

Original Article

Impacts of Cognitive and Metacognitive Strategies on Vocabulary Learning in Junior Students

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Abstract

According to the importance of vocabulary and expanding the range of vocabulary in English learning, today it is effective and necessary to use methods and strategies to increase the amount of learning and the speed of learning. This research has used a mixed method and the purpose of this research is to investigate the effect of cognitive and metacognitive strategies on the learning of English vocabulary of junior high school students. To conduct this research, 25 students aged 13 to 15 years were selected through an English proficiency level test to ensure that students were at the same level in English skills. The students were divided into two experimental and control groups, and a pre-test was done. Then vocabulary was taught to the students based on cognitive and metacognitive strategies, and finally, a post-test was taken from them and Karami's questionnaire (2002) was given to them. Finally, to investigate the performance of the two groups and the effect of training based on cognitive and metacognitive strategies, independent sample t-test, ANOVA, and paired samples t-test was used. The most important finding of this research is that cognitive and metacognitive strategies have been effective in English vocabulary learning of junior high school students, and they use cognitive strategies more than metacognitive strategies to learn English vocabulary.

Keywords: Cognitive strategies, English, Junior, Language, Metacognitive strategies, Students, Vocabulary

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1. Introduction

Vocabulary knowledge is one of the effective parts and important factors learning in any language. A wide range of vocabulary requires familiarity with connotation, collocation, spelling, and so on, so vocabulary learning and the use of lexical items and strategies are effective, important, and original factors in expanding knowledge. Vocabulary in the term of linguistics refers to a semantic system that determines the main or grammatical bases of words, and the theologians of any language, in addition to the set of phonetic, morphological, syntactic and semantic systems of their language, also learn the vocabulary of that language (Halliday, Webster, 2006). In each language, that language is examined structurally, historically, and sociologically, and etymology, linguistics, and semantics are also examined and are among the most important factors related to vocabulary in any language. (Golzarnia, Rahmani, 2018)

The vocabulary of the language is influenced by cultural and social factors and therefore changes more than any other part of the language. Vocabulary carries basic knowledge, and for most languages in the world, there is a vocabulary to use in specific or general applications, and the type of knowledge hidden in vocabulary depends on the application for that purpose. (Schmitt, 2014).

Apart from the category of interest in learning English, today learning English is considered one of the main necessities of life, and by learning English words, the range of words increases, so to increase the level of English language skills, learning English words is one of the main needs. The English language consists of four main skills: listening, reading, writing and speaking, and learning language skills is not possible without familiarity with English grammar and strengthening vocabulary. Increasing vocabulary in English improves communication areas such as listening, speaking, reading, and writing, and allows the learner to be more successful in speaking or writing words. Of course, learning English words is not possible without practice. Considering the importance of vocabulary in learning that language, it is therefore inferred that without the use of words, one cannot speak, even if there is familiarity with all the grammar rules of that language. In general, it can be said that the first step to mastering the English language is to have a wide vocabulary and learn as many English words and phrases as possible.

The first step to learning English vocabulary effectively is to determine what the learner is focusing on and determine the learning goals, and if he is interested in a specific topic and goal, he can start learning with that topic. The most successful English learners are motivated to study because they choose words based on their interests and needs, but if they choose words that are not useful, they will be much less successful in remembering and using them in the text. If there is a more general purpose for learning English, such as communicating with people or reading the news, it is better to focus on words that are used more often in the target language. If in learning English words, there are difficult and ambiguous words in the texts, the students are curious to know the definitions of the words and sometimes the students are persuaded by the teachers to find the definitions and meanings through the dictionary (Catalan, 2003). Having a wide vocabulary is the turning point of victory in the hands of every language learner, by which he strengthens his language skills with the help of grammar, but acquiring this language knowledge is not an easy task, and learning in the early stages requires effort and the use of methods, it is affected.

Memorizing and learning new words in English are important and understand the meaning of a word alone is not enough, we must know its use in a sentence and remember its synonyms and antonyms. Language knowledge is at an appropriate level. It is supposed to be able to understand well different contents in that language and understand their meaning.

One of the important and main sources of learning English are books, applications or educational methods that specifically teach English vocabulary. The first and most essential method to quickly learn English words is to read a lot, and using words in the form of phrases and sentences is useful in remembering words better. English language learners use different methods to learn English words and phrases, so to find the best way to increase the range of English vocabulary, try one or more methods and finally you can conclude which method and methods It has been more useful and effective in increasing the range of vocabulary, but sometimes only one method may be effective, and in some cases a combination of several methods can be effective for the learner.

After getting to know the basic structure of the English language, language learners unconsciously show great interest in learning the latest English words, but language learners need to learn new words. English students should not be limited only to the meaning of those

words, but they should also be familiar with their use in the sentence. Research (Haynes, 2013), shows that to learn English words, a suitable time frame should be used to review words. When a language learner learns a new word in different ways, he must review it first, and in the next step, after six to seven days, review the same word again and postpone the next review to a month later.

By using these days, new words will be well remembered. The first step to effectively learning English vocabulary is to determine what to focus on and to determine the learning goals, and if there is interest in a particular topic and goal, start with it. The most successful English language learners are motivated to study because they choose words based on their interests and needs, but if they choose words that are not useful, they are much less likely to be successful in remembering them and using them in the text. If there is a more general purpose for learning English, such as communicating with people or reading the news, it's a good idea to focus on words that are most commonly used in the target language.

In the English language, many words are made from a common root and originate from the fact that these roots can be used with different suffixes or prefixes, but by learning these roots, which are usually rooted in Greek or Latin, The approximate meaning of many other words is understandable and makes them easy to learn. On the other hand, finding the meaning of an English word in a dictionary or reading its equivalent in Farsi is a difficult task, but in the first attempt to learn words, it is understood that just reading the meaning of words does not mean learning words, and in most cases, the meaning The new word is forgotten. Finding the roots of English words is usually considered one of the modern tricks for learning words, but finding roots is deep and difficult digging, but on the other hand, the key to learning and understanding new English words is through understanding the roots of that word. Understanding the roots of words can make it easier to break down large and new words into smaller units to discover their meanings. In some cases, to increase the range of English words, a method such as homophones is used, in which you can use the homophones of the word with its Persian meaning.

If students expand their English vocabulary, they can better realize and learn metacognitive strategies such as reading texts in lessons and as a result, they will be better performance in school. In contrast to vocabulary expansion, there is limited vocabulary that has

negative effects on metacognitive strategies and their performance in schools (Stanovich, 1986). Evaluating the performance of students and their understanding as a metacognitive strategy and adjusting *cognitive* strategies can be expanded vocabulary and be related to reading comprehension and vocabulary (Blachowicz, 1986).

Cognitive strategies are learning methods that help a person process information, these strategies are very task-oriented, and metacognitive activities are supervisory and are used to monitor and evaluate cognitive strategies and control and guide them. (Rivas, Saiz, Ossa, 2022). Metacognitive strategies help students to understand and are considered the main and important aspects of learning strategies. And they are used only when planning, reviewing and evaluating a cognitive strategy. Cognitive strategies are the purpose of implementation used for a specific purpose, but metacognitive strategies are used to ensure the realization of the goal. Metacognitive experiences usually follow cognitive activities.

Practices such as repetition and reviewing information are related to cognitive strategies and, practices such as evaluation, monitoring, testing are related to metacognitive strategies that are effective on students' performance and long-term memory, so some research on EFL and ESL learners shows that metacognitive strategies such as planning and evaluating are effective on vocabulary learning and creates a sense of autonomy in students learning.

Vocabulary knowledge is one of the most important factors that determine the level of a language learner, therefore there is a strong and meaningful relationship between the learner's vocabulary and his skills in using the language. Therefore, to strengthen the basic and standard of language skills, we must first focus specifically on increasing vocabulary skills. Considering the importance of vocabulary and vocabulary development in learning English better and developing language skills, both English language learners and teachers should focus on this important issue and find ways and means that help to expand vocabulary. use it, and be aware of its positive effect in improving the four skills, i.e. listening, speaking, reading and writing skills. Sometimes, learners do not have any information about the methods and methods used in vocabulary development, and sometimes coherent and effective methods are not used by teachers to improve learners' vocabulary development.

So present research evaluates the vocabulary learning strategies of language learners and helps them in expanding vocabulary learning strategies, improving vocabulary learning and

creating motivation and independence. Therefore, this study refers to cognitive and metacognitive strategies and their functions in English learning and has considered effective strategies for vocabulary learning through cognitive and metacognitive strategies.

2. Literature review

Previously, English language learning focused on learning grammar and vocabulary, and some researchers believed that learning grammar rules provide conditions for learning the vocabulary needed to communicate and English learning, So Wilkins (1972) states that “while without grammar very little can be conveyed, without vocabulary, nothing can be conveyed”(p. 111). The research and use of strategies in English language learning began in the 1970s and the use of strategies in vocabulary learning between language learners is different. Wenden (1987) states that the use of strategies in language learning is a guide that learners use to learn a new language.

2.1. Cognitive and Metacognitive Background

The educational system of a country is the main and important infrastructure in social, economic, political and cultural societies, and educational progress is also considered a sensitive and important issue in the educational system of that country, and the special and special attention of the educational system of each country to the issue Academic progress is to achieve and improve the academic level of students who do not have enough motivation and interest to learn. Among the factors affecting the academic progress of students, we can mention the provision of learning strategies in the classroom, in most cases these strategies have been effective.

Oxford (1990) states that strategies used in language learning are methods and actions used by language learners to learn faster and easier. Metacognitive strategies in vocabulary learning are effective strategies for learning and expanding knowledge from one context to another context and some cognitive researchers (Alavi, Kavianpanah, (2006).

Mayer (1981) believed that learning through cognitive strategies depends on knowledge and information about it (Gagne, 1985; Mayer, 1981; Weinstein & Mayer, 1986). According to Cohen (1996), cognitive strategies include Retrieval and storing words and phrases, but Farragher-Paras (2004) believed that cognitive strategies include: Practicing, organizing,

scanning, etc. Schmitt (1997, 2000) also believed that there are two strategies in vocabulary learning, one of them is the exploration strategy, which refers to social strategies and the other strategy is stabilization which refers to cognitive and metacognitive strategies, and the second strategy, learners find the meaning of new words.

Sato and Loewen (2018) state that metacognitive strategies depend on learners and the realization of tasks related to them. Other researchers state that the realization of tasks by learners has effects on their motivation and consequently on metacognitive strategies (Ashoori et al 2014).

While other researchers believe that learning through metacognitive strategies creates long learning for language learners, so metacognitive scaffolding can be effective in the learning of EFL learners. (Hossein Khani et al 2023).

2.2. Empirical studies

Ashuri et al (2013) conducted research and found out that students who used cognitive and metacognitive strategies for learning had a better level of progress than students who did not use these strategies. And the academic progress of students increases their motivation and continuing education.

Gu and Johnson (1996) conducted research and showed in their research that English language students don't have the desire to memorize and are interested in the extensive use of the dictionary, use of cognitive and metacognitive strategies, and practice. Finally, they also found that there is a considerable relationship between English proficiency and metacognitive strategies. Banisaeed (2010) conducted research on the effects of vocabulary acquisition through strategy learning and autonomy and finally found that if learners use cognitive strategies to learn vocabulary, they will be autonomous in their learning.

1. Is there a difference between students who use cognitive and metacognitive strategies and students who don't use these strategies?

2. What cognitive strategies do junior high school students use more in learning vocabulary?

3. What metacognitive strategies do junior high school students use more in learning vocabulary?

3. Methodology

This research used a mixed method. Data were collected through pre-test, post-test, and cognitive and metacognitive strategy questionnaires.

3.1. Participants

The recent study is a pilot study and the samples were selected using non-random convenience sampling. The participants were selected through an English skill level test and 25 students, 19 female, and 6 male students were selected among 33 participants in an institution in a small city in the southeast of Kerman province. The participants had an intermediate command of English and their mother tongue was Farsi. The participants were 13-15 years old ($M=14/12$, $SD=0.81$).

Table 1.

Demographic Background of the Participants

Students	25
Gender	19 female, and 6 male
Native Language	Farsi
Age	13-15

3.2. Instruments

Instruments used in this research were English books for schools Prospects and junior programs which were compiled by the Educational Planning and Research organization and were used to test the student's vocabulary level in multiple-choices format. The Family and Friends books written by Naomi Simmons were used for the vocabulary pre-test and post-test in multiple-choice format.

Karami's questionnaire (2002) was used to collect qualitative data. This questionnaire contains 86 items with cognitive and metacognitive strategies, of which 49 items are related to cognitive strategies such as repetition, expansion of meaning, and organization. 37 items are related to metacognitive strategies such as self-knowledge and control, and process knowledge and control. The answer to this questionnaire is based on numbers 1 to 9. In this questionnaire, Cronbach's alpha coefficient is used to determine reliability.

3.3. Data Collection Procedure

To carry out this research and the effect of cognitive and metacognitive strategies on the vocabulary learning of junior high school students, first, to ensure that the learners are at the same level in English skills, a multiple choice vocabulary level test (family and friends) was held and the target learners were selected. Target learners had an intermediate level of English language skills. The language learners were divided into two groups, experimental and control groups. And then pre-test was taken from learners. And for two weeks, 6 sessions, each session 30 minutes, a new vocabulary was taught based on the cognitive and metacognitive strategies mentioned in the materials section. Then, the post-test was taken from the learners, and finally, Karami's questionnaire (2002) was given to the students to collect qualitative data. Quantitative and qualitative data analysis was conducted using SPSS 23, and first quantitative data and then qualitative data were collected and analyzed

4. Results

In this section, in addition to the quantitative statistics related to the first question of the research, the independent t-test results to compare the performance of students in the two experimental and control groups using cognitive and metacognitive strategies and the results of the cognitive and metacognitive strategies questionnaire related to the questions the second and third research is aimed at achieving cognitive and metacognitive strategies that are mainly used by students to learn vocabulary is also provided.

About the first question, whether there is a difference between students who use cognitive and metacognitive strategies in vocabulary learning and students who don't use these strategies to learn vocabulary, first the normality of the data in the experimental and control groups was checked. Based on this, Table 2 and histograms 1.1 and 1.2 show the normality of students' performance in the control and experimental groups.

According to the samples in this research $N < 2000$, the Shapiro-Wilk test was used to check the normality of the samples in the two experimental and control groups. Based on this test, if the significance or p-value > 0.05 , then the data has a normal distribution in the pre-test, post-test, and control groups. So it was determined according to the significance level in the

analysis of existing research, data that was > 0.05 , and both groups of these research have a normal distribution and the independent t-test can be done.

Table 2.

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Pretest	.181	12	.200*	.918	12	.270
Posttest	.144	12	.200*	.927	12	.350
Control group	.140	12	.200*	.946	12	.583

Figure 1.1.

Pretest Stem-and-Leaf Plot

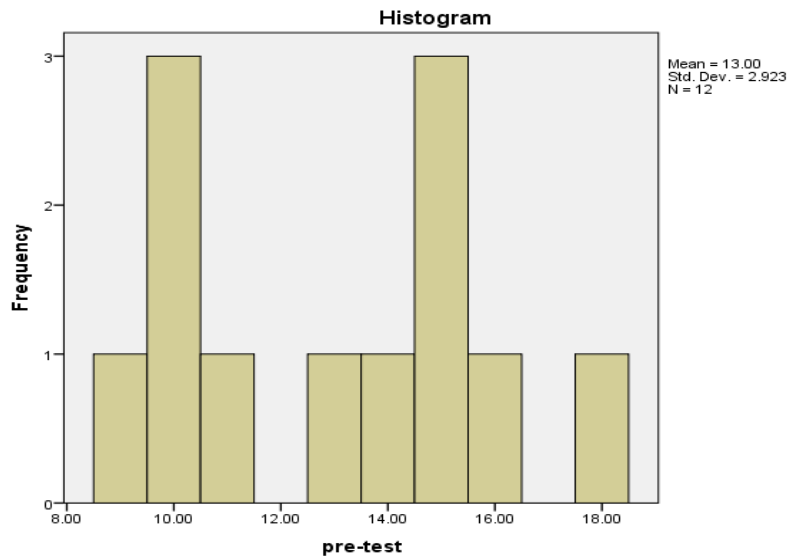
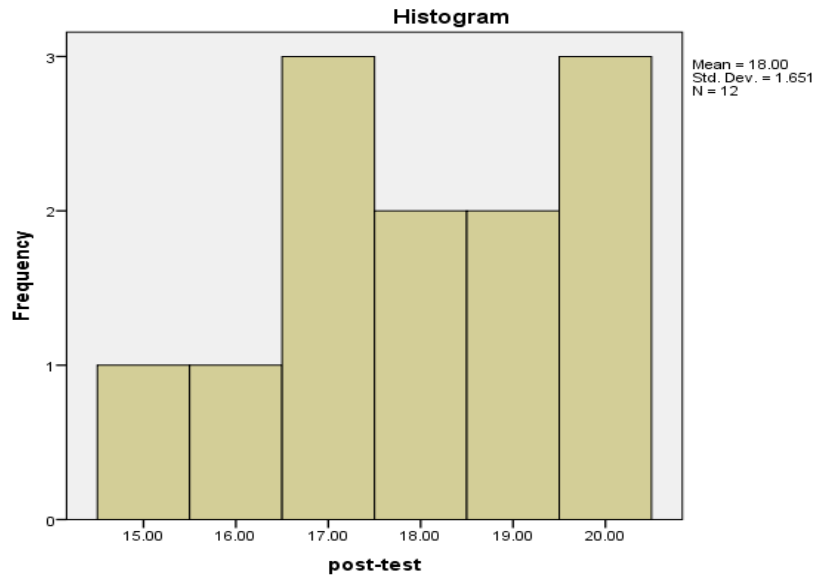


Figure 2.2.

Post-test Stem-and-Leaf Plot



Tables 3 and 4 show group statistics and independent samples test for the available data. Considering that one of the inferential statistics for measuring the homogeneity of variances in several independent societies is to use Levin's test. According to this test, if the significance or p-value < 0.05 , the variances are not homogeneous. This test was obtained by using the option of comparing the mean of two independent groups.

According to the p-value or significance in the table related to independent sample T-Test analysis, this value is < 0.05 , so there is a significant difference between the two groups, so it can be concluded that the Mean of the first group is 18.0000 ± 1.58114 and the Mean of the second group is 13.8333 ± 3.27062 , and therefore the Mean of the two groups is not equal. Therefore variance of the two groups is not visual and there is a significant difference between the two experimental and control groups after the implementation of cognitive and metacognitive strategies and these strategies were effective.

Table 3.

Group Statistics of Independent Samples t- test

	Groups	<i>N</i>	Mean	<i>Std. Deviation</i>	<i>Std. Error Mean</i>
Experimental- posttest Group	control	13	18.0000	1.58114	.43853
		12	13.8333	3.27062	.94415
group	control				

Table 4.

Independent Samples t-test

	Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means						
	<i>F</i>	<i>Sig.</i>	<i>T</i>	<i>df</i>	<i>Sig.</i> (2-tailed)	Mean difference	<i>Std. Error Difference</i>	95% Interval Difference	Confidence of the
experimental- Equal Variances	7.526	.012	4.108	23	.000	4.16667	1.01434	Lower 2.06834	Upper 6.26500
			4.002	15.593	.001	4.16667	1.04102	1.95511	6.37822
control group assumed Equal Variances not assumed									

To ensure of results of the research, the next tests, ANOVA and paired samples tests were conducted. ANOVA between pre-test and post-tests and paired samples T-TEST between post-test and control group. The results of these tests are available in Tables 5 and 6. Based on the available data and significance or p-value < 0.05 and regarding the first research question it can be concluded that cognitive and metacognitive strategies were effective in the experimental group and there is a difference between students who use cognitive and metacognitive strategies and students who don't use them.

Table 5.

One-way ANOVA

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	Sum of Squares	<i>Df</i>	Mean Square	<i>F</i>	<i>Sig.</i>
Between Groups	193.885	1	193.885	29.595	.000
Within Groups	157.231	24	6.551		
Total	351.115	25			

Table 6.

Paired Samples Statistics

		Mean	<i>N</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>
Pair 1	Pre-test	12.5385	13	3.25616	.90310
	Post-test	18.0000	13	1.58114	.43853

Table 7.

Paired Samples Test

	Mean	<i>Std. Deviation</i>	Paired Differences <i>Std. Error Mean</i>	95% Confidence Interval of the Difference		<i>T</i>	<i>Df</i>	<i>Sig. (2-tailed)</i>
				Lower	Upper			
Pre-test								
Post-test	-5.46154	3.84308	1.06588	3.139	-7.78389	5.12	12	.000
				19		4		

The next analysis of this research is related to the analysis of Karami's questionnaire (2002) of cognitive and metacognitive strategies. Tables 6 and 7 show the frequency, Mean, Median, Mode, Standard Deviation, Variance, Range, Minimum, Maximum and total age of the students responding to the questionnaire, percentage, valid percentage, and cumulative percentage. The number of students in this qualitative analysis includes 7 thirteen years old students, 7 fourteen years old students, and 10 fifteen years old students.

Table 7.

Statistics of Age

N	valid	25
Missing		0
Mean		2.12
Median		2.00
Mode		3
Std. Deviation		.833
Variance		.693
Range		2
Minimum		1
Maximum		3
Sum		53

Table 8.

Frequency of Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Thirteen years old	7	28.0	28.0	28.0
	Fourteen years old	8	32.0	32.0	60.0
	Fifteen years old	10	40.0	40.0	100.0
	Total	25	100.0	100.0	

As mentioned in previous sections, cognitive strategies include 49 items and metacognitive strategies include 37 items. Cognitive strategies are given to the students respectively: Special organization strategies for simple and complex tasks, special development strategies for simple and complex tasks, and special repetition and review strategies for simple and complex tasks. These items were analyzed separately.

Table 9 shows the data analysis related to the cognitive strategies of the questionnaire, in this table, the number of participants, Mean, Median, Mode, Standard Deviation, and Variance of the cognitive strategies of the special organization of simple and complex tasks, cognitive strategies of special development of simple and complex tasks, cognitive strategies of repeating and reviewing simple and complex tasks.

As it is clear in the table, the students have selected respectively: repetition and review cognitive strategies for simple and complex tasks ($M = 8.12$, $SD = 1.394$), cognitive development strategies for simple and complex tasks ($M = 8.04$, $SD = 1.513$), Special organization strategies for simple and complex tasks ($M = 6.84$, $SD = 1.972$) for special organizational cognition. Regarding the second research question, it can be concluded that junior high school students in

English learning vocabulary use more cognitive strategies such as repetition and review, development strategies, and special organization strategies respectively.

Table 9.

Cognitive strategies

		cognitive(special organization strategies for complex and simple tasks)	cognitive (development strategies for simple and complex tasks)	cognitive (repetition and review strategies for simple and complex tasks)
N	valid	25	25	25
Missing		0	0	0
Mean		6.84	8.04	8.12
Median		8.00	8.00	9.00
Mode		8	9	9
Std. Deviation		1.972	1.513	1.394
Variance		3.890	2.290	1.943

As mentioned in the previous sections, the metacognitive strategies of the questionnaire included 37 items, which include self-knowledge control and knowledge and process control. Table 10 shows the Mean, Median, Mode, Standard Deviation, and Variance of metacognitive strategies that include self-knowledge and control and knowledge and process control, respectively.

Table 10.

Metacognitive strategies

		metacognitive (self-knowledge and control strategies)	metacognitive (knowledge strategies and process control)
N	valid	25	25
Missing		0	0
Mean		6.92	7.36
Median		8.00	8.00
Mode		8	8
Std. Deviation		1.977	1.287
Variance		3.910	1.657

As it is clear in the table, students have chosen metacognitive strategies of knowledge and process control (M=7.36, SD=1.287) and metacognitive strategies of self-knowledge and control (M=6.92, SD=1.977) respectively. Regarding the third research question, it can be concluded that junior high school students in English learning vocabulary use more metacognitive strategies such as knowledge and process control and self-knowledge and control respectively.

5. Discussion

The findings of this study showed the benefits of using cognitive and metacognitive strategies in learning English and indicated that first-year high school students use metacognitive strategies to learn English vocabulary more than cognitive strategies, the primary finding of research and analysis and The analysis of the results emphasize the effective role of cognitive and metacognitive strategies in English language learning of first secondary students and the results indicated that there is a difference between students who use cognitive and metacognitive methods in learning English and students who there is a significant difference and the students who used cognitive and metacognitive strategies had better grades than the control group at the end of the course, which is by the findings reported by Alavi and Kaivanpanah (2006).

The results of the pre-test and post-test comparison of these students using ANOVA statistical analysis, the results of the post-test comparison with the control group using the paired t-test and the independent samples test, comparing the P-value and Levin's test in the independent samples test showed that between the experimental and control groups There is a

significant difference and the use of cognitive and metacognitive strategies by the teacher in the classroom has been effective in learning English vocabulary.

Therefore, the answer to the first research question that there is a difference between the experimental and control groups was confirmed. The second finding of the research is based on Kerami's analytical questionnaire (2002) and compares the average of cognitive strategies (repetition and review, expansion strategies, specific organizational strategies) and metacognitive strategies (self-knowledge and control, knowledge and process control) and it was observed that knowledge In learning English vocabulary, students have used more cognitive strategies, repetition and review, development strategies and special organization strategies for simple and complex tasks, which is according to the findings of Banisaeid (2013).

The third finding of his research was based on Kerami's questionnaire (2002) and the metacognitive strategies used by students were: knowledge and process control (planning, evaluation, and discipline), and self-knowledge and control (commitment, attitude, and precision).) which is consistent with the findings of Weiwei, Lawrence (2021). This research will increase the level of teachers' awareness of effective strategies in vocabulary learning by students and finally familiarize students with effective strategies in strengthening vocabulary learning.

6. Conclusion

According to the results of this research, there is a significant difference between the students who use cognitive and metacognitive strategies and the students who don't use these strategies, and the experimental group had higher scores in English language learning vocabulary than the control group.

Regard to the results of this research, cognitive strategies were used more than metacognitive strategies by junior high school students. This research showed that teachers in institutions and schools should pay special attention to the use of cognitive and metacognitive strategies in their classes in learning English vocabulary.

In this research, factors such as the age and language level of the students were considered and this research was limited to the students of the junior high school in one institution, but other research to achieve English language learning through cognitive and metacognitive

strategies can be done with a larger number of students and in other age groups and the effect of these strategies on the language skills of the participants.

Finally, the familiarity and effectiveness of these strategies by teachers are important for students' awareness of using strategies for better learning. According to the results of this research and the most effective strategies obtained in this research, it is suggested that teachers encourage students to use the effective strategies of this research to learn vocabulary better.

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