

**ENHANCING THE UNDERSTANDING LEVEL OF THE  
SUBTRACTION OF INTEGERS CONCEPT AMONG VII STD  
STUDENTS THROUGH SCAFFOLDING METHOD**

**ACTION RESEARCH**

**SUBMITTED TO**

**DISTRICT INSTITUTE OF EDUCATION AND TRAINING, MANJUR,  
RAMANATHAPURAM DISTRICT**

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**CHENNAI-600 006**

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## **CERTIFICATE**

This is to certify that the Action research entitled, **“ENHANCING THE UNDERSTANDING LEVEL OF THE SUBTRACTION OF INTEGERS CONCEPT AMONG VII STD STUDENTS THROUGH SCAFFOLDING METHOD”** submitted by T. Anburaja Lecturer, DIET, Manjur is a record of bonafide Action research work done by him and it has not been submitted for the award of any degree, diploma, associateship, fellowship of any University /Institution.

Place: Manjur

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## **DECLARATION**

I hereby declare that the Action research entitled, **“ENHANCING THE UNDERSTANDING LEVEL OF THE SUBTRACTION OF INTEGERS CONCEPT AMONG VII STD STUDENTS THROUGH SCAFFOLDING METHOD”** submitted by me is the result of my original Action research work carried out under the guidance of Dr. P. Natarajan Principal, District Institute of Education and Training, Manjur, Ramanathapuram District, and it has not been submitted for the award of any degree, diploma, associateship, fellowship of any University / Institution.

Place: Manjur

Date:

Signature of the Researcher

(T. ANBURAJA)

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**T. ANBURAJA**

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## **I. Background of the Study**

Mathematics is a way to settle in the mind a habit of reasoning. It trains the mind and develops thinking and reasoning powers of the mind. Due to accuracy, certainly of results and originality in thinking, Mathematics discipline the mind.

Mathematics equips pupils with uniquely powerful ways to describe, analysis and change the world. It can be stimulating moments of pleasure and wonder for all pupils when they discover a more elegant solution. The nature and quality of instructional materials, the pedagogic skills of the teacher must be kept to ensure quality in teaching Mathematics. It is the job of the teacher to decide what importance it has to be accorded and what value it should be assigned in the school curriculum. Mathematics is an essential component of school learning and a basic building block without which desired schooling outcomes, however defined, cannot be achieved. Despite massive investment in primary education, many children lack even basic ability in arithmetic.

Mathematics is a subject of great educational values and makes a major contribution in achieving the aims of Education. No subject can be taught in isolation particularly 'Mathematics'- Generally, Students are afraid of studying Mathematics. Teaching of Mathematics is the most difficult task and everybody is not fit to be a Mathematics teacher. For effective Learning of Mathematics the method has to be as good as the content. It is only through method that is possible to make a subject interesting and useful. Without a method, teaching would be hard. The arrangement of the subject and its presentation is very important for successful teaching. In this way, teaching Mathematics through "SCAFFOLDING METHOD" is very useful.

## **II. Perception of the Problem**

### **a. Perception of what is happening**

Learning Mathematics requires both cognitive and meta cognitive processes and the ability to make remarkable contributions to it. Learners are more stimulated by the environment to gain learning. More physical presence cannot be guarantee for attentiveness in classroom. Individual involvement in classroom is a result of hid readiness such as physical, intellectual, social and emotional aspects. A teacher is an instrument to provide the need based academic setting for the learner in the classroom. Well planned structured classroom activities is essential to avoid any distraction that diverts the attention of learners, children have intellectual power and creative abilities, which are the source of our classroom setting.

In most of the schools, teaching of Mathematics is carried out with the help of talk, chalk and blackboard. Teachers follow the single traditional method and strategy to teach all Mathematics concepts and all kinds of students. So, students are less interested and easily get bored to learn mathematics through single method. In this situation, the students find it difficult to understand the concept of integers. So the researcher decided to take it as a challenge and do some intervention for eradicating this situation to learn mathematics in the selected school.

### **b. Analysis of the problem**

Learning of fundamental four operations in Integers is very important and basic thing. Without this basic knowledge no one can learn algebra and higher Mathematics. Each concept is a basic for the development of further concepts. Without the learner's interest in Mathematics, it will be impossible for them to have a reliable conceptualization and understanding. The investigator felt that

scaffolding method in teaching subtraction of integers to VII std students may solve the difficulty in doing sums.

## **Integers**

An integer is a number that can be written without fractional component. The set of integers consists of Zero, the natural numbers ( 1,2,3.....) and their additive inverses (.....-3,-2,-1). It is denoted by Z. Thus  $Z = \{....-3,-2,-1,0,1,2,3....\}$

## **Subtraction of integers**

Applying fundamental operation (-) in doing sums with the integers.

### **C. Objectives of the study**

- To find out the initial level of students in subtraction of integers.
- To design the activities to eliminate the obstacles.
- To implement the scaffolding method to enhance the concept of subtraction of integers.
- To assess the improvement of students through post test

### **d. Probable Causes for the problem**

The Investigator has identified the following as the probable causes for the problem understudy.

- Students do not have accuracy in doing subtraction integers.
- Fundamental operations in integers were not taught by suitable activities.
- Students have lack of interest in learning math concepts.
- Students unable to understand the basic concepts in subtraction of integers.
- Chalk and talk method only followed by the Mathematics teacher.



### **e. Development of Proposition**

- If the students are taught the rules of the operation, they will do the doing sums easily.
- If the students are given opportunity to self learning at their own pace through little facilitation by the teacher, their understanding will be better.
- If the students are given opportunity to handling learning material, the errors will rectify gradually.
- If the students are given exposure through Scaffolding Strategy, they will easily do the mathematical calculations.
- If the students are given peer group learning their understanding will be better.
- If the students are given opportunity to analyze the mistakes where they committed mistakes will be reduced.
- If the teachers are suitably trained to use suitable strategies to teach Mathematics, then the classroom transaction will be better

### **III.DEVELOPMENT OF ACTION HYPOTHESIS**

“Scaffolding Method will enhance the understanding level of std VII students in subtraction of integers “.

### **IV.PLANNING FOR INTERVENTION**

After scrutinizing and analyzing the pre-test scripts, the investigator came to know what the students lack in subtraction of integers. They were very poor in subtraction of integer concept. This was evident from the pre test scores. The Investigator decided to give an intervention through “Scaffolding Method” strategy.

## V.EXECUTION OF INTERVENTION

### Sample

The sample was 20 [5 Male and 15 Female] students are studying VII STD from the Municipal High School, Emaneswaram, Paramakudi Block in Ramanathapuram District.

### Tool

Two achievement papers in Mathematics one for per-test and other for post - test were used to measure the academic achievement level of the students in subtraction of integer concept. The achievement test papers were prepared by the investigator. The content area was restricted to the Capacity in subtraction of integer from mathematical textbook, prescribed by the Government of Tamil Nadu for Standard VII.

S. No	Type of question	Number of Question	Marks
1.	One word question	8	8
2.	Simple problem	4	12
3.	Word problem	1	5
	<b>TOTAL</b>		25

In all, there were 13 questions in the test paper and the maximum marks is 25.

### Duration of the Intervention

The Intervention was designed for two weeks and various explanations were facilitated to the students by the investigator. The investigator taught the basic subtraction of integers with lot of activities through Scaffolding Strategy. These activities were helped their deeper understanding of subtraction of integers concept. This was evident from the responses of the Sample group were recorded

both in the pre- test and in post-test and the same were analyzed from various statistical measure to ascertain where the students stand before and after the intervention.

Once it was decided to give intervention to the students of VII standard in doing subtraction of integers concept effectively and the activities were planned, they were executed in the same spirit, wasting no time.

The following activities were given by investigator for the students to facilitate the subtraction of integers concept.

### **Activity:1**

#### **Teacher Activity:**

Investigator used two types of beads of this activity. Green beads indicate positive number and red beads indicates negative number. Both are considered as one number.

#### **Case 1:** positive number – positive number (for Example 4-3)

The investigator places four green beads in that green beads remove three green beads as both are positive integers. The remaining is one green bead. So the answer is positive one



**Case 2:** Negative number - Negative number (for Example  $-4 - (-3)$ )

The investigator places four red beads and the bead to remove is three red beads he left with one red bead. So the answer is negative one  $(-1)$

**Case 3:** Positive number - Negative number (for Example  $4 - (-3)$ )

The investigator places four green beads but he have remove three red beads which is not possible. So he adds three red and three green beads to proceed as it does not change any value. Now he remove three red beads left with seven green beads which is positive seven  $(+7)$

**Case 4:** Negative number – Positive number (for Example  $-3 - (4)$ )

The investigator places three red beads he has to remove four green beads from it for the convenience he adds four beads from both colours. Now he removes four green beads. He has seven red beads as remaining which is negative seven  $(-7)$

### **Student Activity:**

Students were divided into four groups. They were given different sums with beads to do. All students actively done and deliver the correct answer successfully.

### **Activity:2 (Using Integer scale)**

**Case 1:** Subtracting Bigger number from smaller number (for Example  $7 - 10$ )

This sum can be rewritten as  $7 + (-10)$ . By overlapping the positive and negative plates in integer scale. We can see three gaps between the numbers as

the negative number is above the answer is -3

**Case 2: Subtracting Smaller number from bigger number (for Example 10-7)**

By overlapping the plates in integer scale. Investigator left with three gaps whereas positive plate is above. So, the answer is +8



**Student Activity**

Investigator gave integer scale to four group of students. They were given sums to do. Students eagerly overlap the integer scale to find answer and arrive the correct answer.

**Activity 3:( Using Number line chart)**

**Teacher Activity:**

Positive indicates the right jump and Negative indicates the left jump

**Example 1: (10-4)**

Investigator start the bead in + 10 in the number line. Then he has to jump 4 steps left side as it is -4. He landed in positive six. Which is the answer

**Example 2: (-11-3)**

Investigator start the bead in -11 in the number line. Then he have to jump 3 steps left side as it is -4. He arrived at -14. Which is the answer

**Example 3: (7-12)**

Investigator start the bead in +7 in the number line. Then he have to jump 12 steps left side in the number line. Thus, he reaches as -5. Which is the answer

**Example 4: (-3+4)**

Investigator start the bead in -3 in the number line. Then he has to jump 4 steps right side in the number line. Thus, he reaches as +1. Which is the answer

**Student Activity:**

Students were given number line charts and beads. They have provided sums to solve. Students actively do the jumps in number line as per rule and arrives the answer easily.



#### Activity 4: (Evaluation Activity)

Investigator pen down different sums like  $7+4$ ,  $-7+4$ ,  $7-4$  and  $-7-4$  in chart like bat and he writes the correct answer in different ball cut outs. He gave the four sets of bat and balls to each your groups separately and asked them to match the correct ball with bat having the correct answer as soon as possible.



The first team to match the four bats with their corresponding balls are appreciated whereas all the teams done the sums correctly only the time taken differs.

## VI.DATA COLLECTION AND ANALYSIS

### Data Collection and Analysis Mark Sheet

S. No	Boys / Girls	Pre test Max 25	Post test Max 25	Pre test Max 100	Post test Max 100
1.	ANANTHAN	12	24	48	96
2.	DHINESHKUMAR	8	16	32	64
3.	SEENIVASAN	9	18	36	72
4.	SANTHOSH	15	21	60	84
5.	YOKESHKUMAR	13	20	52	80
6.	ANITHA	10	18	40	72
7.	THANYASRI	8	16	32	64
8.	GANGADEVI	11	19	44	76
9.	JENITHA	14	19	56	76
10.	KRISHNAVENI	12	20	48	80
11.	PRABHAVATHI	9	17	36	68
12.	RUBINI	8	18	32	72
13.	RAJESWARI	9	18	36	70
14.	SABHAHA JEMILA	12	22	48	84
15.	SAATHANA	12	19	48	72
16.	SANJANADEV	15	21	56	84
17.	SATHIYABAMA	12	20	48	80
18.	SARUMATHI	10	19	40	76
19.	THEJESWARI	12	19	48	76
20.	VIGNESWARI	7	17	28	68



**Table – 1**

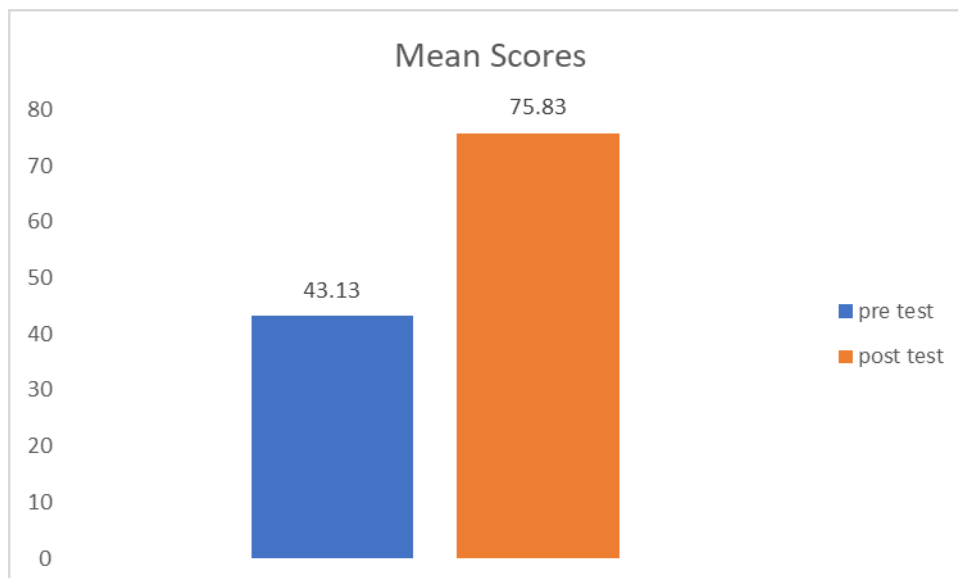
**Pre-test and Post –test mean scores**

<b>Test</b>	<b>N</b>	<b>M</b>
<b>Pre - test</b>	20	43.13
<b>Post- test</b>	20	75.83

From the table 1 inferred that the post-test means scores of the VII std Students is higher than the pre-test, The higher mean value in the post-test showed that the better performance of the students after the intervention given through Scaffolding method Strategy. This statistical data is evidence for learning mathematics through Scaffolding method Strategy.

Bar Diagram

Mean Score of Pre-test and post-test



**Table – 2**

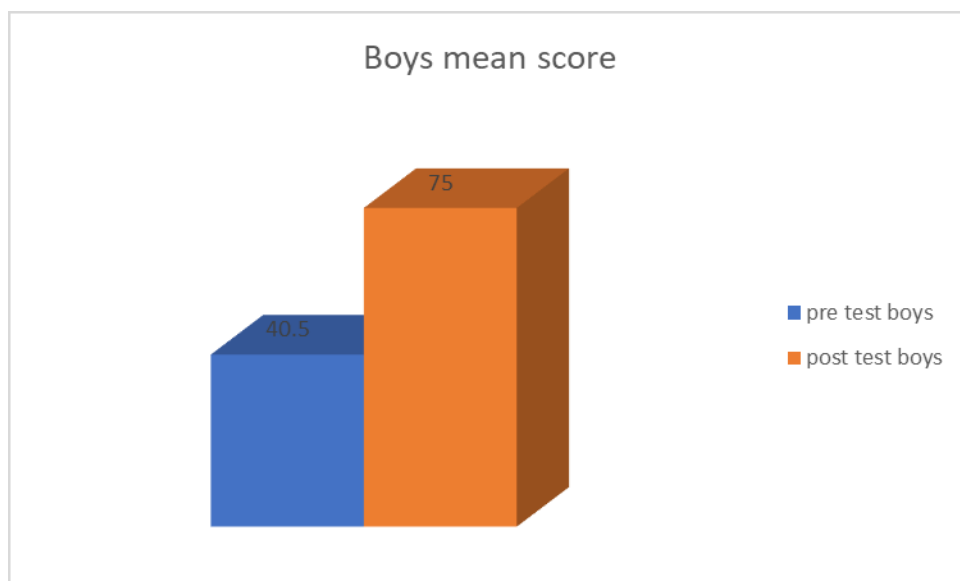
**Mean Score Difference= Gain Score**

<b>Sex</b>	<b>N</b>	<b>Pre-test Mean</b>	<b>Post- test Mean</b>	<b>Gain Score</b>
Boys	5	40.5	75	<b>34.5</b>
Girls	15	44.53	76.26	<b>31.73</b>

The table clearly shows that the average mean scores of the boys have increased from 40.5 in the pre-test to 75 in the post - test; and that the mean scores of the girls have increased from 44.53 in the pre-set to 76.26 in the post-test. The class average increased from pre-test to post-test. The mean gain in the case of the boys is 34.5 and in the case of girls 31.73 which show that there is a considerable improvement in the case of both boys and girls. This further shows that learning mathematics through “Scaffolding method” improves the achievement of the students.

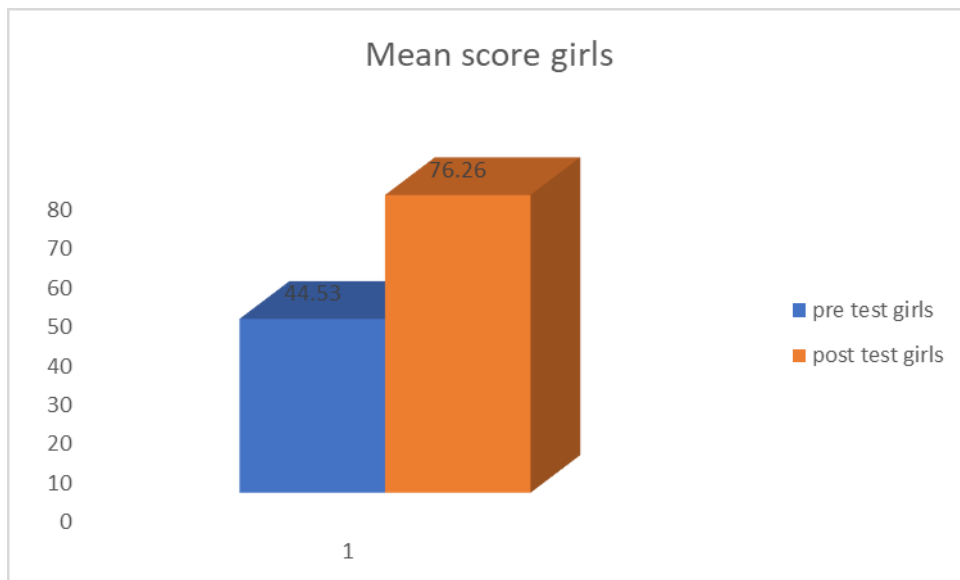
Bar Diagram

Mean Score of Pre-test and post-test (Boys)



## Bar Diagram

### Mean Score of Pre-test and post-test (Girls)



## **VII. Decision making and Reflection**

The above tables indicate teaching through “Scaffolding method” contributes a lot of improvement in the achievement of the students. This finding will be helpful for the teachers to practice the Scaffolding method for deeper understanding of the mathematical concept in upper primary level. During the intervention the investigator did not meet any difficulties to facilitate the topic in question. At the completion stage, the students have been able to do the simple sums in basic subtraction easily and happily.

## **VIII. Termination**

Analysis of the data shows the achievements of students studying through “Scaffolding Method” was found to be higher than the students studied through the traditional method. So the investigator terminated her intervention in time. The result can be known from the diagrams easily. The intervention proved

success since the students acquired the mathematics Subtraction of integers skill effectively. The data tabulation and diagrams stand evidence to the successful intervention.

## **IX Net Gains**

- The teachers who observed the intervention phase got some ideas on Scaffolding Method to teach Mathematics.
- The 20 students of the Municipal High School, Emaneswaram are so happy that they are able to do the problems in Subtraction of integers easily and effectively.
- In this intervention the teacher/investigator is kingpin in the process of mathematics teaching learning process in classroom.
- Learning is an active process, which has to be ensured through **Scaffolding Method**.
- This action research work will motivate the researchers to carry the similar studies on other school subjects for various grades.
- In order to help the students in avoiding and overcome the difficulties, the teacher must become an expert in using Scaffolding Method.
- The diagram will throw light on the effectiveness of **Scaffolding Method** on developing deeper understanding and achievement of students in mathematics at the Upper primary level.
- It should be borne in mind that suitable method is required before concept can be fully mastered. It should be very useful different kinds of students in the single classroom.
- It should be helpful for the students easily understand the abstract ideas in mathematics.

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# APPENDICES

செயல் ஆராய்ச்சி  
முன் தேர்வு மற்றும் பின் தேர்வு

வினாத்தாள்

வகுப்பு : 7

மொத்த மதிப்பெண்:25

I.கீழ்க்கண்டவற்றின் கூட்டல் தலைகீழி எழுதுக

$$5 \times 1 = 5$$

1. (+1)
2. (-3)
3. (+5)
4. (-1)
5. (+4)

II.கொடுக்கப்பட்ட கழித்தல் கணக்கை (விடை மாறாதவாறு)

கூட்டல் கணக்  $\square\square\square$  மாற்றுக

$$3 \times 1 = 3$$

1. (+4) - (+2)
2. (-6) - (-3)
3. (-5) - (+1)

III.விடை காண்க :

$$4 \times 3 = 12$$

1. (-5) - (-2)
2. (+3) - (+3)
3. (-4) - (+1)
4. (-8) - (-4)

$$1 \times 5 = 5$$

IV.A என்ற நகரத்தின் வெப்பநிலை  $-28^{\circ}C$  . B என்ற நகரத்தின் வெப்பநிலை  $-13^{\circ}C$  . A மற்றும் B க்கும் இடையேயான வெப்பநிலையின் வித்தியாசம் என்ன?

## PRE-TEST



## POST-TEST





# TEACHER ACTIVITY





# Student Activity





# Evaluation Activity



## **ABSTRACT**

### **Enhancing the understanding level of the subtraction of integers among VII std students through Scaffolding method**

#### **1.Introduction**

Mathematics is a way to settle in the mind a habit of reasoning. It trains the mind and develops thinking and reasoning powers of the mind. Due to accuracy, certainly of results and originality in thinking, Mathematics discipline the mind. It is the job of the teacher to decide what importance it has to be accorded and what value it should be assigned in the school curriculum.

#### **2.Significance if the study**

Learning Mathematics requires both cognitive and meta cognitive processes and the ability to make remarkable contributions to it. Learners are more stimulated by the environment to gain learning. More physical presence cannot be guarantee for attentiveness in classroom. Individual involvement in classroom is a result of hid readiness such as physical, intellectual, social and emotional aspects. A teacher is an instrument to provide the need based academic setting for the learner in the classroom. Well planned structured classroom activities is essential to avoid any distraction that diverts the attention of learners, children have intellectual power and creative abilities, which are the source of our classroom setting.

#### **3.Statement of the Problem**

Learning of fundamental four operations in Integers is very important and basic thing. Without this basic knowledge no one can learn algebra and higher Mathematics. Each concept is a basic for the development of further concepts. Without the learner's interest in Mathematics, it will be impossible for them to have a reliable conceptualization and understanding. The

investigator felt that scaffolding method in teaching subtraction of integers to VII std students may solve the difficulty in doing sums.

#### **4.Probable causes of the Problem**

- Students do not have accuracy in doing subtraction integers.
- Fundamental operations in integers were not taught by suitable activities.
- Students have lack of interest in learning math concepts.
- Students unable to understand the basic concepts in subtraction of integers.
- Chalk and talk method only followed by the Mathematics teacher.

#### **5.Objectives of the Study**

- To find out the initial level of students in subtraction of integers.
- To design the activities to eliminate the abstacles.
- To implement the scaffolding method to enhance the concept of subtraction of integers.
- To assess the improvement of students through post test

#### **6.Action Hypothesis**

“Scaffolding Method will enhance the understanding level of std VII students in subtraction of integers “.

#### **7.Methodology**

##### **(i) Experimental Method**

Pre-test, Post-test, Single group experimental design method was adopted

##### **(ii) Sample**

20 VII std students of Municipal High School, Emaneswaram, Paramakudi Block

### **(iii) Tool**

Achievement test questionnaire was taken for 25 marks

### **(iv) Statistical Techniques**

Mean deviation calculated

## **8.Findings**

- The pre-test mean score is 45.13 and the post –test mean score is 75.83. The post-test mean scores of the VII std students in higher than the pre-test
- The higher mean value in the post-test showed that the better performance of the students after the intervention given through Scaffolding method
- This findings shows that Scaffolding method is effective tool for the students achievement in subtraction of integers