A Program Based on Dual Coding Theory and Dynamic Written Corrective Feedback to Develop Prep School Students' EFL Writing Performance, Vocabulary Retention and Self-Efficacy

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ABSTRACT

The present study explored the impact of an instructional program grounded in Dual Coding Theory (DCT) and Dynamic Written Corrective Feedback (DWCF) on enhancing preparatory school learners' English as a foreign language (EFL) writing skills, vocabulary retention, and writing self-efficacy. The participants were sixty second-year preparatory students from Dondate Preparatory School for Girls, Dakahlia Governerate, who were randomly divided into two groups: an experimental group (n = 30) and a control group (n = 30) during the first semester of the 2023 academic year. To assess the targeted variables, the researcher designed achievement tests and questionnaires measuring writing performance, vocabulary retention, and self-efficacy. While the experimental group received instruction through the newly designed program, the control group continued with conventional teaching methods. The findings demonstrated that the proposed program significantly improved the experimental group's writing proficiency, strengthened their ability to retain vocabulary, and fostered higher levels of self-efficacy compared to their peers in the control group.

Key words: Dual Coding Theory, Dynamic Written Corrective Feedback, EFL writing performance, EFL vocabulary retention, EFL writing self-efficacy

Introduction

Human civilization has long been distinguished by the ability to communicate through writing. Beyond being a cultural marker, writing is a fundamental life skill that enables individuals to engage effectively with the demands of modern society. For learners, writing is not only a vehicle of self-expression but also a powerful tool for consolidating knowledge of their language system. By engaging in written production, students refine their grasp of grammar, vocabulary, mechanics, and rhetorical conventions, while also learning to organize and convey thoughts with clarity and precision (Wu, 2015).

Despite its importance, mastering writing is rarely straightforward. Researchers have emphasized three interrelated dimensions that make writing a demanding task: the cognitive, the affective, and the social. Cognitive challenges often stem from gaps in linguistic knowledge or ineffective writing strategies; affective barriers include anxiety, low motivation, or limited self-confidence; and social aspects of writing highlight its dialogic nature, as writing is essentially a private conversation transformed into a public text (Lee, 2005; Williams, 2012).

Students' performance is further shaped by external influences such as limited practice opportunities, weak academic backgrounds, reliance on traditional instruction, and inconsistent feedback (DeDeyn, 2011; El-Nagar, 2016; Fareed, Ashraf & Bilal, 2016; Ramadan, 2019).

Vocabulary knowledge has consistently been identified as a cornerstone of successful communication and academic achievement. Nation (2001) classified vocabulary knowledge into three interdependent dimensions—form, meaning, and use each of which contributes directly to writing quality. A limited

vocabulary makes it difficult for learners to construct well-developed texts, whereas strong vocabulary skills often predict better writing outcomes (Solati-Dehkordi & Salehi, 2016). Scholars have further shown that vocabulary development and writing reinforce each other: writing provides learners with an extended opportunity to practice, recall, and retain new words (Karakoç & Köse, 2017). While vocabulary acquisition is critical, the ability to retain and retrieve words over time is what truly supports sustained language development (El-Garhy, 2013; Syuhada, 2019).

Equally important is learners' belief in their own capacity to write successfully. The construct of self-efficacy students' confidence in their ability to achieve desired outcomes—has been strongly associated with persistence, motivation, and academic achievement (Bruning, Dempsey, McKim, Kauffman, & Zumbrunn, 2013).

When learners experience progress and success in writing, their self-efficacy strengthens, leading to reduced anxiety and increased willingness to engage in challenging tasks (Williams, 2012). Conversely, repeated failure or lack of supportive feedback can diminish self-beliefs and negatively affect performance.

To support learners, writing instruction must therefore extend beyond rule teaching and error correction. Effective pedagogy resembles a workshop environment that emphasizes collaboration, meaningful feedback, and active student participation. Teachers play a vital role in guiding students through the composing process planning, drafting, revising, and editing—while providing targeted feedback that develops both linguistic accuracy and writing confidence (Ferris & Hedgcock, 2005; Matsuda, 2003; Silva & Matsuda, 2002).

Recent scholarship has highlighted the potential of Dual Coding Theory (DCT) and Dynamic Written Corrective Feedback (DWCF) as complementary frameworks for addressing the challenges of writing instruction. DCT, introduced by Paivio (1971, 1990, 1991), posits that human cognition relies on two interlinked but distinct systems: one for processing verbal information and another for nonverbal imagery. Learning is enhanced when both systems are activated, as verbal and visual representations support encoding, storage, and retrieval of knowledge (Lohr & Gall, 2008; Workman, 2017). In writing instruction, this dual-channel processing can deepen understanding, strengthen recall, and improve vocabulary retention.

On the other hand, DWCFfirst developed by Hartshorn and colleagues (2010)—offers a practical method for helping students improve their writing accuracy. This feedback approach is "dynamic" in that it relies on ongoing interaction between teacher and learner: students produce short, timed writings on a daily basis, and teachers respond with focused feedback tailored to individual needs (Hartshorn & Evans, 2015).

By engaging directly with their errors and revising iteratively, students become more aware of their weaknesses, assume responsibility for improvement, and gradually develop stronger writing habits (Kurzer, 2017).

Taken together, these perspectives suggest that improving writing performance requires attention not only to linguistic competence but also to cognitive, motivational, and instructional factors. The integration of DCT and DWCF may offer a promising approach for enhancing students' writing skills, promoting long-term vocabulary retention, and fostering higher levels of self-efficacy. Accordingly, the present study proposes the implementation of a program grounded in these two frameworks to address learners' writing challenges more effectively.

Context of the problem

A review of earlier research indicates that constructing coherent and well-structured texts remains a persistent challenge for learners of English as a foreign language, particularly at the preparatory or intermediate stage (El-Nagar, 2016; Fareed, Ashraf, & Bilal, 2016; Haider, 2012; Ramadan, 2019). Another recurring issue concerns vocabulary: many students encounter difficulties not only in acquiring new words

but also in retaining them over time (El-Garhy, 2013; Ihmaid, 2017; Mohammed, 2009; Syuhada, 2019). Such weaknesses often undermine students' confidence in their abilities, leading to diminished self-efficacy and reduced satisfaction, which in turn negatively influence learning outcomes.

To confirm the existence of these problems in the current context, the researcher carried out a pilot investigation in September 2021. A writing performance test and a vocabulary retention test were given to a sample of thirty second-year preparatory EFL learners at Dondate Preparatory School for Girls in Dakahlia Governorate. In addition, a writing self-efficacy scale was administered to another group of thirty students from the same grade level to measure their confidence in performing writing tasks in English. The findings revealed widespread shortcomings in students' writing abilities, vocabulary retention, and levels of self-efficacy. These outcomes highlight the urgent need for targeted instructional interventions. In response, the researcher proposes implementing a program informed by Dual Coding Theory (DCT) and Dynamic Written Corrective Feedback (DWCF) with the aim of strengthening writing performance, improving vocabulary retention, and boosting self-efficacy among preparatory school EFL learners.

Statement of the problem

Based on the literature review and the previous studies, the observations of the researcher, and the results of the pilot study; the problem of this study could be stated as follows:

There are weaknesses in the second grade preparatory EFL students' writing performance, vocabulary retention and self-efficacy.

Questions of the Study

This study tried to answer the following main question:

How can a program based on Dual Coding Theory and Dynamic Written Corrective Feedback be designed to develop EFL preparatory students' writing performance, vocabulary retention and self-efficacy?

This main question could be subdivided into the following ones:

1. What are the most important EFL writing performance components required for the second grade preparatory school students?
2. What are the most important EFL vocabulary retention components required for the second grade preparatory school students?
3. What are the most important EFL writing self-efficacy dimensions required for the second grade preparatory school students?
4. How can a program based on Dual Coding Theory and Dynamic Written Corrective Feedback be designed to develop EFL second grade preparatory school students' writing performance, vocabulary retention and self-efficacy?
5. What is the effect of a program based on Dual Coding Theory and Dynamic Written Corrective Feedback on developing EFL second grade preparatory school students' writing performance?
6. What is the effect of a program based on Dual Coding Theory and Dynamic Written Corrective Feedback on developing EFL second grade preparatory school students' vocabulary retention?
7. What is the effect of a program based on Dual Coding Theory and Dynamic Written Corrective Feedback on developing EFL second grade preparatory school students' self-efficacy in writing performance?

Purpose of the study

The main purpose of this study was to investigate the effect of using a program based on Dual Coding Theory and Dynamic Written Corrective Feedback on developing EFL second grade preparatory school students' writing performance, vocabulary retention and self-efficacy.

Delimitations of the study

This study was delimited to:

1. A random sample of the 2nd year general preparatory school male students as it is an important intermediate grade in which they face many challenges while writing and retaining vocabulary and many of them begin in this stage to be demotivated in writing and avoid writing tasks altogether..
2. The sample was chosen and divided into two groups, an experimental group and a control one (thirty girls in each group).
3. The first semester of the school year 2023.
4. Some writing performance components suitable for the 2nd grade preparatory school students.
5. Some components of vocabulary retention suitable for the 2nd grade preparatory school students.
6. Some self-efficacy dimensions in writing performance which are suitable for EFL second grade preparatory school students.
7. A program based on Dual Coding Theory and Dynamic Written Corrective Feedback to develop EFL second grade preparatory school students' writing performance, vocabulary retention and self-efficacy.

Instruments of the study

1. A pre-post writing performance test and a rubric to score the writing performance test (prepared by the researcher).
2. A pre-post vocabulary retention test (prepared by the researcher).
3. A pre-post self-efficacy scale in writing performance (prepared by the researcher).

Hypotheses of the study

For substantiating the study, the following hypotheses were introduced:

1. There would be a statistically significant difference between the mean score of the experimental group and that of the control group in their performance of the post EFL writing test results, in favor of the experimental group.
2. The program based on dual coding theory and dynamic written corrective feedback would have a positive effect on developing EFL writing performance of second year preparatory school students.
3. There would be a statistically significant difference between the mean score of the experimental group and that of the control group in their performance of the post EFL vocabulary retention test results, in favor of the experimental group.
4. There is no statistically significant difference between the mean score of the experimental group in the post and the follow-up administrations of the vocabulary retention test.
5. The program based on dual coding theory and dynamic written corrective feedback would have a positive effect on developing EFL vocabulary retention of second year preparatory school students.
6. There would be a statistically significant difference between the mean score of the experimental group and that of the control group in their performance of the post administration of the EFL self-efficacy scale, in favor of the experimental group.
7. The program based on dual coding theory and dynamic written corrective feedback would have a positive effect on enhancing EFL self-efficacy of second year preparatory school students.

Procedures of the study:

To answer the previously mentioned questions, the following procedures were conducted:

I- For the first question:

1. Reviewing relevant literature and previous studies related to writing performance to crystallize the writing performance components that need to be acquired by the students and to develop the writing performance test.
2. Designing a list of writing performance components for second grade preparatory students.

II- For the second question:

1. Reviewing relevant literature and previous studies related to vocabulary retention to crystallize the components of vocabulary retention that need to be acquired by the students and to develop the vocabulary retention test.
2. Designing a list of the components of vocabulary retention suitable for second grade preparatory students.

III- For the third question:

1. Reviewing relevant literature and previous studies related to self-efficacy in writing performance to conclude the required self-efficacy dimensions in writing performance for the second grade preparatory students and to develop the self-efficacy scale in writing performance.
2. Designing a list of the self-efficacy dimensions in writing performance suitable for second grade preparatory students.

IV- For the fourth question:

1. Reviewing relevant literature and previous studies related to Dual Coding Theory and Dynamic Written Corrective Feedback to design the suggested program and to draw the experimental frame of the study.
2. Developing a pre-post writing performance test and submitting it to a jury of specialists to determine its validity.
3. Developing a pre-post and follow-up vocabulary retention test and submitting it to a jury of specialists to determine its validity.
4. Developing a pre-post self-efficacy scale in writing performance and submitting it to a jury of specialists to determine its validity.
5. Choosing the study participants from the second grade general preparatory school students and dividing them into two groups: an experimental group and a control one.
6. Pre-administering the writing performance test, the vocabulary retention test and the writing self-efficacy scale to both groups.
7. Using the suggested program to teach vocabulary, grammar and writing to the experimental group while using regular instruction with the control group.

V- For the fifth, sixth and the seventh questions:

1. Post-administering the writing performance and vocabulary retention tests and the self-efficacy scale to both groups to investigate the effect of the suggested program on developing writing performance, vocabulary retention and self-efficacy.
2. Administering the vocabulary retention test after a month of the post administration.
3. Comparing and treating the data statistically.

4. Discussing the results of the study.

Findings of the study

All the data collected were analyzed using the Statistical Package for the Social Science (SPSS Version 18) program. The results of administering the writing performance and vocabulary retention tests and the self-efficacy scale, to both the experimental and the control groups were statistically discussed in the light of the study hypotheses.

Hypothesis One

It was hypothesized that "there would be a statistically significant difference between the mean score of the experimental group and that of the control group in their performance of the post EFL writing test results, in favor of the experimental group".

The independent samples t-test was used to verify this hypothesis, as shown in **Table (1)**. There is a statistically significant difference at (0.01) level between the attained mean score of the experimental group and that of the control one in favor of the experimental group in the post administration of writing performance test. The estimated t-value is (26.36). It is significant at (0.01) level in favor of the post results of the experimental group.

Table (1): **The Post administration of the writing performance test comparing the experimental group to the control group**

Group	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Experimental	30	30.17	1.68	26.36	58	0.01
Control	30	10.43	3.74	26.36		

Hypothesis Two

It was hypothesized that "the program based on dual coding theory and dynamic written corrective feedback would have a positive effect on developing EFL writing performance of second year preparatory school students". The effect size is measured through Eta Square as follows:

$$\eta^2 = \frac{t^2}{t^2 + df}$$

$$\eta^2 = 0.92$$

The results can be summarized in **Table (2)**. The effect size of the program on developing the writing performance of the experimental group is (0.92). Therefore, the program proved to have a positive effect on developing second year preparatory school students' writing performance.

Table (2): **The effect size of the program based on dual coding theory and dynamic written corrective feedback on the writing performance of the experimental and control groups using η2**

Independent variable	Dependent variable	T	η^2
The program	writing performance	26.36	0.92

Hypothesis Three

It was hypothesized that "there would be a statistically significant difference between the mean score of the experimental group and that of the control group in their performance of the post EFL vocabulary retention test results, in favor of the experimental group".

The independent samples t-test was used to verify this hypothesis, as shown in **Table (3)**. There is a statistically significant difference at (0.01) level between the attained mean score of the experimental group and that of the control one in favor of the experimental group in the post administration of vocabulary retention test. The estimated t-value is (16.21). It is significant at (0.01) level in favor of the post results of the experimental group.

Table (3): **The post administration of the vocabulary retention test comparing the experimental group to the control group**

Group	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Experimental	30	31.97	3.29	16.21	58	0.01
Control	30	15.67	4.42	16.21		

Hypothesis Four

It was hypothesized that "there is no statistically significant difference between the mean score of the experimental group in the post and the follow-up administrations of the vocabulary retention test". A paired samples t-test was used to verify this hypothesis, as shown in **Table (4)**. The obtained t-value (3.26) is significant at 0.01 levels. This means that the program continuous to have a positive effect in enhancing vocabulary retention.

Table (4): T-test results comparing the post to the Follow-up test administrations of the experimental group in the vocabulary retention test

Test	N	Mean	Std. Deviation	t	Sig. (2-tailed)
Post-test	30	31.97	3.29	3.26	0.01
Follow-up test	30	32.40	2.91		

Hypothesis Five

It was hypothesized that "the program based on dual coding theory and dynamic written corrective feedback would have a positive effect on developing EFL vocabulary retention of second year preparatory school students". The effect size is measured through Eta Square as follows:

$$\eta^2 = \frac{t^2}{t^2 + df}$$

$$\eta^2 = 0.82$$

The results can be summarized as shown in **Table (5)**. The effect size of the program on developing the vocabulary retention of the experimental group is (0.82). Therefore, the program proved to have a positive effect on developing second year preparatory school students' vocabulary retention.

Table (5): The effect size of the program based on dual coding theory and dynamic written corrective feedback on the vocabulary retention of the experimental and control groups using η^2

Independent variable	Dependent variable	T	η^2
The program	vocabulary retention	16.21	0.82

Hypothesis Six

It was hypothesized that "There would be a statistically significant difference between the mean score of the experimental group and that of the control group in their performance of the post administration of the EFL self-efficacy scale, in favor of the experimental group".

The independent samples t-test was used to verify this hypothesis, as shown in **Table (6)**. There is a statistically significant difference at (0.01) level between the attained mean score of the experimental group and that of the control one in favor of the experimental group in the post administration of the self-efficacy scale. The estimated t-value is (17.17). It is significant at (0.01) level in favor of the post results of the experimental group.

Table (6): t-test results of the post administration of the self-efficacy scale comparing the experimental group to the control group

Group	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Experimental	30	63.60	6.07	17.17	58	0.01
Control	30	34.80	6.91	17.17		

Hypothesis Seven

It was hypothesized that "the program based on dual coding theory and dynamic written corrective feedback would be effective in enhancing EFL self-efficacy of second year preparatory school students ". The effect size is measured through Eta Square as follows:

$$\eta^2 = \frac{t^2}{t^2 + df}$$

$$\eta^2 = 0.84$$

The results can be summarized as shown in **Table (6)**. The effect size of the program on developing the self-efficacy of the experimental group is (0.84). Therefore, the program proved to have a positive effect on developing second year preparatory school students' self-efficacy.

Table (7): The effect size of the program based on dual coding theory and dynamic written corrective feedback on the self-efficacy of the experimental and control groups using η^2

Independent variable	Dependent variable	T	η^2
The program	self-efficacy	17.17	0.84

Discussion

First and second hypotheses

The results of the first hypothesis reveal that there is a statistically significant difference at (0.01) level between the mean scores of the experimental group participants (taught through the program) and those of the control group on the writing performance post-test in favor of the experimental group. This means that students of the experimental group outperformed the control group students in the post test of writing performance. This outperformance of the experimental group is due to using the program in teaching writing performance, while students in the control group received instruction of the writing performance through the regular methods.

Moreover, the results of the second hypothesis reveal that the effect size of the program on developing the writing performance of the experimental group is (0.92). Therefore, the program proved to have a positive effect on developing second year preparatory school students' writing performance.

Through administering the program to the experimental group, the experimental group students had an active role in the learning process. Students were given the opportunities to practice varied activities and learn through visualization and dynamic written corrective feedback methods. Moreover, students were given opportunities to practice working in small groups sharing their ideas and work with each other and with the whole class, and holding and participating in discussions about reading texts and the questions. Through the administration of the program to the experimental group, it was noted that the students were interested in practicing those activities and methods as they gave them the opportunity to interact with the teacher and the reading text and to play more positive roles in the process of enhancing writing. DCT and DWCF proved to have a positive effect on developing writing performance. This can be shown as follows:

This study supported the results of those studies which proved the positive effect of using DCT on developing writing, such as the following studies (Kusumawati & Rachmawati, 2017; Sadoski & Paivio, 2013).

This study also confirmed the results of those studies which proved the positive effect of using DWCF on developing writing, such as the following studies (Deghatkar, Khodareza & Valipour, 2022; Eckstein, Sims & Rohm, 2020; Kurzer, 2017).

Third, fourth and fifth hypotheses

The results of the third hypothesis reveal that there is a statistically significant difference at (0.01) level between the mean scores of the experimental group participants (taught through the program) and those of the control group on the vocabulary retention post-test in favor of the experimental group. This means that students of the experimental group outperformed the control group students in the post test of vocabulary retention. This outperformance of the experimental group is due to using the program in teaching vocabulary, while students in the control group received instruction of the same vocabulary through the regular methods.

Also, the results of the fourth hypothesis reveal that the program has a positive effect on enhancing the vocabulary retention of the experimental group at 0.01 level when comparing the results of the vocabulary retention post and follow-up tests. This means that students of the experimental group were able to remember and retain vocabulary. This can be attributed to the use the program in teaching vocabulary. On the other hand, the results of the follow-up test were higher than these of the post test and this may be also attributed to the revision lessons which students had in their school and outside school after the end of the experiment as the formal exams were not held yet and there were many opportunities for always revising the target vocabulary regularly.

Moreover, the results of the fifth hypothesis reveal that the effect size of the program on developing the vocabulary retention of the experimental group is (0.82). Therefore, the program proved to have a positive effect on enhancing second year preparatory school students' vocabulary retention.

Through administering the program to the experimental group, the experimental group students had an active role in the learning process. Students were given the opportunities to practice varied activities and learn through visualization and dynamic written corrective feedback methods. Moreover, students were given opportunities to practice working in small groups sharing their ideas and work with each other and with the whole class, and holding and participating in discussions about reading texts and the questions.

Through the administration of the program to the experimental group, it was noted that the students were interested in practicing those activities as they gave them the opportunity to interact with the teacher and the reading text and to play more positive roles in the process of learning vocabulary. DCT and DWCF proved to have a positive effect on developing vocabulary retention. This can be shown as follows:

This study lends support to those studies which proved the positive effect of using DCT on developing vocabulary retention, such as the following studies (Kassim, 2018; Wang, 2013; Wong & Samudra, 2019).

The sixth and seventh hypotheses

The results of the sixth hypothesis reveal that there is a statistically significant difference at (0.01) level between the mean scores of the experimental group participants (taught through the program) and those of the control group in their performance of the post administration of the EFL self-efficacy scale, in favor of the experimental group. This means that students of the experimental group outperformed the control group students in the post scale of self-efficacy. This outperformance of the experimental group is due to using the program in teaching, while students in the control group received instruction through the regular methods.

Moreover, the results of the seventh hypothesis reveal that the effect size of the program on developing the self-efficacy of the experimental group is (0.84). Therefore, the program proved to have a positive effect on enhancing second year preparatory school students' self-efficacy.

Through administering the program to the experimental group, the experimental group students had an active role in the learning process. Students were given the opportunities to practice varied activities and learn through visualization and dynamic written corrective feedback methods. Moreover, students were given opportunities to practice working in small groups sharing their ideas and work with each other and with the whole class, and holding and participating in discussions about reading texts and the questions

Through the administration of the program to the experimental group, it was noted that the students were interested in practicing those activities as they gave them the opportunity to interact with the teacher and the reading text and to play more positive roles in the process of learning vocabulary. DCT and DWCF proved to have a positive effect on developing self-efficacy. This can be shown as follows:

This study supported the results of those studies which proved the positive effect of using DWCF on enhancing self-efficacy, such as the following studies (Bakri, 2018).

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