

**A WORD ATTACK SKILLS-BASED PROGRAM TO ENHANCE
EFL SECONDARY SCHOOL STUDENTS' VOCABULARY
LEARNING, READING COMPREHENSION AND SELF-EFFICACY**

Hamdy Ibrahim Elmasry

Eman Al-Bashbeeshi, Ph.D

Asmaa Abdel-Moneim Mostafa, Ph.D

Introduction:

Word attack skills/strategies refer to techniques that help students to deal with the unfamiliar word by using the available clues within it and in context. These skills are valuable for both first language (L1) and second language (L2) readers as it is almost impossible to memorize all the vocabulary in the target language and as frequent use of a dictionary disrupts the natural flow of reading. When English as a second/foreign language (ESL/EFL) learners encounter unfamiliar vocabulary during reading, they tend to employ a number of strategies: ignoring the word, consulting a dictionary, seeking teacher's assistance, using word parts (roots, prefixes or suffixes) or inferring the meaning of the word from context. Students need to acquire the latter two strategies to deal with the unfamiliar words that impede comprehension.

Considering word attack skills in an EFL setting, it is assumed that inferring from context can compensate for EFL learners' limited vocabulary knowledge (Bialystok, 1998; Oxford, 2003) as a result of little exposure to L2 comprehensible input (Krashen, 1989) obtained from reading and listening. Since English is merely used inside classroom settings, reading rather than speaking or writing seems to be of great value to these learners. Therefore, teaching these skills/strategies can be useful in developing two areas: ability to infer the meanings of unknown words from context and using morphological clues, which in turn develops their skill of reading. Current

Egyptian EFL textbooks need to focus more on these skills, while also addressing other reading strategies such as identifying main ideas, reading between the lines (making inferences), skimming and scanning. Examining *Hello! English for Secondary Schools* (Haines & Dallas, 2008), it appears that there is little evidence of treatment of these skills, especially in the context of reading comprehension. This is because there are a few activities or follow-up practice opportunities that address guessing the meaning from context.

It has been observed by the researcher that a large number of secondary school students have several comprehension problems while reading written texts in an EFL setting, one of which is their deficiency to derive the meanings of unknown words from context. This is mainly because they are accustomed to memorizing long vocabulary lists as the sole method of vocabulary learning, and because they lack experience and training in guessing the meaning from context and using affixation (prefixes or suffixes). Furthermore, they rarely receive formal or direct instruction in these strategies from their teachers. The outcome may be that they simply ignore a new word without making any effort to discover its meaning, or that they give up reading, and this in turn leads to limited vocabulary knowledge and poor reading ability.

Statement of the problem

Several studies confirm that inferencing of unfamiliar words from context and through morphological analysis is a formidable challenge to both ESL/EFL

learners. Even L1 learners have problems with this ability. It seems illogical to assume that EFL students can infer word meaning from context automatically or efficiently.

On the basis of this problem, the researcher's observation and the results of the pilot study, it seems necessary to implement a word attack skills-based program to investigate its effectiveness in enhancing EFL secondary school students in three areas: vocabulary learning, reading comprehension and self-efficacy.

Purpose

The current study aimed at:

1. Improving students' ability to identify word meaning from context through implementing a training program.
2. Raising students' awareness of the importance of using both intraword clues and interword information for the derivation of word meaning from context.
3. Raising students' awareness of the importance of using word analysis such as grammatical function (whether it is noun, verb, etc.), and word parts such as roots, prefixes and suffixes.

Research questions

The present study sought to address the following research questions:

1. What is the effect of the word attack skills-based program on enhancing EFL students' vocabulary learning?
2. What is the effect of the word attack skills-based program on enhancing EFL students' reading comprehension?
3. What is the effect of the word attack skills-based program on improving EFL students' self-efficacy beliefs in vocabulary learning and reading comprehension?

Hypotheses

- There is a statistically significant difference at 0.05 level between the experimental and control groups' mean scores on the post-vocabulary learning test in favor of the experimental group.
- There is a statistically significant difference at 0.05 level between the experimental group's mean scores on the pre-and post-vocabulary learning tests in favor of the post-test.
- There is a statistically significant difference at 0.05 level between the experimental and control groups' mean scores on the post-reading comprehension test in favor of the experimental group.
- There is a statistically significant difference at 0.05 level between the experimental group's mean scores on the pre-and post-reading comprehension tests in favor of the post-test.
- There is a statistically significant difference at 0.05 level between the experimental and control groups' mean scores on the post-self-efficacy scale in favor of the experimental group.
- There is a statistically significant difference at 0.05 level between the experimental group's mean scores on the pre- and post-self-efficacy scales in favor of the post-self-efficacy scale.

Definitions of terms

A) Word attack skills/ strategies

"Word attack skills" is a term borrowed from Nuttall (1996; 2005) to refer to strategies (procedures) applied for determining the meanings of unfamiliar vocabulary in FL. "Word attack" includes three strategies or processes: (1) using the syntactical clues and morphological clues; (2) guessing meaning from context (using context clues); and (3) using the dictionary. It seems noteworthy that Nuttall used the term "skills" to describe what other researchers, including the researcher of the current study, consider to be "strategies".

For this reason, word attack skills and word attack strategies were used interchangeably in the current study.

B) Vocabulary learning

In simple terms, vocabulary learning can be defined as the acquisition of vocabulary for the sake of communication. Elgort and Nation (2010, p.90) defined vocabulary acquisition in L2 as “a process that may take place implicitly and explicitly, incidentally and deliberately, in a natural or structured manner, in foreign or second language settings.” Based on this, both ‘vocabulary learning’ and ‘vocabulary acquisition’ were used interchangeably in the current study.

C) Reading comprehension

The National Reading Panel (2000, p.1) defined reading comprehension as “a cognitive process that integrates complex skills and cannot be understood without examining the critical role of vocabulary learning and instruction and its development.”

D) Self-efficacy

Self-efficacy is defined as the learner’s beliefs in his or her abilities to perform a certain learning task successfully to achieve particular goals (Bandura, 1997).

Related studies

In an L1 context, Baumann, Edwards, Font, Tereshinski, Kameenui, and Olejnik (2002) gave young native speakers training in two word attack skills, morphemic and contextual analysis in combination. The participants were 88 fifth-grade American students who were divided into four groups: context-only, morphemic-only, context- morphemic, and a control group. In the context-only group, eight context clues were presented: word definitions, synonyms, antonyms, appositives, examples, figurative language, summary, and mood, tone or setting. The three experimental groups followed an explicit instruction based on Pearson and Gallagher’s (1983) model for releasing

responsibility approach for strategy use: presentation and overview, explicit instruction (modeling), and independent practice. The results revealed that the experimental groups’ performances showed great improvements in both modes of instruction, independent and combined, for lesson words and unknown words.

Likewise, Baumann, Edwards, Boland , Olejnik, and Kameenui (2003) investigated the effects of two inferential strategies, morphemic and contextual analysis, on students’ ability to infer the meanings of unfamiliar words. The participants were 157 fifth-grade students from eight classrooms from a middle school in the USA. The study included two conditions: the treatment group received training in the morphemic and contextual analysis (MC), and the comparison group received training in textbook vocabulary (TV). In the MC group, participants received training in five context clues: definition, synonym, antonym, example and general. Training tasks involved a three-step strategy: context clues, word-part clues, and context clues. The study revealed interesting findings. First, TV students had better performance in learning textbook vocabulary. Second, MC students inferred the meanings of new affixed words more successfully than TV students. Third, MC students had better scores on a delayed test of inferring the meanings of new words (morphologically and contextually decipherable words).

In an L2 context, Tomesen and Aarnoutse (1998) conducted a study with a quasi-experimental design to examine the impact of an instructional program for inferring word meaning from both context and morphological analysis. The program focused on two approaches: direct instruction and reciprocal teaching. The participants were grade 4 primary-school pupils from eight schools in The Netherlands. Four schools participated as

experimental schools while the other four served as control schools. The students were given training in context clues such as illustration, synonym, antonym, and general description, and in morphological analysis such as unspecified familiar parts of a word. The results demonstrated that the program was effective concerning improving students' ability to derive word meaning from context. The experimental group had a better performance in both tests of word-meaning inferencing and reading comprehension than the control group.

Examining the effectiveness of three methods of instruction in using context as a word attack strategy to infer unknown word meanings, Walters (2006) conducted a study with a quasi-experimental design. The three methods were a general inferencing procedure (Clarke & Nation 1980), recognition of particular context clues, and cloze exercises with practice and feedback. Using Haastrup's (1991) categories, Walters relied on a comprehensive list of context clues: reference, adjective-type structures, contrast, grouping, examples, restatement in the same sentence and in another clause, description, punctuation, and inference. The participants were 44 ESL male and female students from varying nationalities taking an intensive English course at San Diego State University, USA. They had different levels of language proficiency. They were assigned to two groups: experimental group and control group. The experimental group was further divided into three experimental groups according to the training method as mentioned above. Each training group received six hours of instruction whereas the control group received no training. The results demonstrated that on average, the experimental group had higher scores on the post-tests than did the control group. The largest improvement was seen in the general strategy group.

In an EFL context, Lo (2004) explored how teaching inferring word meaning from context affects students' vocabulary learning and reading comprehension. It also aimed at examining the correlation between reading comprehension and vocabulary knowledge. The participants were 68 Taiwanese junior high school students. They were split into two groups: experimental group and control group. In the experimental group, Bengelil's (2001) modified taxonomy of knowledge sources and Clarke and Nation's (1980) general inferencing strategy were used as the training tools. The data were gathered both quantitatively and qualitatively. The quantitative data were collected from a questionnaire and two language tests, vocabulary and reading comprehension. The qualitative data were collected from interviews in order to examine to what extent students succeeded in using knowledge sources or contextual clues in their endeavor to infer word meaning from context. The study found that the experimental group had better performance on both vocabulary and reading comprehension tests, and used more contextual clues than did the control group. There was also a significant correlation between vocabulary knowledge and reading comprehension. This indicates that instruction in inferencing increases vocabulary knowledge, which in turn develops reading comprehension.

In Egypt, Khalaf (2010) investigated the effects of teaching an inferring strategy on improving EFL preparatory school pupils' reading comprehension. The researcher conducted her study in response to the inattention given to teaching language learning strategies in the prescribed Teacher's Guides. The research participants were 68 second year preparatory school pupils at Nile Preparatory School for Girls in Damietta. They were divided into two groups:

experimental and control groups. An inferring strategy-training program was employed in the experimental group, whereas a given strategy of the Teacher's Guide was followed in the control group. The program lasted three months, and reading comprehension pre- and post-tests were administered to both groups before and after the experiment. The results demonstrated that the experimental group had higher mean scores on the reading comprehension post-test than the control group. The experimental group showed more gains for post-testing than for pre-testing. These results suggest that training students on the inferring strategy was more effective than teaching them the prescribed strategy of the Teacher's Guide.

In another study, Abdel Kader (2007) examined the effect of teaching context clues on improving students' ability to infer the meanings of unknown words in context and their reading comprehension. The participants were 60 EFL students studying a course in English for academic purposes at the faculty of Education, Menoufia University. They were split into two different groups: experimental and control groups. They received training in context clues for eight weeks. The study followed Ying's (2001) teaching procedures that focused on modelling, guided practice and think-aloud. For teaching context clues, the researcher developed a classification scheme based on 8 types of context clues: a definition, restatement, synonym, contrast, cause-effect, example, summary, and experience. The study used a pre-post-test design, and it included three tests: a reading comprehension test, a word-in-context multiple-choice test, and a word-in-context paraphrase test. The most important finding of this study is that instruction in context clues improved EFL students' ability to determine the meanings of unknown words in context. This was supported by the

surprising improvement in the experimental group's performance on the post-tests.

Zaid (2009) compared the effectiveness of two strategies for teaching inferring word meaning from context. The first strategy emphasized decontextualized vocabulary teaching (direct teaching of unfamiliar words in isolation) whereas the second strategy emphasized teaching in inferring word meaning from sentence context. The participants were 34 Arabic-speaking students in the English Department studying Vocabulary Building at King Khalid University, KSA. They had a similar language proficiency based on achievement in vocabulary-related courses. They were grouped into two treatments (two experimental groups): the context word meaning condition (N=34) and the no-context word meaning condition (N=17). Each treatment dealt with 60 target words over 3 sessions of 50 minutes each. In the no-context vocabulary mode, the target words were presented with their definitions or Arabic equivalents, and students were asked to do more drills with definitions or synonyms for the target words. In the context vocabulary mode, students were trained to use a general strategy to derive word meaning from context developed by Jenkins, Matlock and Slocum (1989). As the study followed the quasi-experimental design, a paired samples t-test that compared scores on pre-test and post-test revealed that both strategies for teaching inferencing were effective. Students produced significantly better scores on vocabulary post-tests than they did on vocabulary pre-tests (** $p < .001$). The study concluded that a "teach vocabulary in context" approach should be applied in teaching vocabulary.

Similarly, Shokouhi and Askari (2010) studied the impact of teaching contextual inferencing on reading authentic texts and vocabulary learning. The participants were 120 Iranian senior high

school students aged between 17 and 19. They were randomly assigned to two experimental groups: context and no-context. The context group was given instruction in inferring the meanings of low-frequency words from context while the no-context group was given direct vocabulary teaching. Using a quasi-experimental design, two language tests were administered: a reading comprehension test composed of 10 items and a vocabulary test composed of 30 items for both pre-testing and post-testing. "A vocabulary rule" used by Ruddell (1999) was the inferencing procedure that Shokouhi and Askari adapted to assist students in inferring the meanings of low frequency words. It depended on both context clues and word-part clues (root, suffix or prefix) to deal with unknown words while reading. The treatment lasted about 3 months. Each group received two training sessions per week and post-tests were administered around two weeks after the end of the treatment. The results revealed that contextual inferencing training was more effective than direct vocabulary teaching. Significant gains were found in both vocabulary learning and reading comprehension. The independent t-test showed that there was a significant difference between context and no-context groups.

Design

The current study employed experimental research as one of the types of quantitative methods. The design used in the study is quasi-experimental. The main advantage of this design is that it utilizes existing groups in educational settings rather than artificial groups created by the researcher (Creswell, 2008).

Participants

The research participants were second-year secondary students at Hamza Alsunbati Secondary School, Damietta Governorate. They were of similar age

range (16-17 years) and studying English as a foreign language. Two classes were selected to serve as an experimental group (30 female students) and a control group (30 female students). In the former group, students received training in a word attack skills-based program, whereas in the latter group, students received conventional teaching.

Instruments

Three quantitative instruments were employed to gather the data: two language tests and a self-efficacy scale. The two language tests were vocabulary learning and reading comprehension. Below is a description of both tests and the scale.

Vocabulary Learning Test (VLT)

VLT was developed by the researcher of the current study to measure students' vocabulary skills and to determine the effect of the word attack skills-based (WAS) program on enhancing students' vocabulary learning on the basis of the statistical difference between students' pre- and post-scores on the test.

The VLT involved various types of vocabulary learning exercises: multiple choice, matching definitions, finding and correcting the mistakes, filling in the gaps, and determining the parts of speech of given words, providing the synonyms and antonyms of specific words, writing sentences, finding words in letters, and guessing meaning from context. The VLT contained 65 items that were classified according to Bloom's cognitive levels, each of which comprised particular vocabulary learning skills. Three levels were considered: knowledge (20 items / 30.77%), comprehension (25 items / 38.46 %), and application (20 items / 30.77%). VLT was based on reviewing previous studies, especially those on developing vocabulary learning tests in the Egyptian context, e.g., (Qoura, 2014).

Reading Comprehension Test (RCT)

The RCT involved two types of reading comprehension exercises: multiple choice and an open ended question (a critical thinking question) and therefore it highlighted both objective and subjective testing. It contained 20 items that comprised ten reading comprehension skills. The relative weight of each skill is about 10%. This suggests that the weight of all skills was distributed evenly and in a balanced manner.

When developing RCT, a number of criteria were taken into account. To measure the level of the text readability ease, Flesch-Kincaid readability index was used. The reading ease of both texts was 80.30% and 70.70% respectively, which implies that both texts are not difficult to understand.

Both texts were adapted from Common Educational Proficiency Assessment (CEPA). This assessment was used in a similar EFL context. RCT was based on reviewing the previous studies, especially those on assessing reading comprehension skills in an EFL context, e.g. (Al-Soufi, 2017). Each item assessed only one reading comprehension skill. Words or sentences used in test items were familiar and clear to students, as they were very similar to the ones studied in their textbooks.

Self-efficacy scale (SES)

The self-efficacy scale was developed by the researcher of the current study to examine students' self-efficacy beliefs in learning vocabulary and reading English texts. SES involved two dimensions: vocabulary learning and reading comprehension. Statements 1-7 represent students' self-efficacy beliefs in learning vocabulary while statements 8-15 represent their beliefs in reading comprehension.

When constructing the scale, the following points were taken into

consideration. SES was created on the basis of Bandura's (2006) "*can do*" statements that reflect the tasks measured in both vocabulary and reading assessment. It contained a 4-Likert point scale (not sure, maybe, pretty sure, really sure) based on Smith et al. (2003) suggestions that type of scale could increase systematic variance or types of information. Creswell's (2008) criteria of constructing scales were followed. First, the scale format was neat and brief. Second, the included items were relevant to the study objectives, followed by multiple response options. Third, the response options were of equal distance from each other, in the sense that the distance between 1 and 2 is equal to the distance between 3 and 4. Fourth, the differences between the values (response options) were also meaningful. Finally, wording of the scale was clear to the students by translating it into their native language.

Validity and reliability for the instruments of the study were established before administering these instruments.

Results and discussion

The results of the study are reported. The results were analyzed to answer the research questions and to verify the hypotheses, and were discussed on the basis of the related studies.

Results of VLT

Hypothesis 1: "There is a statistically significant difference at 0.05 level between the experimental and control groups' mean scores on the post-vocabulary learning test in favor of the experimental group."

To verify this hypothesis, the t-test for two independent groups was employed to compute the experimental and control groups' mean scores on the levels of the vocabulary learning test and the total score of the test, as shown in Table (2).

Table (1) T-values comparing the experimental and control groups' mean scores on the levels of VLT and the total score of the test

Levels of vocabulary learning test	Groups	N	Mean	Std. deviation	df	T. value	Level of sig
Knowledge	Experimental	30	17.93	2.73	58	10.80	Significant
	Control	30	6.63	5.04			
Comprehension	Experimental	30	21.70	2.49	58	12.74	Significant
	Control	30	7.63	5.51			
Application	Experimental	30	17.63	1.99	58	11.80	Significant
	Control	30	6.67	4.69			
Total test	Experimental	30	57.27	5.39	58	13.53	Significant
	Control	30	20.93	13.69			

As Table (1) shows, it can be concluded that the experimental group overtook the control group in the three levels of vocabulary learning. The means of knowledge, comprehension and application were relatively similar at 17.93, 21.70, and 17.63 respectively. All the differences between both groups were statistically significant at 0.05 level, which implies that these groups were heterogeneous in terms of post-testing. These differences can be attributed to the treatment, the word attack skills-based program, which had an effect

on enhancing the experimental group's vocabulary learning.

Hypothesis 2: "There is a statistically significant difference at 0.05 level between the experimental group's mean scores on the pre-and post- vocabulary learning tests in favor of the post-test."

To verify this hypothesis, the t-test was used to compute the experimental group's mean scores on the levels of the pre-and post- vocabulary learning tests and the total score of the test, as shown in Table (2).

Table (2) T-values comparing the experimental group's mean scores on the levels of the pre- and post- vocabulary learning tests and the total score of the test

Levels of vocabulary learning test	Measuring	N	Mean	Std. deviation	T. value	df	Level of sig
Knowledge	Post	30	17.93	2.81	10.44	29	Significant
	Pre	30	6.60	7.14			
Comprehension	Post	30	21.70	2.49	10.56	29	Significant
	Pre	30	7.83	7.83			
Application	Post	30	17.63	1.99	9.33	29	Significant
	Pre	30	7	6.46			
Total test	Post	30	57.03	5.53	11.19	29	Significant
	Pre	30	21.43	19.94			

As seen in Table (2), there was a statistically significant difference between the experimental group's pre-test and post-test mean scores on vocabulary learning levels and the total test score. The experimental group had higher means for the post-testing than those for the pre-testing: 17.93, 21.70 and 17.63 vs 6.60, 7.83 and 7. This demonstrates that this group had significant gains on all levels of the vocabulary learning test, which was due to the effect of the experiment on developing their vocabulary learning.

Effect size, another statistical procedure, was also used to determine the effect of the training program on enhancing EFL students' vocabulary learning in each level of the test and the total test score. So, the eta square (η^2) was computed to achieve this, as shown in Table (3).

Table (3) Effect size of the training program on the experimental group's levels of vocabulary learning and the total score of the test

Levels of vocabulary learning test	T. Value	η^2	Size effect
Knowledge	10.44	0.79	Large
Comprehension	10.56	0.79	Large
Application	9.33	0.75	Large
Total test	11.19	0.81	Large

Table (3) reveals that effect size for all the vocabulary learning levels and the total test score was large. The η^2 values for the levels ranged between 0.75 and 0.79,

whereas the η^2 value for the total test score was 0.8, which indicates that the training program contributed to the variance in the three levels of vocabulary learning at 81%. This is due to the effect of the training program on increasing the experimental group's vocabulary learning. In light of the above results, it can be concluded that the first two hypotheses were accepted.

Results of RCT

Hypothesis 3: "There is a statistically significant difference at 0.05 level between the experimental and control groups' mean scores on the post-reading comprehension test in favor of the experimental group."

To validate this hypothesis, the t-test for two independent groups was employed to compute the experimental and control groups' mean scores on the skills of the reading comprehension test and the total score of the test, as shown in Table (4).

As seen in Table (4), the experimental group outperformed the control group in all skills of reading comprehension. It also had higher mean score on the total test score than the other group (20.33 and 7.47 respectively). All the differences between both groups were statistically significant at 0.05 level and all F-values were 58, which implies that both groups were heterogeneous in terms of the post-reading comprehension test. These differences can be attributed to the word attack skills-based program, which had an effect on enhancing EFL students' reading comprehension.

Table (4) T-values comparing the experimental group's mean scores on the skills of the pre- and post- reading comprehension tests and the total score of the test

Skills of the reading comprehension test	Group	N	Mean	Std. deviation	T. value	df	Level of sig
Understanding explicitly stated information	Experimental	30	1.73	0.52	6.05	58	Significant
	Control	30	0.73	0.74			
Understanding information when not explicitly stated(inferencing)	Experimental	30	1.93	0.37	8.68	58	Significant
	Control	30	0.67	0.71			
Guessing the meaning of vocabulary in context	Experimental	30	1.40	0.62	4.63	58	Significant
	Control	30	0.67	0.61			
Reading for specific information (scanning)	Experimental	30	1.90	0.31	8.45	58	Significant
	Control	30	0.73	0.69			
Comprehending the sequence of events	Experimental	30	1.87	0.35	7.36	58	Significant
	Control	30	0.80	0.71			
Identifying main ideas	Experimental	30	1.90	0.31	9.44	58	Significant
	Control	30	0.63	0.67			
Identifying parts of speech in texts	Experimental	30	2	0.12	7.76	58	Significant
	Control	30	0.80	0.85			
Identifying pronoun reference	Experimental	30	2	0.12	8.12	58	Significant
	Control	30	0.70	0.88			
Reading for gist (skimming)	Experimental	30	1.97	0.18	8.65	58	Significant
	Control	30	0.67	0.80			
Giving one's opinion about the text (critical thinking)	Experimental	30	3.63	0.61	10.42	58	Significant
	Control	30	1.07	1.20			
Total test	Experimental	30	20.33	1.45	13.19	58	Significant
	Control	30	7.47	5.14			

Hypothesis 4: “There is a statistically significant difference at 0.05 level between the experimental group's mean scores on the pre-and post-reading comprehension tests in favor of the post-test”.

To verify this hypothesis, the t-test was used to compute the experimental group's mean scores on the skills of the pre-and post- reading comprehension tests and the total score of the test, as indicated in Table (5).

Table (5) T-values comparing the experimental group's mean scores on the skills of the pre- and post- reading comprehension tests, and the total score of the test

Skills of reading comprehension test	Measuring	N	Mean	Std. deviation	T. value	df	Level of sig
Understanding explicitly stated information	Post	30	1.73	0.52	6.92	29	Significant
	Pre	30	0.77	0.68			
Understanding information when not explicitly stated (inferencing)	Post	30	1.93	0.37	9.95	29	Significant
	Pre	30	0.70	0.65			
Guessing the meaning of vocabulary in context	Post	30	1.40	0.62	4.43	29	Significant
	Pre	30	0.70	0.79			
Reading for specific information (scanning)	Post	30	1.90	0.31	9.20	29	Significant
	Pre	30	0.70	0.70			
Comprehending the sequence of events	Post	30	1.87	0.35	5.96	29	Significant
	Pre	30	0.80	0.89			
Identifying main ideas	Post	30	1.90	0.31	8.96	29	Significant
	Pre	30	0.60	0.72			
Identifying parts of speech in texts	Post	30	2	0.12	7.76	29	Significant
	Pre	30	0.80	0.85			
Identifying pronoun reference	Post	30	2	0.12	8.51	29	Significant
	Pre	30	0.70	0.84			
Reading for gist (skimming)	Post	30	1.97	0.18	8.96	29	Significant
	Pre	30	0.67	0.80			
Giving one's opinion about the text (critical thinking)	Post	30	3.63	0.61	9.22	29	Significant
	Pre	30	1.07	1.34			
Total test	Post	30	20.33	1.45	12.52	29	Significant
	Pre	30	7.50	5.47			

Table (5) summarizes means, standard deviations of the experimental group's scores for pre-testing and post-testing to show the distribution of these means and the calculation of T-values. The results reveal that there was a statistically significant difference between the experimental group's mean scores for pre-testing and post-testing at 0.05 level, and F-values were $F = 29 = 2.05$. This means that the experimental group made significant gains

on all skills of the reading comprehension test, which was due to the effect of the training program on developing their reading comprehension.

Likewise, effect size was also employed to establish the effect of the training program on improving EFL students' reading comprehension in each skill of the test and the total test score. So, the eta square (η^2) was calculated to achieve this, as indicated in Table (6).

Table (6) Effect size of the training program on the experimental group's skills of reading

Skills of reading comprehension test	T-value	η^2	Effect size
Understanding explicitly stated information	6.92	0.62	Large
Understanding information when not explicitly stated	9.95	0.77	Large
Guessing the meaning of vocabulary in context	4.43	0.40	Large
Reading for specific information (scanning)	9.20	0.74	Large
Comprehending the sequence of events	5.96	0.55	Large
Identifying main ideas	8.96	0.73	Large
Identifying parts of speech in texts	7.76	0.67	Large
Identifying pronoun reference	8.51	0.71	Large
Reading for gist (skimming)	8.96	0.73	Large
Giving one's opinion about the text (critical thinking)	9.22	0.75	Large
Total test	12.52	0.84	Large

Table (6) shows that effect size for all the reading comprehension skills and the total test score was large. The η^2 values for the skills ranged between 0.40 and 0.77, whereas the η^2 value for the total test score was 0.84. This is attributed to the effect of the training program on developing the experimental group's vocabulary learning. By validating these two hypotheses, the second research question was answered.

Results of SES

Hypothesis 5: "There is a statistically significant difference at 0.05 level between the experimental and control groups' mean scores on the post-self-efficacy scale in favor of the experimental group."

To verify this hypothesis, the t-test for two independent groups was employed to compute the experimental and control groups' mean scores on the dimensions of the self-efficacy scale and the total score of the scale, as shown in Table (7).

Table (7) T-values comparing the experimental and control groups' mean scores on the post-self-efficacy scale and the total score of the scale

Dimensions of self-efficacy scale	Measuring	N	Mean	Std. deviation	T. value	df	Level of sig
Vocabulary learning	Post	30	23.60	2.72	7.34	29	Significant
	Pre	30	14.07	6.05			
Reading comprehension	Post	30	27.53	3.17	10.92	29	Significant
	Pre	30	14.73	5.17			
Total scale	Post	30	51.13	5.08	9.63	29	Significant
	Pre	30	28.80	10.58			

As Table (7) shows, the experimental group outstripped the control group in all dimensions of the self-efficacy scale. It also had higher mean score on the total test score than the other group (51.13 and 28.80 respectively). All the differences between both groups were statistically significant at 0.05 level and all F-values were 58. These differences can be attributable to the word attack skills-based program, which had an effect on improving the experimental group's self-efficacy beliefs in vocabulary learning and reading comprehension.

Hypothesis 6: “There is a statistically significant difference at 0.05 level between the experimental group’s mean scores on the pre- and post-self-efficacy scale in favor of the post-self-efficacy scale.”

To validate this hypothesis, the t-test was used to calculate the experimental group's mean scores on the dimensions of the pre-and post-self-efficacy scales and the total score of the scale, as shown in Table (8).

Table (8) T-values comparing the experimental group’s mean scores on the dimensions of pre- and post-self-efficacy scales, and the total score of the scale

Dimensions of self-efficacy scale	Measuring	N	Mean	Std. deviation	T. value	df	Level of sig
Vocabulary learning	Post	30	23.60	2.72	7.34	29	Significant
	Pre	30	14.07	6.05			
Reading comprehension	Post	30	27.53	3.17	10.92	29	Significant
	Pre	30	14.73	5.17			
Total scale	Post	30	51.13	5.08	9.63	29	Significant
	Pre	30	28.80	10.58			

As noticed in Table (8), there was a statistically significant difference between the experimental group's mean scores for pre-scale and post-scale at 0.05 level, and F-values were 29 = 2.05. These results reveal that the experimental group showed significant growth on all dimensions of the self-efficacy scale. These gains were due to the impact of the training program on improving the experimental group's self-efficacy beliefs in vocabulary learning and reading comprehension.

Like the previous procedures with vocabulary learning and reading comprehension, effect size was employed to establish the effect of the training program on improving the experimental group's self-efficacy beliefs in each dimension of the scale and the total score of the scale. So, the eta square (η^2) was computed to achieve this, as indicated in Table (9).

Table (9) Effect size of the training program on the experimental group's self-efficacy scale dimensions and the total score of the scale

Dimensions of self-efficacy scale	T. value	η^2	Size effect
Vocabulary learning	7.34	0.65	Large
Reading comprehension	10.92	0.80	Large
Total scale	9.63	0.76	Large

As can be noticed in Table (9), efficacy scale and the total test score was effect size for all the dimensions of self- large. The η^2 values for the dimensions

ranged between $.65$ and $.80$, whereas the η^2 value for the total test score was 0.76 , which indicates that the training program made contribution to the variance in all dimensions of self-efficacy at 84% . This is attributed to the effect of the training program on developing the experimental group's self-efficacy beliefs in vocabulary learning and reading comprehension. In light of the above results, it can be concluded that the fifth and sixth hypotheses were accepted.

Discussion of the results

The results presented above have ascertained the fact that the treatment had positive effects on EFL students' vocabulary learning, reading comprehension and self-efficacy. In other words, the word attack skills-based program had contributed to improving the three variables. These positive results were in line with other studies in both L1 and L2 contexts such as Baumann et al (2002), Baumann et al (2003), Tomesen and Aarnoutse (1998), and Walters (2006). In the preceding studies, L1 and L2 students received training in one or two of the word attack skills and demonstrated gains in vocabulary development or reading comprehension. For example, in Tomesen and Aarnoutse's (1998) study the participants were given training in context and morphological analysis, while in Walters' (2006) study the participants were given training in three methods of instruction in using context. On average, all these studies yielded similar results to the current study.

In view of the studies conducted in EFL contexts, it was found that all the results of such studies agreed with those of the current study. As is the case with the studies in L1 contexts, the students received training in one or two word attack skills. For example, Lo (2004) trained Chinese students in inferring word meaning from context using a general strategy and found

that using this strategy had improved the students' vocabulary learning and reading comprehension, which again concurred with the results of the current study. Khalaf (2010) and Abdelqader (2007) focused on teaching Egyptian students inferring strategy and context clues, and proved that teaching these strategies enhanced the students' ability to infer meaning from context and reading comprehension. Such results concurred with those of current study. In Zaid (2009) and Shokouhi and Askari (2010), students were given training in contextual inferencing. These studies found that training in contextual inferencing developed the Saudi or Iranian students' vocabulary or reading comprehension, which were once more in agreement with the results of the current study.

Conclusion

Results of this study, supported by previous studies, reached the following conclusions:

1. The training program improved students' ability to identify word meaning from context, and in turn their reading comprehension skills.
2. It raised students' awareness of the importance of using both intraword clues and interword information for the derivation of word meaning from context, which developed their vocabulary.
3. It raised students' awareness of the importance of using word analysis such as grammatical function (whether it is noun, verb, etc.), and word parts such as roots, prefixes and suffixes.

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