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Promoting ESL Learning Through Game-Based Design: A Case Study of Language Valley

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Abstract: This paper delves into the integral role of game-based learning (GBL) in advancing English as a Second Language (ESL) education, scrutinised through three distinct lenses: theoretical foundations from an affordance perspective, critical evaluation of traditional and gamified methodologies, and the demonstrable superiority of fully integrated GBL frameworks. The first section explores affordance theory, emphasising how GBL leverages affordances such as contextual engagement, adaptivity, and instructional scaffolding to surpass conventional educational approaches. This section also adopts the Theory of Change framework to conclude that GBL offers significant long-term cognitive and motivational benefits for ESL learning. Subsequently, the analysis identifies shortcomings in existing ESL resources, such as textbooks and digital applications, which fail to sustain genuine linguistic proficiency and engagement. By comparing the gamified product with the GBL experience, the advantage of later in ESL learning is further conveyed. The final section presents a case study of Language Valley, a purpose-built game that rectifies these deficiencies. It illustrates how immersive, narrative-centric GBL environments significantly bolster cognitive development, motivational dynamics, and practical language application in an ESL learning context. The paper posits that GBL, focusing on interactive and applicable learning experiences, offers transformative potential in ESL settings, fostering profound and enduring educational outcomes.

Keywords: Game-based learning, Affordances, ESL, Language Valley.

1. Introduction

The effectiveness of English as a Second Language (ESL) instruction, particularly among elementary learners, has long been a focus of educational research. Traditional teaching methods typically centred on structured grammar, vocabulary, and syntax lessons, have provided essential frameworks for language learning [1]. However, despite their foundational role, these methods often lack the dynamic and interactive elements needed to sustain engagement and facilitate practical language use in real-world contexts [2]. As a result, students frequently struggle to bridge the gap between classroom learning and authentic language application, which is crucial for long-term retention [3]. In response to these limitations, game-based learning (GBL) has emerged as a potential solution, offering interactive environments that encourage learners to engage with language in meaningful, context-driven scenarios.

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While existing literature has begun to explore the motivational benefits of GBL [4], less attention has been given to its broader educational impacts—particularly its ability to foster deeper cognitive development and sustained language proficiency [5]. This gap in research suggests the need for a more comprehensive analysis of GBL's effectiveness in ESL learning, beyond its role in increasing motivation.

Therefore, this paper aims to comprehensively identify the affordances of GBL in ESL education, demonstrating how it enhances engagement, adaptability, and contextual learning in one single learning experience. Through the case study of Language Valley, an educational game designed for ESL learners, the paper illustrates in detail how features like contextual learning, scaffolding, and problem-solving can transform ESL education and address the motivational and cognitive challenges often associated with language learning.

2. Theoretical Underpinnings of ESL Game-Based Learning Affordances

2.1. Theory of Affordance

The concept of "affordance" was introduced by ecological psychologist James Gibson in the 1970s. Gibson described affordances as the potential actions an environment offers to an individual, contingent on both the objective characteristics of the environment and the individual's subjective capabilities [6]. This view effectively bridges technological determinism and social constructivism by recognising affordances as properties that emerge from the interaction between the actor and their environment. Affordances are not individually constructed; rather, they are latent features of the environment that are recognised and utilised according to personal needs and environmental cues.

In educational settings, affordance theory has been applied to analyse how technologies, such as mobile media and educational games, provide opportunities for learning. Schrock expanded this framework by introducing the concept of "communicative affordances," which refer to the interplay between users' subjective perceptions of utility and the objective qualities of technology, creating possibilities for communication. This is especially relevant to mobile and game-based learning, where learners interact with technology to achieve educational outcomes, taking advantage of affordances such as portability, multimedia functionality, and constant availability [7].

Norman further distinguishes between "affordances" and "perceived affordances," emphasising that although affordances are intrinsic, designers should prioritise how users perceive and interact with them [8]. This distinction is critical in educational game design, where learners must clearly recognise and engage with affordances to enhance their learning experience. In game-based learning, affordances like contextualised learning, adaptivity, scaffolding, and information representation are key to fostering effective ESL learning experiences.

2.2. Conceptualisation of Affordances in Game-Based Learning

In GBL, affordances are the distinct features that facilitate meaningful interactions and enhance learning, particularly in ESL contexts. Each cognitive affordance in games plays a crucial role in constructing a comprehensive learning environment. One such affordance is situated and contextual learning, where games immerse learners in realistic settings that mirror real-world language usage. For instance, a language-learning game may place learners in a virtual marketplace, allowing them to practise conversational skills with in-game characters. Importantly, games provide just-in-time support, offering assistance precisely when learners encounter difficulties, thus enabling them to learn and apply new language in context without disrupting their progress [4].

Another significant cognitive affordance is adaptivity and scaffolding. Games can tailor tasks to match a learner's current proficiency, ensuring challenges remain suitable as their skills evolve [4]. A beginner learner, for example, may receive additional hints or simplified language early in the game.

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As their abilities improve, these supports are gradually withdrawn, encouraging the learner to tackle more complex tasks independently, reflecting the educational practice of removing scaffolding as competence increases.

Information representation in GBL is another key affordance, particularly for learners at lower proficiency levels. Games often employ semiotics, using symbols, icons, and other visual cues to simplify complex language concepts [4]. For example, a game designed to teach grammar might use visual representations to depict sentence structure, helping learners understand abstract grammatical rules in a more intuitive and accessible manner. This use of multiple forms of representation enables learners to grasp challenging content without being overwhelmed by dense textual explanations.

Additionally, games foster problem-solving and critical thinking, requiring learners to apply their language knowledge actively. In many cases, learners must solve puzzles or engage in interactive dialogues, using language as a tool to progress [4]. For instance, a learner may be tasked with negotiating a solution using newly acquired vocabulary or grammatical structures, reinforcing their language skills through active engagement and critical thinking.

Beyond cognitive affordances, games offer facilitative affordances that support the aforementioned affordances from the emotional and motivational aspects. Affective affordances, such as engaging narratives and interactive dialogues, help learners form emotional connections with the material. A common feature in games is the concept of graceful failure, where learners can make mistakes without negative consequences, encouraging them to experiment and take risks without fear of failure. Motivational affordances are embedded in the game's structure, maintaining engagement through intrinsic rewards like enjoyable gameplay or extrinsic rewards like points and badges [4].

By incorporating both cognitive and facilitative affordances, game-based learning creates a dynamic and supportive environment for ESL learners.

2.3. The Effects of Affordances in ESL Game-Based Learning

The Theory of Change framework, commonly employed in educational psychology, outlines the process through which learning interventions like GBL generate both short-term and long-term impacts [9]. This framework allows for a structured understanding of how affordances of GBL lead to immediate outcomes—such as increased engagement and initial skill acquisition—and how these accumulate to foster more significant, enduring changes, such as sustained mastery and practical language use. Applying the Theory of Change to ESL GBL, researchers can analyse how specific affordances drive these outcomes, not just as isolated features, but as interdependent components that create a cohesive learning experience.

Situated and contextual learning, in the short term, fosters the immediate application of language skills by immersing learners in realistic, relevant environments. By engaging in tasks that mirror everyday scenarios, learners can bridge the gap between knowledge acquisition and practical use, applying newly acquired vocabulary and grammar in meaningful contexts. This approach reduces challenges related to knowledge transfer and offers immediate feedback, reinforcing learning and skill development [4]. Additionally, the relevance of these real-world tasks quickly builds learners' confidence and motivation, as they begin to perceive the practical utility of language in everyday situations. In the long term, as learners are consistently exposed to contextual language use, Lave and Wenger’s situated learning theory suggests that they gradually internalise vocabulary and grammatical structures, resulting in better retention and the ability to transfer these skills to authentic communication settings [2]. Cognitive theory supports this, suggesting that sustained engagement with meaningful tasks strengthens neural connections, making the retrieval and application of language skills more efficient and automatic over time [10]. Ultimately, this method leads to real-world readiness, equipping learners with the fluency and independence necessary for effective communication in everyday situations.

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Adaptivity and scaffolding in games closely align with Vygotsky's Zone of Proximal Development (ZPD), which highlights the significance of offering support just beyond learners' current abilities. In the short term, games provide tailored scaffolding in the form of hints, prompts, or simplified tasks, enabling learners to bridge the gap between their independent abilities and what they can achieve with guidance. This assistance helps learners navigate initial language barriers by working within their ZPD, where learning is most effective. As learners progress, the game gradually reduces this support, encouraging the application of language skills autonomously and promoting incremental mastery. Over the long term, the gradual removal of scaffolding builds learners' confidence and self-efficacy, allowing them to perform tasks independently. This progression mirrors Vygotsky's belief that the most effective learning takes place when learners are appropriately challenged but still supported [11]. As scaffolding decreases, learners move from assisted to autonomous performance, fostering greater independence in language acquisition. This development is consistent with Bandura's concept of mastery experiences, which asserts that successful navigation of progressively difficult tasks bolsters learners' sense of competence [12]. Consequently, learners cultivate resilience, intrinsic motivation, and autonomy as they advance in their language-learning journey.

While cognitive affordances directly contribute to the learning outcomes of GBL, facilitative affordances—emotional and motivational elements—are essential for sustaining engagement.

Affective affordances in games, such as engaging narratives, interactive elements, and rewarding experiences, evoke positive emotions, reducing anxiety and fostering a supportive learning environment. This emotional engagement not only makes learning enjoyable but also enhances cognitive processing by making the material easier to remember. Over time, these positive emotional experiences contribute to a more favourable attitude towards learning, increasing the likelihood of sustained engagement. The concept of graceful failure within games further builds resilience, helping learners overcome challenges in both learning and life [4].

Motivational affordances are key to maintaining engagement. Games cater to diverse motivational needs by aligning with learners' values and interests, fostering intrinsic motivation through enjoyable challenges, and supporting various achievement-related goals. This alignment leads to increased effort and participation in learning tasks. Over time, sustained motivation ensures continued learning and mastery, as learners achieve their goals and see the relevance of what they are learning, which is vital for both academic and personal success [4].

Together, cognitive and facilitative affordances work in tandem to achieve the long-term objectives predicted by the Theory of Change. These affordances are not isolated features but interconnected elements that collectively drive the process of language mastery, from initial engagement to real-world application.

3. Contrasting Educational Mechanisms: Traditional Method, Gamification, and GBL

3.1. Comparison of Traditional Learning Media with Game-Based Learning

In current ESL education, a broad spectrum of traditional and modern learning media has been utilised to aid language acquisition. While these applications have demonstrated some effectiveness, they frequently exhibit shortcomings related to engagement, feedback, adaptability, and contextual learning. These gaps in current ESL strategies highlight the necessity for more dynamic approaches.

Textbooks have traditionally served as the foundation of ESL instruction, providing structured lessons on grammar, vocabulary, and syntax. However, a major limitation of textbooks is their lack of interactivity. Learners often passively absorb information rather than actively engage with it, reducing opportunities for dynamic language practice, which is essential for better retention. Furthermore, textbooks do not offer real-time feedback, leaving learners without immediate corrections. This delay in feedback can hinder progress and may reinforce incorrect language usage

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[1]. Immediate feedback is crucial for effective learning as it corrects errors and reinforces correct responses in real-time. Without it, learners may struggle to track their progress and identify areas for improvement. Moreover, textbooks typically lack the ability to contextualise learning [1]. While they provide essential knowledge, they rarely simulate real-world environments where language is naturally applied, making it more challenging for learners to transfer skills into everyday conversation. Situated learning theory emphasises that language acquisition is most effective when learners can apply their knowledge in authentic contexts [2], an aspect often absent from traditional textbook learning.

Audio-visual resources, such as podcasts, videos, and language tapes, aim to mitigate some limitations of traditional materials by introducing a sensory dimension to language learning. These tools expose learners to authentic pronunciation, accents, and conversational patterns, which are particularly beneficial for developing listening comprehension. Despite these advantages, audio-visual materials are often linear and non-interactive, resulting in similar issues of passive learning. Learners typically consume content through listening or watching pre-recorded material without the opportunity for real-time dialogue or interaction. While audio-visual tools are effective for building receptive skills, such as listening and reading, they generally fall short in fostering productive skills like speaking and writing. Considering language proficiency, researchers highlighted that active engagement, especially through interaction, is crucial but often absent in static audio-visual formats. Additionally, audio-visual materials lack adaptability. Designed for broad use, they are rarely tailored to individual learners' proficiency levels or specific needs, making it difficult for educators to adjust content dynamically [1]. Personalised learning approaches, which adapt to learners' progress, have been shown to significantly enhance language acquisition, particularly for learners at varying proficiency levels. The absence of this flexibility in audio-visual resources creates inefficiencies, as the one-size-fits-all approach fails to accommodate the diverse needs of learners.

In recent years, digital tools like language learning apps such as Duolingo and Babbel have gained popularity due to their convenience and flexibility. These apps allow learners to practise language skills at their own pace, often incorporating gamified features such as points and streaks to sustain motivation. However, despite their widespread use, they present notable limitations. One common issue is the focus on isolated vocabulary drills and grammar exercises, which often lack depth and contextual relevance. Learners may memorise individual words or phrases, but struggle to apply them effectively in communicative situations. Research indicates that memorisation without meaningful context results in shallow learning, where learners recognise words but fail to use them conversationally. Moreover, while these apps offer quizzes and tests, they rarely provide opportunities for authentic language use or meaningful interaction. The interactionist theory of language acquisition emphasises that learning is most effective when driven by social interactions, an element frequently absent in app-based learning. The interactions are pre-determined, lacking the spontaneity and complexity of real conversations [13]. Additionally, although language apps provide immediate feedback on correct or incorrect answers, they often fail to offer detailed explanations. This limited feedback hinders deeper understanding and reflection, preventing learners from grasping the underlying reasons for their mistakes [1].

A common issue across both traditional and modern learning media is the lack of contextual learning and sustained engagement. Passive consumption of information, isolated drills, and restricted interaction limit learners' ability to practise language in meaningful, real-world contexts. Herrington and Oliver argue that learning is more effective when students apply language in practical situations, leading to better retention and deeper comprehension [13]. Furthermore, many of these methods struggle to maintain long-term learner motivation, a key factor in successful language acquisition. Plass et al. emphasise the importance of intrinsic motivation, where learners are driven by a personal

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interest in the task itself, yet many traditional methods fail to engage learners in ways that foster this essential motivation [4].

3.2. The Need for Game-Based Learning in ESL Education

Through the evaluation of traditional learning methods and existing digital tools, the previous section indicates a special need in ESL learning for methods that not only engage learners but also seamlessly integrate language use into real-world contexts. Traditional methods often fall short by focusing too heavily on grammar and vocabulary without providing practical application, while many digital tools, though interactive, do not offer the depth required for meaningful language learning. This underscores the distinct challenges in ESL education, where the integration of language skills into everyday communication is essential.

Given these unique needs within ESL education, the argument for GBL over gamification becomes particularly compelling. While gamification employs elements like points, rewards, and competitive features to superficially engage users, these mechanisms often remain disconnected from fundamental educational goals. For example, applications such as Quizlet might encourage learners to compete for high scores by completing flashcard exercises, but these game mechanics generally do not enhance the depth of learning or the ability to apply knowledge in authentic settings. Such strategies may lead to transient engagement but typically fail to support long-term retention or the transfer of practical skills, as noted by Deterding et al [14].

In contrast, GBL meticulously integrates game mechanics into the learning process, ensuring that gameplay directly contributes to the educational objectives. This approach not only motivates learners through intrinsic rewards but also requires them to apply their acquired knowledge in meaningful and challenging scenarios. The game world itself acts as a medium through which learners can practice skills, solve problems relevant to real-world tasks, and engage with the language in a context that mirrors actual usage. According to Kiili, this holistic integration supports not just deeper cognitive engagement but also substantial development, making GBL a crucial strategy in ESL education where practical application and interactive learning are key [15].

4. Embedding Affordances in Game Design – Language Valley as a Case Study

4.1. Case Study: Language Valley and Its Core Mechanics

Acknowledging the limitations of traditional learning strategies and gamified products, there is a need for fully integrated GBL tools that offer learners immersive, real-world scenarios in which gameplay itself facilitates learning. In this section, a game specifically designed to bridge this gap—Language Valley—will be introduced, illustrating how game mechanics and learning objectives can work hand-in-hand to foster deep, meaningful engagement with educational content.

Language Valley is an innovative educational game designed for beginners to make language learning an engaging and enjoyable experience. Inspired by the charming and immersive world of Stardew Valley, this game combines the appeal of exploration and discovery with the practical challenges of acquiring a new language. Set in a vibrant, interactive town, Language Valley invites players to embark on a journey where they develop language skills naturally through gameplay. By blending educational content with an entertaining and visually appealing world, the game aims to motivate learners of all levels to improve their language abilities while having fun.

The Interactive Dialogue System with Drag-and-Drop Sentence Formation is a core feature that allows learners to construct sentences by selecting and arranging words or phrases in the correct order. This mechanic enables the player to form a sentence simply by selecting the words and rearranging the order. This not only helps learners understand grammar and syntax but also aligns with the affordance of contextual learning by embedding sentence construction within meaningful

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conversations. The visual and interactive nature of the Drag-and-Drop system engages multiple cognitive pathways, making the learning process both intuitive and effective [15].

Scenario-based challenges further build on the concept of contextual learning by placing learners in realistic, context-driven situations that require the application of language skills. For example, a learner might navigate a virtual marketplace where they must use their language knowledge to negotiate or ask for directions or being asked by a Non-player character (NPC) about the weather. These challenges are adaptive, gradually increasing in complexity to match the learner's progress, which utilises the affordance of adaptivity and scaffolding. The realistic scenarios mirror real-world experiences, requiring critical thinking and problem-solving, which deepens cognitive engagement and reinforces language use in context [15].

The Progressive and Guided Path mechanic ensures that learners are continuously challenged as they progress through the game. The game will start with an interactive introductory tour to deliver users the basic English words and how to interact with the game. Early stages only present simple conversations and tasks, and extensive guidance and scaffolding are also included, which gradually fade as the learner gains confidence and competence. The support could be provided by NPCs through communication with the user or directly from the game. With the progression of the game, the complexity of conversations will increase. This is presented by more confusing word options in the Drag-and-Drop system or more complicated scenarios, such as reconciliation of disputed events without absolute right or wrong [4].

The Notebook and Hint System is another significant feature that enhances both the learning process and learner engagement, deeply rooted in constructivist principles. This system discourages reliance on translators, instead prompting learners to actively construct their own understanding by writing personal definitions of new words encountered during gameplay. By engaging learners in this reflective practice, the system encourages them to internalise and personalise their learning, which is a core aspect of constructivism. If a learner enters an incorrect definition, they must revisit and correct it after experiencing real-world consequences within the game, such as misunderstandings with NPCs or failed tasks. An example could be the user writing down the definition of apple as a banana in Chinese, ending up with bringing the wrong item to the NPC. The NPC may communicate with the user again with further descriptions of the characteristics of Apple. If the user still fails to complete the purchase of Apple from the store, the seller of the store may use pictures to help the user understand the definition of Apple. At the end, the user corrects the definition. This iterative process of trial and error reinforces learning through experience and reflection, key tenets of constructivist theory. By grounding learning in these meaningful, context-driven scenarios, the Notebook and Hint System ensures that learners are not merely passive recipients of information but are actively constructing their knowledge through interaction with the game world [4].

Finally, the Reward System from NPCs plays a vital role in maintaining motivation through the affordance of motivational and affective support. As learners complete tasks or solve challenges, they receive rewards such as in-game items, currency, or unlock of a new area. These rewards not only incentivise continued engagement but also create a sense of accomplishment, enhancing emotional investment in the game. Though behaviourist's learning strategies were not intended to be included in the game, considering the individuality of users, positive reinforcement from NPCs may contribute to a more enjoyable learning experience for some of them, fostering resilience and persistence even when learners face challenges [4].

4.2. Supportive Design Elements and the Alignment

Apart from the core game mechanics, several additional design elements also adopt the affordances of the game and contribute to the construction of a motivating and immersive language learning experience.

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In Language Valley, the Narrative Design is central to drawing players into the game world. The storyline follows a journey where players interact with a variety of characters, each with their own unique background and personality. Character development is another key aspect. Players build relationships with NPCs through meaningful dialogue, which serves as both a learning tool and a way to progress the narrative. The evolving storyline and character interactions provide continuous engagement and offer a practical context for applying language skills, enhancing both learning and emotional connection to the game.

Furthermore, the Assessment Mechanics in Language Valley are seamlessly integrated into the gameplay, providing continuous feedback on the learner's progress. Learners receive feedback on their language application and understanding. These assessments are designed to be non-intrusive, blending naturally into the gameplay through dialogue outcomes and task completions, all of which help learners track their progress and identify areas for improvement [4].

Most importantly, Language Valley carefully aligns its game mechanics with the learning objectives to minimise cognitive load and prevent players from gaming the system, where they might focus on advancing in the game rather than actually learning. The game achieves this by avoiding a strong intrinsic goal, encouraging players to engage with the educational content at their own pace. The core mechanics, such as interactive dialogues and scenario-based challenges, are designed so that players must use English effectively to progress, making language learning an integral part of the gameplay [4].

4.3. Comparison Between Game-Based Learning Product and Gamification Product

Duolingo, a popular language learning application, exemplifies gamification in education. It incorporates gamified elements such as streaks, experience points (XP), and leaderboards to drive user engagement. While these features can effectively motivate users through external rewards, they primarily appeal to extrinsic motivations and often do not encourage a deeper interest in the content itself. The nature of the exercises in Duolingo—largely focusing on translation, listening, and speaking—is repetitive and designed to reinforce language skills through rote memory rather than application. Although the app adjusts the difficulty to match users' skill levels, the challenges it presents require more memory recall than actual problem-solving, limiting deeper cognitive engagement.

In sharp contrast, Language Valley represents a robust implementation of game-based learning (GBL) principles. This educational game immerses learners in a richly developed narrative environment where language learning is intricately woven into the storyline and interactions with game characters. This contextual approach ties language skills directly to practical uses within the game's universe, significantly enhancing the learning's relevance and depth. Unlike the repetitive tasks in Duolingo, Language Valley's challenges demand critical thinking and problem-solving, pushing learners to apply language in innovative and complex ways. This not only tests their linguistic abilities but also develops them in a manner akin to real-world usage.

Moreover, Language Valley excels in leveraging motivational and affective affordances. The emotional connections that players form with the story and characters transform the learning process from a task to an engaging experience. This emotional investment deepens learners' commitment to the language learning journey, making their engagement more intrinsic and enduring. The narrative-driven gameplay of Language Valley ensures that each linguistic challenge is meaningful, making the educational experience not only more immersive but also more effective in achieving lasting language proficiency.

This delineation between the superficial engagement of gamified products and the deep, meaningful interactions offered by game-based learning underscores the significant advantages of

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GBL, especially in the context of ESL where practical application and emotional engagement are crucial for success

5. Conclusion

This study illustrates the significant impact of GBL in ESL education through the lens of affordance theory and the Theory of Change. By embedding meaningful interactions and tailored challenges, GBL creates both immediate and lasting improvements in language learning. The comparative analysis with traditional methods and gamified products highlights the superiority of GBL, where affordances are not just motivational tools but key elements that enhance learner engagement, adaptability, and practical language use. The case study of Language Valley illustrates how affordances like contextual learning and scaffolding can be successfully embedded into game design, ensuring learners progress through meaningful interaction and problem-solving. Comparative analysis confirms that fully integrated GBL tools provide deeper, more sustained engagement compared to gamified products. Thus, the adoption of GBL should be prioritised to bridge gaps in traditional ESL instruction and inspire greater learner motivation. While this study has highlighted the considerable advantages of GBL in ESL education, further exploration is warranted to deepen understanding of its broader applications. Future research could focus on how GBL might be customised for advanced learners or for those in specialised language domains, such as academic or professional English. Additionally, the integration of artificial intelligence in GBL environments offers a promising area for investigation, particularly in enhancing personalised learning experiences and adapting to individual progress. Longitudinal studies would also be beneficial, tracking learners over extended periods to provide insights into the long-term retention of language skills and their practical use beyond the game environment. Such research would not only expand the current knowledge base but also refine GBL approaches for diverse educational contexts.

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