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## Research Article

# Enhancing Vocabulary Acquisition through Gamification

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**This study investigates the effects of gamification on vocabulary acquisition and student motivation among 54 students enrolled in the Orientation Program at a higher education institution in Bahrain. The study compared traditional vocabulary instruction with a gamified approach using the Kahoot platform. Results revealed that the gamified group achieved significantly higher vocabulary gains, with a mean post-test score of 86 compared to 78 for the control group. Furthermore, 85% of participants in the gamified group found this method more effective for retention, and 92% preferred it over traditional worksheets. The findings indicate that gamification can considerably enhance vocabulary learning by making the process more engaging and effective. Nevertheless, to fully leverage its benefits, it is essential to overcome challenges such as technical issues and varying levels of student familiarity with the platform.**

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## 1. Introduction

Vocabulary acquisition is fundamental to language development, forming the basis for clear communication, strong reading comprehension, and overall proficiency in both spoken and written language. Extensive research has shown that a rich and diverse vocabulary enhances learners' ability to understand and produce language more accurately and fluently (Nation, 2013). Building upon this notion, Schmitt (2008) emphasizes the indispensable role of vocabulary knowledge in enabling learners to articulate their thoughts accurately and comprehend the expressions of others, thereby reinforcing the central importance of vocabulary in the language acquisition process. Consequently, educators are always looking for effective ways to help students acquire vocabulary.

Traditional methods of teaching vocabulary often involve repetitive memorization, rote learning, and the use of vocabulary lists. Although these strategies can be

effective in some scenarios, they frequently fail to fully engage students or accommodate the diverse learning preferences and styles found in a classroom setting (Schmitt, 2008). As a result, educators are seeking alternative approaches to make vocabulary learning more dynamic, engaging, and impactful.

An innovative strategy that has garnered significant attention in recent years is gamification. This approach involves integrating game design principles into non-game settings to engage and motivate learners (Deterding et al., 2011). In educational contexts, gamification has been shown to boost student engagement, motivation, and learning outcomes by making learning experiences more interactive and enjoyable (Hamari et al., 2014). Particularly in language learning, gamification has shown considerable promise in improving vocabulary acquisition.

Recent studies have further validated the effectiveness of gamification in education. For instance, Sailer and Homner (2020) highlight that gamified learning environments can lead to higher levels of student motivation and better learning outcomes compared to

traditional methods. Additionally, Subhash and Cudney (2018) provide evidence that gamification not only enhances engagement but also fosters a more collaborative learning atmosphere, which is crucial for language development. More recent research by Aguilar et al. (2021) supports these findings, indicating that gamification can significantly improve vocabulary retention and learner satisfaction. Furthermore, Dicheva et al. (2019) found that the implementation of gamified elements in educational settings can cater to diverse learning preferences and improve overall educational experiences.

With the rising need for effective language learning strategies, incorporating gamification into vocabulary instruction marks a significant advancement. This method not only taps into learners' intrinsic motivation but also offers a structured and adaptable framework for vocabulary practice. The focus of this study is to examine the effects of gamified instruction on vocabulary acquisition and student motivation, providing insights into the effective implementation of these innovative techniques in higher education language programs. The results of this research could offer valuable insights for educators aiming to enhance their teaching methods and improve student outcomes in language learning.

## 2. Literature Review

### 2.1. Gamification in Higher Education

Gamification refers to applying elements of game design in contexts outside of gaming to boost user engagement and motivation (Deterding et al., 2011). Within education, gamification has become increasingly popular for its ability to render learning more interactive and enjoyable. Studies indicate that incorporating gamified learning environments can notably elevate student motivation, engagement, and academic achievements (Hamari, Koivisto, & Sarsa).

Gamification has emerged as an innovative strategy for boosting student engagement and motivation within educational settings. By incorporating principles of game design into learning tasks, educators can establish dynamic environments that stimulate students' inherent drive to learn (Deterding et al., 2011). Research suggests that gamified learning experiences effectively elevate student engagement by presenting challenges, encouraging collaboration, and providing immediate feedback (Hamari, Koivisto, & Sarsa, 2014). These aspects not only enhance the enjoyment of learning but also motivate students to actively

participate in educational activities. Furthermore, gamification fosters a sense of accomplishment, further fueling students' motivation to persist in their learning pursuits. Therefore, by harnessing the potential of gamification, educators can create immersive learning experiences that inspire and empower students to reach their full potential.

### 2.2. Gamification and Vocabulary Acquisition

In the context of language learning, gamification holds potential for improving vocabulary acquisition. Through the incorporation of game elements into vocabulary instruction, educators can cultivate a more captivating and motivating learning atmosphere. According to Muntean (2011), gamification enhances engagement in e-learning environments, a key factor in vocabulary development. Gamified learning tasks like vocabulary games and quizzes provide students with regular chances to interact with new words in an engaging manner, thereby aiding in better retention.

Additionally, the motivational elements inherent in gamification, including competition, rewards, and immediate feedback, complement the fundamentals of successful vocabulary acquisition. Studies conducted by Muntean (2011) indicate that these components not only enhance the enjoyment of learning but also prompt students to dedicate more time to practicing and absorbing new vocabulary. Such heightened engagement and practice are pivotal for vocabulary acquisition, as reiterated by Nation (2013), where repeated exposure and application play crucial roles in the learning process of new words.

### 2.3. Empirical Evidence

Empirical research examining the effects of gamified vocabulary instruction corroborates these findings. For instance, a study conducted by Nah, Zeng, Telaprolu, Ayyappa, and Eschenbrenner (2014) revealed that gamified learning tasks notably enhanced students' acquisition and retention of vocabulary compared to traditional methods. Similarly, Huynh, Zuo, and Iida (2019) demonstrated the positive impact of gamification on vocabulary learning outcomes and student motivation within language learning contexts.

These investigations suggest that gamified instruction can serve as an effective approach for bolstering vocabulary acquisition and motivation among language learners. However, it's crucial to consider the design and implementation of gamified activities to ensure they are aligned with educational objectives and

effectively support learning, as emphasized by Deterding et al. (2011).

## 2.4. Addressing Challenges in Vocabulary Learning

Students frequently encounter difficulties in recalling and retaining English vocabulary, regardless of their skill levels. Conventional approaches like multiple-choice queries, fill-in-the-blanks, and cloze tests typically serve as tools to reinforce and review vocabulary. Nevertheless, these techniques often lack the ability to inspire students and can become tedious. Additionally, many students refrain from seeking clarification on unfamiliar words or phrases, contributing to gaps in comprehension.

To address these issues, the researcher implemented gamified learning through the development of diverse online vocabulary games using Kahoot. This platform was chosen to infuse vocabulary review with elements of play, competition, and immediate feedback, aiming to transform the learning experience from a mundane task into an interactive and enjoyable activity that fosters increased engagement and improved retention.

The study's goal is to evaluate the efficacy of gamification in vocabulary learning and review among students enrolled in the Orientation Program at a higher education institution in Bahrain. The study seeks to answer the following research questions:

1. Can interactive online games help students learn and retain vocabulary?
2. What are students' perceptions of using online games to review vocabulary?

This research adds to the evidence supporting the use of gamified learning in education and shows how it can benefit vocabulary learning and student motivation.

## 3. Method

### 3.1. Participants

The participants in this study were university students enrolled in the Orientation Program at a higher education institution in Bahrain during the academic year 2023-2024. This program is designed to support students' essential academic skills, including language proficiency and to prepare them for further studies in various university departments. The study targeted a total of 54 students who were invited to participate at the beginning of the semester. These students were aged between 17 and 20 years old, reflecting a typical

age range for students in an introductory university program.

The study involved 20 male and 34 female participants, reflecting a balanced gender representation commonly found in university settings. Including both genders aimed to ensure that the study's findings would be relevant across genders, providing a more comprehensive understanding of how the intervention impacts all participants. All 54 participants were at the B1 (intermediate) level of English proficiency according to the Common European Framework of Reference for Languages (CEFR).

### 3.2. Research Design

This study employed a mixed-methods approach, blending quantitative and qualitative data collection and analysis methods. The quantitative aspect utilized a pre-test/post-test design to evaluate the impact of gamified learning on vocabulary acquisition, while the qualitative component involved administering surveys to gain insights into students' experiences and perspectives of gamified learning.

As per Isnawan (2020), the nonequivalent control group design allows for comparing two groups—a control group and an experimental group—while recognizing that these groups may not be entirely equivalent due to the absence of random assignment. This design is valuable for assessing the effectiveness of interventions in practical educational environments.

For this study, participants were split into two separate groups: the control group and the experimental group. Each group comprised 27 students, ensuring an even distribution for a fair comparison. The control group continued their vocabulary learning through traditional methods commonly used in higher education. First, new vocabulary was pre-taught before reading tasks through lecture-based instruction, where the instructor introduced vocabulary with visual aids, explained definitions, provided usage examples, and gave contexts for each new word. This pre-teaching method helped students understand new texts better by giving them the meanings of words beforehand. Students then completed vocabulary exercises from their textbooks, which typically included matching words with definitions, filling in the blanks, and sentence completion tasks. Additionally, students were given supplementary reading assignments, where they had to identify new vocabulary words and check their meanings. Discussions and comprehension questions followed to reinforce their understanding. Traditional memorization techniques, such as rote learning, were

used to help students remember the spelling, meaning, and usage of new vocabulary words. At the end of each unit, students received a list of key vocabulary words with definitions and example sentences, encouraging them to use these new words in real-life situations. This approach helped familiarize students with the words and activate their passive vocabulary. Furthermore, students were encouraged to maintain a reading routine and read extensively in the library, where many books were arranged according to proficiency levels. The control group, utilizing traditional methods, served as a point of comparison to evaluate the effectiveness of the gamified learning approach.

In contrast, the experimental group was exposed to a gamified learning approach, integrating interactive and captivating activities tailored to boost vocabulary acquisition. This approach utilized online platforms such as Kahoot, integrating gamified features to enrich the learning experience with increased engagement and interactivity. Kahoot was selected as the gamification platform for two primary reasons. First, it provides an engaging and interactive way to learn vocabulary. Its game-based format, featuring quizzes and real-time competition, captures students' attention and makes learning fun, which can lead to better retention of vocabulary as students are more likely to participate actively and enjoy the learning process. Second, Kahoot offers immediate feedback on answers, allowing both students and instructors to assess understanding in real-time. This instant feedback helps students recognize and correct mistakes promptly, reinforcing the correct usage and meaning of vocabulary. For instructors, it provides valuable insights into students' progress and areas needing improvement, enabling more targeted and effective teaching strategies. The quizzes featured multiple-choice questions with 2 to 4 options, where students had to select the correct answer within a time limit. This setup created a competitive environment where students earned points based on how quickly and accurately they responded. This competition stirred excitement and encouraged students to actively participate and strive for higher scores. By integrating competition and rewards like points and rankings, the gamified approach encouraged students to engage deeply with vocabulary learning. It not only tested their knowledge but also sharpened their quick thinking and decision-making skills. Overall, these activities skillfully combined gamification with educational goals, aiming to make vocabulary learning more engaging and effective. They fostered a dynamic learning environment where students were motivated to improve their retention and comprehension through

enjoyable and competitive experiences. The objective of this intervention was to investigate whether gamification could result in enhanced vocabulary retention and comprehension compared to conventional learning techniques.

To establish a baseline for both groups, a vocabulary pre-test was given at the beginning of the study. The same pre-test was administered to both the experimental and control groups to gauge the students' initial vocabulary knowledge and proficiency levels. The pre-test results were crucial for assessing any initial differences in vocabulary knowledge between the two groups before implementing the gamified learning intervention.

### *3.3. Quantitative Data Collection and Analysis*

Quantitative data were gathered through pre-tests and post-tests given to both the experimental and control groups to evaluate vocabulary acquisition. The pre-test comprised 20 vocabulary items relevant to classroom material, utilizing sentence completion tasks to ensure familiarity and emphasize the application of specific vocabulary. After the intervention, the same post-test was administered to both groups to measure the effectiveness of gamification techniques employed in the experimental group compared to traditional teaching methods in the control group. Quantitative data analysis entailed comparing pre-test and post-test scores across both groups utilizing suitable statistical approaches like t-tests or analysis of covariance (ANCOVA).

### *3.4. Qualitative Data Collection and Analysis*

Qualitative data were obtained through surveys given to all participants to capture their perspectives and experiences with gamified learning. A descriptive analysis of survey responses was carried out to uncover recurring themes, patterns, and differences in students' feedback. These qualitative findings supplemented the quantitative results, offering detailed insights into the effectiveness of gamified learning and suggesting potential areas for enhancement.

### *3.5. Implementation in Experimental group Using Kahoot*

This experimental group was exposed to gamified instruction for a total of seven weeks. In this context, the online games designed for 50-minute vocabulary teaching was played seven times.

### *3.5.1. Setting Up the Learning Environment*

To begin the gamified learning using Kahoot, the classroom was thoroughly set up with essential equipment, including an overhead projector, a whiteboard, and reliable internet connectivity. The seating layout was arranged to accommodate both individual and group tasks effectively. Students received an introduction to Kahoot through a brief tutorial, illustrating the platform's interface and its application for vocabulary development activities. Each student created an account, ensuring readiness for participation in interactive quizzes. The teacher also outlined how scores would be visible on the whiteboard to monitor progress instantly.

### *3.5.2. Designing Vocabulary Activities*

The teacher created a set of engaging vocabulary quizzes on Kahoot tailored to accommodate various proficiency levels among the students. These quizzes were organized to encompass different question formats, including multiple-choice and sentence completion tasks. The quizzes contained both easy and challenging questions to keep students engaged and address different learning levels. They included vocabulary relevant to the curriculum and were reviewed to ensure valuable learning experiences. This preparation set the stage for an interactive learning session.

### *3.5.3. Implementing the Activities*

During the implementation phase, students engaged in Kahoot quizzes individually, in pairs, and in small groups. Initially, each student participated in individual quizzes to concentrate on their understanding and progress. Next, students worked together in pairs to answer vocabulary questions, promoting teamwork and support. Finally, small groups competed against each other, collaborating to answer vocabulary questions. The live leaderboard, projected on the whiteboard, fostered excitement and competition during the session.

### *3.5.4. Integrating Point Systems*

To boost motivation and offer immediate feedback, a point system was integrated into the Kahoot quizzes.

Students earned points for correct answers, with additional points given for quicker responses. These points were tracked and displayed on a leaderboard projected on the whiteboard, fostering healthy competition and encouraging improved performance. Scores were updated promptly, and top performers were recognized, celebrating their success and motivating others to excel. The visibility of scores and prompt feedback played a vital role in keeping students engaged and motivated to enhance their vocabulary skills.

## *3.6. Data Collection*

Data collection involved conducting pre-tests, post-tests, and surveys with all participants after the intervention. Quantitative analysis of pre-tests and post-tests assessed vocabulary acquisition changes, while qualitative analysis of surveys explored students' gamified learning experiences and perceptions.

## **4. Findings**

The study revealed significant differences in pre-test and post-test scores between the experimental and control groups. Initially, the experimental group had a slightly lower mean score of 66 compared to the control group's mean score of 68. However, following the implementation of teaching interventions—gamification in the experimental group and conventional methods in the control group—significant improvements were observed. Both groups exhibited remarkable increases in post-test scores, with the experimental group achieving a mean score of 86 and the control group attaining a mean score of 78. These results indicate that the gamification approach utilized in the experimental group led to more substantial enhancements in vocabulary acquisition compared to conventional teaching methods in the control group. These findings underscore the effectiveness of innovative instructional strategies, such as gamification, in improving students' vocabulary learning outcomes. Furthermore, 85% of students reported finding it easier to remember new words using online games, indicating their preference for this method due to its novelty and interactive nature (Table 1).

Do you prefer revising vocabulary using online games more than worksheets?	
Preference	Number of Students
Yes	24
No	3

**Table 1.** Preference for Using Online Games to Review Vocabulary

Moreover, when questioned about the effectiveness of online games in aiding vocabulary retention, 85% of students indicated that they found it easier to remember new words through this method (Table 2).

This demonstrates that the engaging and interactive nature of online games can enhance the learning experience and improve memory retention compared to conventional methods.

Do you believe that using online games to review vocabulary enhances your ability to remember new words?	
Response	Number of Students
Yes	26
No	1

**Table 2.** Effectiveness of Online Games for Vocabulary Retention

Regarding the usefulness of the online games in learning vocabulary, a substantial number of students (24 out of 27) rated online games as "useful" for learning vocabulary, indicating their acceptance of integrating educational technology into the classroom (Table 3).

How beneficial do you find online games for learning vocabulary? (1 = not useful, 5 = very useful) Rating 1 = not useful, 2 = somehow useful, 3 = quite useful, 4 = useful, 5 = very useful	
Rating	Number of Responses
1	0
2	0
3	3
4	18
5	6

**Table 3.** Usefulness of Online Games for Vocabulary Learning

Moreover, 92% of students expressed willingness to learn and practice vocabulary using other online games, highlighting the success of this new initiative and its potential for engaging students in learning (Table 4).

Regarding students' perceptions, 92% found online games more engaging, enjoyable, and motivating compared to traditional worksheets (Table 5). However, some students (48%) found the games challenging, and the high rate of non-responses (33%) suggests a potential lack of familiarity with technology and time constraints as contributing factors (Table 5).

Perception	Number of Responses
More challenging	13
Not challenging	8
No response	6
More fun	25
Not fun	1
No response	1
More interesting	25
Not interesting	0
No response	2

**Table 5.** Perceptions Towards Using Online Games to Learn and Review Vocabulary

Feedback from students supported these findings, with many praising the effectiveness of online games in vocabulary learning and suggesting improvements, such as including prompts for the first letter of vocabulary words (Table 6).

Feedback Type	Number of Responses
<i>Positive Feedback</i>	
It is good	5
It is fun	10
It is interesting	12
Better than vocabulary worksheets	13
Helps in remembering vocabulary	14
<i>Negative Feedback</i>	
Internet was slow	3
Enjoyable but not helpful for retention	2
<i>Suggestions</i>	
Include first letter hints for vocabulary	4

**Table 6.** Students' Feedback on the Use of Online Games for Vocabulary Learning

The results confirm that students prefer using online games for vocabulary learning. These games are engaging and interactive, making learning enjoyable and improving vocabulary retention. Feedback suggests the need for better game design and technical infrastructure to enhance the learning experience further. Overall, most students favor interactive online games as a useful tool for vocabulary review, supporting continued integration of gamification in education.

## 5. Discussion

This study highlights the advantages of utilizing gamified learning methods to boost vocabulary acquisition among university students. The findings demonstrate a marked improvement in vocabulary test scores for the experimental group, which was taught using gamification methods. This group showed a considerable increase in post-test scores, averaging 86, compared to the control group, which followed standard teaching practices and scored an average of 78. These results indicate that gamification not only enhances vocabulary learning but also improves retention and comprehension more effectively than traditional instructional methods.

### 5.1. The Effectiveness of Gamified Learning

The experimental group's post-test scores showed a significant improvement. Using games to learn vocabulary makes learning more fun and interactive, which can motivate students to engage more. Research has consistently shown that gamified approaches boost student interest and involvement (Hamari et al., 2014). This engagement likely helps students remember words better over time (Nation, 2013). Studies like Albashtawi and Al Bataineh (2020) in the International Journal of Emerging Technologies in Learning and González-Cabrera et al. (2021) in Educational Research Review confirm that gamification significantly improves vocabulary retention in English as a foreign language learners. Lee and Baek (2023) also found similar benefits for students in South Korea, showing that gamification enhances not only vocabulary but also listening and writing skills.

### 5.2. Challenges and Student Perceptions

Despite the overall positive outcomes, some challenges were identified in the implementation of gamified learning. Nearly half of the students (48%) found the online games more difficult, likely due to varying degrees of technological familiarity and comfort among participants. Additionally, the relatively high rate of non-responses (33%) indicates that some students may have struggled to adapt to this new learning approach,

potentially due to unfamiliarity with technology or time limitations. These findings underscore the need for sufficient support and training for students to ensure effective engagement with gamified learning tools.

Additionally, while the majority of students gave positive feedback, some pointed out issues like slow internet connections and the feeling that, although the games were enjoyable, they were not especially helpful for retention. This feedback indicates that while gamification holds substantial potential, its effectiveness can be limited by technical problems and differing student experiences, highlighting the need for continuous improvement and support to fully realize its benefits.

### 5.3. Implications for Educators

The positive outcomes from this study provide valuable insights for educators seeking to enhance vocabulary instruction through innovative methods. The findings suggest that integrating gamification into vocabulary teaching can lead to improved learning outcomes and greater student engagement and therefore incorporating game-based elements, such as interactive quizzes and real-time feedback to create more engaging and effective learning environments is recommended. Furthermore, the study highlights the importance of addressing technical challenges and ensuring that students are adequately supported in using new educational technologies.

## 6. Limitations

The study has some limitations, like having a small sample size of only 54 students at one proficiency level. Including students from different proficiency levels could give more comprehensive results. Also, relying on stable internet access and familiarity with the Kahoot platform might have affected student engagement. The study lasted only seven weeks, so it may not fully gauge the long-term effects of gamified learning on vocabulary retention. To address these limitations, future research could use larger and more diverse samples, try different gamification tools that are easier to access, and conduct studies over longer periods to see the lasting effects on language learning.

## 7. Conclusion

This study demonstrates the significant potential of gamified learning approaches in enhancing vocabulary acquisition among university students. The findings

indicate that gamification can lead to substantial improvements in vocabulary retention and overall learning outcomes, making it a valuable tool for educators seeking to innovate their teaching practices. By making learning more engaging and enjoyable, gamified instruction not only enhances students' motivation but also facilitates deeper and more effective vocabulary learning.

The positive feedback from students and the observed gains in vocabulary knowledge suggest that gamification should be considered as a viable and effective method for vocabulary instruction. However, the study also highlights the importance of addressing technical challenges and ensuring that students are adequately supported in adapting to new learning technologies. Future research should explore the long-term effects of gamified learning and investigate ways to optimize its implementation in diverse educational contexts.

In conclusion, gamification represents a promising advancement in educational technology that can significantly enhance language learning outcomes. By leveraging the engaging and interactive nature of games, educators can create more dynamic and effective learning experiences that support students in achieving their full potential in vocabulary acquisition and beyond.

## References

- Albashtawi, A. H., & Al Bataineh, K. B. (2020). The Effectiveness of Gamification in Enhancing English as a Foreign Language (EFL) Learners' Vocabulary. *International Journal of Emerging Technologies in Learning (ijET)*.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From Game Design Elements to Gamefulness: Defining "Gamification". *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, 9-15. <https://doi.org/10.1145/2181037.2181040>
- González-Cabrera, C., León-Mejía, A., Bermejo-Berros, J., & Calvete, E. (2021). Gamification and Digital Game-Based Interventions in Language Learning: A Systematic Review and Meta-Analysis. *Educational Research Review*.
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does Gamification Work?—A Literature Review of Empirical Studies on Gamification. *Proceedings of the 47th Hawaii International Conference on System Sciences*, 3025-3034. <https://doi.org/10.1109/HICSS.2014.377>

- Huynh, T., Zuo, L., & Iida, H. (2019). Investigating the Impact of Gamification on Vocabulary Learning among Vietnamese EFL Students: A Case Study. *Education and Information Technologies*, 24, 1921-1939. <https://doi.org/10.1007/s10639-019-09866-4>
- Isnawan, H. (2020). The Nonequivalent Control Group Design in Educational Research. *Journal of Educational Research and Evaluation*, 4(2), 121-128. <https://doi.org/10.29303/jere.v4i2.143>
- Kahoot! (n.d.). Retrieved from <https://kahoot.com>
- Lee, J.-Y., & Baek, M. (2023). Effects of Gamification on Students' English Language Proficiency: A Meta-Analysis on Research in South Korea. *Sustainability*.
- Muntean, C. I. (2011). Raising Engagement in e-Learning through Gamification. *Proceedings of the 6th International Conference on Virtual Learning ICVL*, 323-329. [https://www.icvl.eu/2011/2011/papers/ICVL2011\\_Paper36.pdf](https://www.icvl.eu/2011/2011/papers/ICVL2011_Paper36.pdf)
- Nah, F. F.-H., Zeng, Q., Telaprolu, V. R., Ayyappa, A. P., & Eschenbrenner, B. (2014). Gamification of Education: A Review of Literature. *Proceedings of the 1st International Conference on HCI in Business*, 401-409. [https://doi.org/10.1007/978-3-319-07293-7\\_39](https://doi.org/10.1007/978-3-319-07293-7_39)
- Nation, I. S. P. (2013). *Learning Vocabulary in Another Language* (2nd ed.). Cambridge University Press. <https://doi.org/10.1017/CBO9781139858656>
- Schmitt, N. (2008). Review Article: Instructed Second Language Vocabulary Learning. *Language Teaching Research*, 12(3), 329-363. <https://doi.org/10.1177/1362168808089921>
- Common European Framework of Reference for Languages (CEFR). (n.d.). Retrieved from <https://www.coe.int/en/web/common-european-framework-reference-languages>

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