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The Effect of Game-Based Vocabulary Learning on Middle School Students' Motivation and Vocabulary Retention

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Abstract: Game-based learning (GBL) has proven to be very effective in enhancing students' motivation for vocabulary learning, encouraging them to spend more time memorizing words as the learning process becomes less tedious. By incorporating elements like instant feedback, competition, and rewards, GBL sustains students' learning enthusiasm and helps strengthen the retention of previously learned words. Research shows that game-based vocabulary learning (GBVL) often outperforms traditional methods, significantly boosting students' engagement and performance. This research explores the connection between GBL's ability to enhance motivation and its impact on improving vocabulary retention, particularly among middle school students. GBL enhances learning motivation and encourages active participation by making the learning process more enjoyable and interactive. This strong motivation is critical to improving retention rates, as students are more likely to voluntarily revisit the learning materials. Integrating GBVL into language courses provides educators with a promising tool to boost motivation and vocabulary retention. Thus, GBL is considered an effective strategy to improve the outcomes of vocabulary teaching.

Keywords: Game-based learning, vocabulary, retention, motivation, language learning.

1. Introduction

Vocabulary learning has long been regarded as one of the most challenging yet essential aspects of language learning, as it forms the foundation for building communication and comprehension skills. Traditional vocabulary learning methods frequently depend on rote memorization techniques like flashcards, word lists, and various practice exercises. While these methods can be effective in the short term, they tend to bore students over time. Students always need more motivation, and the words learned are quickly forgotten. As noted, every study conducted in the past five years and included in this systematic review indicated that digital games were effective for vocabulary learning.

Furthermore, all applicable studies demonstrated that digital game-based vocabulary learning (DGBVL) was even more successful than traditional teaching methods [1]. With advancements in educational technology, game-based learning (GBL) has gained attention. GBL makes learning more engaging and interactive by integrating game mechanics like rewards, instant feedback, competition, and collaboration. Compared to traditional methods, GBL is more effective at stimulating students' interest in learning. As pointed out, "Behaviorist theory provides the theoretical basis for understanding how digital educational games enhance students' motivation through reward mechanisms [2]." This boost in motivation is crucial for maintaining long-term memory retention,

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especially in language learning, where frequent exposure to new vocabulary is essential for improvements.

Although substantial evidence shows that game-based learning enhances cognitive abilities and overall learning performance, there still needs to be significant gaps in the literature regarding its specific impact on vocabulary retention. Most previous studies have focused on short-term cognitive improvements and have yet to explore how game-based learning profoundly influences long-term vocabulary retention. Moreover, many studies have focused on adults or college students, while there needs to be more research on how these techniques affect younger learners, particularly middle school students. Middle school students are likely to benefit more from the interactive and engaging aspects of game-based learning. This study seeks to fill this gap by investigating how game-based learning tools can improve vocabulary retention by boosting student's willingness to learn. "Motivation is one of the key determinants of success in EFL learning [3]," highlighting the need to investigate further how motivational elements in games can support vocabulary learning.

The main objective of this study is to evaluate the impact of game-based vocabulary learning tools on middle school students' motivation and their ability to retain vocabulary. It aims to examine how specific game features, such as competition, rewards, instant feedback, and social cooperation, can boost student interest in learning and improve their retention of vocabulary. Additionally, the study seeks to compare the effectiveness of game-based learning with traditional methods in enhancing short-term and long-term vocabulary retention.

This paper is divided into three main sections. First, in the "Motivation Enhancement through Game-Based Learning" section, the paper will discuss how game-based learning boosts student motivation, supported by theoretical frameworks and empirical research. Next, in the section "Vocabulary Retention through Game-Based Learning," the paper will analyze how game-based learning helps overcome challenges related to vocabulary retention. Finally, in "The Relationship Between Motivation and Retention," the paper will explore how motivation drives retention and how game-based learning strengthens this relationship to improve vocabulary retention.

2. Motivation Enhancement Through Game-Based Learning

2.1. Theories and Importance of Motivation in Vocabulary Learning

Motivation is crucial in successful language learning, particularly in vocabulary acquisition. Game-based learning (GBL) integrates rewards, challenges, and competition, effectively boosting students' intrinsic motivation and making the learning experience engaging and stimulating. Digital educational games, as noted, can strengthen the relationship between the games and students' learning engagement, further emphasizing the importance of student involvement in the learning process [2]. This sense of engagement is critical for maintaining students' long-term motivation, and their level of motivation directly affects how well they can retain new vocabulary. In vocabulary learning, motivation can be divided into intrinsic and extrinsic motivation. Intrinsic motivation comes from the personal satisfaction that learning provides, while external rewards like grades or points drive extrinsic motivation. Game-based learning supports both types of motivation. On the one hand, it provides progress-based rewards; on the other, it offers fun and stimulating tasks that allow students to enjoy learning while improving their skills.

2.2. How Game Elements Boost Learning Motivation

Game mechanics, such as immediate feedback, competition, collaboration, and reward systems, are essential components that increase motivation in game-based learning. These elements leverage the inherent human desire for progress and achievement, making students more likely to stay engaged and persevere in learning tasks. For example, power-up rewards were accessible to two treatment

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groups: ComPU and noComPU. These rewards are defined as incentives designed to directly support the completion of game tasks [4]. Power-up rewards motivate students by offering them tangible, short-term goals that enhance engagement, making vocabulary learning more like a game than a chore.

Moreover, immediate feedback is a central component of most digital games. Unlike traditional methods, which may delay feedback until tests or quizzes are graded, game-based learning tools provide instantaneous correction, reinforcing correct answers and prompting reflection on errors. Using games in the classroom can create a fun, enjoyable, and highly motivating learning environment [5]. They also help alleviate the anxiety associated with speaking the target language. This emphasizes how games create a low-stress environment that encourages learners to participate without fear of making mistakes, thus boosting their willingness to engage repeatedly. Collaboration and competition are also highly effective in raising motivation levels. Collaborative tasks within games foster a sense of shared achievement, which encourages students to learn from one another. The competitive aspect, such as leaderboards or timed challenges, introduces a healthy level of rivalry that pushes students to perform better. Games use rewards such as badges and points to maintain player engagement and encourage continued participation. This reinforces the idea that structured competition in game-based learning can stimulate students' willingness to learn, as they are motivated to study to earn rewards or achieve higher scores.

2.3. Comparative Analysis of Motivation Levels: Traditional Vocabulary Learning Methods vs Game-Based Learning Methods

Traditional vocabulary learning methods such as flashcards, rote memorization, and word lists are often perceived as monotonous, leading to disengagement. These methods typically rely on extrinsic motivators like grades, which may not foster long-term interest or mastery. On the contrary, game-based learning actively engages learners by integrating intrinsic and extrinsic motivators. For example, Students who use the game-based vocabulary learning app perform better than those utilizing the traditional paper-based wordlist method in areas such as vocabulary learning achievement, motivation, and self-confidence [4]. This comparison clearly illustrates how digital tools outperform traditional methods by providing immediate engagement and reinforcing learning through enjoyable interactions.

Furthermore, traditional methods often create a rigid, high-pressure environment that can demotivate learners, especially when they struggle to keep up with the vocabulary volume they are expected to memorize. Game-based learning, on the other hand, reduces this pressure. Transforming vocabulary learning into a series of challenges, where progress is rewarded, and mistakes are treated as learning opportunities, significantly boosts motivation. Students considered digital games as enjoyable, motivating, and interactive aids to learn vocabulary and, therefore, can be used to learn other language components or skills [6]. This quote supports the idea that game-based tools create a more interactive and student-centered environment, making learning more engaging and effective than traditional methods.

3. Vocabulary Retention through Game-Based Learning

3.1. Challenges in Vocabulary Retention

Vocabulary retention has historically been a challenge in language learning, mainly due to the limitations of conventional teaching approaches. Traditional methods, like flashcards and word lists, often need more frequent exposure and contextualization for sustained retention. Moreover, cognitive overload often hinders vocabulary retention when students are exposed to too much new information at once. Game-based learning addresses these issues by incorporating spaced repetition—students encounter the same vocabulary at intervals, allowing for more muscular retention over time. Moreover, games often employ scaffolding, where more complex vocabulary is gradually introduced

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after learners have mastered simpler terms, helping to reduce cognitive overload. Instant feedback helps learners correct mistakes in real time, reinforcing correct vocabulary usage and quickly addressing misunderstandings. This is particularly effective compared to traditional classroom settings, where feedback may be delayed by days or weeks. Games like Kahoot and Wordwall provide learners with immediate feedback on their answers, creating a feedback loop that strengthens vocabulary retention through correction and reinforcement. The enjoyment and immediate reinforcement from games increase students' willingness to practice vocabulary repeatedly, contributing to better retention. In an experiment, participants completed a pre-test on 10 target vocabulary words, followed by two weeks of practicing vocabulary using digital games like Wordwall and Kahoot. A post-test conducted in the fourth week showed significantly improved vocabulary acquisition. Two weeks later, a post-interval test confirmed that the digital games effectively supported vocabulary retention [7]. The importance of adaptive game design in promoting retention. The most crucial game design elements in game-based English vocabulary learning apps were providing feedback and aligning the challenge level with the player's skill [8]. This demonstrates how games can tailor difficulty levels to match learners' proficiency, ensuring that vocabulary retention is reinforced rather than hindered by overwhelming challenges.

3.2. Mechanisms for Enhancing Retention in Game-Based Learning:

Vocabulary retention is enhanced through emotional engagement: Excitement and anticipation are more likely to create psychological connections with vocabulary. When learners are heavily engaged in an emotionally charged experience, the vocabulary they encounter might become more memorable. Storytelling, role-playing, and rewarding/penalizing are some game elements that likely increase students' emotional engagement experience. Digital game-based learning has the potential to effectively engage students and promote active participation in classroom learning [9]. The participating students in game-based learning could be more engaged, thus creating a more 'live' learning experience that would entice learners to revisit and practice the vocabulary more than once. Likewise, collaborative dialogue within game-based environments further improves retention, as students are encouraged to communicate with other team members and apply the vocabulary being learned in relevant contexts. When students negotiate the meaning of words, correct each other's mistakes, and apply new words directly to real-time tasks, their understanding of vocabulary is strengthened through repeated use. "Collaborative dialogue is a type of interaction in which the learners engage in language production and knowledge-building activities [10]." This type of interaction pushes the learners to use their knowledge of vocabulary more actively, thus strengthening their vocabulary in their long-term memory. The dialogues students engage in when playing multiplayer games require them to use the vocabulary they have learned when communicating with other students. Collaboration promotes both language production and retention. Lastly, games often simulate real-world scenarios that require students to use vocabulary in practical applications. For example, role-playing games can immerse learners in environments where they must use target vocabulary in conversation or problem-solving. This contextual application of vocabulary deepens learners' understanding and retention by linking the words to real-life situations. The variety of contexts provided by game-based learning allows students to form multiple connections to vocabulary words, strengthening retention and recall.

4. The Relationship Between Motivation and Retention

4.1. Motivation as a Driver for Retention

Motivation is essential for encouraging active participation and plays a critical role in retention. Studies have shown that more motivated learners are more likely to repeatedly engage in vocabulary

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learning tasks, which leads to improved retention. Motivation influences how much effort learners are willing to invest, directly correlating with how well they retain new vocabulary over time. The process of motivated vocabulary learning functions as a cyclic process, going through a series of different learning stages [11]. This cycle starts with motivation, which drives engagement and reinforces retention, thereby motivating the learner to continue learning.

The most important of these is internal motivation, or the desire to complete the task for its own sake. Game-based learning is uniquely effective at promoting intrinsic motivation because it makes learning enjoyable, such that students will feel compelled to practice their vocabulary. Learning trajectories often rely on extrinsic motivation, which serves as an externally given award such as a grade. On the other hand, games have this feature built-in because they make learning fun. Again, by motivating students to learn vocabulary, game-based learning encourages them to regularly practice vocabulary – over time- which will build retention. However, games also incentivize this initial operationalization through extrinsic channels, such as points, badges, and leaderboards. These extrinsically given incentives serve as rewards and sustain motivational perseveration – even if the tasks become more challenging. Although extrinsic motivation alone does not guarantee retention over the long term, it helps to establish a brief period of initial engagement in the task, which is a prerequisite for building consistent and reliable vocabulary learning habits. Once students are immersed in the learning process, they will be intrinsically motivated to consistently practice vocabulary, which will build retention over time.

4.2. Mechanisms of Motivation's Influence on Retention

There are several mechanisms through which motivation directly influences retention in game-based learning environments. First, engagement is a critical factor. Learners engage more frequently with vocabulary tasks when motivated, strengthening retention through repetition. Game-based learning environments are designed to foster high levels of engagement by making the learning process interactive and enjoyable. This reinforces the idea that engagement through games promotes better retention by increasing students' willingness to practice vocabulary consistently. Another mechanism is goal setting, which is inherent in most game-based learning environments. Learners are often tasked with reaching certain levels or achieving specific scores, which motivates them to engage more frequently with vocabulary exercises. These goals serve as short-term objectives that drive long-term retention; the structure of games encourages students to revisit vocabulary repeatedly until they have mastered it.

The feedback loop in game-based learning also plays a significant role in reinforcing motivation and retention. Immediate feedback helps learners correct real-time mistakes, preventing the internalization of incorrect vocabulary usage. Over time, this constant feedback reinforces correct usage, which strengthens retention. Mobile game-based learning environments enhance retention by making vocabulary practice both enjoyable and educational: Mobile Game-Based Learning can enhance students' enjoyment of vocabulary learning, increasing their motivation and interest in mastering new words [12]. This combination of enjoyment and feedback ensures that learners are motivated to practice regularly, which improves retention. Finally, the social dynamics in multiplayer games, such as competition and collaboration, motivate learners to engage more deeply with vocabulary tasks. Multiplayer formats encourage students to communicate and collaborate with peers, which reinforces the vocabulary they have learned. This social aspect is absent in traditional learning methods, where learners work independently. The result shows that there was no significant difference in the average HII scores between the post-training test and the subsequent retention test... this demonstrates the ability of the participants to retain the knowledge acquired during the training session, even after a gap of 1 year [13]. This finding underscores the effectiveness of collaborative

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learning environments in promoting long-term retention, as students are motivated by both competition and teamwork to revisit vocabulary.

5. Conclusion

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