SCIENTIFIC CULTURE

www.sci-cult.com

*SCIENTIFIC CULTURE, Vol. 12, No. 4, (2026), pp. 8049-8058*
*Open Access. Online & Print*

**DOI: 10.5281/zenodo.12426802**

# VISUALIZING VOCABULARY: A PROPOSED INSTRUCTIONAL GUIDE UTILIZING DUAL CODING THEORY TO ENHANCE VOCABULARY RETENTION IN IRAQI PRIMARY EFL CONTEXTS

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**Received: 26/12/2025**
**Accepted: 25/04/2026**

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## ABSTRACT

***This study examined the effectiveness of a researcher-designed interactive paper-based vocabulary guide rooted in Dual Coding Theory (DCT) in enhancing vocabulary retention among Iraqi primary EFL learners. A quasi-experimental non-equivalent groups design was implemented with 69 fifth-grade Iraqi learners assigned as experimental (n=33) and control (n=36) groups. The experimental group received instruction through structured visual-verbal activities using the researcher-designed instructional guide, whereas the control group received conventional vocabulary instruction. Results indicated that the instructional guide was effective in enhancing vocabulary mastery on pre- and post-tests. A follow-up retention test was administered exclusively to the experimental group to assess the stability of the vocabulary gains obtained from the proposed instructional guide over time. These findings underscore the pedagogical value of integrating visualization strategies and verbal encoding within the framework of DCT in Iraqi primary EFL contexts.***

**KEYWORDS:** Dual Coding Theory, Visualizing Vocabulary, Vocabulary Retention, Iraqi EFL Primary School Learners, Instructional Guide.

## 1. INTRODUCTION

Vocabulary is a core element of any language system and the basis for making sense of communication and explaining language (Zahar, Cobb, & Spada, 2001). They needed to develop their lexical knowledge more, which involved their making sense of input and expressing themselves (including ideas) more effectively, by all means of grammar use as well as the other means of language whole use: vocabulary, collocations, and so on. Wilkins (1972, cited in Agazzi, 2022) famously asserted that grammar is a small part of communication, while vocabulary is everything. Therefore, a good vocabulary is considered crucial for improving the four key skills of a language (listening, speaking, reading, and writing).

Modern research is also beginning to clearly indicate a great deal of successful language learning is largely based on learners being able to pick up, store, go back to and make use of words correctly in different contexts (Nation, 2013; Schmitt, 2019).

Vocabulary learning is neither a static nor a short-term process, but a cumulative, long-term process that involves multiple exposures, deep processing, and efficient instructional scaffolding. Learners must do more than identify word forms and meanings; they must also be able to retain vocabulary over time and retrieve it efficiently in communication (Nation, 2013).

However, in many EFL settings, traditional vocabulary teaching still takes center stage with all its emphasis on memorizing, translating, and solitary drilling due to which shallow processing and forgetting ensues (Schmitt, 2019).

In the Iraq EFL primary context, English exposure is mostly limited to formal teaching in the classroom with very limited occasion for meaningful interaction outside class. The practices of teaching are still very much teacher-centered and textbook-led based on rote learning and children's first language translation dictionaries containing lists of words along with bilingual word lists, and repetitive exercises, and occasionally some visual and contextual support (Al-Khateeb & Hasan, 2016, Waham, 2024). These strategies put young learners in a passive role and do not promote meaningful interaction with new lexical items. Consequently, Iraqi EFL primary school students are often considered to have low levels of vocabulary and to be short of long term retention, a situation that persists even after years of formal education (Rassaei, 2017).

A key theoretical model that addresses to these issues is Dual Coding Theory (DCT). Originally formulated by Allan Paivio (1986, 2007), DCT claims that human cognition is represented by two separate but linked systems: a verbal system that handles linguistic information, and a non-verbal system that handles visual images. Learners are afforded two cognitive routes to information when it is encoded in parallel in the two systems, and this dual coding has been demonstrated to improve memory, comprehension, and retention. From a pedagogical standpoint, this means that learning of vocabulary should be accompanied with verbal explanations with the help of visual aids such as pictures, graphs, diagrams etc. to facilitate the learning process.

The efficacy of dual coding theory and multimodal instruction in vocabulary learning is well supported empirically. Research in various EFL settings shows that learners receiving a combination of visual and verbal input perform better than those receiving verbal instruction only on both learning and recall (Li et al., 2022; Doa Ra Ta Na & Nguyen, 2022; Alhazmi, 2024). The results above also show a promising application of DCT for improving vocabulary learning in EFL contexts.

Likewise, Paivio's theoretical propositions are supported by cognitive studies showing dual-coded information is more immune to forgetting and is more easily accessed in long-term memory (Paivio, 2007).

Although DCT is well justified theoretically and empirically, its implementation in Iraqi EFL primary classrooms is still lacking and needs to be furthered. Most of the Iraqi research tend to be about generic forms of instrucional games or activities delivered via technology, without being rooted in a specific cognitive model or incorporating visual and verbal components systematically (Alrickaby, 2024).

In addition, most of the studies in Iraq are conducted at the level of secondary or university students, are short interventions and do not consider retention. This reveals a glaring research void, that is the lack of well-established instructional guidelines explicitly constructed in line with DCT theory and tested empirically with Iraqi primary EFL learner.

It is important to fill this gap because early vocabulary development determines the trajectory of learners' long-term language proficiency. Studying the effect of a DCT-based instructional guide at the primary stage contributes to empirical evidence with the potential to enhance instruction and to develop theoretical as well as pedagogical understanding of EFL vocabulary instruction.

Thus, the present study is an attempt to develop

and apply a DCT-based instructional guide for the promotion of long-term vocabulary retention for Iraqi fifth graders as EFL learners. Particularly, it analyzes whether the guide has the potential to influence vocabulary learning as shown in an immediate post-test and to prolong the time for vocabulary retention in a delayed post-test, which is only administered to the experimental group.

It was predicted that the experimental group trained by the DCT-based guide would outperform the control group receiving their instruction via traditional methods significantly on the post-test and sustain stable retention of vocabulary over time as manifested in the follow-up test administrated to the experimental group only.

## 2. LITERATURE REVIEW

### *2.1 Vocabulary Learning and Retention in EFL*

Acquiring vocabulary is an essential part of English as a foreign language (EFL) learning, as it affects reading comprehension, speaking, and overall language learning (Nation, 2013). Although vocabulary learning strategies have been studied extensively at secondary and tertiary levels, relatively little focus has been paid to EFL learners at primary level, resulting in a distinct research void (Laufer & Goldstein, 2003; Webb & Nation, 2017).

At the primary level, instruction in vocabulary is especially important, for young children's lexical development is the basis of their later language competence and academic success. Evidence from empirical studies shows that knowledge of academic vocabulary is a strong determinant for learners' achievement in key subjects such as reading, writing, and maths, after adjusting for the effects of age, language background, and non-verbal cognitive ability (Schuth, Köhne, & Weinert, 2017).

Retention of newly learned vocabulary is still a problem to be solved because learners tend to forget words if they are not sufficiently recycled in meaningful ways or given opportunities for retrieving them (Schmitt, 2008). New teaching methods, such as mixing visual and verbal forms of information, have been suggested to improve vocabulary memorization. DCT provides an environment in which learners are able to encode verbal information with associated images, which improves memory formation and as a result both immediate and delayed recall (Paivio, 2007). In the context of Iraqi primary EFL classrooms, implementing such DCT-based treatments could effectively fill gaps in vocabulary retention, while at the same time offering evidence-based approaches that match best with the needs of young learners.

### *2.2 Cognitive Foundations of Vocabulary Learning*

The cognitive processes involved in vocabulary learning are based on principles of memory and information processing. DCT holds that human cognition is constituted by two complementary systems (verbal and non-verbal/visual systems) which are the two sides of the same coin and process independently in a different manner linguistic and pictorial information (Paivio, 2007). Studies show that as learners use two channels at the same time, the dual encoding lead to stronger encoding, retrieval and long-term retention of lexicon (Clark & Paivio, 1991).

Furthermore, cognitive load theory stresses that instructional materials should be designed in a way that minimizes the cognitive load of working memory, especially for children (Van Merriënboer & Sweller, 2005). Visual aids with verbal explanations may also contribute a reduction in extraneous cognitive load by depicting specific information about abstract words, enabling more elaborated processing of semantic features. EFL research evidence suggests that learners that are taught with dual-coded materials perform better than their peers taught in the traditional- text only medium of instruction, not only on immediate assessments but also in retention tests (Mousavi, Low, & Sweller, 1995).

As a result, integrated DCT principles in vocabulary teaching is a theoretically and empirically informed approach to maximize the learning of young EFL learners.

### *2.3 Dual Coding Theory*

DCT, developed by the Canadian psychologist Allan Paivio, constitutes a solid cognitive model to conceptualize the processing, representation and retention of the information by learners. DCT postulates that human cognition is composed of two interconnected systems, one verbal for linguistic information and one non-verbal for images and visual representations (Paivio, 1986, 2007). When both are activated at the same time, learning is enhanced, since learners can acquire integrated traces in memory that can improve both comprehension and the amount of information retained.

Studies confirm that the combination of spoken explanations and visual illustrations (images, diagrams, gestures) positively affects the learning and retrieval of vocabulary, especially for young learners in EFL environments (Clark & Paivio, 1991; Mayer, 2014). The dual representation principle

serves as a theoretical foundation for the design of the current lesson plan which combines verbal and visual channels systematically to facilitate effective vocabulary retention for the fifth-grade Iraqi EFL students. By taking advantage of the strengths of each cognitive system, DCT provides a scientifically motivated framework for the creation of instructional approaches that emphasize deep processing, formation of semantic networks, and long-term retention of novel vocabulary.

### *2.4 Visual Strategies in Language Learning*

Visual approaches to language learning entail the intentional manipulation of visual stimuli (e.g., images, charts) as well as other forms of input (e.g., text) within a single processing channel to facilitate processing of input in the cognitive domain and/or to promote retention of the linguistic information. DCT postulates that verbal and visual channels are active simultaneously in the mind of an individual (Ismail et al., 2020), implying that materials for learning delivered via both channels might lead to increased encoding strength and better performance in LTM (Paivio, 1986, as cited in Sadoski, 2005).

Visualized representations, for example, concept maps, pictorial flashcards, as well as multimedia, are found to promote learners' lexical processing as a result of involving multiple sensory modalities, mitigating cognitive burden, and providing scaffolds for understanding (Raxmonova & Fayzullayeva, 2025). Research on visual-supported versus traditional vocabulary instruction demonstrates that visual techniques are universally more effective and lead to better vocabulary retention - especially for young language learners (Raxmonova & Fayzullayeva, 2025; Differential Effects study, 2026). These findings underline the salience of visualization in effective language pedagogy design that adheres to multimedia learning principles and accommodates different learner profiles.

### *2.5 Empirical Studies on Dual Coding in EFL*

Studies on dual channel theory (DCT) in the EFL context consistently support the effectiveness of dual-channel instruction on vocabulary learning. Yanasugondha's (2017) research investigated the pictorial, translation and the mixed dual-coding among others for the acquisition of vocabulary of EFL learners and showed that dual coding resulted in better improvement in immediate and delayed recognition and retention. In the same way, studies on multimodal inputs indicate that the use of visual representations together with linguistic ones promotes vocabulary understanding and serves as a positive factor for long-term memorization, but such influences are qualified by cognitive load-related and instructional design-related considerations (Li et al., 2022).

Studies of a comparative nature also reveal that audiovisual techniques are more effective in terms of lexical retention and learner motivation when compared with traditional methods (Noor-ul-Ain & Pervaiz, 2023).

Taken together, these results imply that the use of dual coding in EFL teaching promotes more robust lexical representations, retrieved more quickly and efficiently, and yields better learning outcomes in vocabulary acquisition for learners of varied proficiency levels.

## 3. METHODOLOGY

### *3.1 Research Design*

The current study employed a quasi-experimental design with the non-equivalent pre-test and post-test in which the follow-up test was only administered to the experimental group seven weeks after the post-test to investigate the efficiency of the DCT-based teaching material in boosting vocabulary retention for young learners of EFL in the context of Iraqi primary schools. This type of design was chosen because of the impossibility of using random allocations in formal education setting and the need to use intact classes. While causal inference is restricted relative to true experiments, quasi-experimental designs facilitate a systematic contrast between experimental and control groups in real classroom environments with acceptable levels of internal and ecological validity (Shadish et al., 2002; Rogers & Révész, 2020).

Two fifth-grade classes taught by the same teacher functioned as the experimental and control groups. The equivalency of the groups was determined by the pretest scores before the treatment. The experimental group was taught based on DCT, and the control group was instructed by traditional means of vocabulary teaching. Parallel post-tests were given to both groups for vocabulary achievement. To test how well the vocabulary of gains was maintained after instruction, the follow-up test was also given to the experimental group alone. The goal of that additional test was to observe the persistence and the stability of the effect of instruction within the treatment group with particular attention directed to the persistence of learning outcomes in the dual coding–based intervention group.

Overall, this design provided a methodologically

rigorous and contextually appropriate framework for evaluating instructional effectiveness in applied linguistics research (Creswell & Creswell, 2018).

### *3.2 Participants and Setting*

The targeted population included all the fifth-grade students of the public primary schools in Al-Najaf Al-Ashraf Governorate in the scholastic year 2025-2026 (N = 22,077). The total sample consisted of 69 female students from al-Afrah Primary School for Girls, divided into experimental (n = 33 ) and control (n = 36) groups on the basis of intact classes. There were no statistically significant differences, $p > .05$, on the groups' vocabulary pretest scores, which established group equivalence. The instruction manual was followed from two months and twenty days (October 08, 2025 to December 28, 2025) and the experimental group was taught twice coding based on the instruction vocabulary guide, whereas the control group was taught traditionally. Using intact classes guaranteed ecological validity in a real class setting.

### *3.3 Instructional Guide (Dual Coding-Based)*

In this study, a paper-based, interactive vocabulary guide which was designed by the researcher and based on DCT, was applied to increase the retention of vocabulary by EFL fifth grade students in Iraq. The guide covered all verbal and visual components in a systematic manner through activities like the illustrated flashcards, word-picture matching, vocabulary drawing and contextualized activities. The vocabulary items were derived entirely from the official fifth-grade English syllabus and were presented in communicative situation with repeated, scaffolded exposure to develop stable form-meaning connections.

The guide consisted of eight units; nevertheless, only four units were taught due to time restrictions in the experimental stage with a total of twenty-eight 40 min session, to secure systematic, developmental suitable practice. This combination of theoretical soundness and practical classroom feasibility was aimed at enhancing immediate understanding, long term memorization and motivation in multimodal vocabulary learning.

The teaching guide was intentionally crafted-based to help learners to rethink the lexical concepts and ideas described in the chapters through visual and verbal Re-Encoding. In marrying pictorial and linguistic representations, the guide attempted to facilitate cognitive processing strategies other than the ordinary ones in traditional text-based pedagogy, in line with the philosophical underpinnings of Visual-Verbal Integration of Vocabulary.

The researcher carried out the guide as the classroom teacher, using a standardized lesson plan to control for instructional bias and ensure uniformity across class periods. To provide a better understanding of the guide's working principles, a full sample lesson from Appendix A is given, illustrating the structure of the lesson, the working of tasks, and the integration of the visual and verbal modes. This appendix provides a narrative of the instructional approach, order of tasks, and the modality-based integration. The attached lesson is representative of a regular class and it was solely used for instructional practice; it was not utilized in any way to evaluate or measure within the research.

### *3.4 Research Instruments*

Three versions of a vocabulary test were constructed: a pre-test, a post-test and a follow-test. All versions were matched for number of items, maximum score, scoring method and cognitive distribution, with the actual content of items varying across administrations in order to reduce possible testing effects such as recalling items or becoming familiar with the procedures of the test that might falsely increase the scores.

Pre-test and post-test were conducted in both group. The pre-test was conducted before the intervention to determine the baseline equivalence, and the post- test was conducted immediately upon completion of the intervention. The follow-up test was given only to the experimental group, with the purpose of examining long-term maintenance of vocabulary.

The use of equivalent forms also permitted stringent control for threats to the validity of the measurement, so that differences in the post-test and follow-up measurement truly represented learning gains and not testing effects. This is consistent with established principles in applied linguistics and EFL research, whereby any extraneous variable (e.g., item familiarity, test-taking strategies) can potentially confound the instructional effect of novel treatments (e.g., a DCT-based guide).

All tests were based on the target vocabulary from the Units 1-4 of the fifth grade English curriculum for officially Iraqi students. 20 items made up each test of pictures. The learners were given 40 minutes to do it and one point was given for each right answer (Total score = 20). The instruments were designed based on Revised Bloom's Taxonomy and the DCT approach, by the

integration of verbal and visual stimuli to elicit the use of both cognitive channels (Anderson & Krathwohl, 2001; Clark & Paivio, 1991).

Content validity was supported by means of a TOS, which evenly allocated items to content area and to cognitive level (Nitko & Brookhart, 2014). All the instruments were examined by EFL specialists to ensure clarity, pertinence, and coherence with instructional goals. Follow-up test was an empirical measure of long-term and reliable vocabulary retention, demonstrating the practicability of the DCT-guided instructional guide.

### *3.5 Validity and Reliability*

The instructional guide and vocabulary tests were validated through content, face and construct validation. Face and content validity were achieved through iterative revisions informed by expert judgment, construct validity was informed by test design in accordance with DCT and was conceptualized according to a hierarchical cognitive model (based on Bloom's Revised Taxonomy, Anderson & Krathwohl, 2001; Paivio, 2007).

Reliability was calculated by the Kuder-Richardson Formula (KR-20), which is an adequate method when the test scores are dichotomous (0 = false/1 = true). The pretest exhibited satisfactory internal consistency (KR -20 = 0.72). The post-test achieved KR-20 = 0.87, indicating good internal consistency. KR-20 is a reliability statistic Kuder-Richardson Formula for assessing reliability: KR-20 is suitable for dichotomously scored items (E.g., true or false questions). KR-20 or Kuder Richardson Formula 20 is a figure that determines reliability scores for tests with two options, such as true or false. KR-20 or Kuder-Richardson Formula 20 is a statistic used to estimate the reliability of measures with two possible answers, for example, true/false types of questionnaires. At the follow-up, the test yielded KR – 20 = 0.82 denoting excellent reliability. These alpha coefficients demonstrate that the instruments used in both the pilot and main studies were reliable, psychometrically valid, and could be used to validly and reliably assess vocabulary knowledge of the participant sample.

### *3.6 Data Collection Procedures*

The collection of the data was completed by means of a structured series of steps. Both groups were given a pretest to assess baseline equivalence prior to the intervention. The experimental group was taught vocabulary by the DCT-based instructional module during the teaching term and the control group was the regular instruction.

The teaching guide was applied during the first term and encompassed Units 1-4 of the curriculum specification. Both groups took a post-test on vocabulary learning after the treatment and then a follow-up test seven weeks later, which was only administered to the experimental group to test retention of vocabulary. All test administrations were conducted in a standardized manner in the classroom to the best of our ability to ensure uniformity and to reduce potential measurement bias.

## 4. DATA ANALYSIS

### *4.1 Statistical Techniques*

Data were analyzed with SPSS to guarantee the statistical rigor. Descriptive statistics (means and standard deviations) were used to summarize performance for the learners and two independent-samples t-test were performed to verify the equivalence at the baseline. Paired-samples t-tests and effect sizes (Cohen's d) were used to investigate the effect of the dual coding-based instructional guide on the retention of the vocabulary. A significance level of 0.05 was used throughout.

### *4.2 Descriptive Statistics*

Descriptive statistics were calculated to summarize learners' performance on the pre-test, post-test, and follow-up test. For both the pre-test and post-test, the dataset included 69 valid cases with no missing values. In contrast, the follow-up test was administered only to the experimental group to examine learners' vocabulary retention after completion of the instructional guide; consequently, the number of valid cases for this test was 33, also with no missing data.

Descriptive statistics of the participants' vocabulary performance are presented in Table 1.

In the pre-test, the control group (CG) scored slightly lower (M = 5.47, SD = 2.45) than the experimental group (EG) (M = 6.18, SD = 2.62). This difference was not statistically significant (t = 1.160, df = 67, p = .250) and yielded a small effect size (Cohen's d = 0.28), confirming the equivalence of the groups before the instructional intervention. In the post-test, the experimental group demonstrated a markedly higher mean gain (M = 7.58, SD = 3.01) compared to the control group (M = 4.39, SD = 2.77), a statistically significant difference (t = 4.580, df = 67, $p < .001$) with a substantial effect size (Cohen's d = 2.887). These results indicate the substantial effectiveness of the proposed instructional guide based on DCT in enhancing vocabulary mastery. Follow-up testing, conducted seven weeks after the

instructional period exclusively for the experimental group, showed that the mean score (M = 14.24, SD = 3.47) did not differ significantly from their post-test scores (M = 13.79, SD = 3.82; t = -0.974, df = 32, p = .338). This finding suggests that the vocabulary gains were well retained over time, demonstrating the long-term stability of learning outcomes.

Collectively, these results provide strong empirical evidence that the dual coding-based instructional guide not only improved immediate vocabulary acquisition but also facilitated sustained retention, confirming its educational efficacy for Iraqi EFL fifth-grade learners.

***Table 1: Descriptive Statistics for the Pre-Test, Post-Test, and Follow-Up Test.***

| Group | Test | N | Mean | SD | T-value | df | p-value | Cohen's d |
|---|---|---|---|---|---|---|---|---|
| CG | Pre-Test | 36 | 5.47 | 2.45 | 1.160 | 67 | .250 | 0.28 |
| EG | Post-Test | 33 | 6.18 | 2.26 | | | | |
| CG | Post-Test Gain | 36 | 4.39 | 2.77 | 4.580 | 67 | .000 | 2.88 |
| EG | Post-Test Gain | 33 | 7.58 | 3.01 | | | | |
| EG | Follow-Up Test | 33 | 14.24 | 3.47 | -0.974 | 32 | .338 | / |

*Note.* Post-test gain scores represent an improvement from pre-test to post-test. The follow-up test was administered exclusively to the experimental group seven weeks after the post-test to examine the durability and stability of vocabulary over time.

### *4.3 Inferential Statistics*

Inferential statistical tests were performed to investigate whether the differences between learners' vocabulary scores were significant across groups. The experimental group and the control group were compared in the pre-test and the post-test by means of independent samples t-test, and the retention of vocabulary learning in the experimental group in the follow-up test was analyzed through the paired samples t-test. First, to establish whether the experimental and control groups were equivalent prior to the treatment with the instructional guide, an independent samples t-test was run. There was no statistically significant difference between the two groups in the pre-test, t (67) = 1.16, p = .250. This indicates that the two groups were similar at the beginning of the experiment. The obtained effect size for pretest was small (d=0.28) indicating little difference between the two groups prior to the treatment.

Another independent samples t-test was run to compare the two groups' post-test scores following the instructional guide. The results were a statistically significant difference in favor of the experimental group for t (67) = 4.58, p = .000. The difference was large as indicated by the Cohen d value 2.887) which means that the instructional guide was highly effective in promoting learners' vocabulary mastery.

To assess vocabulary retention, a paired sample t-test for the experimental group was run for the post-test and the follow-up test after an interval of several weeks since the application of the instructional guide. The results showed that the difference for the two tests was not significant, t (32) = -0.97, p = .338. These results imply that the learners were able to sustain their vocabulary knowledge, thus suggesting the stability of the learning achievement through the instructional guide.

Taken together, the results of inferential statistics indicate that the present DCT-based instructional guide could significantly enhance learners' vocabulary mastery and that their gained vocabulary knowledge could be maintained.

## 5. DISCUSSION

The results of this study indicate that the visually presenting vocabulary learning instructional package, Visualizing Vocabulary, which is grounded in DCT, was an effective means of improving EFL learners' vocabulary knowledge at the fifth-grade of primary school in the context of Iraq. The experimental group performed better than the control group on the post-test, and the large effect size showed that the combination of visual and verbal was effective in helping participants learn more new words. These results support previous findings (Mayer, 2014; Paivio, 2013) showing that dual coding and MPL principles effectively facilitate the learning of vocabulary.

The follow-up findings also revealed that the vocabulary performance of the experimental group was stable after seven weeks. Although the mean of the follow-up was a bit higher than that of the post-test, the difference was not significant, suggesting that the vocabulary learning achieved in the instructional guide was preserved. Within the limitations of the current sample, these findings provide support for visual–verbal teaching technique and its efficacy in consolidating vocabulary learning in undergraduate EFL learners in Iraq.

## 6. CONCLUSIONS

This study suggests that DCT-based guide instruction has the potential to enhance immediate vocabulary learning for fifth grade Iraqi EFL students. Post-test results revealed that the experimental group significantly outperformed the control group after a two-month and twenty-day treatment, having completed four units from the Iraqi English syllabus. Furthermore, the follow-up at seven weeks showed that the vocabulary gains were preserved, indicating that retention was sustained in the experimental group.

These findings highlight the relevance of using both visual and verbal input when instructing primary EFL learners. These findings are consistent with the theoretical premises underlying DCT, that more information is stored when it is presented in verbal and non-verbal forms.

However, some limitations have to be noted. The study was conducted in one school and with female students only, thus limiting generalizability. The treatment was constrained by the duration of eleven weeks and a selected number of curriculum units, thus it does not address the consequences of long-term or whole year implementation. In addition, collection and analysis of quantitative data alone hinder our comprehension of the cognitive strategies employed by the learners and of their interaction with the instruction. Further research adopting mixed-methods approaches and with more participants would substantiate evidence for dual coding approaches implementations in EFL context.

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## Appendix A

**Sample lesson from the Instructional Guide**
**Look at the characters and match them with the correct country and nationality using the word bank.**
The Word Bank:

| Country | France | Iraq | Japan | Italy | Egypt | Thailand | turkey | England |
|---|---|---|---|---|---|---|---|---|
| Nationalities | French | Iraqi | Japanese | Italian | Egyptian | Thai | Turkish | English |

| Character | Country | Nationality |
|---|---|---|
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