التعليم متعدد الوسائط وتأثيره على تطور تعلم المفردات بين متعلمي اللغة الإنكليزية

Multimodal Learning and its Effect on vocabulary Development among EFL learners

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الكلمات المفتاحية : التعليم متعدد الوسائط، تطور الكلمات، متعلمي اللغة الإنكليزية كلغة اجنبية، الاحتفاظ بالكلمات، تعليم اللغة الإنكليزية.

Keywords: Multimodal Learning; Vocabulary Development; EFL Learners; Vocabulary Retention; Vocabulary Achievement; English Language Teaching.

الملخص:

تحاول هذه الدراسة ان تختبر تأثير التعليم متعدد الوسائط على تعلم المفردات بين متعلمي اللغة الإنكليزية كلغة اجنبية، حيث تم استخدام تصميم شبه تجريبي وكذلك ضم البحث (60) طالبا من الصف الخامس الاعدادي من المدارس الحكومية في مدينة بغداد/ العراق، وتم تقسيم الطلبة الى مجموعتين: المجموعة التجريبية والمجموعة الضابطة ، وتم اعطاؤهم الدرس (المفردات) بطريقة التعليم متعدد الوسائط والطريقة التقليدية على التوالي.

المجموعة التجريبية تم تعليمهم من خلال عرض الكلمات مع التعاريف وعرض الصور والمقاطع الفديوية مع التلفظ إضافة الى الفعاليات الصفية، بينما المجموعة الضابطة تم تعليمهم الكلمات من خلال الشرح والترجمة والاعادة وتمارين الكتابة. وتم عمل اختبار للمجموعتين: اختبار قبلي واختبار بعدي، اختبار ثلاثة اشهر لمعرفة مدى الاحتفاظ بالكلمات، وعمل استبيان لمعرفة توجهات الطلبة نحو التعلم.

بينت النتائج ان المجموعة التجريبية حصلت على درجات اعلى من المجموعة الضابطة. فكانت نتائج المجموعة التجريبية في ارتفاع من (41.20) (في الامتحان القبلي) الى (78.60) (في الامتحان البعدي) في فرق يصل الى (37.40). وفي اختبار الاحتفاظ بالمعلومة كانت تشير النتائج الى ان المجموعة التجريبية كانت تؤدي بصورة افضل حيث حصلت على (72.40) بينما المجموعة الضابطة حصلت على (54.10). كما بين ان توجه الطلبة كان إيجابيا نحو التعلم متعدد الوسائط وخاصة فيما يتعلق بالدافعية والفهم والتذكر، لذلك اخلصت الدراسة الى ان التعلم بطريقة تعدد الوسائط اكثر فاعلية في تعليم المفردات وفي الاحتفاظ بهذه المفردات بالنسبة لمتعلمي اللغة الإنكليزية.

ABSTRACT

The present study examined the impact of multimodal learning on vocabulary learning for EFL learners. This study used a quasi-experimental research design and involved 60 preparatory fifth-grade EFL students in a public preparatory school in Baghdad, Iraq. Students were divided into two groups: the experimental and the control, taught with multimodal and traditional vocabulary learning strategies, respectively. The experimental group was taught vocabulary through exposition of words and definitions, presentation of pictures and videos, presentation of gesture, pronunciation, and classroom activities, and the control group was taught primary vocabulary through explanation, translation, repetition and written exercises. The tests used were a vocabulary pre-test, a vocabulary post-test, three-month vocabulary retention test, a student attitude questionnaire, and an observation checklist. It indicated that the experimental group had higher vocabulary test scores than the control group. The experimental group's mean scores improved from 41.20 (in the pre-test) to 78.60 (post-test), for a gain score of 37.40, while the control group improved from 40.85 to 61.30 (20.45 gain score). The results from the retention test also indicated that the experimental group performed better in terms of language retention (72.40) than the control group (54.10). The questionnaire revealed that students were positive about multimodal vocabulary learning, particularly in relation to being motivated, understanding, memorable, and favour over rote memorization. The study concludes that multimodal learning is effective in promoting vocabulary achievements and vocabulary retention of EFL learners.

1. Introduction

Vocabulary learning is a critical aspect of English as a Foreign Language (EFL) education. Mastery of vocabulary is necessary for effective communication, comprehension of texts, and linguistically acceptable production of speech and writing. Though recent vocabulary research shows that word knowledge extends beyond meaning to include form, usage, collocation, pronunciation, spelling, and appropriateness (Nation, 2022), much vocabulary teaching still focuses on words as isolated entities and tries to teach vocabulary meaning and usage through rote learning(Webb& Nation, 2017).

In second language (EFL) classrooms, vocabulary learning is often difficult due to the lack of exposure that learners receive outside of the classroom. As a result, this might affect the amount of repetition needed to move vocabulary knowledge from recognition (short-term) to deeper, more productive knowledge. So, vocabulary teaching should not only focus on memorization, but should offer learners frequent, meaningful, and variable exposure to words(Schmitt, 2019, 261-274).

Common approaches to vocabulary instruction traditionally rely on translation, memorization and repetition and teacher explanation. These approaches might lead to recognition of word meanings, but might fail to build rich vocabulary knowledge, including pronunciation, spelling, cognitive processes involved in using and storing words in memory over time. In this sense, multimedia learning studies indicate that strategically integrated words and images can help learning better than explaining them verbally(Mayer, 2020).

Multimodal learning offers an engaging way to learn vocabulary. It introduces vocabulary through various modes, such as text, visuals, audio and video, gestures and interactive multimedia games. These modes may help learners merge word forms, meanings, pronunciations and contexts. Existing empirical studies of EFL vocabulary learning have demonstrated that multimodal input can impact vocabulary learning, with the success of the input depending on mode selection and mode sequence(Li, 2022, 834706).

Although newer research shows that multimedia input (particularly with audiovisual support) has positive effects on vocabulary learning and retention for EFL learners(Teng, 2023, 738-754). Also, studies investigating different sequences of multimodal input indicate that

ordering multimodal input (text, audio, pictures and translations) could influence learners' acquisition and retention of word-meaning(Yu& Liu, 2022, 12). Furthermore, recent research on multimedia vocabulary learning indicates that the presentation of additional relevant nonverbal information may lead to better than verbal-only input, especially in the use of productive vocabulary(Zhang
& Zhang, 2024, 103275).
Thus, this research will explore the impact of multimodal learning on improving vocabulary for EFL learners by comparing multimodal instruction and traditional vocabulary instruction.

2. Statement of the Problem

Students of English as a foreign language (EFL) learn new vocabulary for the short term to pass in-class tests, but do not retain these words or apply them correctly. It seems that this is due to traditional vocabulary instruction, which mainly focuses on translation of words and learning through memorisation, while visual, auditory, contextual and interactive aspects are lacking.

Knowing the meaning of a word is not all that matters when learning new vocabulary. They should also be able to understand and pronounce words, spell them, and retain words in memory. But these multiple dimensions of vocabulary may not be equally supported in traditional instruction.

Thus, the problem of this study is:

How does multimodal learning impact EFL learners' vocabulary compared to traditional vocabulary teaching?

3. Research Objectives

The study aims to:

1.Investigate the impact of multimodal learning on EFL learners' vocabulary learning.

2.Examine vocabulary achievement between the experimental and control groups.

3.Assess vocabulary retention and multimodal learning.

4.Determine the vocabulary dimension students improve the most in multimodal vocabulary teaching.

5.Analyze learners' attitude towards multimodal vocabulary acquisition.

6.Offer a model for teaching vocabulary in EFL classes.

4. Research Questions

The study will answer the following questions:

1.What are the effects of multimodal learning on EFL learners' vocabulary?

2.Is there a statistically significant difference between the control group and experimental group with their post-vocabulary test?

3.Are EFL learners' vocabulary retention abilities enhanced with multimodal learning?

4.Which aspects of vocabulary are improved by multimodal teaching?

5.What are the learners' perceptions of multimodal vocabulary?

5. Research Hypotheses

H1: There is a statistically significant difference between the experimental group and the control group in the post-test vocabulary scores in favor of the experimental group.

H2: There is a statistically significant difference between the experimental group and the control group in the delayed vocabulary

6. Previous Studies

Multimedia input and multimodal input has been found to be effective in supporting vocabulary learning in EFL and other second language contexts. Zhang and Zou conducted a review of studies on multimedia input in second and foreign language learning and concluded that multimedia input, such as text, audio, animation, captions, subtitles, and visual input, has been extensively used to support vocabulary knowledge, listening comprehension, reading comprehension and grammar(Zhang& Zou, 2022, 2790-2816). This review is relevant to the current research, as it confirms that multimedia input has emerged as a major research focus in language learning; it also shows that more targeted studies of vocabulary outcomes are needed.

Wang and Lee studied the impact of various multimedia glosses on EFL learners' vocabulary learning and reading comprehension. They used a number of gloss types, such as L2 definition alone, L2 definition with audio, L2 definition with picture and L2 definition with video. They

found that vocabulary gains with picture and video glosses were greater than with glosses using definitions only or audio cues(Wang& Lee, 2021, 602520). This study supports the current research as it shows that visual and video support can enhance vocabulary learning with text.

Lin, et al., examined the incorporation of multimodal cues using an educational robot and an Internet of Things enabled 3D book to improve children's EFL vocabulary. Their research demonstrated that visual, audio and elicitation cues can establish a task-based interactive learning environment to enhance vocabulary oral production(Lin, et al, 2022). This study is relevant because it shows the importance of interactive multimodal embodied learning and not just the use of visual cues.

Huang, Zhang, Yu, Liu and Huang examined multimodal learning of English phrases. They used multimodal materials (containing pictures, audios and videos) in the research group, and unimodal paper materials in the control group. They found that both groups made improvements but the multimodal group made greater improvements and expressed positive feelings regarding multimodal materials(Huang, et al., 2022). This study is relevant to the current research, as the study involved form, meaning and use, which are also important aspects of word learning.

Teng investigated incidental learning of L2 vocabulary with captioned videos. The research looked at the effects of captioned video compared to non-captioned video. It was found that captioned videos promoted vocabulary learning in multiple ways, including word and meaning recognition and recall(Teng, 2022, 102736). This research validates the use of audiovisual resources to teach vocabulary because captions provide students with a combination of visual, textual and audio information.

In a mixed-method study, Khan, Ali, Kumar and Venugopal examined the impact of augmented reality on teaching vocabulary in EFL. They employed pre-test, post-test, delayed post-test and interviews with 95 EFL students. Results indicated that augmented reality supported learning vocabulary, and had a positive effect on learners' attitudes(Khan, et al., 2023). This research is valuable to the current study as it incorporates delayed testing and learner evaluation, which are also part of the current study.

Sembiring and Simajuntak investigated the use of digital storytelling as a new approach to teaching vocabulary skills to EFL

learners. They applied a comparative research design with pre-test, treatment and post-test. They reported that BETA learners who were instructed using digital storytelling outperformed the learners who were not, and were positive toward digital storytelling as a learning technique(Sembiring& Simajuntak, 2023, 211-224). This study is useful in that digital storytelling is a multimodal medium, an approach which integrates language, images, narration and context.

A second-level meta-analysis of multimedia glosses for second language vocabulary was carried out by Mahdi, Mohsen and Almanea. They conducted a meta-analysis of existing meta-analysis and found that multimedia glosses are mostly beneficial for vocabulary learning, particularly vocabulary recognition tests and young learners(Mahdi, 2024, 104341). This is an important resource to justify the current study, as it provides evidence that multimedia supported vocabulary learning has a positive effect, while cautioning us that not all multimodal combinations will be equally effective.

7. Methodology

7.1 Research Design

This quasi-experimental design was used to explore the impact of multimodal learning on foreign language vocabulary acquisition of the EFL students. The reason for choosing this design is that this study sought to compare vocabulary outcomes of two groups before and after instruction.

The study involved two intact classes. The first class was designated as the experimental class, and the other as the control class. The experimental group learned the vocabulary through multimodal instruction (written, visual, audios with pronunciation, videos, gestures, classroom activities). The control group learned the same vocabulary items using the traditional vocabulary instruction.

The classes learned the same vocabulary items, received the same duration of learning time and performed the same tests. The variable between the two classes was the instruction of vocabulary.

7.2 Participants

The subjects of the study were 60 fifth-grade preparatory English language learners at a public fifth preparatory school in Baghdad, Iraq.

We chose this school because it comprises two similar classes at the same level, allowing us to use a quasi-experimental design.

The learners were distributed into two groups: group A (experimental group) and group B (control group). Both had 30 learners. The participants were taking English as a second language as part of their classroom study. School's name was withheld for ethical and administrative reasons.

Both groups were given a test before the intervention period (vocabulary pre-test) to assess their knowledge of vocabulary and confirm that there was no difference between the two groups before the intervention.

Table 1. Distribution of Participants by Group

Group	Number of Learners	Educational Stage	Grade	Location	Instruction Type
Experimental Group	30	Preparatory School	Fifth Preparatory	Baghdad, Iraq	Multimodal vocabulary instruction
Control Group	30	Preparatory School	Fifth Preparatory	Baghdad, Iraq	Traditional vocabulary instruction
Total	60	—	—	—	—

7.3 Instructional Material

The teaching content was a set of 40 target words that were extracted from the learners' English course book. The target vocabulary list was appropriate for the learners and covered nouns, verbs, adjectives and common topic-related words.

When being introduced to the vocabulary items, the experimental group were presented with items in multiple modes. The word was learned and read first, then defined, exemplified in a sentence, presented visually, pronounced, and then used in a sentence. Some were also enhanced by brief clips, gestures of the teacher and interactive practice activities in the classroom (matching, completing sentences, pronunciation, and oral use of words).

In the control class, the vocabulary items were introduced through conventional methods. The teacher taught the word and made sure that

the learners understood its meaning, translated the word if required, instructed the learners to repeat the word, and provided the learners with some written exercises for the target vocabulary.

This allowed us to teach the same words to both groups, but use different instruction methods.

7.4 Instruments of the Study

The instruments used in the study were: a vocabulary pre-test, a vocabulary post-test, a delayed vocabulary retention test, a learner attitude questionnaire and a classroom observation checklist.

The vocabulary pre-test was given to assess learners' vocabulary knowledge prior to the intervention. The vocabulary post-test was administered after the intervention to assess vocabulary improvement. The vocabulary retention test was given two weeks later to assess the retention of the target vocabulary items.

The learner attitudes questionnaire was administered to the experimental group to find out the learners' attitudes towards multimodal vocabulary learning. This included their perception of understanding, memorability, motivation, pronunciation support, and discrimination for multimodal instruction. The classroom observation checklist was administered during the intervention to assess the learners' engagement, interaction and participation.

Table 2. Vocabulary Test Dimensions and Scoring

Vocabulary Dimension	Number of Items	Score Weight	Assessment Focus
Meaning Recognition	10	25%	Understanding word meanings
Spelling Accuracy	8	20%	Writing words correctly
Pronunciation Recognition	6	15%	Recognizing correct pronunciation
Contextual Use	10	25%	Using words in meaningful sentences
Retention / Recall	6	15%	Remembering words after a delayed period

Total	40	100%	Overall vocabulary development

7.5 Validity and Reliability

To assess the validity of the study instruments, the vocabulary tests and the questionnaire on learners' attitudes towards vocabulary were checked by experts in English language teaching and applied linguistics. They evaluated the clearness, suitability and relevance of the items to the research purpose. Following their suggestions, the wording of unclear items and unsuitable items were edited before being administered.

The reliability was assessed with a pilot run with a group of students that were not later part of the sample. The reliability of the questionnaire was checked using Cronbach's Alpha and the reliability value was suitable for the study. The vocabulary test was also examined to determine whether the items tested all the dimensions of vocabulary.

7.6 Study Procedure

The study was conducted in eight weeks. Prior to the intervention, a vocabulary pre-test was given to the experimental and control groups in week 1. The aim of this test was to establish the vocabulary level of the learners and to ensure the equivalence of groups before the study.

Between the 2nd week until the 6th week, the intervention was implemented. The treatment group was given vocabulary instruction using multimodal learning. The teacher presented the new vocabulary in words, meanings, pictures, video clips, pronunciation, gestures and interactive exercises. The control group received vocabulary instruction through explanation, translation, repetition and written exercises.

The vocabulary post-test was given to both groups in week 7 to evaluate vocabulary growth. The learner attitude questionnaire was also given to the experimental group. The delayed vocabulary retention test was given to both groups in the eighth week to determine the retention of vocabulary development.

The same vocabulary, lesson length, teacher and assessment methods were used for both groups. This allowed us to control extraneous variables and to ensure that vocabulary development was due primarily to the approach taken in the study.

8. Results

This section presents statistical findings of the vocabulary pre-test, post-test, delayed retention test, and questionnaire. These data are based on fifth-grade preliminary English as a Foreign Language (EFL) students in a public preparatory school in Baghdad, Iraq. Data are displayed in the form of descriptive statistics, the result of group comparison, vocabulary retention results, learner attitudes results, and figures.

8.1 Vocabulary Achievement Results

The descriptive statistics revealed that the two groups were similar in the pre-test since they had similar means. Following the experimental treatment, the experimental group post-test mean score was higher than that of the control group. The retention test also indicated that the experimental group retained more vocabulary words.

Table 3. Mean Scores across Testing Stages

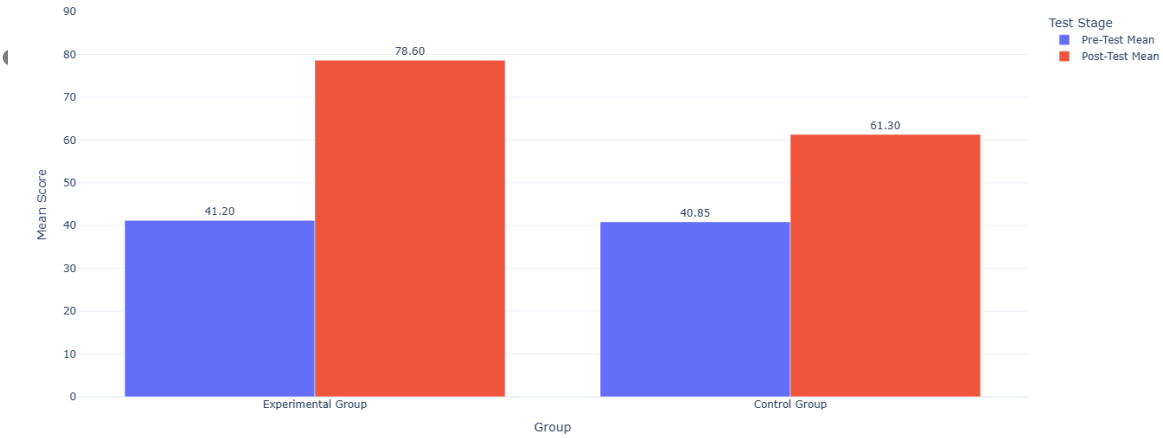
Group	Pre-Test Mean	Post-Test Mean	Delayed Test Mean	Gain Score
Experimental Group	41.2	78.6	72.4	37.4
Control Group	40.85	61.3	54.1	20.45

The data in Table 3 show that the experimental group increased their vocabulary knowledge from a pre-test mean of 41.20 to a post-test mean of 78.60 (a change of 37.40). The control group improved from 40.85 to a post-test mean of 61.30 with a gain score of 20.45. This indicates that multimodal vocabulary instruction led to stronger vocabulary learning than conventional vocabulary instruction.

The delayed tests also show that the experimental group remembered more words than the control group. The mean delayed test result for the experimental group was 72.40 and the mean delayed test result for the control group was 54.10. This supports the finding that multimodal instruction had more impact not only on vocabulary learning but also on vocabulary retention.

8.2 Learner Attitude Results

Figure 1. Pre-Test and Post-Test Vocabulary Scores by Group



The learner attitude questionnaire was administered to the experimental group after the intervention. The results showed positive attitudes toward multimodal vocabulary learning.

Table 4. Learners' Attitudes toward Multimodal Vocabulary Learning

Questionnaire Item	Mean	SD	Interpretation
Multimodal materials helped me understand new words.	4.35	0.62	High
Images and videos made vocabulary easier to remember.	4.42	0.58	High
Audio pronunciation improved my recognition of words.	4.1	0.71	High
Interactive activities increased my motivation.	4.5	0.55	Very High
I prefer multimodal vocabulary learning to traditional memorization.	4.28	0.66	High

As can be seen in Table 4, students positively received multimodal vocabulary instruction. The item with the highest mean was motivation with a mean of 4.50 and a standard deviation of 0.55. This suggests that interactive activities made a pivotal contribution to enhancing motivation. The findings also reveal that images and videos increased learners' ability to recall new words, with a mean of 4.42 Moreover, the learners' feedback indicated that multimodal resources helped them comprehend new words, identify the pronunciation and choose multimodal over only memorization.

Figure 1. Pre-Test and Post-Test Vocabulary Scores by Group

This graph shows the experimental and control groups' pre-test and post-test means. Here we can see that both groups have improved their scores in the post-test, but the experimental group has done so to a greater extent.

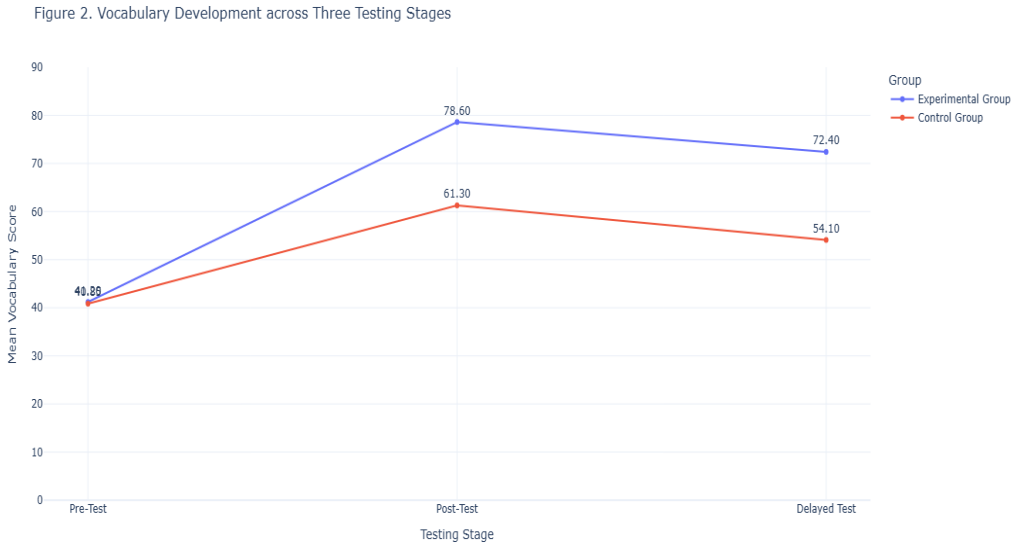
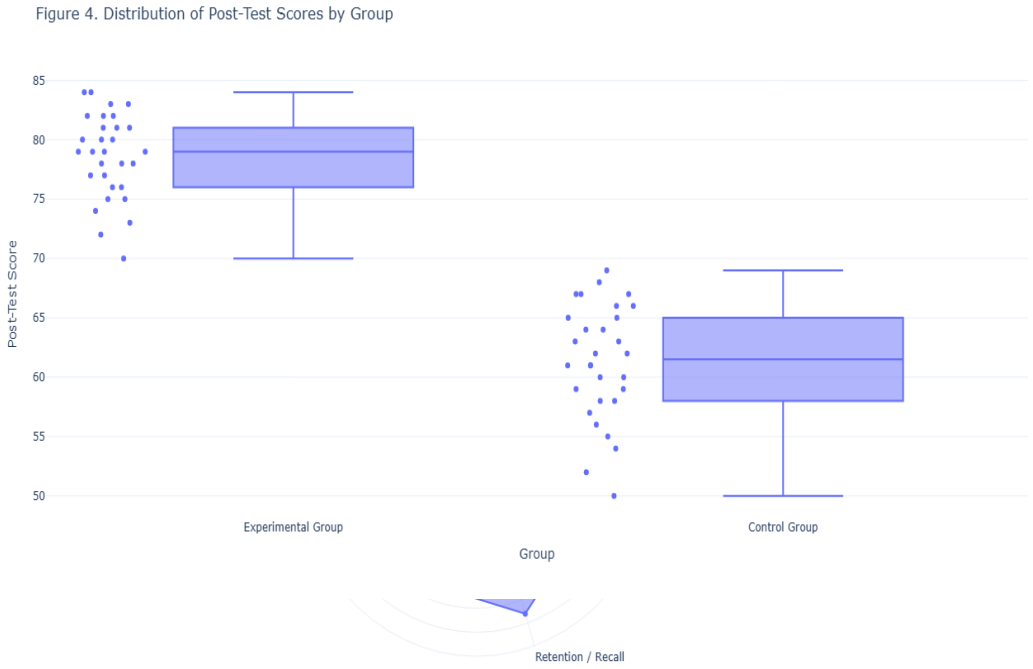


Figure 2. Vocabulary Development across Three Testing Stages



This figure illustrates the vocabulary scores from the pre-test, post-test and delayed retention test. The experimental group's vocabulary improved more and had greater retention in the delayed test.

Figure 3. Improvement by Vocabulary Dimension

This figure illustrates the difference in improvement across vocabulary dimensions: meaning recognition, spelling, pronunciation recognition, use and retention. This indicates greater improvement in the experimental group for all vocabulary dimensions.

Figure 4. Distribution of Post-Test Scores by Group

This figure shows the distribution of post-test scores in both groups. The experimental group achieved higher post-test scores and showed more consistent performance compared with the control group.

9. Discussion

The results of the present study revealed that multimodal learning greatly improved EFL students' vocabulary learning. The post-test mean score of the experimental group was significantly higher than that of the control group, and its gain score was significantly higher than the control group. This finding suggests that the provision of vocabulary in written, visual, auditory (pronunciation), video (often as short clips), gesture and

practice activities in this study prompted learners to establish stronger associations between word form, meaning, pronunciation, and usage.

This result is in line with the study conducted by Lo that viewing subtitles and subtitles simultaneously with repeating video helped EFL learners with immediate vocabulary learning and retention performance better than viewing the video without repetition(Lo, 2024, 152-167). The commonality between the studies is the use of visual, textual, and auditory input. But the present study is different from Lo as it did not only use video and subtitles as input to learn vocabulary in the classroom; it used a larger classroom-based multimodal approach, which involved not only visual cues but also pronunciation practice, teacher gestures, and interactive vocabulary tasks.

The results also concur with Pu, Chang and Wang (Pu& Wang, 2024, 103416)which reported that students in multimodal input conditions, i.e., reading-while-listening and viewing with captions, scored significantly higher in both recall and recognition than those in unimodal conditions. This result supports the finding of the present study, particularly because the experimental group achieved higher improvement in not only general vocabulary, but also vocabulary retention. The result implies that early vocabulary input is important because it provides learners with multiple channels of vocabulary input.

The results of delayed retention are crucial. The mean score of the experimental group in the delayed test was 72.40 and 54.10 for the control group. This suggests that multimodal learning resulted in better retention than conventional classes. This is also consistent with Xing and Zhang's study, which demonstrated that multimodal (audio-visual) input improved retention of vocabulary more than unit-modality input in a delayed test(Xingm 2025). This finding is supported by the present study in the Iraqi EFL classroom, where students typically have few opportunities to practice English outside the classroom in a natural environment.

Another reason for the improvement of the experimental group is the type of tasks conducted in the classroom setting. Students not only learned vocabulary items but also used them to complete sentences, practise orally, and match words or phrases as well as provide examples. This finding is consistent with Eskandari, Khatin-Zadeh, Farsani and Banaruee's study on the use of productive vocabulary tasks for vocabulary learning, where they found that more productive tasks (e.g. sentence reconstruction, composition writing) were more successful than less productive tasks(Eskandari& Banaruee, 2024, 1306306). So, the results of the present study on the experimental group may be due to both multimodal representation and vocabulary output.

The results also agree with the study of Dang, Lu and Webb on incidental learning through watching academic lectures. The researchers found that watching academic lectures resulted in learning single words and collocations(Dang& Webb, 2022, 708-736). But the present study led to better classroom outcomes as it involved intentional instruction, not only incidental learning. This may suggest that multimodal materials may be more effective if they are integrated with teaching, practice and active involvement on the part of the learner.

The results of learner attitudes also indicate the success of multimodal vocabulary instruction. The experimental treatment showed a positive attitude towards multimodal instruction, particularly in terms of motivation, memorability and comprehension. The item with the highest mean score was interaction activities, suggesting that learners found them to be motivating. This is consistent with Cárdenas-Claros, Sydorenko, Huntley, and Montero Perez's assertion that teachers' use of multimodal input is dependent on student needs, pedagogic principles and teaching environment(Sydorenko& Montero, 2023). In our study, the use of multimodal instruction was appropriate for the learner level of proficiency demanded by the school environment, and that may have contributed to the positive feedback of the learners.

The findings are also backed up by a review of audiovisual input and on-screen text in second and foreign language learning by Montero Perez. This review indicated that multimodal presentations (with audiovisual input and on-screen text) can address aspects of language learning such as vocabulary, listening, comprehension and learner perceptions(Montero, 2022, 163-192). Our study contributes to this body of research by demonstrating that multimodal learning can be effectively applied in a public preparatory school in Baghdad, Iraq, and that it can improve vocabulary achievement and retention.

In general, the discussion of the results shows that multimodal vocabulary teaching is better than traditional vocabulary teaching. The vocabulary instruction used in the control group was effective, but it was not as effective as the multimodal vocabulary instruction. Therefore, explanation, translation and repetition can help with vocabulary learning, but it might not provide the type of exposure needed for more advanced vocabulary learning. Multimodal learning, on the other hand, offered learners more varied input, meaning greater contextualization and use of words.

These insights suggest that vocabulary acquisition is more successful through the multimodal approach and with the use of vocabulary in activities during class. So, EFL teachers should not only

use translation and memorization. Rather, they should include images, audio, video, gestures, contextual information and classroom tasks to assist learners in understanding, remembering and using vocabulary appropriately.

10.Conclusion

The current research explored the impact of multimodal learning on the vocabulary learning of EFL students. The findings indicated that multimodal vocabulary instruction is more effective than vocabulary instruction. The vocabulary development of the experimental group, who were instructed through text, images, audio, short videos, gesture, and interactive activities, were significantly higher than of the control group, who were instructed through explanation, translation, repetition, and written exercises.

This study found that the experimental group's average improvements from pre-test to post-test were from 41.20 to 78.60, with a gain score of 37.40. This was in contrast to the control group's improvement from 40.85 to 61.30 with a gain score of 20.45. This suggests that both learning styles resulted in vocabulary improvement, but multimodal learning led to a greater improvement.

This finding was supported by the delayed vocabulary test. The mean delayed vocabulary test results for the experimental group were 72.40 and for the control group was 54.10. This means that the multimodal instruction for vocabulary helped the learners to retain the target words after the teaching period.

Moreover, the questionnaire on learner attitudes found higher positive responses towards multimodal vocabulary learning techniques. They indicated that the use of images, videos, audio pronunciation and interactive activities were effective in learning new vocabulary. The highest rating was for motivation, suggesting that multimodal instruction boosted learners' interest in learning vocabulary.

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