The Effect of Two Online Versions of Etymological and Non-etymological-based Games on Vocabulary Learning and Retention of Iranian Language Learners: An Educational Intervention

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ABSTRACT

Background: Vocabulary learning is of paramount importance in language learning. Thus, effective ways of teaching new words are sought after by language teachers. This study aimed to investigate the effectiveness of three techniques of vocabulary teaching on learning and retention.

Methods: Initially, 80 upper intermediate female learners of Iran Oxford institute in Tehran participated in this one sample time series quasi-experimental study. Based on the Oxford Online English -Vocabulary Level Test, 37 learners were qualified. In Summer 2021, they took part in the first phase and received the routine treatment. The same students took part in the first experimental group and received the non-etymological-based online game, although only 33 students turned up. In the last stage, the number of participants reduced to 30; therefore, the data analyses were done with 30 students. After each stage, a posttest and a delayed posttest (taken from Building English Vocabulary with Etymology from Latin) were administered. One way ANOVA and Scheffe's Test were run to compare the groups.

Results: The results indicated that the etymological game group outperformed (M=13.16, SD=1.17) the non-etymological (M=12.00, SD=2.33, P=0.04) and control groups (M=11.10, SD=1.53, P<0.001). Moreover, the difference between the non-etymological group and the control group was significant (P=0.048). In the delayed posttest, a significant difference was detected between the etymological game group and the control group (P<0.001). Besides, the etymological game group gained a significantly higher mean score mean score (M=12.40, SD=1.83) than the non-etymological game group (M=9.93, SD=1.99) (P<0.001). However, the non-etymological game group did not significantly outperform the control group (P=0.915).

Conclusion: The results of post- and delayed post-tests indicated that the etymological game group had the best result followed by non-etymological game group.

Keywords: Learning, Education, Distance, Research, Game, Kahoot, Vocabulary, Etymological and non-etymological

Introduction

Vocabulary is, indisputably, a fundamental component of learning a language as knowing fewer words in a language adversely impacts different language skills. Vocabulary knowledge is needed for interact with others (1) and language learners lose interest and are driven to frustration when facing communication circumstances demanding vocabulary knowledge beyond their ability (2). Research has showed that depth and breadth of vocabulary knowledge play a vital role in English language learners' reading comprehension performance (3), listening comprehension (4), and is a predictor of their performance in speaking and writing (5). Also, the use of vocabulary learning strategies to develop vocabulary knowledge and to facilitate the retention of second language (L2) vocabulary has been the subject of a number of L2 studies (6). The use of word etymology and the derivation or origins of words as a vocabulary learning strategy makes English as a foreign language (EFL) learner cognizant of the etymological structure of words and thus enables them to decode unseen and unheard words through breaking them into basic elements (e.g., affixes and roots) (7). Such etymological knowledge also empowers EFL learners to construct thousands of English words accurately (8). Not only does the knowledge of etymology help learners strengthen their current vocabulary knowledge but also it helps them conceive undefined English words in the future (9).

One rational explication for the benefits of etymology can be found in Dual Coding theory (10). As Boers, Eyckmans, and Stengers (11) stated: "the etymological information is likely to call up a mental image of a concrete scene which can then be stored in memory alongside the verbal form, and which can subsequently provide an extra pathway for recall". Although morphological studies (10-12) have been carried out in the context of Iranian EFL learners to show the significance of teaching and learning through etymology, there have been a limited number of English

language schools and institutes to employ etymological-based books, syllabus, or approaches in concept of vocabulary learning and teaching. Furthermore, nowadays, in the technologically advanced societies, traditional vocabulary enquiries are tedious, especially for EFL learners who are brought up in the digital era (13).

With the development of the 4th Industrial Revolution in education, Cybergogy (14) motivated teaching and learning exercises in the virtual environment. One of the considerable accomplishments of the beginning of the twenty-first century is Gamification which has traversed various domains such as culture, technology, society, economics, and healthcare (15). Gamification, the self-determined nature of activities such as similar characteristics of games (16-18), has made its way to the realm of vocabulary learning. Over the past years, vocabulary learning has transformed from monotonous traditional learning resulting in motivation loss and boredom into technological learning (19). Besides, independent learning as the other feature of Gamification has proved to play an important role in tackling the lack of time in some English classes (20, 21). Therefore, in this study, the effect of the combination of online game and etymology-based vocabulary learning are studied.

A significant body of research has investigated vocabulary instruction. Research has shown that both learners and educators perceive vocabulary instruction as fruitful and admit the effectiveness of vocabulary instruction (22, 23). Direct vocabulary teaching has been reported to be more efficient and more effective than independent reading or incidental learning (24).

Taking advantage of morphological knowledge, a basic strategy to concentrate on the structure of a word, i.e., roots and affixes, is one of the approaches to teaching words (25). Accordingly, constructive vocabulary instruction should entail direct instruction in affixes (prefixes and suffixes) and roots. The activity of morphological strategy shows that an acceptable understanding of morphology

along with the capability of using contextual and definitional clues presents a powerful and practical combination that can help learners to figure out the precise definition of new words (25).

Learners learn through relation between new information and prior learning knowledge which is a constructive kind of learning (26). Therefore, based on the Meaningful Theory of Ausubel (27), consisting of the relationship between related prior knowledge and non-arbitrary couple with non-literal interaction of novel knowledge, and etymological instruction can be beneficial in language learning and can be practical for learners to explicate the spelling of a word and retain the meaning of a word from its morphological origins (28).

Besides, as Frances and Simpson (29) pointed out, vocabulary teaching should be geared to learners' beliefs or interests. Nevertheless, learners deem vocabulary learning to be tedious (30) and express their preference for online learning as opposed to traditional learning (30, 31). Therefore, teaching strategies congruent with learners' interest, which can be the combination of technology and vocabulary teaching, should be employed (32).

Moreover, gamification, the conversion of the learning procedure into game (33), is yet another approach inspiring learners to learn new words. Deterding (17) coined gamification to the usage of game elements in different non-game contexts. A game is defined as a system in which an abstract and conceptual challenge is provided for players to engage (34). The challenge can be elucidated by rules, feedback, and interactivity, which culminates in an assessable result often eliciting a sentimental and emotional reaction. As Whitton (35) pointed out, fundamental elements of games in education are challenging activities, doing meaningful and problematic tasks which are constructed with rules, objectives, rewards, and progression. Furthermore, games entail a social aspect and are typically played with other people.

Games provide an enjoyable platform for learners in learning concept among which gamification and game-based learning approaches can be utilized to improve the learning process of learners by motivating and engaging them as digital natives (36). In the realm of education, the gamification approach is utilized to engage and motivate learners by fun environments, fostering intense focus, fun, collaboration, and competitiveness. Games provide multitude advantages to the learning and teaching process, yet some problems can be brought when they are not utilized appropriately. Several of the benefits can be noted: creating continuous motivation for learners to accomplish the learning tasks, creating enjoyable and engaging educational environment, fostering learners' attentiveness and lastly, fostering healthy and enjoyable competition between peers (36). However, it is worth mentioning that creating a really engaging, perfect instructional game is time consuming, pricey, and difficult (34). Furthermore, research into gamification in vocabulary has yielded inconclusive results as some studies have shown a constructive effect on learners' motivation and learning outcomes (21, 37) while some other did not. In addition, although root-based learning is one of the ways which has revealed beneficial results in vocabulary learning, there are some researches which point out the opposite (38). Thus, this study was conducted to investigate the effects of combination of gamification and etymology in vocabulary learning and retention of Iranian EFL learners. Taking the characteristics of gamified vocabulary learning such as independent learning, collaboration, and problem-solving (34), the present research targeted to shed light on the effect of two online versions of etymological and non-etymological-based games on vocabulary learning and retention of Iranian EFL learners. The research focused on the etymology of English vocabularies with an online research-tailored game and aimed to find out: 1) whether there was any significant difference in students' vocabulary learning in non-gamified instruction versus two versions

(Etymological and Non-etymological) of an online game in the posttest, and 2) whether there were any significant difference in students' vocabulary retention in non-gamified instruction versus two versions (Etymological and Non-etymological) of an online game in a delayed posttest.

Methods

Study Design

This one sample time series quasi-experimental study with a pretest, posttest and delayed posttest design was carried out through comparing analysis of non-etymological-based and etymological game groups and non-game group as two experimental groups and control group, respectively. The independent variables were etymological and non-etymological online games and the dependent variables were vocabulary learning and vocabulary learning retention.

Participants and Inclusion Criterion

Initially, using WhatsApp Status and Instagram story, one of the researchers who is a language teacher in Tehran, called English language learners to attend free online vocabulary courses. Around 80 English language learners volunteered to take part in the study. To ensure the homogeneity of the participants, they took The Oxford Online English -Vocabulary Level Test (VLT) and only students with one standard deviation above and below the mean were selected. Consequently, 37 upper-intermediate students aged between 22 and 32 years met the inclusion criterion. Later on, when the study proceeded, the number of participants shrank to 30. Thus, data gathered only from 30 participants was considered for data analyses.

The sample size was calculated through the Morgan formula (39):

$$n = \frac{x^2 N p (1 - P)}{e^2 (N - 1) + x^2 p (1 - P)}$$

The result indicated 23.904. Therefore, the sample size of the current study which was 30, was appropriate.

Instruments

Vocabulary Level Test of Oxford Online English

The Oxford Online English -Vocabulary Level Test (VLT), designed by Oxford Online English, was utilized to find out about the participants' vocabulary proficiency levels (levels were categorized based on the Common European Framework of Reference for Languages: A1, A2, B1, B2, C1, and C2). The vocabulary section of VLT entails 40 multiple questions that are available at OXFORD Online English Level Test (https://www.oxfordonlineenglish.com/English-level-test/vocabulary). The test is a standardized and validated test by oxford university press.

Novelty Test (Pretest)

The novelty test, which acted as pretest as well, was taken from the vocabularies of Beaven's 4-series books "The Image Building English Vocabulary with Etymology Introduction". Since students had to be taught and examined only on unknown words, the Novelty test was administrated in order to select 105 vocabularies (based on frequencies of either wrong answers or no answers). After the test, only the unknown words were chosen to be taught via three different techniques of teaching vocabulary. The results of posttest for each technique were compared with each other; therefore, the changes in the number of words learned by the participants in each type of treatment could be representative of the result of the independent variable. After the treatment, the results of posttests were compared to the novelty test and each other.

Posttests and Delayed Posttests

The posttests and a delayed-posttests were prepared based on the instructed vocabularies of each group. The items were taken from Building English Vocabulary with Etymology from Latin, Book 1 (available online: http://www.cheshirepress.com). To ensure the content validity of the items, they were given to two experts in TEFL. The 15-matching

items of posttest were administered to assess vocabulary learning outcomes and the other 15-matching items of delayed posttest were conducted to investigate the retention outcomes.

Data Collection Procedure
The Control Group

A group of 37 students was created on WhatsApp to be notified about the Google Meet link. They were exposed to English vocabulary teaching one hour twice a week for six weeks. The participants received conventional vocabulary teaching. Selected vocabularies of each session were typed with their definitions, parts of speeches, examples, and relevant activities in PowerPoint slides which were shared on the Google Meet's screen and students read and answered the teacher's questions. They were given 15 minutes to do activities and ask any questions. The teacher helped and corrected them when needed while they were reading their answers.

The First Experimental Group

In the first experimental group, only 33 participants were exposed to gamified vocabulary teaching one hour twice a week for six weeks, because 4 students did not turn up for the rest of the experiment. They received the same vocabulary instruction of control group on Google Meet within 5 sessions, whereas they were required to enter their own Kahoot's code to do gamified activities. Considering the limitation of Kahoot, as a free user for the number of players (10 players), participants were divided into 3 groups of 11-players (labelled A, B, C). Students played researcher-tailored-game (specified for the relevant vocabularies of each session) as the gamified activities. The players had the opportunities to have immediate feedback to their responses in Kahoot. The top five players getting the higher point indicated on the Kahoot's leaderboard. Participants were notified that have the accessibility to the game to practice more and take advantage of different features of Kahoot including practice, study, flashcard, pronunciation, and

game in order to change their position on the leaderboard to get the position of the top three players.

The Second Experimental Group

In the second experimental group, the number of students shrank to 30 and 3 more students did not complete the experiment. They participated in one-hour sessions every other day for two weeks. The etymological-based instruction was employed to run 5 sessions including giving definitions and examples along with decoding of each word (prefix, root, suffix) on Google Meet. Students were permitted to join Kahoot and play the researcher-customized game based on the etymological vocabulary instruction and put efforts to become the top three winners on Kahoot's leaderboard. As it was mentioned earlier, due to limitation of free-user on Kahoot, students were divided into three 10-member groups. Students were informed about the availability of the games on Kahoot along with its mentioned features. Figure 1 includes detailed information about the procedure.

Statistical Method

To meet the first aim of the study, whether there was any significant difference in the control and the experimental groups scores, descriptive statistics and one-way analysis of variance (ANOVA) were utilized. ANOVA was utilized because there were more than two means to compare. To apply ANOVA, first the normality test of Kolmogorov-Smirnov was run to find out whether data was distributed normally and whether parametric tests could be applied (sig≥0.05). Having made sure that the normality condition was met, the means and standard deviations of the two experimental groups as well as the control group were calculated. To evaluate the differences, the Post hoc Scheffe test was applied. It should be noted that SPSS version 22.0. was performed.

Results
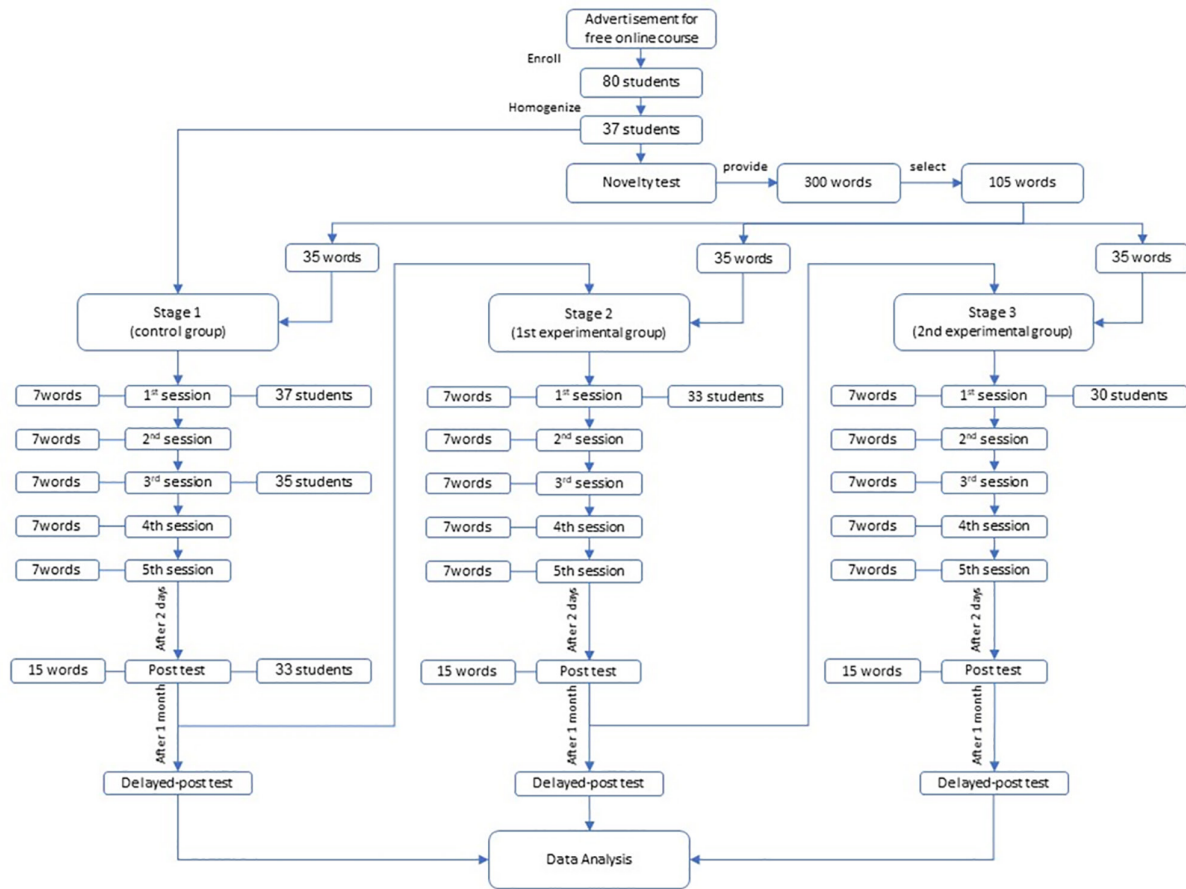In order to find out whether there were

Figure 1: The diagram of the procedure

Table 1: Descriptive statistics for post and delayed posttest

		Posttest		Delayed Posttest	
Group	**N**	**Mean**	**SD**	**Mean**	**SD**
Control Group	30	11.10	1.53	9.73	1.68
Non-etymological Game Group	30	12.00	2.33	9.93	1.99
Etymological Game Group	30	13.16	1.17	12.40	1.83
Total	90	12.08	1.92	10.68	2.19

differences among the groups in the posttest, having made sure that the normality condition was met, the researchers first calculated the means and standard deviations of the two experimental conditions, namely the non-etymological game group and the etymological game group, and control group on the vocabulary posttest. The results are shown in Table 1.

As depicted in Table 1, descriptive statistics results indicated that the mean score gained by the etymological game group was higher than the other two groups. It was found that the etymological game group (M=13.16, SD=1.17) outperformed the control

group (M=11.10, SD=1.53). Moreover, it can be seen that the other experimental group, the non-etymological game group, gained a mean score higher than the control group (M=11.10, SD=1.53). Besides, between the two experimental conditions, the etymological game group (M=13.16, SD=1.17) showed an advantage over the non-etymological game group as it could gain a mean score which was higher than the non-etymological game group (M=12.00, SD=2.33). Yet, at this stage it was not clear whether the observed discrepancies between groups were statistically significant. Thus, in order to figure out whether these differences were statistically significant or

not, an Analysis of Variance (ANOVA) test was run. The results are illustrated in Table 2.

As Table 2 depicts, the results of the one-way ANOVA on the vocabulary knowledge after the treatment yielded significant differences among the performances of the learners in various conditions in the posttest, $F_{(2, 87)}=10.50$, (P=0.001). By the same token, the results of the ANOVA on the delayed posttest indicated significant differences among the performances of the learners in various conditions, $F_{(2, 87)}=19.52$, (P=0.001). Next, to find out where the difference lay, post hoc Scheffe's tests were carried out on both posttest and delayed posttest. The results of the post hoc Scheffe's are shown in Table 3.

As Table 3 shows, in the posttest, the Etymological game group could significantly outperform both the non-etymological game group (P=0.040) and the control group (P<0.001). Moreover, the difference between the non-etymological group, and the control group was found to be significant (P=0.048).

Moreover, in the delayed posttest, a statistically significant difference was detected between the etymological game group and the control group (P<0.001). However, the other experimental condition, the non-etymological game group was not found to significantly outperform the control group (P=0.915). Besides, between the two experimental conditions, it was found that the etymological game group could gain a mean score which was significantly higher than the non-etymological game group (P<0.001).

Discussion

The purpose of this study was to evaluate the effectiveness of two versions of online games on English vocabulary learning of Iranian EFL learners. The outcomes revealed that there was a significant difference among the three groups (control, non-etymological game, and etymological game) in that the etymological-gamified group outperformed the other groups significantly and the non-etymological game group put up a better performance than the control group in the post-test. To examine the retention of words, the results of the delayed posttest indicated the significant effect of etymological based game over the other two groups.

The findings of this study are justifiable regarding Dual-coding Theory of Paivio (11). Due to the combination of game and etymology as visual and verbal aspects of treatment respectively, etymology-based game led to the best performance of the participants.

Table 2: One Way ANOVA, tests of between-subjects effects, for posttest and delayed posttest

	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Posttest	Intercept	13152.71	1	13152.71	4287.85	0.00
	Group	64.42	2	32.21	10.50	0.001
	Error	266.86	87	3.06		
	Total	13484.00	90			
Delayed Posttest	Intercept	10282.71	1	10282.71	3033.21	0.00
	Group	132.35	2	66.17	19.52	0.001
	Error	294.93	87	3.39		
	Total	10710.00	90			

Table 3: Scheffe's Test for posttest and delayed posttest

	Group	Non-etymological game	Etymological game	Control
Posttest	Non-etymological game		-1.16* (P=0.040)	0.90* (P=0.048)
	Etymological game	1.16* (P=0.040)		2.06*(P<0.001)
	Control	-0.90* (0.048)	-2.06*(P<0.001)	
Delayed Posttest	Non-etymological game		-2.46*(P<0.001)	0.20 (P=0.915)
	Etymological game	2.46* (P<0.001)		2.66* (P<0.001)
	Control	-0.20 (P=0.915)	-2.66* (P<0.001)	

*The mean difference is significant at the 0.05 level.

It could be argued that employing the etymological information can be stored in memory alongside the visual form which can provide an extra path for retention and recall. The results are consistent with the results of Boers, Eyckmans, and Stengers (12) who reported that engaging the Dutch-speaking learners' minds in combinations of more senses can lead to better results in learning. In their study, they conducted a series of experiments that were set up with the participation of students of English in higher education. The results indicated that knowledge of the origin of idioms can effectively help learners comprehend their figurative meaning. They claimed that the problem-solving task of inferring idiomatic meaning on the basis of etymological information is feasible and it facilitates recall, too.

In the present study, comparing the results of the posttests showed that gamified vocabulary learning in non-etymological game and etymological game performed better than non-gamified vocabulary learning. The results are in line with those of the study conducted by Robson (2015) who pointed out that Gamification takes advantage of game design elements. These elements are summarized as the eight basic gamification elements, utilized in online game learning. Similarly, another 173-player study conducted by Hamari (17) indicated that engagement played an important part in having a positive effect on learning. Besides, in Lam's (39) study it was pointed out that learners preferred online games to worksheet in terms of reviewing vocabulary because learners' interest were captured by gamified vocabulary learning. The findings also corroborate the previous findings of similar studies that have demonstrated that in terms of vocabulary retention, learners who learned vocabulary through online games performed better in retaining (39). Considering Lam's (39) study, there was a common request by learners to have more questions to play in the game that was in light of enthusiasm for vocabulary learning through gamification. Furthermore, the findings of the present

study indicating that etymological gamified treatment in delayed posttest outperformed non-etymological gamified treatment are in accord with those of Zolfagharkhani and Moghadam (10) who conducted a study using 60 English learners majoring English within 20 to 28 years of age both females and males in Iran. Zolfagharkhani and Moghadam concluded that Iranian EFL students in the experimental group in which etymological treatment was applied, outperformed the control group.

The results of this study are partly in accord with the results of Yip and kwan (30), as in their study, time limit might have distracted learners and frustrated them while learning vocabulary via games, meaning that the restriction of time throughout the non-etymological-based treatment diverted the learners' concentration from retention. Additionally, Hamari and Kiovisto (16) claimed that although positive effects of gamification are inevitable, the effects are highly dependent on contexts and players.

The results of the present study are not in agreement with some other researches which claimed that incorporating games in vocabulary learning did not make any significant differences. For example, Furdu, Tomozei, and Köse (40) declared that by playing games, students might commit errors and interpret errors as a failure and become frustrated. Moreover, when the assignment changes into an obligatory one by teachers, students will identify games as tedious exercises. In the same line, Martí-Parreño, Seguí-Más, and Seguí-Más (41) reported that lack of some resources including time and financial backing in gamifying the activities and exercises can lead to disadvantageous circumstances in learning. They also reported that some students do not consider games as proper learning tools and, therefore, games could assist some subjects, but not all. In the same vein, Calongne and Hiles (42) pointed out that the creation of virtual spaces can be costly and expends time and, therefore, might lead to unfavorable circumstances. Moreover, digital games, as Gentile, Choo, Liau, Sim,

Li, Fung, and Khoo (43) claim, are not always successful materials to include in education as they claimed that learners, especially the young ones, can become hooked to them.

Limitations and Suggestions

This study experienced some limitations and delimitations that need to be considered in generalizability of the results. One of the delimitations of this study was the number of participants. Given that this study was conducted during Covid-19 pandemic and lockdowns, the number of participants was small; therefore, the replication of the study using a larger number of participants as well as other proficiency levels is recommended. Furthermore, exploring the learning and retention of other components and skills of second languages can be addressed in further studies. The study can also be replicated by comparing different genders.

Conclusion

The study has highlighted the potential benefits of incorporating games and verbal language aspects to improve language learning. In particular, the results have shown that combining the two forms of information processing can lead to superior outcomes in the acquisition and retention of new vocabulary. The etymological game group demonstrated significantly better performance, which indicates the positive impact of integrating mental imagery created by games with the verbal aspect of etymology. This result highlights the importance of using a combination of cues to enhance memory recall and deep learning. Additionally, it seems that the use of games and problem-solving activities can contribute to increased motivation and interest in language learning. Engaging learners in fun and enjoyable activities has been shown to enhance engagement and promote long-term retention.

Moreover, the study suggests that promoting learners' interest in the fun side of learning can lead to more positive attitudes towards the learning process. By introducing an enjoyable and engaging element to language learning, learners may become more motivated to persist with their studies and develop a deeper understanding of the language.

Overall, the findings suggest that incorporating games and verbal language aspects can be a powerful tool in language learning. By combining different forms of information processing and incorporating enjoyable activities, learners can improve their language proficiency and develop a deeper understanding of the language. This approach may be particularly effective for learners who struggle with traditional language learning methods, as it offers a more engaging and interactive learning experience.

Authors' Contribution

All authors (GA, FH, and FT)) conceptualized the study, and all were major contributors to writing the manuscript. All authors approved the final manuscript.

Conflict of Interest: None declared.

Ethical Considerations and Participants Consent

This research was conducted with the consent of the participants. They were also assured that all information collected will remain confidential. The authors declare that they have no conflict of interest. The study was approved with code: (IOI. T1158003).

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