

## The Effect of Using Posse Strategy on Logical Thinking among Second Intermediate Class, Females Students, in Mathematics

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### Abstract

The current research aims to identify the effect of using Posse strategy in logical thinking among second-intermediate class (female students) , in Mathematics. To verify the aims of the research, a null hypothesis was used. (no significant statistical difference was found at the level of (0.05) among the average of the scores of experimental group who study under the ordinary method in testing the logical thinking . The current research has been limited to the female students of second intermediate class at intermediate day – time schools, secondary day – time schools, belong to the state directorate of Rasafa / 2 in Baghdad, first academic term of the academic year 2020 – 2021. The researchers s have adopted the experimental approach of the partial control on two groups (experimental and control) of dimensional test.

The researchers s have chosen the intermediate school of distinctive students to apply the experiment. Two classes have been chosen randomly to represent the experimental group including (31) students, and other two classes to represent the control group including (30) students. The total number of the students was (61) . The two groups were rewarded in the variables (chronological age calculated in months, previous achievement in mathematics, IQ test and a prior knowledge test), as well as adjusting other variables. The experimental group was taught according to Posse strategy, while the control group was taught according to the ordinary method . The researchers s have studied the two groups by herself . To measure the logical thinking of the female students, the researchers s have prepared a test for this purpose consisting of (30) paragraphs of the multiple choice type with four alternatives.

After applying the test and processing the data statistically, using the T-test for two independent samples, the results came out as follows (there is a statistically significant difference at the function level (0.05) between the average scores of the experimental group students who studied according to the Posse strategy and the average scores of the control group students who studied according to the ordinary method of the logical thinking test , and for the benefit of the experimental group ) . In light of the results, several conclusions were obtained.

The use of Posse strategy contributes to increasing the effectiveness and excellence of the students and makes them the focus of the educational process, and that the Posse strategy helps the students in the ability to store information, remember it and recall it when needed. The researchers s recommended encouraging mathematics teachers at all school levels to use the posse strategy. Several proposals have been made, including conducting similar studies to know the effectiveness of using posse strategy in other variables; such as concepts acquisition, thinking development, attitudes development, and others tendencies.

### First chapter

#### Definition of the research

#### Research problem

Mathematics is considered a structural structure that helps the individual to think and develop his ability to innovate. Therefore, attention to it has become a requirement for the progress and development of societies as well as the impact of mathematics on the development of thinking and the

development of its methods and because of its importance in developing students' mental abilities. (AL – Sarhan 12:2004). The intermediate stage is considered one of the important academic stages as a link in which the learner moves from tangible experiences to abstract experiences, and through which students can increase their abilities which comes from mathematics. ( Salama 2005 : 113 ) , as any effective model or strategy must contribute to the transition from learning based on memorization and indoctrination to learning based on activity, participation and logical thinking , because there is a clear weakness in the level of learners in the use of different thinking methods and styles, including logical thinking skills . A group of previous studies confirmed this, such as (Abu Sultan study 2012) and (Jumaa study,2006 ) whose results revealed the low levels of logical thinking among learners in their studies of mathematics .

**The current research has sought to answer the following question:**

(What is the effect of using posse strategy on logical thinking among second-class intermediate students in mathematics?)

**The importance of the research:**

- 1 - This research comes in response to global and local trends calling for the need to pay attention to modern teaching methods and strategies that depend on constructivism theory in teaching mathematics.
- 2 – The importance of the intermediate stage as a link between the primary stage and the secondary stage.
- 3 – To present a strategy in teaching mathematics to develop the skills of logical thinking.
- 4 – The research may help the teachers of the intermediate stage in learning and teaching the skills of the logical thinking.
- 5 - The absence of an Iraqi or Arab previous study to the researchers s' knowledge that dealt with Posse strategy in achieving mathematics and logical thinking among female students of the second intermediate grade at the time of doing the study.

**The aim of the research:**

The current research aims to investigate the effect of using Posse strategy on the logical thinking skills of second-grade intermediate female students in mathematics.

**Research hypothesis**

To achieve the aim of the research, the researchers used the null hypothesis (no statistically significant difference was found at the level of (0.05) between the average scores of the experimental group students who studied according to the Posse strategy and the average scores of the control group students who studied according to the ordinary method of the logical thinking test).

**Limits of the research**

The current research has been limited to the female students of second intermediate class at intermediate day – time schools, secondary day – time schools, belong to the general state directorate of Rasafa / 2 in Baghdad, first academic term of the academic year 2020 – 2021 .

### **Terms definitions**

#### **Posse strategy :**

Dayrson 2012, defined posse strategy as one of the strategies that goes beyond thinking . Posse strategy includes group of measures and practices followed by the teacher and the student. It consists of several steps such as (predict, organize, search, summarize, evaluate). (Dayrson 2012: 20 )

#### **Logical thinking :**

Ali : 2005 , defined logical thinking as a process that depends on the use of the rules of logical inference in all its forms to reach solutions to the problems facing us . ( Ali 2005: 202).

The researchers s have defined the logical thinking as a mental activity for the students of the experimental and control groups , depending on their knowledge, experience and skills that enable them to answer the test items . Logical thinking is measured by the degree that the student obtains in the logical thinking skills test that was prepared by the researchers .

### **Second chapter: Theoretical framework and previous studies**

#### **First / Theoretical framework**

##### **Posse strategy :**

Posse strategy is one of the modern strategies helps the learner to find the main ideas in a text that the learner reads or listens to. The posse strategy was named after the first letters of its steps (predict, organiz, search, summarize, evaluate). The posse strategy has **been developed by Karol Injlert and Troy Maryaj (1991)** .

The posse strategy is for reading comprehension, text structures, self-evaluation, and to activate the previous knowledge, and to encourage learners to organize the knowledge (Aprilia , 2015:24) .

(Boyle : 2010) , defined posse strategy as a variety of operations including ( predict , organize , search , summarize , evaluate ) , which helps learners in understanding the main components of the explanatory text . ( Boyle , 2010 , 210 ) .

##### **Stages of teaching Posse strategy :**

Posse strategy includes three stages ( the stage of presenting the strategy , the stage of direct training , the stage of independent training ) the following is a detailed explanation of these steps .

##### **First: the stage of presenting the posse strategy**

**Predict:** the teacher demonstrates some photos and the photos of the textbook .The teacher asks the students to look at the photos , then he discusses with them and encourages them to obtain the main idea and the title of the lesson . The teacher writes the title on the board.

**Organize :** the teacher asks the students to list their thoughts and write down the required goals for learning . The teacher specifies the suitable teaching methods to obtain these goals.

**Search** : the teacher shows tables or a video or voice recording of the lesson topic . The students write down what has been concluded to by the research , and what interests them in the video or audio recording .

**Summarize** : students are asked to take indicative notes that summarize what they have seen through reading the text or video, and identify their ideas and display them on the board.

**Evaluate** : the teacher compares the students 'notes with the notes he arrived at with the help of the students and then writes them on the board . The students notice the extent to which their information matches the correct information on the board that was prepared by the teacher with their help .

**Second : the stage of direct training to carry out Posse strategy .**

**Predict** : the teacher demonstrates the lesson , the students predict the thoughts of the lesson and share them without teacher's guidance .

**Organize** : the teacher directs the students to write down what their thoughts and notes learnt through the lesson . The teacher then divide the students to groups to obtain the goals .

**Search** : the teacher demonstrates tables or a video of the subject of the lesson . The teacher encourages the students to specify their main ideas .

**Summarize** : the students specify their main thoughts to what they watch . The groups of the students write one or two sentences including the main ideas .

**Evaluate** : each group compares its summary with the summary shown in the beginning of the lesson . The students analyze the summaries to investigate the similarities and differences to write a unified lesson . ( Dayrson , 2012 : 11 – 5 ) .

**Third : the stage of independent training .**

At this stage, the stages of implementing the steps of this strategy are divided into two parts.

**First** : it includes the first step ( predict ) and the second step ( organize ) . This part is implemented inside the classroom as it is mentioned in the first stage .

**Second** : it includes the three steps ( search , summarize , evaluate ) which is done by the student outside the school ( homework ) . The implementing is done by the students themselves independently . The students write the measures, done by them , and to be submitted to the teacher . ( Atayaa , 2009 : 100 ) .

**Features of using Posse strategy :**

1 - It develops the self-reliance of the student and increases his capabilities in building his knowledge of himself .

2 – The students learns how to find the main ideas contained in the text and how to summarize and interact with it .

3 – The student learns how deal with her / his peers , to benefit them and benefit from them .

4 – The students uses this strategy several times to get familiar with it .

5 - It reduces the student's dependence on the teacher and gives him an active role in the teaching and learning process .

6 – The student learns how to find the main ideas contained in the text and how to summarize them . ( Dairson ,2004 : 38 ) .

**The role of teacher in Posse strategy :**

1 – To demonstrate the study material in the form of pictures or videos or texts .

2 – To divide students to equal groups .

3 – To encourage the student in participating in lessons , discussions and dialogue with his classmates .

4 – To encourage the student to record the ideas, observations and goals that he learns in the lesson.

5 – To conclude a summary for the lesson , to compare the thoughts and observations of the student with those of the teacher's .

**The role of the student in Posse strategy :**

1 – Encouraging discussion between the student and her classmates .

2 – To research and find out information through watching photos and reading texts during the lesson .

3 – To be collaborative and to respect the others' views .

**Logical thinking :**

One of the types of thinking that has received special attention among many educators as it is one of the finest mental activities for a person, as a person cannot dispense with it when he encounters a problem that he cannot solve with his usual ways of thinking, and the scientific method of thinking helps us save time for the purpose of solving problems . without logical thinking , our thinking becomes vulnerable to trying and error, which leads to a waste of time , effort and money . ( AL – Khalili and others 1996 : 56 )

The logical thinking is not defined by a problem treated by scientists , or scientific language or mathematical symbols , but we can use this kind of thinking in our daily life , because this kind of thinking is well organized , solid and based on groups and principles , present at the specialists and within the scope of their conscious feeling, but it is outside this domain among ordinary people . ( Zakarya , 1988 : 5 ) .

Logical thinking is considered one of the thinking , in which , the results are obtained from introductions include the result including relationships . Logical thinking is a necessity for scientific thinking as the scientific thinking is a deductive hypothetical thinking . ( William Tashanz , 1961 : 17 ) .

**Characteristics of logical thinking :**

Byajei specifies five characteristics distinguish logical thinking .

1 – Propositional Reasoning

It requires ability from the individual in inferring the propositional relationship among elements by proportion .

2 – Controlling Variables :

The individual should have the ability to isolate factors affect certain phenomena among group of factors defined by the individual herself .

3 – Co relational Reasoning :

The individual should have the ability to recognize the correlations between factors and then make a decision accordingly .

4 – Probabilistic Reasoning :

The individual should have the ability to study the quantitative relationships of group or groups factors and to specify the proportion of each , then comparing the proportions and give certain probabilities .

5 – Combinational Reasoning :

The individual should have the ability in dealing with experimental and theoretical combination to form as many number as possible of correlations among factors of the study on condition that those correlations must be organized and coordinated , not random or duplicated . ( AL – Khalili and others 1996 : 124 – 123 ) .

### **Logical thinking skills**

Some of the logical thinking skills are characterized by their easiness to measure and apply . They are as follow :

First : data gathering skills

Observation skill : it means intentional attention to the phenomena , events and symbols in order to find out their causes and laws . This process depends on accuracy of the observation and experience

Questioning skill : it is used to support the quality of the information , and to clarify the meanings through investigation , which requires laying effective questions, formulating them and choosing the best ones. It also means searching for new information by forming and raising questions . ( Abo Jado & Mohammed 2008 : 51 ) .

### **Second : Information memorizing skills**

Includes the ability in storing information or what is called ( the code ) , as well as remembering and recalling information when it is needed .

### **Third : information organizing skills**

Includes organizing the information to be used effectively . These skills are :

Comparison : to observe similarities and differences between two things or more .

Classification : Putting things in groups according to common characteristics .

Organizing : putting things or terms in system or context under specific criterion .

### **Fourth : information analyzing skills**

Include skills of analyzing information as follow ;

Specify characteristics and components .

To specify the relationships and patterns . ( Ali , 2011 : 212 )

### **Fifth : skills of producing information . Includes skills of producing information as follow ;**

Research and experiment , induction , expectation and prediction and innovation .

Deduction : Think beyond the available information to fill in the gaps .

Prediction : using previous knowledge to add meaning to the new information then linking them to the existing cognitive structures .

Expatriation : developing the basic thoughts and the given ones , and to enrich them with important details which may lead to new conclusions . ( Jarwan 2008 : 18 ) .

**Sixth : information evaluation skills**

These skills Include the ability of taking decision and to judge the validity of the information then indicate the accuracy of the sources and the discrepancies . ( Katami , 2004 : 272 ) .

**Second : the previous studies**

Table (1)  
Previous studies related to Posse strategy and logical thinking

Name of the researchers , the country and the academic year	The aim of the research	The independent variable	The dependent variable of	The study material and size the sample and its sex	The approach of the research and the study tools	Statistical tools	The result of the study
Abo Shanab 2019 – Palestine	The effect of using Posse strategy in developing skills of creative thinking in social studies for the female students of eighth basic class in Gaza	Posse strategy	Creative thinking	Social studies – eighth basic class - 72 female students	The experimental approach . To test the skills of creative thinking .	T – test for two independent groups . T – test for two related groups . Eta square .	Outperformance of female students of experimental group on the students of the control group in choosing the creative thinking which attributes to the posse strategy .
Al – Rubaie 2017 Iraq	Knowing the effect of teaching biology according to the Adey and Shayer model on scientific fourth students' acquisition of concepts and their logical thinking	Aday & Shayer model	Acquiring concept and logical thinking	Biology for fourth scientific class – 72 males	Experimental approach , test of measure of acquiring concepts , and the test of logical thinking .	T – test for two independent equal groups	Outperformance of students of experimental group who study under the the Adey and Shayer model on the students of the control group who study under the ordinary method .

**Third chapter / Research Methodology .**

**First : The experimental Design**

Experimental design is considered at the forefront of the steps that fall on the researchers' responsibility in the experiment that he performs because the validity of the design guarantees that the researchers will obtain sound and accurate results ( Alian & Ghunaim 2000:47 ).

The researchers have adopted experimental design of partial control suits the conditions of the current research . The design has come out as it is shown in the following table :

Table (2)  
The experimental design of the research

Group	The two equivalent groups	The independent variable	The telemetric
The experimental group	Previous education Previous knowledge Chronological age Intelligence	Posse strategy	Logical thinking
The control group		Ordinary method	

**Second : the community of the research and its sample**

The community of the research consists of second intermediate female students of the intermediate and secondary schools for females , with a number of ( 21795) students of day – time study , belong to the general state directorate of Rasafa / 2 in Baghdad, first academic term of the academic year 2020 – 2021 .

The researchers intentionally chose the Distinctive Students School - Basmayaa - , belongs to the state directorate of Rasafa / 2 in Baghdad , to be the sample of the research . The sample consists of (61) students , ( 31) students of experimental group , and (30)students of control group .

**Third : control procedures**

**-Internal safety of experimental design :**

The researchers were keen, before starting the experiment, to statistically equalize the students of the two research groups in a set of variables that she believes may affect the safety of the experiment and the accuracy of its results. Equivalence means making the two groups (experimental and control) equivalent, that is, close in all variables except for the independent variable whose effect is to be studied .

The following, is a clarification of statistical equivalence procedures of variables ;

Table (3)

The results of (T- test ) of the chronological age of the female students of the two groups counted by months :

Variables	The groups	Size of the sample	Statistical average	Standard deviation	Degree of freedom	(T – test )		The function at the level of 0.05
						Counted	Tabular	
Chronological age	Experimental	31	161.26	3.71	59	0.48	2.00	Non – functional



	Control	30	160.80	3.70				
Previous knowledge	Experimental	31	6.48	1.90	59	0.97	2.00	Non – functional
	Control	30	7.00	2.24				
Previous Education	Experimental	31	84.74	9.66	59	0.32	2.00	Non – functional
	Control	30	85.50	8.76				
Intelligence	Experimental	31	16.68	2.55	59	0.80	2.00	Non – functional
	Control	30	17.27	3.16				

### **-External Safety of Experimental Design**

As well as what has been mentioned of statistical equivalent between the two groups of the current research , the researchers have tried to control some intrusive variables ( non - experimental ) , which affect the proceeding of the experiment . Controlling the intrusive variables is considered one of the important measures in the experimental research in order to provide degree of internal validity for the experimental designer .

#### **The following is a demonstration of the variables and how to control them :**

1 - Processes related to maturity : the period of experiment was equal for the two groups . This factor did not have any effect on the results of the experiment .

2 - Experimental extinction : means the resulted effect of leaving some students ( sample of the research ) the study or due to their dropping out during the experiment .

In the current research , no dropping out occurred for any student due to absence or transfer to another school , with the exception of normal absences, which are almost equal between the two groups.

3 – Associated accidents : means the ordinary or unordinary accidents which may occur during the experiment , that hinder the proceeding of the experiment , or affect the ( logical thinking ) along with the independent variable . No accidents was occurred affected the proceeding of the experiment .

4 – Measure tool : the researchers used unified measure tool to measure the logical thinking. The test was applied on the experimental group and the control one .

5 – The effect of experimental procedures :

A – Secrecy of the experimental :

The researchers ensured the secrecy of the experiment by agreeing with the administration of the school not to inform the students about the nature of the research and its goal ,in order not to affect the students' activities or their dealings with the experiment, which may affect the safety of the experiment and the safety of the results .

B – Lessons allocation :

The weekly schedule was organized in agreement with the school administration through the equal distribution of lessons between the experimental and control of research groups, as the experimental and control group studied six classes per week, (one class in attendance and the other five electronically) according to the Ministry of Education's decision for the academic year 2020 – 2021 , due to the Corona pandemic .

C – The period of the experiment :

The duration of the experiment was unified and equal for the students of the two research groups (experimental and control), since the experiment began on Tuesday 8.12.2020 , and ended on Thursday 18.2.2021 .

D – The teacher :

The researchers , personally taught the two research groups (experimental and control), and this step gives the results of the experiment a degree of accuracy and objectivity.

E - Select the course material :

The subject was specified to the experiment and unified for the two research groups, it is one of the subjects of the mathematics textbook for the second intermediate grade to be taught in accordance with the syllabuses by the Ministry of Education for the academic year 2020 – 2021 .

F – The location of the experiment :

The researchers applied the experiment in one school ( Distinctive School in Basmaia ) , a classroom dedicated to mathematics and suitable in terms of seating, ventilation and lighting .

#### **fourth : Research Tools**

##### **Preparation of logical thinking test :**

Since the researchers did not obtain a ready-made test to measure the logical thinking that fits with the nature of the intermediate stage and the subject, the researchers prepared a test for logical thinking, and the researchers followed the following steps in preparing it :

##### **1 – Specify the test of logical thinking**

The test aims to measure the ability of logical thinking for the students of second intermediate class.

##### **2 – Specify the skills of the test**

After reviewing the literature and previous studies and taking the opinions of experts and referees in the field of teaching methods and educational sciences, the researchers identified 6 logical thinking skills that she will adopt in building the test, and these skills are as follows;

The skill of data gathering , the skill of memorizing information , the skill of producing information , the skill of organizing information , the skill of analyzing information , and the skill of assessing information .

##### **3 – Preparing of test items**

The researchers prepared the test items that consist of (30) items for testing , (5) items for every skill . It is a type of multiple choice with four alternatives

##### **4 - Formulation of test instructions**

The researchers designed the instructions regarding answering the test paragraphs and asked the students to read the paragraphs carefully before answering them . The focus was on not to leave any paragraph without an answer . It is not permissible to give more than one answer , and not leave any paragraph without an answer . The researchers specified the allocated time for answering the paragraph. The researchers clarified that the answer must be on the questions sheet .

##### **5 – Set the correction instructions**

The researchers prepared the correct answer key to the clauses of the test . One mark was given for the correct answer and zero for the incorrect one . The abandoned clause , or the one that contains more than one answer , will be dealt with as incorrect clause , accordingly , the total marks of the test clauses is (30) .

##### **6 – Test validity :**

Test validity means what was placed for the purpose of measuring it, as it is the first criterion for good construction of the evaluation tool, in addition to objectivity and reliability, ( Mulham 2011 : 272 ) . To verify the validity of the test, the researchers accredited the following;

##### **- Virtual validity :**

The researchers demonstrated the clauses of the test to group of specialized arbitrators in mathematics method teaching and psychological educational sciences to present their observations ,

opinions and assessment . The results were obtained by agreeing most of the arbitrators on the content of the test .

#### **- Construct validity**

The validity of the internal consistency of the logical thinking test was verified by finding the correlation between the clause score and the total score of the test. The researchers used Pearson correlation coefficient to discover the relationship between the score of the clause and the total score of the test , as well as the relationship between the score of the clause and the score of the skill belonging to , where the values of Pearson correlation coefficient were between ( 0.52 – 0.31) . It was a good indicator for the construct validity to test the logical thinking.

#### **7 – Information sample, sample of statistical analyses to test the logical thinking:**

##### **A – Information sample :**

To make sure of the clarity of the test clauses and its regulations and to allocate the required time to answer all the test clauses , the test was applied on exploratory sample of the research community of students of second intermediate class . To find out the time spent on answering the test items, as well as to know the clarity of the paragraphs , the researchers chose AL – Iktidar School for females as an exploratory sample . The number of the students was (30) females students . The researchers concluded that the test clauses and how to answer them was obvious for the students , the researchers , simply clarified the questions during the test , and then the time taken for the answer was calculated .

The average time for answering was (40) minutes.

##### **B-Sample of statistical analyses :**

After making sure of the clarity of the clauses and the time taken for the test, the researchers applied the logical thinking test on an exploratory sample other than the research sample , consisting of (100) females students from AL – Iktidar School for females affiliated to the State Directorate of Education in Baghdad - Rasafa /2 , and after correcting and collecting the students' answers, they were arranged descending from the highest degree to the lowest degree and the percentage of (27%) was taken as a higher group and (27%) as a lower group, where the upper group consisted of (27%) female students and the lower group of (27%) female students . The total number of the students was (54) , accordingly , the statistical analyses was carried out under the following steps :

##### **- Coefficient of clauses difficulty :**

The difficulty coefficient was calculated for each paragraph of the logical thinking test , it was found that it ranged between (0,70 – 0.33) . Bloom and the others think that the test paragraph is acceptable if its difficulty ranges between ( 0.80 – 0.20) ( Bloom & et al , 1971 : 66 ) , which means that all the test paragraphs are acceptable .

##### **-Discrimination coefficient :**

The researchers applied the relation of discriminatory powers . She found that all the paragraphs were good and the discriminatory power ranged between (0.56 – 0.30) , where the paragraph is acceptable ,if its discriminatory power ranges between ( 0.80 – 0.20) ( AL- Nabhan 2004:197) .

##### **-The effectiveness of false alternatives :**

After calculating the effectiveness of alternatives for the logical thinking test paragraphs , it was found that the wrong alternatives attracted a number of students, and thus it was decided to keep them without change or deletion .

#### **8 – Test solidity :**

The test was applied on a sample of (30) female students of second intermediate class . After using the equation of (Cronbachs Alpha ) to calculate the test solidity , it was found that solidity value equals (0.86 ) which proves the solidity of the test .

**Fifth : Experiment application**

The researchers applied the experiment in the first term for the academic year (2020 – 2021), after she accomplished the requirements for conducting the experiment by selecting the two groups, achieving parity between them, and determining the scientific material . The experiment was applied on Tuesday 8.12.2020 and ended on Thursday 18.2.2021 .

**sixth: Statistical Tools**

The researchers used appropriate statistical tools , including T – test for two independent groups , Pearson correlation Coefficients , Cronbachs Alpha equation , difficulty coefficients , discriminatory coefficients , effectiveness of false alternatives , as well as using the statistical program (SPSS) .

**Fourth chapter – Demonstration of the results and their explanation :**

**First : Demonstration of the results**

no statistically significant difference at the indication level of (0.05) was found between the average scores of the experimental group students who studied using Posse strategy and the average scores of the control group who studied by the ordinary method in the test of logical thinking .

To verify the applied hypothesis , the researchers carried out the test of logical thinking on the research groups . After having finished the application of the strategy for the experimental group , and the ordinary method for the control group , and to find out the significance of the difference between the average scores of the logical thinking test on the two groups (experimental and control), the researchers used the T-test for the two independent samples. The table (4) clarifies the results ;

Table (4)

T - test calculated and tabular of logical thinking test of the two groups ( experimental and control )

Group	Sample size	Arithmetic Average	Standard deviation	Freedom degree	T – test		Significant at the level of 0.05
					calculated	tabular	
Experimental	31	21.29	3.59	59	4.33	2.00	Statistically significant
Control	3	17.53	3.17				

Table (4) shows that the statistical average of the students' scores of the experimental group was (21.29) with a standard deviation amounting (3.59) , whereas the statistical average of the control group was (17.53) with a standard deviation amounting (3.17) . When using T – test for the two independent groups , the T – Value was (4.33) , bigger than the tabular value amounting (2.00) , which indicates significant difference of statistical significant at the level of (0.05), and a degree of freedom of (59) . The results showed the superiority of the experimental group , who studied under the Posse strategy ,on the control group , who studied under the ordinary method in the test of logical thinking .

**Second : Results explanation**

The result that the researchers s concluded can be explained as follows;

The result showed dismissing of null hypothesis which means the superiority of the experimental group students , who studied in accordance with Posse strategy , to the students of the control group who studied under the ordinary method , in the testing of logical thinking in Mathematics . The result attributes to several reasons :

1 – Carrying out Posse strategy increased the students' awareness and readiness to receive information, it also gave them the chance to teach themselves and organize their experiences, encoding these information and storing them in the memory by changing their role from the receiver to the role of doer. Posse strategy also activate their mental flexibility and decreases the mental routine and monotony which pervades classrooms which adopt the ordinary method.

2 – Superiority of the experimental group students who studied in accordance with the Posse strategy may be due to the modernity and uniqueness of this strategy in teaching Mathematics. This strategy may meet success when it is applied.

3 – Posse strategy makes the student the focus of the educational process, and it also makes the student able to do the activities scientifically, making learning process enjoyable, which leads to increase the student's motivation to learn more.

### **Third : Conclusions**

In the shed light of the result concluded by the current research, it is possible to conclude the following ;

1 – Using Posse strategy increases the effectiveness and superiority of the students and their activity and it makes them the focus of the educational process, which is indicated by the results of the research.

2 – Posse strategy requires students' accurate and sharp observation. The success of a student means the success for all.

3 – Posse strategy helps students in storing recalling the information.

### **Fourth : Recommendations**

In the shed light of the result obtained by the researchers in this study, they recommended the following ;

1 – The institutions belong to the Ministry of Education, should generalize using strategy of constructive learning including Posse strategy, and to train teachers on using this strategy.

2 – To design syllabuses especially mathematics based on Posse strategy, and to Increase activities that activate students' thinking of logical correlation of subjects in all stages.

3 – To carry out training sessions for teachers of Mathematics on how to use strategies and modern teaching designs including Posse strategy, not to be limited on the teaching methods which rely on indoctrination and memorization.

### **Fifth : The proposals**

The researchers propose to carry out the following studies:

1 – To carry out studies similar to the current research on the universities and high schools.

2 – To carry out similar studies to know the effectiveness of using Posse strategy in other variables such as growing thinking and acquiring concepts and to activate other trends.

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