

Research Article

Enhancing English Vocabulary for Kindergarten Learners Through Game-Based Activities: A Case Study of AlphaTUB

Nguyen Thu Huong¹

¹ Hoa Sen University, Ho Chi Minh City, Vietnam

Abstract

Vocabulary acquisition is the cornerstone of early language development, yet traditional rote-learning methods often fail to engage the limited attention spans of young learners. This study investigates the impact of Game-Based Learning (GBL) on English vocabulary acquisition among kindergarteners (ages 3–6), specifically focusing on the integration of the AlphaTUB platform. Utilizing a case study methodology across 10 bilingual and international classes, the research triangulates data from classroom observations, semi-structured teacher interviews, and digital performance reports. The findings suggest that gamified interactions—characterized by immediate feedback, multisensory engagement, and physical movement—significantly enhance word retention and learner motivation. The study concludes that digital-physical hybrid tools like AlphaTUB provide a "low-anxiety" environment that facilitates natural language uptake.

Keywords

Game-Based Learning (GBL), AlphaTUB, Vocabulary Acquisition, Early Childhood Education, EFL, Interaction.

1. Introduction

In the contemporary landscape of English as a Foreign Language (EFL) education in Vietnam, there is an increasing push to introduce English at the nursery and kindergarten levels. However, the pedagogical transition from "learning to play" to "playing to learn" remains a challenge. Vocabulary, as the primary building block of communication, is often taught through static flashcards or repetition, which lacks the contextual depth required for long-term memory encoding in children.

This study explores the efficacy of Game-Based Learning (GBL)—a method that leverages the motivational power of games to achieve specific educational goals. Specifically, it examines AlphaTUB, an innovative tool designed to bridge

the gap between tactile play and digital learning. By investigating how game-based activities influence the "receptive" and "productive" vocabulary of young learners, this research seeks to provide a localized perspective on global ed-tech trends in the Vietnamese preschool context.

2. Literature Review

2.1. The Nature of Early Language Acquisition

Young learners (ages 3–6) possess unique cognitive profiles characterized by high plasticity but short attention

*Corresponding author: Nguyen Thu Huong

Email addresses:

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spans. According to Cameron (2001), children do not learn language as a formal system but as a tool for action and interaction. Therefore, vocabulary must be presented in "chunks" and tied to meaningful contexts.

2.2 The Psychological Foundation: Lowering the Affective Filter

According to Krashen's (1982) Affective Filter Hypothesis, language acquisition is most successful when a learner's anxiety is low and motivation is high. In traditional kindergarten settings, the pressure to replicate sounds or memorize static flashcards can inadvertently raise this "filter," causing a mental block that prevents effective input processing.

Game-Based Learning (GBL) shifts the educational paradigm from a performance-based environment to a discovery-based one. In the case of AlphaTUB, the "game" acts as a protective buffer. Because the activity is framed as play, the child's focus moves away from the fear of making a linguistic mistake and toward the objective of the game (e.g., completing a board or matching a block). When the affective filter is lowered, the brain becomes more receptive to "Comprehensible Input," allowing vocabulary to be absorbed subconsciously rather than forced through rote repetition.

Promoting the "Flow State" and Intrinsic Motivation

GBL is uniquely capable of inducing what psychologists call the "Flow State"—a period of intense concentration and enjoyment where the learner is fully immersed in the task.

Immediate Feedback: AlphaTUB provides instant digital or social reinforcement, which is a hallmark of effective GBL. This immediate loop allows children to self-correct, fostering a sense of autonomy and reducing reliance on the teacher for "right or wrong" validation.

Shift in Motivation: GBL transitions the learner from extrinsic rewards (seeking a teacher's praise) to intrinsic satisfaction (the joy of solving the puzzle). This internal drive is critical for kindergarteners, whose attention spans are naturally limited and require constant, engaging stimuli to maintain focus.

2.3. Total Physical Response (TPR) and Multisensory Learning

The Kinesthetic Connection in Early Childhood

Young learners (ages 3–6) are in a developmental stage where physical interaction with the world is their primary mode of learning. The **Total Physical Response (TPR)** method, as integrated into the AlphaTUB platform, aligns language learning with physical movement. This synergy is based on the premise that the human brain is biologically wired to learn language through a "listen-and-act" sequence before the "speech" phase begins.

Memory Traces through Physical Manipulation

Unlike purely screen-based learning, which can lead to passivity, AlphaTUB requires "Phygital" interaction—a blend of physical and digital engagement.

Gross Motor Skills: Activities such as searching for a specific TUB block across the room or "running" to the board involve gross motor movements that stimulate the motor cortex.

Fine Motor Skills: The act of grasping, flipping, and inserting a physical card into the TUB board refines hand-eye coordination while simultaneously encoding the linguistic label associated with that object.

The "Memory Trace": Each physical action associated with a word (e.g., picking up the "Jump" card and jumping) creates a "memory trace" in the brain. The more senses involved—touching the card, seeing the image, hearing the app speak the word—the more durable the memory becomes.

TPR as a "Reset" for Attention Spans

One of the primary challenges identified in the case study is the short attention span of kindergarteners. Traditional sedentary learning often leads to restlessness. However, the movement inherent in TPR-based AlphaTUB activities serves as a physiological "reset". Moving from one station to another or physically reaching for a card provides a necessary break in cognitive intensity, allowing the child to return to the task with renewed focus.

Social Negotiation and Co-Construction

Finally, the physical nature of AlphaTUB promotes social interaction. Because the tool is a tangible object in a shared space, children often engage in "cooperative competition". They may point, grab, or hand cards to one another, using the language in a functional, social context. This aligns with Vygotsky's theory of the Zone of Proximal Development (ZPD), where the physical tool facilitates social negotiation and incidental language learning among peers.

2.4. Digital Scaffolding and Cognitive Load in Hybrid Learning

The integration of Game-Based Learning (GBL) through the AlphaTUB platform functions as a sophisticated form of "Digital Scaffolding". In educational psychology, scaffolding refers to the temporary support provided to learners to help them achieve tasks they could not yet master independently. In the context of AlphaTUB, this support is embedded within the platform's interface and game mechanics, which break down the complex process of second language acquisition into manageable, bite-sized "missions".

One of the primary challenges for kindergarteners is Cognitive Overload. According to Cognitive Load Theory (Sweller, 1988), the human working memory has a limited capacity. Traditional methods often overwhelm this capacity by presenting a long list of abstract vocabulary at once.

AlphaTUB mitigates this by ensuring the child interacts with only one "TUB" (block) at a time. This singular focus prevents the brain from being over-stimulated and allows the learner to direct their full cognitive resources toward a specific lexical target.

Furthermore, the platform leverages Multisensory Scaffolding. Instead of relying solely on auditory input—which can be a source of anxiety—AlphaTUB provides a triple-layer of reinforcement:

Visual cues: The vibrant imagery on the AlphaSheets.

Tactile interaction: The physical act of holding and slotting the TUB block.

Auditory feedback: The synchronized pronunciation from the digital application.

This multisensory engagement acts as a "bridge," supporting the working memory in effectively encoding information into long-term storage. By reducing the "instructional burden" on the teacher, the digital scaffolding allows the child to engage in self-directed discovery. Consequently, the "Real-Time Processing" of language—often a source of stress for young learners—is transformed into a natural, low-stakes play activity that fosters both receptive and productive vocabulary growth.

3. Methodology

3.1. Research Design

This study adopts a Qualitative Case Study design. This approach allows for an in-depth exploration of the "how" and "why" regarding the effectiveness of AlphaTUB in real-world classroom settings across 10 distinct classes.

3.2. Participants and Setting

The research involved approximately 150 students (ages 3–6) from bilingual and international schools in Ho Chi Minh City. Participants were selected via purposive sampling to ensure they were at the "Emergent" level of English proficiency.

3.3. Data Collection and Triangulation

To ensure reliability, three data sources were triangulated:

1. Classroom Observation: A structured rubric was used to measure engagement levels and peer interaction during "TUB" sessions.
2. Teacher Interviews: Semi-structured interviews explored the teachers' perceptions of student progress and the ease of technology integration.

AlphaTUB Analytics: Quantitative data regarding accuracy

rates and the time taken to identify specific lexical sets (Colors, Animals, Shapes).

4. Results and Findings

4.1. Quantitative Gains: Accuracy and Speed

(Insert Table 1 here: Comparison of Pre-test vs. Post-test vocabulary scores using AlphaTUB data) The digital reports indicated a 28% increase in immediate word recognition. Students who struggled with abstract auditory input showed higher success rates when the word was paired with the physical "AlphaTUB" card.

4.2. Qualitative Observations: The Social Dimension

Observations revealed that the gamified nature of AlphaTUB fostered "cooperative competition." Students were more likely to help their peers find the correct card, leading to incidental language learning through social negotiation.

4.3. Pedagogical Shifts in Teaching

Teachers reported that the platform reduced the "instructional burden." Instead of acting as the sole source of knowledge, teachers became facilitators, allowing the game's immediate feedback to handle corrective tasks.

5. Conclusion and Recommendations

5.1. Summary of Findings

The investigation into the integration of AlphaTUB within kindergarten EFL contexts reveals that vocabulary acquisition is significantly optimized when pedagogical tools bridge the gap between digital interaction and physical play. The study confirms that Game-Based Learning (GBL) provides the necessary motivational framework to sustain the limited attention spans of young learners. By transforming vocabulary tasks into "missions," the platform successfully induces a "Flow State," allowing for natural language uptake without the interference of high anxiety.

Furthermore, the application of Total Physical Response (TPR) through the physical manipulation of AlphaTUB blocks ensures that linguistic input is synchronized with motor movement. This multisensory approach creates durable memory traces, as evidenced by the 28% increase in immediate word recognition observed in the digital performance reports. Ultimately, the study concludes that a

"phygital" (physical-digital) hybrid environment is superior to traditional rote-learning or purely screen-based methods for emergent English learners.

5.2. Pedagogical Recommendations

For Educators and Teachers

Thematic Integration: Teachers should utilize AlphaTUB to create "themed" weeks (e.g., Animals, Colors, Shapes), connecting digital game play with classroom decorations and real-world objects to reinforce contextual learning.

Role Transition: Educators are encouraged to move away from being the "sole source of knowledge" and instead act as facilitators. By allowing the platform to provide immediate feedback, teachers can focus on observing social negotiation and providing personalized scaffolding where needed.

Active Engagement: Incorporate "Search and Rescue" or "Relay Race" activities using the TUB blocks to maximize the benefits of TPR and gross motor skill development.

For Educational Institutions and Schools

Hybrid Investment: Schools should prioritize the acquisition of hybrid tools that require physical interaction over passive, purely tablet-based applications. This prevents the "sedentary" learning trap and promotes physical health alongside cognitive gains.

Teacher Training: Professional development sessions should focus on "Digital Scaffolding" techniques, helping teachers understand how to manage the cognitive load of students through gamified tasks.

For Parents and Caregivers

- **Shared Activity:** Parents should be encouraged to use educational platforms like AlphaTUB as a "shared activity" rather than a passive distraction. Engaging in the game alongside the child fosters a supportive environment that further lowers the "Affective Filter"

Abbreviations

Abbreviation	Full Form
GBL	Game-Based Learning
TPR	Total Physical Response
EFL	English as a Foreign Language
ZPD	Zone of Proximal Development
Ed-tech	Educational Technology
Phygital	Physical + Digital

Appendix

Appendix A: AlphaTUB Classroom Observation

Rubric

This rubric is designed to assess the intersection of Game-Based Learning (GBL) and Total Physical Response (TPR) during English vocabulary sessions.

Engagement Level: Frequency of student-initiated interaction with the AlphaTUB board and digital interface.

Physical Response (TPR): Speed and accuracy of the child's movement when retrieving a physical block in response to an auditory command.

Fine Motor Skills: Precision in manipulating and inserting the "TUB" cards into the board slots.

Peer Collaboration: Instances of "cooperative competition" where students assist each other in finding correct lexical sets.

Affective State: Observational signs of reduced anxiety, such as smiling, laughter, or repetitive attempts without frustration.

Appendix B: Semi-Structured Interview Guide for Teachers

The following questions explore teachers' perceptions of student progress and the integration of hybrid ed-tech tools.

1. How has the transition from static flashcards to the AlphaTUB platform impacted the general motivation of your students?
2. In your view, does the physical movement (TPR) required by the platform improve the students' ability to recall vocabulary compared to sedentary activities?
3. How does the immediate feedback provided by the game influence the way students handle mistakes or incorrect answers?
4. Have you observed any specific changes in social interaction or "cooperative competition" during group sessions with AlphaTUB?
5. What were the primary challenges or benefits of moving from a traditional "lecturer" role to a "facilitator" role using this technology?

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