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## " Study of the Effect of Teaching Chemistry by Concept Map on the Achievement of Students"

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### Abstract:

The present research was undertaken to study the effect of teaching chemistry by concept map on the achievement of students. The sample for the study comprised of Experimental group of 20 students and control group of 24 students of XI grade. The tool used for the study was an achievement test in chemistry for class XI prepared and standardised by the research scholar. Concept map was prepared by the research scholar on the topics to be taught to the students. Statistical analysis involved Mean, Standard deviation and t-test. Results revealed a significant difference between the pre-test and the post test of the experimental group of students on the test of achievement in chemistry. No significant difference was found between the pre test and the post test of controlled group of students on the test of achievement in chemistry. Moreover there was a significant difference between the post tests of the controlled and experimental group of students on the test of achievement in chemistry.

**Key Words:** Achievement, Concept Map, Experimental Group, Control Group.

### Introduction:

Concept Mapping is a technique used by the teacher to help the students organise their understanding of a topic. It was originally developed at Cornell University as a practical and useful classroom tool and derived from the Ausubel's Learning theory. According to Novak and Gowin (1984) concept mapping have been used to improve students achievement and as aids in

instructional design. For the present study concept mapping on the topics “Rate of Chemical Reaction”, “Nomenclature of organic compounds” and “Qualitative Inorganic Analysis” have been prepared by the researcher.

### **Objectives of the study:**

1. To find out if there exists any significant difference between the pre-test and post test scores in the achievement test of the controlled group students who are taught chemistry through traditional approach.
2. To find out if there exists any significant difference between the pre-test and post test scores in the achievement test of the experimental group students who are taught chemistry by two way interactive approach by making use of concept map.
3. To find out if there exists any significant difference between the post test scores of the controlled and experimental group of students on the achievement test in chemistry.

### **Hypotheses of the study:**

**H<sub>01</sub>** There would be no significant difference between the pre-tests of controlled and experimental group of students on the test of achievement in chemistry.

**H<sub>02</sub>** There would be no significant difference between the pre-test and post test of controlled group of students on the test of achievement in chemistry.

**H<sub>03</sub>** There would be no significant difference between the pre-test and post test of experimental group of students on the test of achievement in chemistry.

**H<sub>04</sub>** There would be no significant difference between the post-tests of controlled and experimental group of students on the test of achievement in chemistry.

### **Delimitation of the study:**

1. The study has been delimited to the schools of Bhilai.
2. English medium schools affiliated to CBSE was only considered for the present study.
3. The research work has been conducted on class XI students only.
4. The subject which is being selected to find out achievement of students for the present study is Chemistry.

**Sample:**

The sample for the present research study comprised of Experimental Group 20 students and Control Group of 24 students of XI Grade.

**Tool:**

The tool for the research study is an achievement test in chemistry for class XI prepared and standardized by the research scholar.

**Procedure:**

Out of the total CBSE Schools of Bhilai, one school was selected randomly. The total students studying in grade XI of this school were 408. To prepare an identical group one for controlled group and the other for experimental study the students were given the achievement test in Chemistry prepared by the research scholar. On the basis of their achievement the marks were arranged in the ascending order and sets were formed of the students on the basis of their achievement. Then the two sets of the group were formed so that an identical group can be obtained. In this way two groups control and experimental were formed.

The achievement test in chemistry was administered to the students of the experimental as well as the controlled group of class XI for the pre test scores. After administering the pre-test, the controlled group was taught by the traditional method and the experimental group by the two way interactive approach using concept map. The teaching processes were continued for two weeks to the samples of controlled and experimental groups. After completion of the content portion the same test prepared by the research was administered to the students of both the groups controlled and experimental to measure the achievement, the scores obtained were the post test scores.

**Statistical Technique:**

Mean, Standard deviation and t-test was used to analyse the data.

**Results and Discussion:**

Group	Test	N	Mean	SD	t value	Significance
Experimental	Pre-Test	20	19.00	4.09	0.98	Not Significant
Control	Pre-Test	24	20.33	4.62		

**Table:1. Statistical Analysis of the students Pre-Test scores of Controlled and**

### Experimental Group.

Table 1 depicts that the t value was found to be 0.98 which is not significant at the .01 level (df =42). From the results it is found that the students of the experimental and controlled groups showed no significant difference in their pre test scores on the test of achievement in chemistry.

Group	Test	N	Mean	SD	t value	Significance
Control	Pre-Test	24	20.33	4.62	1.63	Not Significant
	Post-Test	24	22.60	4.77		

**Table:2. Statistical Analysis of the students Pre and post Test scores of the Controlled Group**

Table 2 depicts that the t value was found to be 1.63 which is not significant at the .01 level (df =46). Thus on the basis of the above results it is concluded that the students of the controlled group showed no significant difference in their pre and post test scores on the test of achievement in chemistry.

Group	Test	N	Mean	SD	t value	Significance
Experimental	Pre-Test	20	19.00	4.09	9.85	Significant
	Post-Test	20	31.90	3.88		

**Table:3. Statistical Analysis of the students Pre and post Test scores of the Experimental Group.**

Table 3 depicts that the t value was found to be 9.85 which is significant at the .01 level (df =38). Results indicate that there exists a significant difference between the pre test and the post test scores of the students of the experimental group on their test of achievement in chemistry.

Group	Test	N	Mean	SD	t value	Significance
Experimental	Post-Test	20	31.90	3.88	6.88	Significant
Control	Post-Test	24	22.60	4.77		

**Table:4. Statistical Analysis of the students Post Test scores of the Controlled and Experimental Group.**

Table 4 depicts that the t value was found to be 6.88 which is significant at the .01 level. The results show that the post test scores of the students of the experimental and controlled group differ significantly on the test of achievement in chemistry.

**Conclusion:**

The study shows that teaching of chemistry by two way interactive approach using concept map is effective in comparison to the traditional mode of teaching. Two way interactive mode of communication ensures a continuous flow and exchange of views and convictions from the teacher to the students and vice versa. Use of concept map in teaching help the student to a great extent in clarifying their concept .Teachers are therefore suggested to make use of concept maps in their teaching to make learning effective.

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