

**The effect of the scientific stations strategy on  
developing the generative thinking of the fifth  
grade students in the English language subject**



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The current research aims to identify the effect of the strategy of scientific stations in developing the generative thinking of the fifth grade students in the English language subject. The researcher used the experimental design with two groups (controller and experimental), and the sample size was (58), with (29) controls and (29) experimental. The two groups according to the plans The pre-prepared test re-tested the generative thinking, then the researcher analyzed the results statistically. The results showed that there are statistically significant differences between the pre-test and the post-test in generative thinking in favor of the post-test, and there are statistically significant differences between the average difference between the two groups in generative thinking in favor of the experimental group.

Keywords: strategy, educational stations, generative thinking, English language.

## First, the research problem:

Through reviewing a number of literature and the results of previous studies, the researcher noticed that there are some difficulties that middle school students face during their learning period in the middle school stage, and the most important of these difficulties is the use of the usual methods and methods in their education, which are based on memorization, memorization, and neglect of generating ideas for them because they are recipients. negative, Also, the failure to use the appropriate teaching aids, in addition to the lack in most of our schools to this day of an English language laboratory, except in rare cases, which led to a weak ability to generate ideas for the students. In developing the generative thinking of the fifth year middle school students in the English language subject?

## Second: The importance of research:

What our world is witnessing in the current era of scientific revolution and major technological changes in the field of science and modern technologies have caused the so-called massive cognitive development that has clearly affected the lives of individuals and the way they deal with these changes, as technology is the mainstay in the current era that affects all The fields, especially in the educational process, being the field most affected by the changes taking place around them.

(Al-Huwaidi, 2010: 99)

As the goal of education is to build the human personality in line with the developments taking place in the course of society, and it is the most important means that societies adopt in the construction, development and cultural upgrading processes through the comprehensive preparation of female students in the aspects of their different personalities, who will have an active role in bringing about development in all its aspects.(Mahdi et al., 2002: 3)

In order for education to seek to achieve its goals, it must be a scientific education that provides the student with information and functional concepts and develops his scientific trends and ways of thinking to make him able to understand the environment around him and face the problems he encounters (Al-Khafaji, 2013: 4.)The main goal of scientific education is to prepare female students who are able to produce new things and not to repeat the existing knowledge and to re-do what was produced by previous generations.(Alyan, 2010: 105)

Teaching methods are one of the pillars of scientific education and the focus of any effective teaching and have an important role in communicating the different experiences, information and concepts that the teacher wishes to gain to his students.

The English language requires a teaching method that attracts the attention of the students throughout the lesson

(Abu Laila, 2017: 3)

It is one of the curricula that enjoys constant change because it is one of the main pillars in developing the students' experience and developing their thinking and skills

(Zaytoun, 2005: 55).

Among these strategies is the strategy of scientific stations, as scientific stations are based on Brunner's exploratory theory because the student will practice discovery while doing the practical experience by reading a subject and to Piaget's theory in its active role in obtaining information and avoiding memorization and indoctrination and to the Scheman investigative model of dialogue, discussion and questions (yes, no This strategy emphasizes the active role of female students in learning by distributing female students in groups who roam on different stations related to the topic of the lesson, such as conducting an experiment, meeting a specialized expert, reading a text and solving a problem, which was confirmed by (Ambo Saidi and Al Balushi) that the scientific stations contribute to the diversity of practical

and theoretical experiences as well. On the development of science processes. (Ambo Saidi and Al Balushi, 2009: 284-285)

The strategy of scientific stations designed by (Dennis Jones) is one of the modern and interesting teaching strategies, as it represents one of the forms of diversity and distinction of methods and methods of teaching the English language and gives an atmosphere of fun, movement and change in the place and this is necessary for students to increase their desire and love for learning. (Al-Maadidi, 2016: 22)

The strategy includes more than one educational station, each of which has a specific characteristic, skill, or exercise that distinguishes it from other stations.

**The stations are circular in clockwise direction. The stations contribute to the following:**

Acquisition of scientific concepts

Acquisition and development of science processes

-Developing intelligence and developing students' abilities

Giving enough time for interaction between the teacher and the student

It gives students the opportunity to research and discover (Hayawi, 2017: 10)

Teaching thinking skills is of special importance, because the rapid changes and the flow of information have no limits in our current age. Rather, on the general level, especially that the majority of psychologists, researchers and educators have come to accept that the ability to think generative is common among all people, as they are given opportunities and then be guided by teachers with the right guidance. (Worship, 2005: 6)

The global interest in teaching thinking during school subjects in general, and science in particular, has increased, especially after the information revolution that shook the whole world. The importance of activating the learner's mind, stimulating his mental abilities and developing his thinking skills, including generative thinking skills.

(Al-Balla'i, 2006: 15)

Teaching generative thinking and developing its skills for learners has become an urgent need more than ever, as a result of the challenges and complexities that require them to play an active role in the educational process, as well as practicing the processes of interpretation, examining hypotheses, searching for assumptions, and being preoccupied with solving real problems. Traditional classroom interaction patterns in a way that provides opportunities for learners to generate their ideas and information instead of limiting their role to listening to their ideas. (Al-Qahtani, 2018: 106)

**The importance of the current research in the following points:**

1-Using a modern and effective strategy such as the strategy of educational stations, which keeps pace with the development and educational progress and scientific modernity on which learning theories focus.

2- The importance of the English language subject as a human subject because of its importance in the lives of students and society and its relationship with other sciences

3- Shedding light on the importance of generative scholastic thinking as one of the needs of modern education and as one of the most important goals of teaching English.

4- It may contribute to drawing the attention of researchers and graduate students to educational stations, not to conduct future research in this field.

**Search objective:**

**The current research aims to identify:**

The effect of the scientific stations strategy in developing the generative thinking of the fifth year middle school students in the English language.

**research assumes:**

1- There is no statistically significant difference at the level (0.05) between the average scores of the female students in the pre and post generative thinking test for the experimental group that was studied according to the strategy of educational stations.

2- There is no statistically significant difference at the level (0.05) between the average scores of the students of the experimental and control groups in the generative thinking test.

**search limits:**

1-Fifth year middle school students who are on duty for the academic year (2021-2022).

2-The first semester.

3- The English language book for the fifth grade of middle school.

**Define terms:**

Al-Masoudi (2015) defined it as: “The actions taken by the teacher or teacher to achieve the desired outcomes that are based primarily on learning models and theories and are linked to educational activities and are planned in advance” (Al-Masoudi et al., 2015: 65).

**The procedural definition of the strategy:** It is a set of procedures and activities that the researcher prepares and plans in advance to enable him to organize his work and achieve the objectives of his research in a sequential manner.

### 2-Scientific Station Strategy

Al-Shoun and Al-Shibawi (2016) defined it as: “The presentation of the content of the course in various forms of scientific activities that students practice in the classroom or laboratory and are diverse” (Al-Shoun and Al-Shibawi, 2016: 40).

**The procedural definition of the strategy of scientific stations:** It is a set of modern teaching activities and procedures that are presented to the students in the lesson, which makes the student move from the abstract to the tangible. The stations are of three types (reading, electronic, audio-visual, and exploratory).

### 3-Conductive Thinking

He (Ali, 2011) defines it as: the ability to use previous knowledge, not to add new information in a constructive way, as the learner, according to this stage, connects the new information with the information available to him in his knowledge structure (Ali, 2011: 213).

**And procedural generative thinking is defined as:** The use of previous knowledge to add new knowledge measured by the grades obtained by the students of the fifth year of middle school when they answer the test prepared for the purposes of the current research.

### Theoretical background:

#### First: Scientific station strategy:

The science stations strategy is one of the modern teaching strategies, and it is one of the cooperative learning strategies, and it has great importance in teaching scientific subjects, especially science, as the nature of the science subject combines the two sides of knowledge (theoretical and practical), and this strategy attempts to combine these two aspects with the types of stations in it. According to the nature of each lesson, these stations were designed by the scientist (Jones, 2007) to overcome the lack of educational activities, as this strategy adds an atmosphere of fun and positive movement for students accompanied by learning by practicing those activities. (Ambo Saidi, 2011: 125)

#### Types of scientific stations:-

There are many types of scientific stations whose design depends on the topic of the lesson, and two or more stations can be combined in order to design a model that fits the nature of the educational situation, the learners and the available time, and among these types are the following:

1- Exploration station: This station is concerned with laboratory or practical activities that require conducting a specific experiment that does not take a long time to implement.

2- Reading station: This station depends on the teacher’s preparation of the reading material. It may be a text from a book or an educational magazine that aims to form independent students who have the ability to extract knowledge from its sources and have the skill of independence in learning.

3- The electronic station:- If the teacher in such a station needs a computer or an iPad, a small clip is shown on the topic of the lesson using the PowerPoint program, or watching a simple video, or searching on the Internet, as it does not take a long time.

4-Audio-visual station: where a recording device (recorder) or a television is used, from which students listen to or watch what the teacher has prepared in advance about the topic of the lesson, and then answer the specific questions.

(Hayawi, 2017: 25)

#### Application steps for the scientific stations strategy:

There are three main steps in the implementation of the stations strategy according to the following:

##### 1- Roaming on all stations:

If the station needs a short time to complete, it is possible to design (6) different stations, and divide the class into groups of (4-6) students in each group, then the groups begin to distribute to those stations, each group on a station, and the teacher determines A time that may reach five minutes, after which he instructs the students to move to the next station, as each group begins by moving to the station that is located to its right or to its left, according to the law that the teacher sets at the beginning of the lesson. For each group

to stay in the new station for five minutes as well, and then move to the other station and so on, then the groups return to their places, and the teacher begins to discuss the worksheet, and discuss the group's results in each station, after which the activity closes.

## 2- Roaming on half of the stations

Some activities in some lessons require a time of more than 5 minutes, so the teacher or teacher resorts to shortening the number of stations by half, instead of groups passing through 6 stations, only 3 stations are passed, as similar stations are designed for each activity, two stations, for example, two reading stations and two electronic stations, and so on The stay at each station takes approximately (10) minutes.

## 3- Fragmented Education-:

This design is used when there is a need to shorten the time. In this design, the student plays the role of the teacher or teacher, or the role of the envoy, as each member of the group visits only one station, and then the members of one group meet after the specified time to make each One of them did what he saw or did at the station he visited, so experiences are exchanged between them.(Al-Maadidi, 2016: 45).

## Secondly, generative thinking

One of the types of thinking that combines the ability to innovate and the ability to discover (Al-Sayed and Hassan, 2004: 74)

## Dimensions of generative thinking

1 -The exploratory dimension: the individual seeks to explain the structures or structures predisposing to innovation, and it can be a basis for the generation, re-generation and modification of these ideas during the innovation stage.

Generative dimension: cognitive representations occur in pre-creative structures or structures, which include the cognitive characteristics that lead to innovative discovery and then the generation of ideas for learners in different educational situations (Al-Zayyat, 1998: 495).

## Generative thinking skills

A set of mental abilities that enable students to generate information when they are asked an unconventional problem or a question they have not heard before, and then they can evaluate their answers and judge their correctness.

First - Prediction skill: the ability to read data and data and go beyond that, that is, bypassing the limits of information, data, and familiarity with the educated individual.

Second - The skill of inference: the ability to arrange and organize facts and information for the purpose of reaching conclusions, making a decision, or solving a problem.

Third - Fluency skill: (Fisher 2005): It is the use of stored information when needed.

Fourth: The skill of flexibility: It is seeing events and things from different angles. Working those things using various strategies. This ability is represented in mental processes that distinguish between the individual who has the ability to change the direction of his thinking from one angle to another according to events and scientific developments, from the person who freezes. His thinking is one way.(Al-Harbi, 2015: 61)

## previous studies

1-The study of Abdul Karim and Hussein (2015): - The study was conducted in Iraq, and aims to identify the impact of the scientific stations' strategy on the achievement of chemistry among second-grade students and the development of their creative thinking. The study used the experimental method, and the study sample consisted of (70) students from The students of the second intermediate grade were divided into two experimental and control groups equally, and the study tools consisted of an achievement test consisting of (30) items of a multiple-choice type, and a test of creative thinking. In the usual way.

2- Al-Juhani study (2017): The study was conducted in Saudi Arabia, and its aim was to identify the effectiveness of using web investigation to teach biology in developing generative thinking and the trend towards it among second-year secondary school students. It was divided into two experimental groups that were studied according to the web investigation, and a control group that studied according to the usual method, as a test for generative thinking was built consisting of (50) items and a measure of the tendency towards biology consisting of (33) items that were characterized by honesty and stability and the use of statistical means (T-test, Cronbach's alpha, Cohen's equation, Black's equation) and one of the most important results he reached was the effectiveness of web investigation in developing generative thinking and the trend towards biology for the benefit of the experimental group.

After reviewing the previous studies, the researcher came up with the following indicators:

## 1- Research objective:

The study of Abdul Karim and Hussein (2015) aimed to identify the effect of the strategy of scientific stations on the achievement of chemistry among second-grade students and the development of their creative thinking, while the study of Al-Juhani (2017) aimed to identify the effectiveness of using web investigation to teach biology in the development of generative thinking and the trend towards it among Second year secondary school students

## 2- Search tool:

In previous studies, researchers used various tools prepared by them. As for the current study, the achievement test prepared by the researcher was adopted.

## 3- sample

The previous studies also relied on different samples in the number (68-70), school stages and gender in primary and basic. As for the current research, it is applied to the fifth year middle school students, who numbered (58) students.

## Search procedures:

### First, the experimental design:

The researcher adopted the experimental design with two equal groups, experimental and control, as shown in the table below:

(Table1)

### The experimental design used in the research

group	pretest	independent variable	post test
control	generative thinking	normal method	generative thinking
Experimental		the scientific stations strategy	

Second: The research community and its sample: The research community included all the female students of the fifth preparatory school for the academic year (2021-2022), while the research sample included (58) students from the students of the Abi Dhar Al-Ghafari and Dome of the Rock schools for boys for the academic year (2021-2022) deliberately chosen from research community for the following reasons:

1-The administrations of the two schools express their desire to cooperate with the researcher, and this is necessary for the success of the experiment.

2-The two schools are located in two similar environments in terms of the cultural and social levels.

3- The two schools are separated from one another, which does not allow the experiment to not be polluted.

The two research groups were randomly selected to be the experimental group, and the Dome of the Rock School to be the control group.

### Third: The two research groups are equal:-

Before starting the application of the experiment, the researcher made equivalencies between the two research groups (experimental and control) in many variables based on the literature and previous studies that the researcher reviewed. Conducting equivalence between the two research groups in a number of variables (the chronological age of the students calculated in months, the educational level of the fathers, the educational level of the mothers, the general average for all subjects in the mid-year exams for the academic year (2021-2022), the degree of the English language subject in the mid-year exam Academic (2021-2022), the pre-test for generative thinking.

Table (3) The calculated T value of the equivalence variables, chronological age in months, intelligence test, the general average of all subjects in the mid-year exams for the academic year (2021-2022), the score of the English language subject in the mid-year exam for the academic year (2021-2022) for the members of my group Research and tribal thinking for generative thinking.

variable	group	number	x-	SD+-	T value	
					Calculate	tabular

Chronologica l age in months	Experimenta l	٢٩	٢٠٠,٠٨	٦,٧٦٦	٠,٨٣٤	٢,٠٠٠
	control	٢٩	٢٠١,٠١	٦,٩٢٢		
English language degree	control	٢٩	٣٣,٣١٠	٥,٣٧٢	١,٠٦٩	
	Experimenta l	٢٩	٣١,٨٩٦	٤,٤٨٣		
The general average of the mid-year exam	Experimenta l	٢٩	٥٩٤,٩٣ ١	١٢٢,٢٦ ٢	٠,٦٥٩	
	control	٢٩	٦١٣,٢٤ ١	٨١,٥٦٣		
pretest for generative thinking	Experimenta l	٢٩	٩,٦٨٩	٢,٣٦٢	١,١٦٢	
	control	٢٩	٨,٩٦٥	٢,٣٠٦		

It is clear from the above table that the calculated t-value is less than the tabular value (2,000) at the significance level (0.05) and the degree of freedom (56), which means that the two groups are equivalent in all these variables, and the researcher also conducted an equivalence between the two research groups at the level The educational level of the fathers and the educational level of the mothers using the chi-square as a statistical method after the researcher obtained the data related to the level of education of fathers and mothers in both groups from the school card and from the students themselves by means of a form distributed to them. These data were classified into three categories for each group according to the levels of education (primary). and below, secondary school, institute and above)

And it was found that there are no statistically significant differences between the two research groups in these two variables, as the value of the chi-square for the educational level of the fathers was (1). The value of the qhi-square for mothers was (4), which is less than the tabular value of the chi-square of (5,99). ) at the level of significance (0.05) and the degree of freedom (56), which indicates the equivalence of the two groups in these two variables, and the table (4) illustrates this.

**Table (4) The results of the chi-square test for the difference between the two groups in the variable of educational level of fathers and mothers**

group	numb er	Parents' educational level			qhi-square	
		Element ary and below	seco ndar y	institute and above	Calcula ted	tabul ar
Experime ntal	٢٩	٤	٨	١٧	١	٥,٩٩
control	٢٩	٥	٨	١٦		
group	numb er	The educational level of the mother			qhi-square	
		Element ary and below	Sec ond ary	institute and above	Calcula ted	tabul ar

Experimental	٢٩	١١	١١	٧	٤	٥,٩٩
control	٢٩	١١	٩	٩		

#### Fourth: the search tool

##### Generative thinking test:

To prepare the generative thinking test, the researcher performed the following procedures:

- 1- The researcher reviewed the studies and literature that dealt with the skills of generative thinking to identify those skills and the areas they consist of. The researcher reviewed the studies of both Al-Juhani (2017) and Abu Sharj (2017).
- 2- These studies have unanimously agreed that generative thinking consists of two dimensions:  
The exploratory dimension: which includes:

A - Prediction: When the individual arrives at knowing what will happen in the future, using what he has information.

b- Inference: When a person collects evidence, facts, perceptible observations, or partial cases with the intention of arriving at a general conclusion. (Al-Obaidi and Al-Barzanji, 2017: 205)

##### 2-Obstetric dimension: which includes

A- Originality: is the skill used to think in unusual or unique ways and responses.

b- Flexibility: the ability that is manifested in changing the state of mind by changing the situation.

(Al-Huwaiji and Al-Khaza'ala, 2012: 122-123)

##### 1- Preparation of test stands:

The researcher prepared four situations, for each situation six paragraphs representing the four skills, where the exploratory dimension included objective questions of the type of multiple choice for each paragraph four alternatives, one right and three wrong, and the creative dimension included essay questions, so the number of paragraphs was (24) paragraphs, and the The researcher considered when formulating the paragraphs to be:

a- Comprehensive for the purposes to be measured.

b- Clear and unambiguous.

C - easy and peaceful linguistically.

d- Appropriate for the age level of the students.

1- **The validity of the generative thinking test:** The researcher verified the apparent validity of the test, which was presented by the researcher to a group of experts in psychological and educational sciences and teaching methods. The test was fully approved by the researcher after making some minor modifications to it without deleting any of the test paragraphs, so the test is considered honest.

##### 2- The exploratory application of the test:

The researcher conducted the exploratory application on an exploratory sample consisting of (120) female students from the fifth year of middle school who are not from the application school on Saturday (19/2/2022), to ensure the clarity of the test, the clarity of the instructions for the test, the time required to answer, and ease of use The answer sheets prepared by the researcher, and it was found that the test positions are clear to the members of the exploratory sample, and it turns out that the average time taken to answer (40) is an appropriate time to answer the poverty of the generative thinking test.

##### 3- Discriminatory power of the test items:

To calculate the discriminatory power of the test items, the answers of the exploratory sample of 120 students of the fifth grade of middle school were corrected, and then the answers were arranged in descending order. (27%) and the number was (32) students, and the discriminatory power was calculated for each of the test items. And (Allam, 2013) indicates that the paragraph whose distinguishing power is greater than (0,3) is good (Allam, 2013: 306), and after applying the distinction equation for each paragraph, it was found that it ranged between (0.09-0.78) Four paragraphs were deleted from the test paragraphs, so the number of paragraphs of the generative thinking test in its final form was made up of (20) paragraphs in its final form.

##### 4- Difficulty of the test items:



The difficulty coefficient of the test paragraphs was found after applying it to the same exploratory sample of (120) students from the fifth grade of middle school, and after classifying the students' answers in the same way, it was found that the difficulty coefficient ranges between (0.42-0.80), if the test is good and valid If the coefficient of difficulty ranges between (0.2-0.8) (Allam, 2013: 307)

## 5 -Test stability:

To verify the reliability of the test, the researcher adopted the half-segmentation method. Al-Nabhan (2004) indicates that this method is used if the test paragraphs were corrected (either true 1, false 0), as this method is used to avoid the problems of how to divide the test (Al Nabhan, 2004, p. 427). After applying the Spearman-Brown correction equation, the researcher found that the reliability coefficient is (0.743), which is a high value, so the researcher was assured of applying the test to the research sample. (Al Abbasi, 2018) indicates that the stability is good if the stability coefficient is (0.7) or more (Al Abbasi, 2018: 296).

## 6-Correction of the test

The researcher gave a score of (1) for the correct answer, and (0) for the wrong or left out answer, or indicating more than one alternative, and thus the bikes ranged between (0-20).

## Eighth - Execution of the experiment:-

After the researcher completed the procedures for the equivalence of the two research groups, preparing the teaching plans and preparing the research tool represented in the generative thinking and organizing the class schedule in the schools of the research sample, and with three lessons in English for the fifth grade of middle school for the two research groups, the experiment began with a pre-test for generative thinking for my groups. The research was conducted on Saturday, February 19, 2022, and the teaching continued throughout the second semester (2021-2022) according to the pre-prepared teaching plans. Experimental application in a school (Al-Kharja for girls for the experimental group, and Al-Alam for girls as a control group)

## Ninth: Statistical means:

- 1- T-test for two independent samples
- 2- Chi-square
- 3- Spearman's correlation coefficient.
- 4- Paragraph strength equation.
- 5- Paragraph difficulty coefficient equation.
- 6- spss

## Presentation and discussion of the results:

### The results of the first hypothesis, which read:

"There is no statistically significant difference at the level (0.05) between the average scores of the female students in the pre and post generative thinking test for the experimental group that was studied according to the strategy of educational stations".

To verify this hypothesis, the researcher extracted the arithmetic mean and the standard deviation of the test of generative thinking, before and after the experimental group, and found the mean difference for the students' scores and the standard deviation, then applied the t-test for two independent samples and the results were included in Table (5) as shown below

**Table (5) T-value between the pre and post tests for the test of generative thinking among the experimental group students**

Numbers	pretest	the test dimensional	average difference	SD+-	T value	
					calculated	tabular
٢٩	٩٠٦٨٩	١٥٠٩٣	٦٠٢٤١	٢٠٠٢٩	١٦٠٥٦٢	٢٠٠٤٨

It is clear from the above table that the arithmetic mean of the difference degrees between the pre and post-test was (6,241) and with a standard deviation of (2,029), as the calculated t-value amounted to (16,562), which is greater than the tabular t-value of (2,048) when The level of significance (5 0, 0) and the degree of freedom (28), which indicates the existence of a statistically significant difference in the pre and post generative thinking test for the students of the experimental group and in favor of the post application, thus rejecting the null hypothesis and accepting the alternative hypothesis.

The researcher attributes this result to the fact that the use of modern models and strategies in teaching is a catalyst for the superiority of students who study using the educational stations strategy because they are more receptive and inclined to the teaching steps of these modern strategies, because changing the

teaching style from the usual method to the strategy of educational stations may push the students to Investigate aspects of the new strategy and are eager to follow the lesson, which increases their understanding better than the usual method. Also, working in groups and dividing the lesson steps into sequential parts makes the lesson more enjoyable and that activates their generative thinking in obtaining information and ideas that will advance them in all aspects Personality (cognitive, skill, emotional).

### The results for the second hypothesis, which read:

There is no statistically significant difference at the level (0.05) between the mean scores of the difference in the test of generative thinking among the students of the experimental and control groups.

To verify this hypothesis, the researcher extracted the arithmetic mean and the standard deviation of the mean scores of the difference to test the generative thinking of the students of the two groups (experimental and control) and then applied the t-test for two independent samples and the results were included in Table (6).

**Table (6) The difference between the mean scores of the teams for the test of generative thinking among the students of the experimental and control groups**

the group	Numbers	x-	SD+-	T value	
				calculated	tabular
Experimental	٢٩	٦,٢٤١	٢,٠٢٩	٣,٠٥٩	٢,٠٠٠
Control	٢٩	٤,٣١٠	٢,٧٢٦		

It is clear from the above table that the arithmetic mean of the difference scores for the experimental group was (6,241) and with a standard deviation (2,029), while the arithmetic mean of the difference scores for the control group was (4,310) and with a standard deviation (2,726), and the calculated T value reached (3,059), which is greater than the tabular t-value of (2,000) at the significance level (5 0, 0) and the degree of freedom (56), which indicates the existence of a statistically significant difference between the results of the two research groups in the generative thinking test and in favor of the group. Empirical, thus rejecting the null hypothesis and accepting the alternative hypothesis.

The results of this study agree with the study of Muhammad (2014), Al-Juhani (2017) and Abu Sharkh (2017) in the development of generative thinking.

The researcher attributes this result to the effectiveness of the comprehensive educational stations strategy for the educational situation, through the steps of the sequential strategies that help to create positive opportunities for female students to interact with each other in addition to the presence of diversity and heterogeneity in the students of one group, which leads to cooperation by all members as it helps Female students with high thinking and low thinking, which leads to raising the efficiency of their thinking abilities, and this was reflected positively on their superiority in the development of generative thinking.

### First: the conclusions:-

- 1- Educational strategies have a positive impact on the development of generative thinking, which calls for the importance of employing them in teaching English at the intermediate and preparatory levels.
- 2- The strategy of educational stations gives the students an important role in the educational process by giving affiliated and unaffiliated examples from their previous experiences.

### Second: Recommendations

- 1 .Adopting the strategy of educational stations in teaching English in the different stages and for both sexes.
2. Informing English language teachers and female teachers of the foundations and steps of the educational stations strategy, through courses, educational seminars, or special bulletins that explain how to develop generative thinking among their students by using such an educational model.

### Third: Suggestions

- 1- A study similar to the current study in stages and other study subjects
- 2- .A similar study to the current study on female students
- 3- Recognizing the impact of educational stations on other variables, such as acquiring scientific concepts, scientific thinking, formal thinking, and others.

- 1- Abu Sharekh, Asmaa Yousef (2017): The effect of employing Landa's model in developing generative thinking skills in science for sixth grade students in Gaza, (unpublished master's thesis), College of Education, Islamic University, Gaza, Palestine.
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