

## EFFECTIVENESS OF CONCEPT MAPPING STRATEGY ON STUDENTS' ACHIEVEMENT IN ZOOLOGY AT THE HIGHER SECONDARY LEVEL

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### Abstract

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*This study examined the effect of concept mapping teaching strategy on student's achievement in zoology at XI standard students. It also examined the differential effect in achievement among zoology students. The study used two groups pretest-posttest equivalent-groups design, 50 students for adopting for the present research. Zoology Achievement Test (ZAT) developed by the researcher and validated by experts was used for the present study. Students taught using concept mapping strategy achieved higher scores and significantly better than those taught using conventional (lecture) method. The study recommended among other things that since concept mapping is found to be an effective strategy and enhanced achievement among zoology students, teachers of this subject should accept it as one of the strategies they can use in zoology classroom.*

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### Introduction

Concept mapping measures the cognitive activities of the learner (Otor, 2011). It teaches mental skills as opposed to psychomotor activities. The pedagogical use of concept map is to help students learn subject matter more meaningfully in science. The study of psychological theories of learning is very important and valuable as they are the fundamental theoretical foundations for innovative instructional strategies which are used in the teaching-learning process of science. This study is anchored on Ausubel's (1968) psychological theory of learning which is concerned with processing of information and make it more meaningful to the learner so that it can be better understood and used.

## **Need For the Study**

The emphasis of modern science teaching and learning is on learners' active participation in the learning process. This concern calls for the use of teaching strategies which emphasize the teaching of process skills of science and child-centered inquiry-based instruction. It is expected that the teaching strategies that emphasize the teaching of process skills of science as noted by Rejane, Zelia and Milke (2004). Zoology is one of the core science subjects among science students in higher secondary school curriculum in India and linked to almost everything on earth. It plays vital role in the industrial, technological and economic development of any nation. It also features prominently in the areas of health, agriculture to mention but a few. It is therefore a catalyst of sustainable national growth and development. Zoology teachers have applied several instructional approaches in teaching zoology yet the desired result in student's achievement has not been achieved. According to my observation past 10 years low achievement of students in zoology among others include teachers' inadequate preparations and methods adopted in teaching this subject. The pursuance of how to improve the achievement of students in zoology is the concern for this investigation.

## **Statement of the problem**

The researcher observed that the instructional strategies zoology teachers adopt could be responsible for the low achievement among the students in this subject. Certain difficult zoology concepts have also been contributing to poor achievement among zoology students. This study is therefore set to find out if concept mapping teaching strategy could enhance students' achievement in zoology of higher secondary students.

## **Operational Definitions of the Key Terms**

### **Effectiveness**

According to Oxford Advanced Learner's Dictionary (1999), Effectiveness defines having the desired effect and producing the intended result. This study measures the effectiveness in terms of the achievement scores of the students using *concept mapping teaching strategy* in zoology.

### **Concept Map**

Concept maps work as a visual and graphical tool to help structure information, analyze complicated concepts, recall and generate new ideas. In this study concept map is used diagram for representing tasks, words, concepts, or items linked to and arranged around a central concept or subject using a non-linear graphical layout.

### **Strategy**

a long-range plan for achieving something or reaching a goal, or the skill of making such plans

### **Achievement**

Student's achievement refers to the level of schooling you have successfully completed and the ability to attain success in your studies.

### **Zoology**

A branch of biology concerned with the classification and the properties and vital phenomena of animals.

### **Objectives**

The following are the objectives of the study.

1. To find out the effectiveness of Concept Mapping Strategy in science teaching.
2. To find out the achievement mean scores of the pre-test and post test scores of control group student.
3. To find out the achievement mean scores of the pre – test and post – test scores of experimental group students.
4. To find out and compare the mean scores of the control and experimental group students in their gain scores.

### **Hypotheses**

The following are the hypothesis of the study:

1. There is no significant difference between the achievement mean scores of the pre-test and post – test scores of control group students.
2. There is no significant difference between the achievement mean scores of the pre-test and post-test scores of experimental group students.
3. There is no significant difference between the mean scores of the control and experimental group students in their gain scores.

### **Methodology**

Experimental design is the blue print of the procedures that enable the researcher to test hypotheses by reaching vivid conclusions about relationships between independent and dependent variables. In this experimental research, the investigator has chosen the two groups pretest-posttest equivalent-groups design for her study.

The pretest-posttest equivalent groups design is

$$\begin{array}{lll} R O_1 X O_2 & X \text{ gain} = O_2 - O_1 & O_1 O_3 - \text{Pre tests} \\ R O_3 C O_4 & C \text{ gain} = O_4 - O_3 & O_2 O_4 - \text{Posttests} \end{array}$$

In this experimental method two groups of subjects are selected. One of the equivalent groups serves as the control group in which the subjects are taught by traditional method. The other group serves as the experimental group in which the subjects are taught using Concept Mapping Strategy. Both the groups had same number of students and they were given equal time for each session. The treatment was given for 20 days with a schedule of one hour per day for each group and no students were absent on those days. The treatment was given without any disturbances.

### **Tool Used**

A research instrument which was validated by experts in Zoology subject, measurement and evaluation was used for this study namely Zoology Achievement Test (ZAT). The ZAT was made of thirty items drawn from the difficult zoology concepts. The instrument reliability was found to be 0.83.

### **Sample**

The sample for the present study constitutes 50 XI standard Students of D.G.M Higher Secondary school at Sethiathope in Cuddalore district. As per the scoring of a general test in biology, 25 students were chosen as control group and 25 students were chosen as experimental group. Both groups were equated on the basis of their pretest scores (intelligence test)

### **STATISTICAL TECHNIQUES USED**

Statistical techniques serve the fundamental purpose of description and inferential analysis. The following statistical techniques were used in the study.

- ❖ Mean (M) and standard deviations (SD)
- ❖ 't' test for determining the significance of difference between the means of the two sub-groups.

### **ANNALYSIS OF DATA**

#### **Hypothesis: 1**

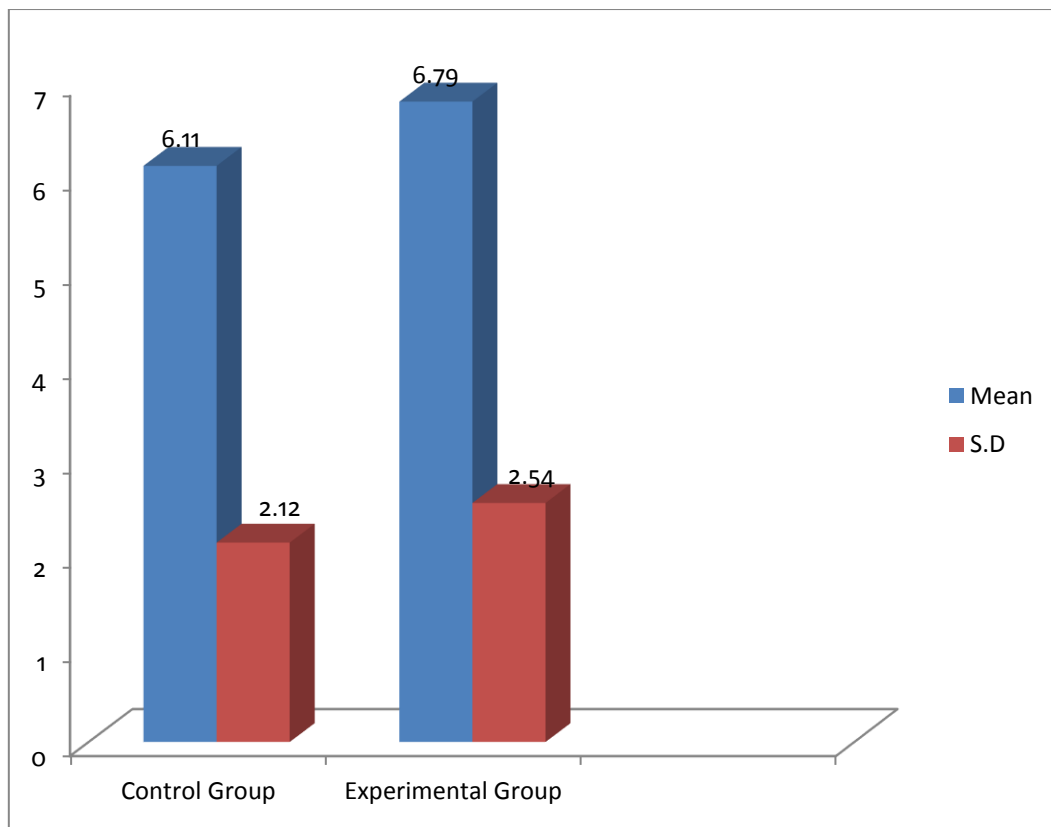
There is no significance difference between the control group and experimental group students in their mean scores of pre test.

**Table .1. Difference between the Mean Scores of Pre Test of Control Group and Experimental Group**

Group	Number	Mean	SD	't' Value		Remarks
				Calc.	Table	
Control	25	6.11	2.12	0.65	1.96	N.S.
Experimental	25	6.79	2.54			

The above table shows that the computed t value 0.65 is less than table value 1.96 at 0.05 level and hence it is not significant. Consequently, the null hypothesis is to be accepted. So there is no significance difference between the control group and experimental group students in their mean scores of pre test.

**Figure.1 Mean Scores of Pre Test of Control Group and Experimental Group**



**Hypothesis: 2**

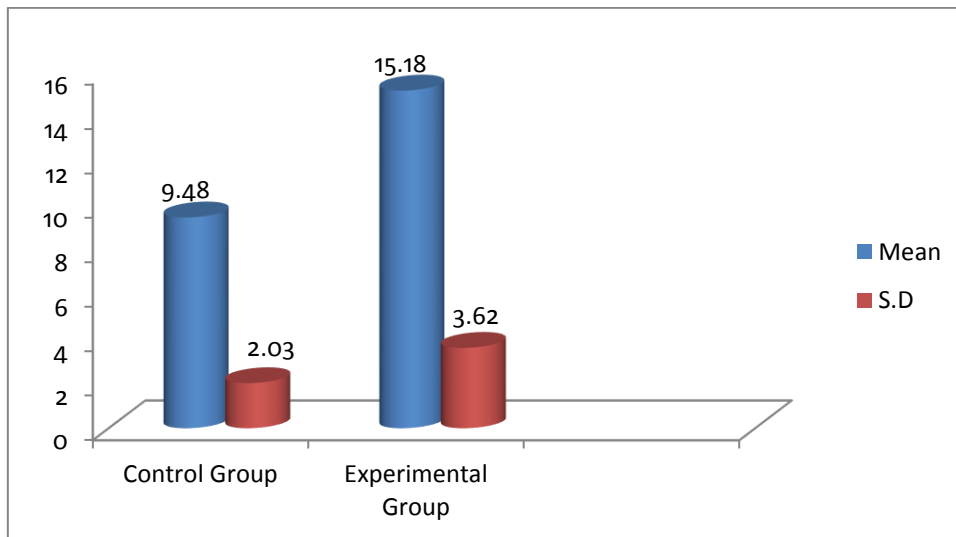
There is no significance difference between the control group and experimental group students in their mean scores of post test.

**Table.2. Difference between the Mean Scores of Post Test of Control Group and Experimental Group**

Group	Number	Mean	SD	't' Value		Remarks at 0.01 level
				Calc.	Table	
Control	25	9.48	2.03	2.35	1.96	S
Experimental	25	15.18	3.62			

The above table shows that the computed 't' value 2.35 is greater than the table value 1.96 at 0.05 level and hence it is significant. Consequently, the null hypothesis is to be rejected. So there is significance difference between control group and experimental group students in their mean scores of post test.

**Figure.2 Mean Scores of Post Test of Control Group and Experimental Group**



**Hypothesis: 3**

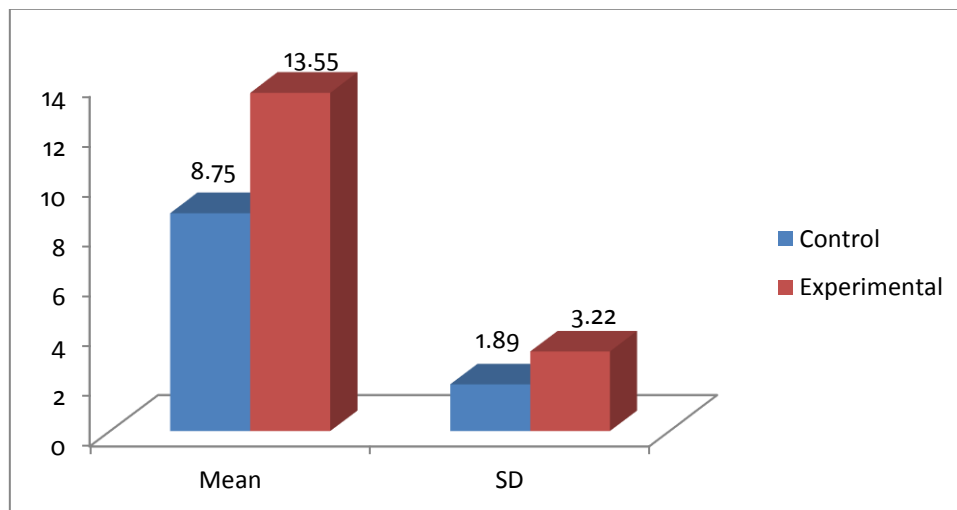
There is no significance difference between the mean scores of gain scores of control group and experimental group students

**Table .3. Difference between the Mean Scores of Gain Scores of Control Group and Experimental Group**

Group	Number	Mean	SD	't' Value		Remarks at 0.01 level
				Calc.	Table	
Control	25	8.75	1.89	3.35	1.96	S
Experimental	25	13.55	3.22			

The above table shows that the computed 't' values 3.35 is greater than the table value 1.96 at 0.05 level and hence it is significant. Consequently, the null hypothesis is to be rejected. So there is significance difference between the mean scores of gain scores of control group and experimental group.

**Figure.3. Gain Scores of Control Group and Experimental Group**



**Conclusion**

However, considering their pretest- posttest gains, this means that there is a significant difference in the mean achievement scores of students taught using concept mapping and those taught using the conventional method. The experimental group achieved significantly higher than the control group. Since concept mapping is found to be an effective teaching strategy that enhances achievement among zoology students, zoology teachers should accept it as one of the strategies they can use in classrooms.

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