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Looking for a Fun Way to Learn English Vocabulary? Discover the Magic of Gamification with Digital Flashcards

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Abstract

Junior high school students learning English as a foreign language (EFL) in countries where English is neither the first nor the second language face significant challenges in acquiring vocabulary due to the infrequent use of English outside the classroom and monotonous teaching techniques. However, in the digital era, innovative educational tools like Digital Flashcard-based gamification offer an interactive and engaging solution. This study aims to understand junior high school EFL students' perceptions of learning English vocabulary through gamification using Digital Flashcards. The research was conducted as Classroom Action Research (CAR) and involved 32 junior high school students in Madiun District, Indonesia, learning English as a foreign language (EFL). Over eight meetings, these students engaged in learning animal-related vocabulary using Digital Flashcard-based gamification. Data were collected through pre-test and post-test and interviews to gather students' perceptions of the learning experience. The results indicate that students' vocabulary mastery significantly improved after using gamification-based Digital Flashcards, with an average increase of 15 points. The pre-test average score was 60, which increased to 75 in the post-test. The gamification elements (story, mechanics, aesthetics, and technology) enhanced students' exposure, attention, and enthusiasm during learning. Vocabulary mastery was effectively facilitated through diverse gamified activities. This study demonstrates that incorporating Digital Flashcards in a gamified format is an effective tool for improving vocabulary learning among EFL students.

Keywords: Digital flashcard, EFL, vocabulary acquisition, gamification.

INTRODUCTION

Mastering vocabulary remains a significant challenge for English as a Foreign Language (EFL) students, many of whom struggle to learn the 2000 most commonly used words despite years of study (Lu & Dang, 2022). Vocabulary knowledge is crucial for developing language proficiency and is well-recognized in the field of applied linguistics. However, the large number of words that language learners need to learn presents a substantial challenge. This issue has led to ongoing discussions among researchers in Teaching English as a foreign language (TEFL), focusing on identifying the most effective

vocabulary subsets for different stages of language learning (Akbari, 2015; Schmitt and Schmitt, 2012). A crucial facet of this discourse involves exploring efficient methodologies and approaches that could potentially streamline and enhance the intricate and long-term process of vocabulary knowledge development for EFL learners (Bao, 2015; Alfadil, 2020; Albaladejo et al., 2018; Tseng et al., 2020; Wu, 2015).

In this study, flashcards, traditionally a popular tool, have maintained their prominence as a strategy for rapid and effective vocabulary acquisition (Senzaki et al., 2017; Zakian et al., 2022). The advent and proliferation of digital technologies have spurred the exploration of technology-assisted vocabulary learning tools, with substantial research focusing on these innovations (Hao et al., 2021; Lin and Lin, 2019). Specifically, the use of digital flashcards on computers and mobile devices has garnered considerable attention. (Xodabande et al., 2022; Pan et al. 2023). Among intentional vocabulary strategies, flashcards stand out for their effectiveness. Typically, these cards feature a target word on one side and its definition, synonym, or translation on the other (Nakata, 2019). This method, which follows the paired-associate learning model, has proven to significantly enhance both receptive and productive vocabulary knowledge. Digital flashcards build on this approach by using technology to facilitate learning through two primary modes: presentation and retrieval. During the presentation mode, learners see target words paired with their native language translations (e.g., tree-arbre). The retrieval mode, based on the Two-Stage Framework, involves two steps. First, in the retrieval phase, the learner is shown a word (e.g., tree) and attempts to recall its translation (e.g., arbre). This is followed by the feedback phase, where the correct translation is provided, reinforcing the learning process.

Recent studies have shown a great deal of interest in the use of digital flashcards for academic vocabulary learning, with a variety of consequences for lesson plans and student performance. Studies have demonstrated significant increases in students' engagement and understanding of language related to their subject areas, demonstrating the effectiveness of digital flashcards in the academic setting. Research by Yüksel et al. (2020) demonstrates that digital flashcards significantly enhance students' technical vocabulary learning. This quasi-experimental study compared digital flashcards (DFs) to traditional wordlists with 57 undergraduate pharmacy students. The results showed that students learned more technical vocabulary through DFs and had positive perceptions of their use. The perceived usefulness of the Quizlet app predicted student success, and regular practice with digital apps indicated a higher intention to continue using them. These findings suggest that teacher-prepared digital flashcards are effective tools for improving technical vocabulary acquisition.

Moreover, research by Zakian et al. (2022) explored the impact of a digital flashcard application (NGSL builder) on vocabulary learning among EFL students. The study involved 86 university students, divided into experimental and control groups. The experimental group used the mobile app for studying vocabulary outside the classroom, while the control group used traditional word lists. Results from pre-tests, post-tests, and delayed post-tests showed that the experimental group significantly outperformed the control group in vocabulary acquisition. The study highlights the long-term benefits of mobile-assisted vocabulary learning and the importance of integrating mobile technologies into language education. In addition, Boroughani et al. (2023) investigated the impact of mobile-assisted self-regulated learning (SRL) on university students' acquisition of academic vocabulary.

With 49 participants split into experimental and control groups, the study examined the use of digital flashcards vs conventional word lists. The experimental group outperformed the control group in post-treatment assessments, despite the fact that both tactics considerably increased vocabulary growth. According to this, acquiring vocabulary with the aid of a mobile device can improve both academic vocabulary and self-regulation. Significant ramifications for EFL programs stem from the findings, which point to mobile-assisted learning as a more successful method for academic vocabulary acquisition.

Despite extensive research into the use of mobile applications for vocabulary learning, there remains a gap in understanding the comparative effectiveness of these applications versus traditional paper-based methods. This study introduces a novel approach to vocabulary learning by integrating gamification elements into digital flashcards for youth EFL students. By comparing the learning results of academic vocabulary acquisition among junior high school students using digital flashcards, the current study aims to close this research gap. It specifically responds to the subsequent research query: Does the academic vocabulary of junior high school students improve noticeably with the usage of digital flashcards? The study intends to answer this question in order to offer insights that may guide the creation of creative and successful vocabulary acquisition techniques in EFL environments.

METHOD

This study employs a Classroom Action Research (CAR) design to investigate the effectiveness of gamification-based Digital Flashcards in learning English vocabulary, focusing on descriptive texts about animals. CAR involves reflective practices aimed at improving classroom learning while researching the quality of educational outcomes. It combines elements of practitioner research, teacher-led research, and technical action research to find the best results in specific contexts, ultimately enhancing student learning (Kunlasomboon et al., 2015). The study involved 32 junior high school students (12 males and 20 females) from Madiun District, Indonesia, who were learning English as a foreign language. The participants, aged 13-14, were in their first year of formal English instruction, aligned with the CEFR Level A1 (Beginner). The research was conducted from August to September 2023. During this period, students participated in problem-based learning activities that involved solving vocabulary-related challenges in a gamified quiz using a flashcard mobile application.

Data were collected through pre-tests, post-tests, and interviews. The research activities were structured into three periods: pre-test, learning activities, and post-test with interviews. Initially, participants completed a pre-test (30 minutes) on vocabulary related to texts about animals. Following this, students received explanations from the teacher and engaged in group discussions (80 minutes), involving various activities such as watching videos about animals, identifying vocabulary, and using Digital Flashcards. The flashcards included images, English words, meanings, and pronunciations, allowing students to learn independently and repeatedly. Students then participated in an interactive gamified quiz, matching words with meanings, organizing letters, and identifying animal names and habits. Finally, students completed a post-test (30 minutes) and participated in interviews about their learning experiences with Digital Flashcards.

The post-test consisted of 24 multiple-choice questions covering form, meaning, and use aspects of vocabulary, as well as gamification elements (story, dynamics, mechanics, and technology). Furthermore, five students were selected for discussion group for interviews based on their post-test scores: two with the highest scores, one with a middle score, and two with the lowest scores, to gather diverse insights into the effectiveness and engagement of the gamified learning approach, (Hennink & Kaiser, 2022). Interviews were conducted in two phases to understand the use of Digital Flashcards, their advantages, and challenges.

The data analysis for this study involved comparing the mean scores of the pre-test and post-test results to evaluate the effectiveness of gamification-based Digital Flashcards in improving vocabulary acquisition. Initially, the pre-test was administered to assess the students' baseline vocabulary knowledge. Following the learning activities and the use of Digital Flashcards, the post-test was conducted to measure any improvements in vocabulary mastery. The mean scores of the pre-test and post-test were calculated and compared using statistical methods to determine the significance of the differences (Alessandri et al., 2017). This comparison helped to identify the extent of vocabulary improvement among the students after using the Digital Flashcards. The coding process for interview involved categorizing the responses to identify common themes and patterns (Castleberry & Nolen, 2018). This qualitative analysis provided a deeper understanding of how the Digital Flashcards influenced student engagement, motivation, and perceived effectiveness in learning vocabulary.

FINDING AND DISCUSSION

In the early stages of the study, researchers conducted observations to understand class conditions and student interactions during the learning process. These observations set the context for the subsequent interventions. Pre-tests were administered to evaluate the students' initial cognitive competence in vocabulary learning, specifically focusing on descriptive texts about animals. The results of the pre-test, as depicted in Figure 1, indicated that students' vocabulary mastery was below the minimum standard required for their level.

The pre-test results revealed the following levels of vocabulary mastery: mastery of vocabulary related to form was 59.38%, meaning was 44.53%, and use was 59.38%. These findings highlighted significant gaps in students' vocabulary knowledge, particularly in understanding the meaning of words, which was the weakest area. The relatively low percentages in all three aspects—form, meaning, and use—indicated a need for more effective vocabulary learning strategies. This initial assessment provided a baseline for measuring the impact of the gamification-based Digital Flashcards intervention.

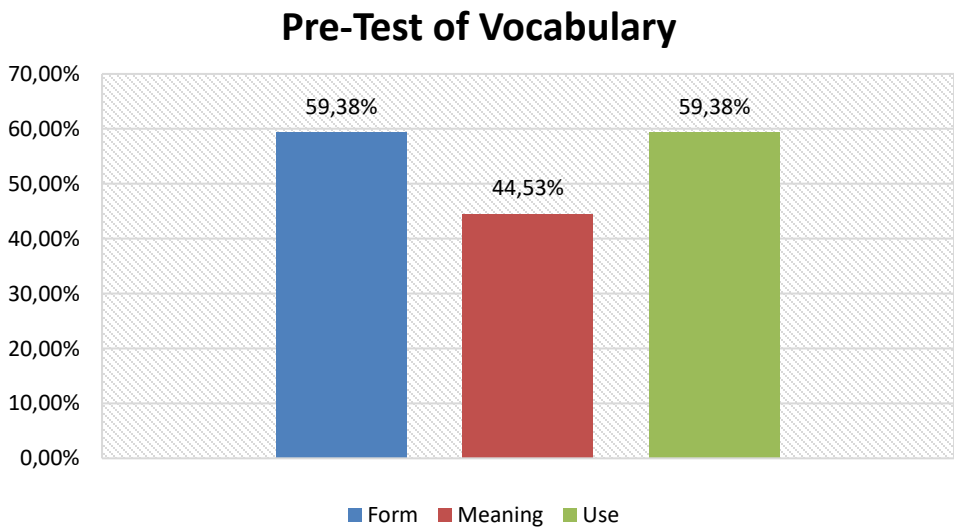

Figure 1. Results of the pre-test of vocabulary proficiency

The observations and pre-test results underscored the challenges faced by students in acquiring and retaining vocabulary related to descriptive texts about animals. These challenges included difficulties in recognizing the correct forms of words, understanding their meanings, and using them appropriately in context. The identified gaps reinforced the necessity of implementing an innovative approach, such as gamified digital flashcards, to enhance vocabulary learning outcomes.

In addition to the pre-test results, interviews were conducted to gain a deeper understanding of students' learning habits and challenges related to vocabulary acquisition. These interviews revealed that students typically relied on traditional methods such as reading and memorizing vocabulary lists manually compiled from the texts they studied. For example, Student 1 stated, *"I learn vocabulary by reading and memorizing a list of dictionaries,"* and Student 4 mentioned, *"I write a word list of the difficult words in the text I read."* Despite these efforts, students found it challenging to memorize vocabulary effectively. Student 3 remarked, *"I can memorize vocabulary by writing difficult words in a vocabulary list and reading it over and over again, but I only quickly remember when I am eager to learn and not lazy."* This statement underscores the difficulty students face in retaining vocabulary using traditional methods, which often require a high level of motivation and repetition. According to findings from various studies, traditional strategies often fail to address the lack of student motivation and engagement in learning. They do not provide the dynamic and interactive experiences needed to maintain student interest and effectively support vocabulary retention (Chans & Castro, 2021; Zhonggen, 2018; Butler, 2015; Sadeghi et al., 2022).

Another major issue was remembering the meaning of rarely used words. Student 2 shared, *"Remembering the words which are often heard or often found in the text is easy; what is difficult is when finding the words that aren't often used."* Student 1 added, *"To remember the meaning, I have to read repeatedly until I remember."* The learning process for vocabulary was described as difficult, exhausting, and boring due to the long time and high

concentration required (Yang et al., 2020; Mavrou, 2021). Moroever, students also struggled with using words in sentences or phrases due to similarities in meaning but differences in usage. For instance, Student 4 remarked, *"It is difficult to define a word used in a particular context because the words have the same meaning,"* and Student 5 noted, *"I have difficulty determining the usefulness of a particular word because it has similar meanings."* This issue is common among EFL students who require contextual or incidental learning to understand word usage correctly (Hasnine & Wu, 2021).

Since students scored low on the pre-test due to a lack of engagement in traditional learning techniques, digital flashcards were implemented as an innovative approach to enhance their vocabulary acquisition. Digital flashcards, incorporating gamification elements, were introduced to make the learning process more interactive and engaging. This method aimed to address the motivational and retention challenges identified in the initial phase of the study. Following the pre-test, students received explanations from the teacher and engaged in group discussions (80 minutes). These discussions involved various activities such as watching videos about animals, identifying vocabulary, and using Digital Flashcards. The flashcards included images, English words, meanings, and pronunciations, allowing students to learn independently and repeatedly. Students then participated in an interactive gamified quiz, which involved matching words with meanings, organizing letters, and identifying animal names and habits.

To assess improvements in student vocabulary mastery after using gamification-based Digital Flashcards, post-tests were conducted. The results, as shown in Figure 2, provide a comparative analysis of student performance before and after the intervention. These post-test results highlight the effectiveness of digital flashcards in improving vocabulary knowledge, demonstrating significant gains in the students' ability to recall and use new vocabulary accurately.

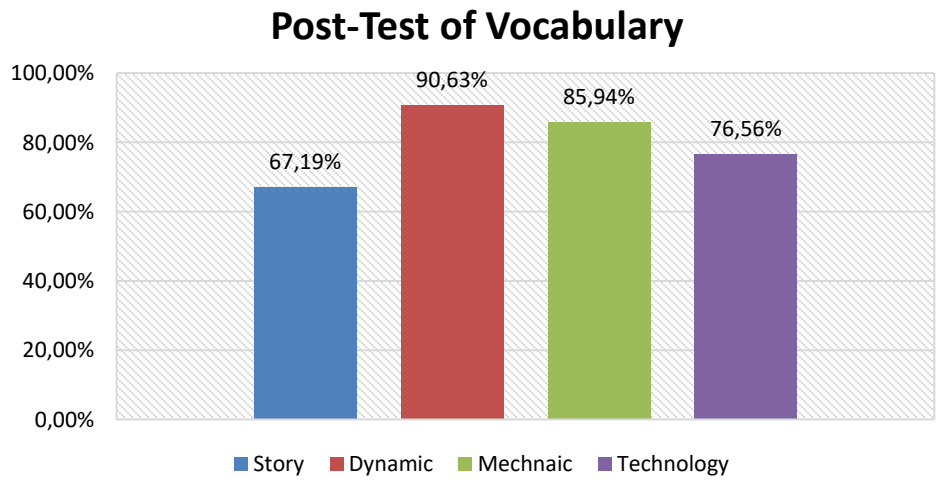

Figure 2. Post-Test results of student vocabulary proficiency using digital flashcard

The bar graph in Figure 2 presents the post-test results of student vocabulary proficiency after using gamification-based digital flashcards. The graph measures four different aspects of vocabulary proficiency: Story, Dynamic, Mechanic, and Technology.

Students scored an average of 67.19% in the Story aspect, indicating a moderate level of proficiency. This category likely evaluates the ability to understand and use vocabulary in narrative contexts, reflecting that while students improved, there remains room for further enhancement in this area. The highest proficiency was observed in the Dynamic aspect, with an average score of 90.63%. This suggests that students were highly successful in using and understanding vocabulary in dynamic and varied contexts, demonstrating the effectiveness of digital flashcards in enhancing vocabulary usage in more fluid and interactive scenarios. In the Mechanic aspect, students achieved an average score of 85.94%. This indicates a strong proficiency in understanding and applying vocabulary rules and structures, showing that digital flashcards effectively reinforced the mechanical and structural aspects of vocabulary learning. The Technology aspect had an average score of 76.56%. This reflects a good level of proficiency in using vocabulary related to technological contexts or through the medium of digital tools, indicating that students could effectively apply their vocabulary knowledge in technology-related areas.

Furthermore, students expressed that Digital Flashcards greatly aided their learning. They appreciated the multimedia elements—sounds with correct pronunciation, engaging images, and the convenience of using smartphones instead of traditional books, which could be accessed anytime and anywhere (Abdulrahaman et al., 2020; Hamidi and Chavoshi, 2018; Cárdenas-Robledo and Peña-Ayala, 2018). Student 4 commented, *"Digital Flashcards make learning more exciting and not boring, helping master vocabulary."* Student 2 added, *"The Digital Flashcards are very attractive with pictures and sounds, and their colorful appearance and pronunciation help me learn better."* Digital Flashcards also helped avoid monotonous learning and prevented student fatigue. Students felt that varied learning activities within the digital flashcards made the process more engaging (Xodabande et al., 2022). Student 3 stated, *"Videos and texts help me understand new vocabulary, especially related to use, by knowing the functions of particular words."* These aspects contributed to better motivation and engagement in learning (Seo et al., 2021).

The multimedia elements of Digital Flashcards also played a crucial role in mastering vocabulary forms and usage. Student 1 mentioned, *"The pronunciation and texts on Digital Flashcards help me understand how words are written and spoken, while images and meanings in Indonesian aid memory."* Student 4 said, *"Digital Flashcards help me remember the significance of words through images, and the voice aids in learning pronunciation."* Student 5 stated, *"Digital Flashcards help me remember meanings through images and sounds, aiding in mastering vocabulary forms and usage."* These findings support the idea that gamification can attract attention, motivate learning, and solve learning challenges (Putz et al., 2020). Regarding gamification elements like scores, levels, and rewards, students reported increased motivation and interest in learning (Saleem et al., 2021). Student 5 said, *"When I get a low score, I learn again to achieve a higher score and level. Winning a trophy or reward makes me very happy and excited to learn."* Student 3 added, *"Points, scores, and rewards enhance my learning motivation; I study more energetically to achieve high scores."* Benefits included improved motivation, positive attitudes, better cognitive achievement, and enhanced competitiveness.

The visual and auditory elements in Digital Flashcards also significantly influenced learning. Pictures helped with word meaning retention (Andrä et al., 2020), while

pronunciations assisted with understanding word forms (Evers & Chen, 2020). Structured quizzes on vocabulary form and use further enhanced retention. Student 2 noted, *"I initially had difficulty putting letters into words, but Digital Flashcards with text and quizzes helped me master new vocabulary."* Student 1 added, *"Digital Flashcards helped me understand pronunciation and writing through audio and text, and quizzes reinforced this learning."* This aligns with research by Luo (2022), which reveals that gamification can make difficult and boring learning content easier to understand and more motivating.

CONCLUSION

The study demonstrated that gamification-based Digital Flashcards significantly improved the vocabulary acquisition of junior high school students learning English as a foreign language. Post-test results showed significant improvements across all measured aspects of vocabulary proficiency: Story (67.19%), Dynamic (90.63%), Mechanic (85.94%), and Technology (76.56%). The pre-test average score was 60, which increased to 75 in the post-test. Interviews confirmed that the multimedia elements and gamified activities of Digital Flashcards engaged students, improved their motivation, and facilitated better retention of vocabulary. Overall, these findings highlight the potential of Digital Flashcards to address the limitations of traditional vocabulary learning methods by providing an interactive and engaging learning experience.

Despite the positive findings, the study had several limitations. Firstly, the sample size was relatively small, consisting of only 32 students from a single district, which may limit the generalizability of the results to other contexts and larger populations. Secondly, the study was conducted over a short period, which may not fully capture the long-term effects of using Digital Flashcards on vocabulary retention and overall language proficiency. Thirdly, the reliance on self-reported data from interviews may introduce bias, as students may have provided socially desirable responses. Lastly, the study focused exclusively on vocabulary related to descriptive texts about animals, which may not reflect the efficacy of Digital Flashcards for other types of vocabulary or subjects.

Future research should address these limitations by including larger and more diverse samples to enhance the generalizability of the findings. Longitudinal studies are recommended to assess the long-term effects of Digital Flashcards on vocabulary retention and overall language proficiency. Additionally, future studies should explore the effectiveness of Digital Flashcards across different types of vocabulary and subject areas to determine their broader applicability. Investigating the impact of other gamification elements, such as competition and collaboration, on learning outcomes could provide deeper insights into optimizing digital learning tools. Finally, integrating mixed-method approaches that combine quantitative and qualitative data could offer a more comprehensive understanding of the benefits and challenges associated with using Digital Flashcards in language education.

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