuo (2007), the experimental group's significant vocabulary gains ($M_{diff} = 6.10$ vs. 4.45) underscore gamification's capacity to enhance intrinsic motivation through autonomy (e.g., game choice) and competence (e.g., tiered challenges). Notably, 83.3% of students reported reduced anxiety during gamified tasks—a result resonating with Krashen's (1982) Affective Filter Hypothesis, which posits that low-stress environments facilitate language acquisition. This synergy between motivation and affective support may explain the 1.37× greater improvement in the experimental group.

Key Limitations

1. Sample Specificity: Participants were drawn from a single rural school in Gansu Province, limiting generalizability to urban or higher-resource settings.
2. Intervention Duration: The 8-week timeframe may not capture long-term retention effects.
3. Teacher Variability: Uncontrolled factors (e.g., instructors' familiarity with gamification) could influence outcomes.

Future Directions

Longitudinal studies tracking vocabulary retention over 6–12 months. Cross-regional comparisons to assess cultural adaptability of gamified models. Teacher training modules to standardize gamification implementation.

The interplay between Self-Determination Theory and Sociocultural Theory emerged strongly: team-based games (e.g., “word relays”) not only boosted collaboration but also enabled scaffolded learning within students' ZPD. This dual mechanism—social interaction driving individualized progress—offers a replicable framework for primary language instruction.

Knowledge from Research

The knowledge derived from this study contributes to both theoretical understanding and practical application in the field of primary English education, particularly in low-resource contexts. Theoretically, this study validates the integration of Constructivist Learning Theory, Sociocultural Theory, Self-Determination Theory, Zone of Proximal Development (ZPD), and the Affective Filter Hypothesis into a unified framework for gamified vocabulary instruction. It demonstrates how interactive, socially embedded tasks can support cognitive engagement and emotional regulation,

which are essential for vocabulary acquisition among young learners. The successful implementation of scaffolded game-based tasks confirms Vygotsky's claim that learning is most effective within socially mediated, developmentally appropriate contexts.

Practically, the findings offer robust evidence that gamified learning not only improves short-term vocabulary retention but also promotes student motivation, reduces learning anxiety, and enhances classroom cooperation. The statistical significance and large effect size (Cohen's $d = 0.88$) underscore gamification's capacity to outperform traditional methods. Moreover, its demonstrated inclusivity across gender and age groups suggests that such pedagogical strategies can be equitably applied in diverse classrooms.

This research yields actionable insights for curriculum designers, educational policymakers, and frontline teachers, especially in rural regions. It affirms that low-tech gamification tools—such as role-play, word chain games, and treasure hunts—can be feasibly implemented without reliance on advanced technology. Finally, by aligning gamified practices with national education standards, this study provides a scalable and culturally adaptable model for enhancing English instruction in primary schools across China and similar educational systems.

Conclusion

This study demonstrates that gamified learning significantly enhances English vocabulary acquisition among third-grade students in Chinese primary schools, outperforming traditional methods with a large effect size (Cohen's $d = 0.88$). The approach's success lies in its ability to merge motivational scaffolding and low-stress collaboration, aligning with China's Compulsory Education English Curriculum Standards (2022) that prioritize interactive, student-centered pedagogy.

Implications for Policy and Practice

1. Curriculum Integration: Embed gamified modules (e.g., "word treasure hunts") into national English curricula to standardize innovative practices.
2. Teacher Training: Develop certification programs for gamified instructional design, particularly targeting rural educators in under-resourced regions like Gansu.
3. Resource Allocation: Establish provincial funding pools to support game-based tool development (e.g., digital-physical hybrid games).

Future Directions

Expand longitudinal studies to assess retention beyond 8-week interventions. Explore cross-cultural adaptations of gamified models in diverse Chinese contexts.

By bridging theory and localized practice, this research offers a blueprint for transforming vocabulary instruction into an engaging, equitable, and policy-aligned endeavor.

Suggestions

To maximize the pedagogical impact of gamified learning in resource-diverse contexts, this study proposes a tripartite strategy targeting teachers, policymakers, and school administrators.

For Teachers, adopting low-tech gamification strategies can mitigate infrastructural constraints. Activities such as Vocabulary Card Races (using handmade flashcards) and textbook-based Role-Play Scripts enable vocabulary mastery without digital tools. Teachers are advised to initiate phased implementation—starting with 1–2 simple games monthly (e.g., Word Chains) and gradually incorporating complex tasks (e.g., Whisper Relays). Additionally, organizing community-driven workshops can foster peer knowledge-sharing. For instance, monthly sessions titled “Adapting Gamification for Low-Resource Classrooms” could demonstrate techniques like converting textbook units into Vocabulary Olympics, ensuring pedagogical alignment with curricular goals.

For Policymakers, establishing Provincial Gamification Hubs in rural regions (e.g., Gansu) is critical. These hubs should prioritize: (1) open-access repositories of low-cost game templates (e.g., printable board games), and (2) mobile training teams to deliver on-site workshops. Allocating 20% of annual EdTech budgets to analog resources (e.g., role-play kits) ensures equitable access. Furthermore, introducing a Gamified Teaching Proficiency certification—requiring mastery of five low-resource activities—can standardize instructional quality across regions.

For Schools, institutionalizing mentorship programs pairs novice teachers with gamification experts to accelerate skill transfer. Schools should also dedicate one staff meeting monthly to collaborative game design, focusing on curriculum integration (e.g., transforming Unit 3 into a narrative-driven Treasure Hunt). Such initiatives not only enhance teacher capacity but also align with national directives like the Compulsory Education English Curriculum Standards (2022), which emphasize interactive and student-centered pedagogy.

By addressing implementation barriers through context-specific, tiered strategies, these recommendations aim to democratize gamified learning, ensuring its scalability and sustainability across China's socioeconomically diverse educational landscape.

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