



## EFFECT OF COOPERATIVE JIGSAW TEACHING TECHNIQUE ON CONCEPT ATTAINMENT AND ACHIEVEMENT MOTIVATION AMONG SEVENTH CLASS STUDENTS

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### Abstract

The purpose of this study was to look into how Jigsaw cooperative teaching technique affected seventh-class students' concept attainment and achievement motivation. Researchers took 40 students as a sample by using a random sampling technique and divided them into two groups. The investigation was conducted and separated into two categories. A random assignment was made to place one group in the Jigsaw strategy group and the other group in the control group, which received instructions via a lecture. Researchers used quasi-experimental design and t -test was employed to analyse of the gathered data. The study's conclusion shows that Jigsaw approach is better than conventional approach in terms of raising students' achievement motivation and concept attainment to teach mathematics. It was also deduced that the Jigsaw technique fosters a more positive attitude toward learning the subject among the students.

**Keywords:** Cooperative Jigsaw Teaching Technique, Concept Attainment and Achievement Motivation

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### Introduction

At both the primary and secondary levels of our educational system, mathematics is a required subject. It is not necessary to go into great detail to explain this statement, but the way mathematics is currently taught in the majority of our schools is not adequate. A lot of students struggle on math exams because they are afraid of the subject. Everyone is aware of the appalling condition of mathematics education, but very few make an effort to identify the causes and put solutions into place. During the last two decades, some teacher trainers in India have been searching for alternative methods and means to teach mathematics effectively. Thus, mathematical instruction has always attracted the attention of

*Dr. Sangeeta Chauhan/ Afr.J.Bio.Sc. 6(Si2) (2024)*

mathematics teachers who are trying to make conscious efforts to find what works best for students. Since the early 1950s, mathematics teachers have been wary of drill and practice techniques as primary teaching techniques because they feared that children would view mathematics as a set of unrelated facts and procedures rather than as an integrated system of concepts and operations. The nature of instructions in mathematics is changing nowadays and many suggestions have been made by many mathematics teachers. For this, the teachers must know how teachers will teach mathematics effectively to the students. Thus, to prepare students to face the challenges of the future electronic age, teachers should ensure that their teaching is not only effective but also useful and entertaining.

Unfortunately, our current educational systems are based on grades, social recognition, scholarships and competition for top admissions into top schools etc. Akinbola, (2010) said that students feel a competitive environment instead of cooperation in our society and our current educational structure is affected by this which is one of the reasons why students go into depression and some students drop out of school. Many researchers and teachers have been saying that teaching methods are one of the problematic areas of education. One of the goals of contemporary educational approaches is to help students develop critical and creative thinking. However, children do not reach the cognitive stage until they independently acquire knowledge, and cooperative learning approaches are crucial in this process. Cooperative Education is a novel approach that integrates studies to improve self-actualization and self-direction. One of the many cooperative learning strategies is the cooperative jigsaw technique, which helps students of various skill levels gain a deeper comprehension of the material. "Students in a group interact with each other and share their ideas and information, seek additional information and discuss their findings with the whole class" (Kort, 1992). Cooperative learning is a student-centered technique that emphasizes achieving learning goals rather than other performance goals; it also encourages teachers to use alternative assessment/evaluative techniques and methods to reduce the competitive environment in any educational institution. In this case, educators can use cooperative jigsaw techniques as a tool to help students achieve more, feel better about them and be more intrinsically motivated. They can also cultivate more positive attitudes toward various learning skills and social skills.

David Clarence McClelland, an American personality psychologist and social psychologist, first used the term "Achievement Motive" to denote the strong desire felt by an individual or society to gain achievement in different dimensions of society such as education, culture, wealth, etc., which is self- Fulfills the need for respect. He was born on March 27, 1917 and is primarily known as the founder of the concept of "achievement motivation". Achievement motivation is a human tendency in which a person knows that his performance will be evaluated and the outcome of his actions will lead to either success or failure and ultimately a good performance will create a sense of pride in achievement. Achievement motive is the disposition to reach success or the ability to take pride in accomplishment through many activities in any field of work. The achievement motive can arise and develop in living things from one's early training, experiences, and subsequent learning. Generally, it can be seen that children generally derive their motive for achievement from the lifestyle of their parents. Many studies show that children whose independent training begins at an early age and who have more autonomy in a supportive, encouraging, and less authoritarian family environment generally develop a more achievement-oriented attitude than others. Experience and learning-based self-created environments help an individual to enrich the intensity of their achievement motive to achieve standards of excellence in any field of work.

On the other hand researchers discussed about the Concept Attainment which is an indirect instructional strategy that uses a structured inquiry process. Concept attainment, as also known as concept learning and category learning, is largely based on the work of American psychologist Jerome Seymour

*Dr. Sangeeta Chauhan/ Afr.J.Bio.Sc. 6(Si2) (2024)*

Bruner, who was born on October 1, 1915. Jerome S. Bruner, Jacqueline J. Goodnow and George A. Austin developed the idea of concept attainment in their book "A Study of Thinking" (1956).

Concept attainment is a type of concept learning. It is a great strategy to encourage critical thinking skills. With this strategy, students use cognitive strategies and higher order thinking skills such as classifying, identifying characteristics and relationships and applying new ideas while using the target vocabulary and concept. They must discriminate between what is and what is not an example of the target concept. Concept Attainment can be used at any level and especially it is beneficial for mathematics teaching.

### **Knowledge Gap**

As the literature review above indicates, a significant amount of research has been conducted both domestically and internationally to examine the impact of the cooperative jigsaw teaching method on academic aspects such as subject achievement, multiple approaches, academic achievements, students' reading, comprehension, retention of knowledge, and attitudes toward mathematics, among other things. The researchers decided to undertake a study titled "Effect of cooperative jigsaw teaching technique on achievement motivation and concept attainment of seventh class students" because there is a dearth of research work in India on the topic of creating mathematics worksheets for seventh-grade students as well as the impact of this teaching method on students' concept attainment and achievement motivation.

### **Review of Literature**

Bharathi, G. (1984) looked at how gender-specific achievement motivation was affected by socioeconomic status. A total of 360 pupils 180 boys and 180 girls were selected at random from Hyderabad's upper secondary schools. Results showed that there was no appreciable effect of gender on achievement motivation, and students from higher socioeconomic backgrounds showed higher levels of achievement motivation. Pandey, N. N. (1993) studied whether Piagetian reasoning, general intelligence and achievement motivation of different mental structures and the relative importance of these measures for concept attainment in Physics. Results indicated that proportional- reasoning, combinational- reasoning and general intelligence are very important for predicting the attainment of Physics concepts. Prabhakaran and Rao (1998) studied the effectiveness of concept attainment model (CAM) in teaching mathematics at secondary level. The study revealed that CAM is more effective than traditional method (TM) in teaching concepts in mathematics at secondary level. Lekha, G. (2000) studied the effect of concept attainment model (CAM) on achievement in mathematics at secondary level. The study revealed that CAM is more effective than traditional method (TM) in learning concepts in mathematics at secondary level. Unierzyski (2003) found that students who were highly motivated to succeed tended to favor circumstances and opportunities that would have a positive effect on them and result in successful outcomes. Students with low achievement motivation, on the other hand, frequently presented a context suggestive of defeat and lacked confidence. The goal of Maden, S. (2010) research was to examine how the jigsaw technique affects the development of written expression skills. A sample of seventy students who were enrolled in Ataturk University's Department of Turkish Teaching in the 2009–2010 academic year were included in the study. The control group design was non-equal. Random selection was used to create two groups: Control (N=34) and Experimental (N=36). According to the results, the Jigsaw method of instruction proved to be marginally more effective than the conventional approach. Gupta, Madhu (2012) looked at several demographic factors, including gender, location, and kind of school to examine the effect of achievement motivation on adolescents' academic performance. Based on how well they did on the board exam for the tenth grade, 320 teenage students were selected. The results showed a significant difference in the motivation for academic achievement depending on the school type, gender, and location. In particular, it was found that teenagers, both male and female who had higher levels of achievement motivation performed better academically than their peers. Norouzi, M., (2012). 159 students in all, 77 female and 82 male, took part in the study and

*Dr. Sangeeta Chauhan/ Afr.J.Bio.Sc. 6(Si2) (2024)*

contributed insightful information. Tools like the SF-36 Questionnaire, Achievement Motivation Test (ACMT), and Cattle Anxiety Questionnaire were used to collect the quality-of-life data. Through the use of a multivariable regression analysis approach, the data demonstrated a significant relationship between achievement motivation and quality of life. Notably, there was also a strong correlation found with anxiety. Additionally, a strong inverse relationship was found between anxiety levels, achievement motivation, and life quality, particularly for women. Sinta, D.P. (2013) discovered that when compared to traditional teaching methods, the jigsaw technique significantly improved students' reading proficiency in descriptive text. He chose 231 students in total for his study, and 66 of them were sampled using purposive sampling. These students were then split into two groups: a control group with the same number of students, and an experimental group with 33 students. The t-test was utilized for data analysis. Sood, V. (2013) studied the effect of mastery learning strategies on concept attainment in geometry among high school students. A random sample of 105 students studying in 9<sup>th</sup> class was selected and "Three Groups: Randomized Matched Subject Pretest-Posttest Design" was employed. The sampled students were divided into three homogeneous groups on the basis of their non-verbal intelligence level by administering Raven's Standard Progressive Matrices (SPM). The first group and second group were taught through Bloom's LFM and Keller's PSI respectively and thus, termed as experimental groups. The third group was imparted instruction through conventional method of teaching and named as control group. The data were collected by administering self-developed concept attainment test in geometry. The statistical technique of Analysis of Co-variance (ANCOVA) was employed to analyze the data. The results revealed that both Bloom's LFM and Keller's PSI were significantly more effective in attainment of geometrical concepts as compared to conventional method of teaching. It was further inferred that Bloom's LFM was significantly better in attainment of geometrical concepts in comparison to Keller's PSI. This study examined the relationship between graduate students' anxiety, achievement motivation, and quality of life. The study conducted by Wani, Mukhtar Ahmad, and Aejaz (2015) aimed to determine the degree of achievement motivation and identify differences in achievement motivation related to gender and academic specialization. The study found that students attending government and private higher secondary schools differed significantly in their drive for achievement. Using a purposive sample approach, 200 participants 100 boys and 100 girls were chosen from upper secondary schools for the study. The results showed that 46.5% of the sampled individuals had an average level of achievement motivation, with girls scoring higher than boys (girls M = 127.82 and boys M = 121.89). Furthermore, notable differences in achievement motivation were noted between the various academic streams. Additionally, the study found that secondary school students attending government schools were more motivated to achieve (M = 125.59) than students attending private schools (M = 119.70). Lai, C. H. et al. (2015) looked into how effective a team-based strategy based on the jigsaw method is at improving report writing abilities. Using this method, students worked together to produce reports in an interactive learning environment. The results demonstrated that using the cooperative, jigsaw-based approach had a positive effect on report writing learning objectives. Juweto, G. A. (2015) The main goal of this study was to investigate how student achievement and attitudes toward biology in secondary schools in Delta State were affected by the Jigsaw cooperative teaching/learning strategy and school location. Even though the investigation looked into the impact of school location, it was found that this variable had little bearing on the results. The results showed that students who received instruction using the Jigsaw cooperative teaching method had a noticeably higher achievement rate.

### **Operational Definitions of the Terms:**

- 1. Jigsaw Teaching Technique:** Jigsaw is a kind of cooperative learning that promotes the sharing and understanding of ideas or texts by using different learning activities.

*Dr. Sangeeta Chauhan/ Afr.J.Bio.Sc. 6(Si2) (2024)*

2. **Concept Attainment:** Concept attainment is an inductive process to know the meaning of concepts and also helps to construct new concepts by comparing like and dislike examples related to any specific concept.
3. **Achievement Motivation:** Achievement motivation is the tendency to do work for achieving more and more success in any specific field.

#### **Research Question:**

1. What is the effect of cooperative jigsaw teaching technique on the concept attainment and achievement motivation of seventh class students?

#### **Objective of the Study:**

1. To study the effect of cooperative jigsaw technique on the concept attainment and achievement motivation among seventh class students.

#### **Research Hypothesis of the Study:**

1. There is significant effect of cooperative jigsaw teaching technique on the concept attainment and achievement motivation among seventh class students.

#### **Null Hypotheses of the Study:**

The null hypotheses are formulated at 0.05 level of significant to achieve the objective of the study –

1. There is no significance difference in the concept attainment of the students taught through cooperative jigsaw teaching technique and traditional teaching method.
2. There is no significance difference in the achievement motivation of the students taught through cooperative jigsaw teaching technique and traditional teaching method.

#### **Delimitations of the Study:**

This study has been delimited as follows:

1. The study has been restricted to the students of the one selected school affiliated to C.B.S.E. in Varanasi city.
2. In the present study only students of class seventh were considered for the teaching of mathematics subject.
3. The content has been delimited only for some specific topics of the entire mathematics curriculum.
4. The study has been delimited by the choice of only two dependent variables namely achievement motivation and concept attainment.
5. Only two teaching methods i.e. the cooperative Jigsaw teaching technique and conventional method were selected to teach to the chosen sample.

#### **Research Design:**

The present study was quasi-experimental study. Non – equivalent control group post-test only design was used.

#### **Population of the Study:**

The population of the present study is defined as the class seventh students of the schools affiliated to C.B.S.E in Varanasi city.

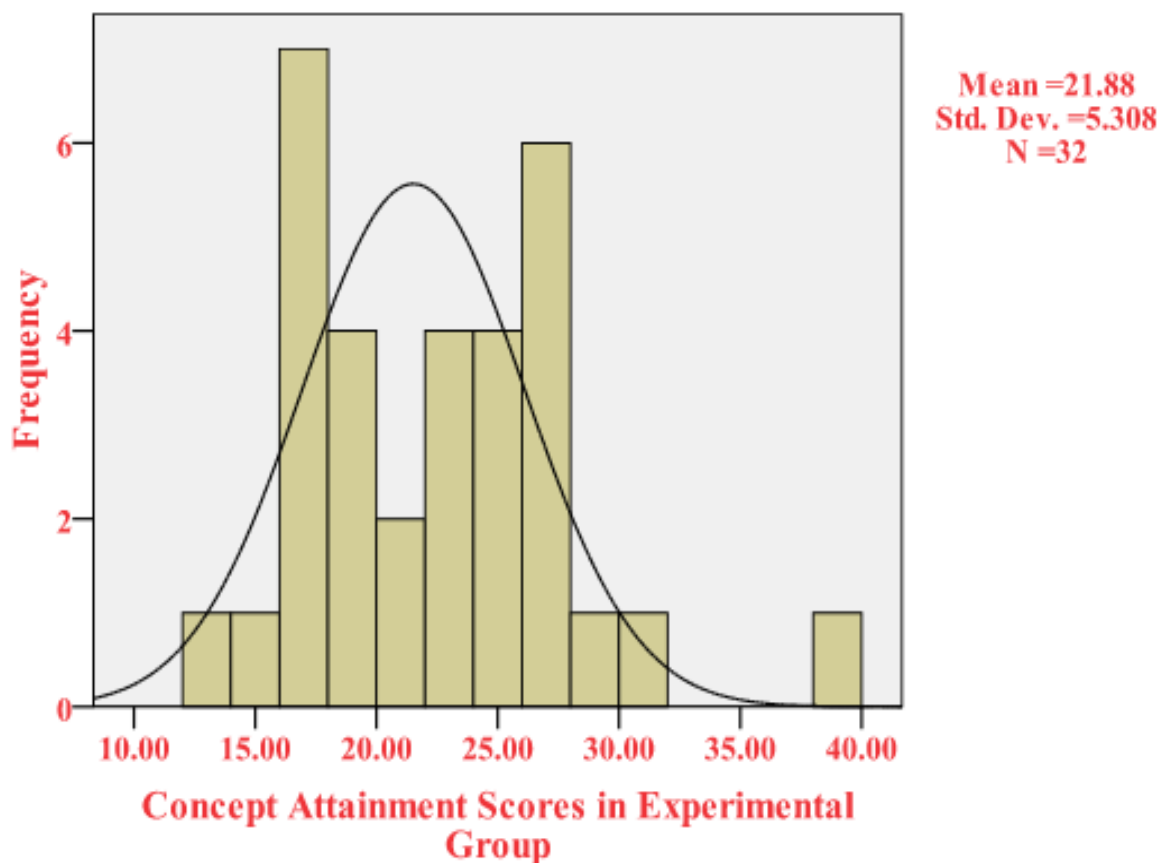
**Sample and Sampling Technique:** Purposive cum random sampling technique was used to select the sample. One school of Varanasi was taken by purposive sampling and students were selected by random sampling technique. There were actually 40 students in control group but only 32 participated in the post-test. Similarly of the 41 students in experimental group only 32 participated in the post-test.

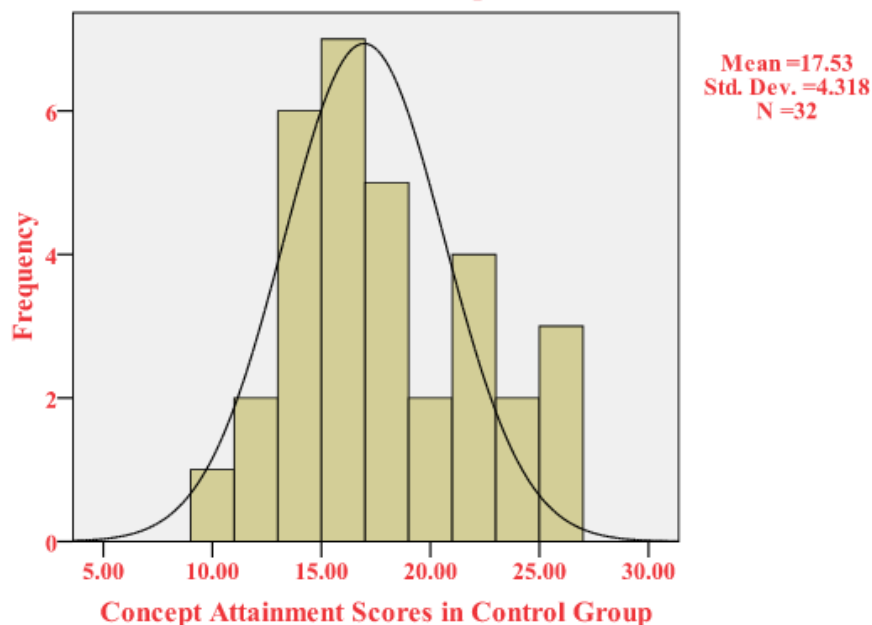
Here, researchers specifically Kolmogorov-Smirnov and Shapiro-Wilk tests (KSSWT) were used to verify the normality and Levene's test (LT) to verify the homogeneity of variance (homoscedasticity) of two independent samples.

**Table No. 1.1** SPSS output for Kolmogorov-Smirnov and Shapiro-Wilk Tests of Normality on Concept Attainment Post – test**Tests of Normality**

	Group	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
CA Post	Experimental	0.112	32	0.200*	0.938	32	0.065
	Control	0.143	32	0.096	0.953	32	0.172

Since, the p-values 0.065 and 0.172 from Shapiro-Wilk test of normality were both greater than 0.05 which imply that it is acceptable to assume that the students' Concept Attainment distributions across both groups (i.e. Experimental group and Control group) are near about as normal probability curve.

**Figure No. 4.1.1 NPC of Concept Attainment Scores in Experimental Group**

**Figure No. 4.1.2 NPC of Concept Attainment Scores in Control Group****Table No. 1.2** SPSS output for Levene's Test of Homogeneity of Variance on Concept Attainment Post – test

	<b>F</b>	<b>Df1</b>	<b>Df2</b>	<b>Sig.</b>
<b>CA Post</b>	1.256	1	62	0.267

Table No. 1.2 shows that the value of sig. is 0.267, which is greater than 0.05, it means that the variability in dependent variable (i.e. concept attainment) is about the same across both groups. Statistically, it can be represented as **CA Post p (0.267) > 0.05**. That means the scores in one dependent sample do not vary too much more than the scores in second dependent sample. Hence the homogeneity of variance assumption is considered met.

Since, all three assumptions of t–test (i.e. random assignment of subjects, normality of distribution and homogeneity of variance) were considered met. So, the t–test was performed to know the effect of independent variable teaching technique (i.e. cooperative jigsaw teaching technique and traditional teaching method) on the dependent variable (i.e. concept attainment, CA Post) of the students of VII grade.

**Table 1.3:** Significance of difference between mean scores of concept attainment of students taught through cooperative jigsaw teaching technique and traditional teaching method.

	<b>Group</b>	<b>N</b>	<b>M</b>	<b>S.D.</b>	<b>t-Value</b>	<b>Level of Significance</b>
<b>CA Post</b>	<b>Experimental</b>	32	21.8750	5.3082 4	3.591	S
	<b>Control</b>	32	17.5313	4.3178 9		

t - Value is significant at 0.05 level of significance

From table no. 1.3, it is clear that the computed value of t is 3.591, which is greater than the table value of t (1.96). So, the results showed that students who were taught through cooperative jigsaw teaching technique (M=21.8750) had significantly higher concept attainment scores, than those students who were taught through traditional method (M=17.5313). In another words, the mean score of the post-test of concept attainment test of the treatment group is significantly higher than that of control group. Thus the first null hypothesis  $H_{01}$  is not accepted.

Dr. Sangeeta Chauhan/ Afr.J.Bio.Sc. 6(Si2) (2024)

Researchers used Kolmogorov-Smirnov and Shapiro-Wilk tests to verify the normality of two independent samples and Levene's Test to verify the homogeneity of variance (homoscedasticity).

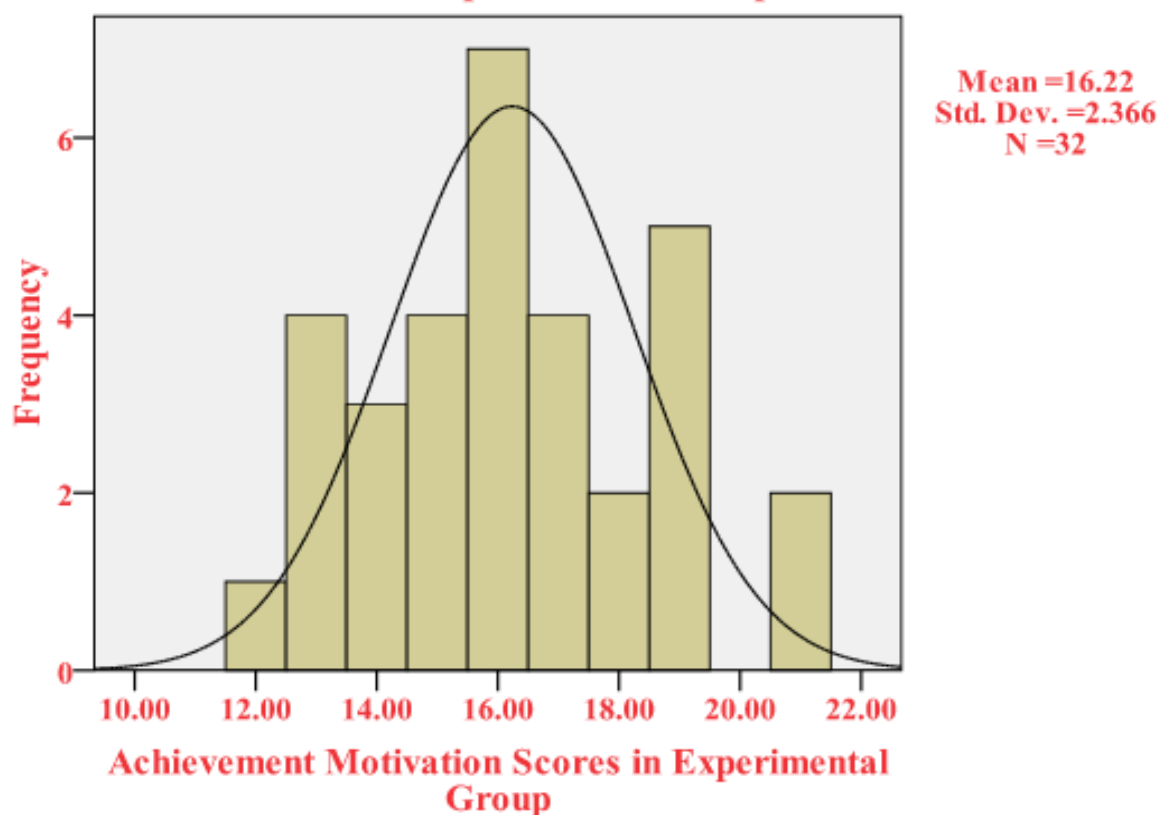
**Table No. 2.1** Kolmogorov-Smirnov and Shapiro-Wilk Tests of Normality on Achievement Motivation Post– test

#### Tests of Normality

	Group	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
AM Post	Experimental	0.131	32	0.179*	0.960	32	0.271
	Control	0.144	32	0.090*	0.948	32	0.127

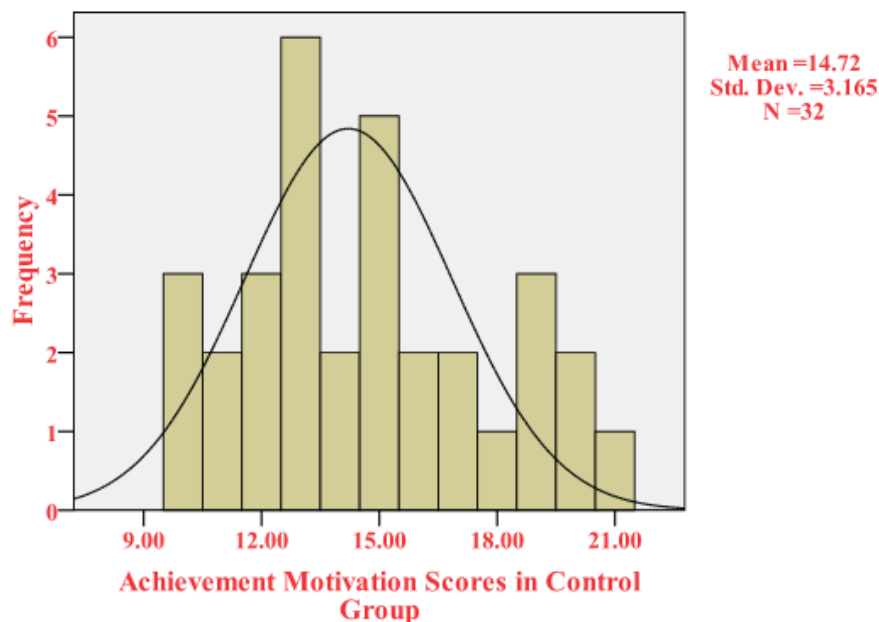
**Table 2.1** shows that The p-values 0.271 and 0.127 from Shapiro-Wilk test of normality were both greater than 0.05 which imply that it is acceptable to assume that the students' achievement motivation distributions across both groups (i.e. Experimental group and Control group) are normal (or bell-shaped).

**Figure No. 4.2.1 NPC of Achievement Motivation Scores in Experimental Group**





**Figure No. 4.2.2 NPC of Achievement Motivation Scores in Control Group**



**Table No. 2.2** Levene's Test of Homogeneity of Variance on Achievement Motivation Post – test

	<b>F</b>	<b>Df1</b>	<b>Df2</b>	<b>Sig.</b>
<b>AM Post</b>	3.217	1	62	0.078

Table No. 2.2 shows that the value of sig. is 0.078, which is greater than 0.05, it means that the variability in dependent variable (i.e. achievement motivation) is about the same across both groups. Statistically, it can be represented as **AM Post p (0.078) > 0.05**. That means the achievement motivation scores in experimental group do not vary too much more than the achievement motivation scores in control group. Hence the homogeneity of variance assumption is considered met.

Since, all three assumptions of t-test (i.e. random assignment of subjects, normality of distribution and homogeneity of variance) were considered met. So, researchers used t-test to know the effect of independent variable teaching technique (i.e. cooperative jigsaw teaching technique and traditional teaching method) on the dependent variable (i.e. achievement motivation, AM Post) of the students of VII grade.

**Table 2.3:** Significance of difference between mean scores of concept attainment of students taught through cooperative jigsaw technique and traditional teaching method.

	<b>Group</b>	<b>N</b>	<b>M</b>	<b>S.D.</b>	<b>t-Value</b>	<b>Level of Significance</b>
<b>AM Post</b>	Experimental	32	16.2188	2.36554	2.148	S
	Control	32	14.7188	3.16467		

t-value is significant at 0.05 level of significance.

From table no. 2.3, it is clear that the computed value of t is 2.148, which is greater than the table value of t (1.96). So, the results showed that students who were taught through cooperative jigsaw teaching technique (M=16.2188) had significantly higher achievement motivation scores, than those students who were taught through traditional teaching method (M=14.7188). In another words, the mean score of the post-test of achievement motivation test of the treatment group is significantly higher than that of control group. Thus the second null hypothesis  $H_{02}$  is not accepted.

**Discussion and Conclusion:** The cooperative jigsaw teaching technique demonstrated significantly greater effectiveness in comparison to the traditional teaching method in fostering achievement motivation and

Dr. Sangeeta Chauhan/ Afr.J.Bio.Sc. 6(Si2) (2024)

improving concept acquisition in mathematics among seventh-grade students. The higher marks achieved by students in the Jigsaw group, in contrast to the control group, can be attributed to their efforts in persuading their peers by fulfilling individual responsibilities and comprehending the subject matter. This method of instruction guarantees that all students actively participate in the learning process by giving them the chance to have meaningful conversations with their peers.

In addition, the jigsaw group discovered this method to be thrilling since it was new to them and it encouraged them to have good conversations with their friends. Compared to the traditional method, it can be assumed that these students have a positive attitude toward it, which has helped to shape their perspective and personality.

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Dr. Sangeeta Chauhan/ Afr.J.Bio.Sc. 6(Si2) (2024)

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