# Effect of Concept Mapping on Interest in Science of Viii$^{th}$ Class Students

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## Abstract

The study described in this paperwas designed to assess the effectiveness of use of the concept mapping on interest in science of VIII class students in Government and Private schools of Delhi. Concept mapping is a schematic device for representing a set of concept meanings embedded in a framework of propositions. The study was conducted under natural settings and without disturbing the ratio of two sections- experimental and control, of eighth class from both the schools. In the control class, the teaching approach was primarily teacher orientated, that is the teacher used the lecturing method in sequencing the instructional activities. In the case of the experimental class, the concept mapping strategy of teaching was adopted to teach the same content. The results of this study indicated that the experimental group students showed more interest in science. Findings of this study will be useful towards the implementation of concept mapping as an instructional strategy in science classroom for enhancing students' interest in science.

**KEYWORDS:** Concept mapping, Effectiveness, Interest, Science

## Introduction

Concept maps are a pedagogical tool that allows learners to represent their understanding of concepts through visual representation. For understanding science concepts and use them practically, we expect learners to develop interest in the science. Interest in science develop certain abilities in the pupils, such as ability to use scientific terminology; improvise and manipulate scientific instruments, collect suitable data from relevant sources, interpret given data, organize science fairs and science club activities etc.Students attain new knowledge in necessary depth and preserve this knowledge for a long period of time after instruction if they have taken it interestingly. So there is a challenge for science educators to teach this subject in such a manner adopting an effective strategy that can develop understanding and interest among students side by side. For understanding science concepts and use them practically, we expect learners to develop interest in the science. Students attain new knowledge in necessary depth and preserve this knowledge for a long period of time after instruction if they have taken it interestingly. So there is a challenge for science educators to teach this subject in such a manner adopting an effective strategy that can develop understanding and interest among students side by side.

Concept mapping was pioneered by Novak and Gowin (1984) taking David Ausubel's (1963, 1968) theory of meaningful learning. They made two–dimensional hierarchical diagrams which illustrate the relationships between and among individual concepts and named them concept maps. The basic concept map developed by them illustrates a hierarchy of concepts where more specific and less inclusive concepts are linked together by valid and meaningful propositions and therefore are listed under the broader, more

inclusive concepts. The propositions, along with arrows indicating the direction of the relationship help to develop the connections between linked concepts more precisely. Concept mapping has been applied at all levels of learning and instruction in in areas of science education as well as in other subjects too.**Jegdeet al. (2006)** studied **"The Effect of Concept Mapping on Students' Anxiety and Achievement in Biology".** The study sought to find out if the metacognitive strategy of concept mapping reduces anxiety and thereby enhances achievement in biology. A total of 51 (30 boys, 21 girls) senior secondary one (grade 10) students participated in this experiment.Findings support the stand that concept mapping is significantly more effective than the traditional/expository teaching strategy in enhancing learning in biology. In addition, it apparently reduces students' anxiety towards the learning of biology.**Trifone(2006)** studied **"To What Extent Can Concept Mapping Motivate Students to Take a More Meaningful Approach to Learning Biology?"** The study was conducted on 82 high-ability ten years old students in biology. It was found that concept mapping contributed to a more meaningful approach to learning biology.**Conklin(2007**) studied **"Concept Mapping: Impact on content and organization of Technical Writing in Science".** A comparison was made to study the relationship between concept mapping and the content and organization of technical writing of 82 ninth grade biology learners.It was concluded that Concept mapping significantly improved learners' attitude toward using concept mapping to plan writing, organize information, and think creatively. Concept maps appeared to facilitate learning how to process information and transform it into expository writing.**Heinz (1990)** studied **"Concept Mapping Brings Long –Term Movement Toward Meaningful Learning"** .The focus question for the study was the use of concept mapping as a tool to enhance instructional unit exposure. Further, this study investigated students' attitudes towards concept mapping. It was found that concept maps gave some insight into how mapping might actually improve student performance.**Lambiotte(1992)** studied **"Multi Relational Semantic Maps"**andcompared Concept Mapping and lecture Method on secondary school students. It was found that students with more well established schemas for the circulatory system when given knowledge through Concept Mapping treatment, Concept Mapping found to be more effective than lecture method. **Gao(2007)** Studied "Collaborative Concept Mapping: An Instructional Strategy To Foster Both Individual Learning And Group Knowledge Construction." It was found that the collaborative concept mapping is a potential effective instructional strategy to facilitate learners in both group knowledge construction and individual learning.**Akinsanya (2004)**studied **"Concept Mapping For Meaningful Learning"** and reported that while students in their study found concept mapping to be challenging, it stimulated inquiry-based learning in the nursing education programme. In their study of how children may be helped to conceptually represent the world for themselves.

Concept mapping has the potential to improve overall achievement, understanding, problem solving, and reasoning abilities of the learners. The connections between various concepts facilitated by concept maps; not only allow pupils to draw associations among the main concepts but also help them to improve comprehension of content, generate greater retention, higher order thinking, and application of the concepts in their day to day life.But negligible studies have been conducted to see the effect of concept

mapping in enhancing interest in science or any other subjects. This is why this study has been conducted.

## STATEMENT OF THE PROBLEM

## EFFECT OF CONCEPT MAPPING ON INTEREST IN SCIENCE OF VIII$^{th}$ CLASS STUDENTS

## OBJECTIVES OF THE STUDY

**1.** To measure the level of interest in science of 8$^{th}$ class students when taught through concept mapping.

**2.** To compare the interest in science of VIII$^{th}$ class students of experimental groups with regard to types of schools.

**3.** To compare the interest in science of VIII$^{th}$ class girls and boys of experimental group.

## HYPOTHESES

**1.** There is an average level of interest in science of VIII$^{th}$ class students when taught through concept mapping.

**2.** There is no significant difference in interest in science of experimental group of VIII$^{th}$ class students of government and private school.

**3.** There is no significant gender difference in the interest in science of experimental group of VIII$^{th}$ class students of government and private schools.

## DESIGN OF THE STUDY

**Non-Equivalent Post-test Only Design** research method is adopted for the present study .This type of design has two randomly assigned groups: an experimental group and a control group. Neither group is pretested before the implementation of the treatment. The treatment is applied to the experimental group and the post-test is carried out on both groups to assess the effect of the treatment or manipulation. This type of design is common when it is not possible or required to pretest the subjects.

## SAMPLE

**Table 1.1 : School-wise distribution of the sample**

| Sr. no. | Name of the School | Type | Exprimental Group | Control Group | Total |
|---|---|---|---|---|---|
| 1. | SarvodayaVidyalaya No. 3 | Government | 35 | 35 | 70 |
| 2. | MG VidyaNiketan | Private | 35 | 35 | 70 |

## TOOLS USED

1.Science Interest Test by L.N Dubey and ArchanaDubey

## ANALYSIS AND INTERPRETATION OF THE DATA

### HYPOTHESIS-I

**There is an average level of interest in science of VIII$^{th}$ class students when taught through concept mapping**.

To assess the level of interest in science of experimental groups of government and private schools; the pre-test and post-test scores were analyzed and categorized in Low, Average and High levels of Interest in science**.**

**Table 1.2 Post-test scores of total no. of students of Experimental Groups of Government and Private School**

| | Government school | | Private School | |
|---|---|---|---|---|
| **Level** | **Pre- Test (No. of Students)** | **Post- Test (No. of Students)** | **Pre- Test (No. of Students)** | **Post- Test (No. of Students)** |
| Low | 15 **43%** | 04 **11%** | 15 **43%** | 06 **17%** |
| Average | 18 **51%** | 19 **54%** | 15 **43%** | 17 **48%** |
| High | 02 **6%** | 12 **34%** | 05 **14%** | 12 **34%** |
| **Total** | **35** | **35** | **35** | **35** |

Table 1.2 clearly indicates the decrease in no. of students in low level of interest in science and a fair increase in number of students in average and high level of interest in science of government and private schools. This clearly shows the efficacy of concept mapping in enhancing level of interest in science. Hence, the hypothesis **"There is an average level of interest in science ofVIII$^{th}$ class students when taught through concept mapping"** is not accepted.It is generalized that concept mapping has proved its efficacy in enhancing interest in science of VIII$^{th}$ class students. There is a need to integrate teaching through concept mapping in science curriculum.

### HYPOTHESIS-II

**There is no significant difference in interest in science of experimental groups of VIII$^{th}$ class students of government and private school.**

To ascertain the significance of difference in interest in science of experimental groups ofVIII$^{th}$ class students of government and private school, t-ratios were computed for difference in mean scores on Science Interest Test.

**Table 1.3 : t-ratio of Pre-test Scores of Interest in Science of Experimental Groups of Government and Private schools**

| **Experimental Group** | **N** | **Mean** | **SD** | **$SE_D$** | **t-ratio** |
|---|---|---|---|---|---|
| **Government school** | 35 | 31.51 | 6.01 | 1.69 | 2.70** |
| **Private school** | 35 | 36.08 | 8.01 | | |

** Significant at 0.01 level

(Critical Value 2.00 at 0.05 and 2.65 at 0.01 level, df 68)

Table 1.3 reveals that pre –test mean scores in interest in of experimental group of government school is 31.51 and which is lower than the corresponding mean score of 36.08 of private school's experimental group. The t-value of mean difference on interest in science is 2.70, which in comparison to the table value is found to be significant at 0.01 level of significance. Hence, the result indicates that the experimental groups of both the schools differ significantly in their interest in science before they are subjected to concept mapping strategy for teaching the content. The results of post-test scores are placed in table 1.4.

**Table 1.4 : t-ratio of Post-test Scores of Interest in Science of Experimental Groups of Government and Private schools**

| Experimental Group | N | Mean | SD | $SE_D$ | t-ratio |
|---|---|---|---|---|---|
| **Government school** | 35 | 41.94 | 8.83 | 1.98 | 0.46** |
| **Private school** | 35 | 42.85 | 7.76 | | |

** Not Significant at 0.05 level

(Critical Value 2.00 at 0.05 and 2.65 at 0.01 level, df 68)

Table 1.4 reveals the scores of experimental groups of government and private school after the content is being taught to them with concept mapping strategy. The mean scores of experimental groups of government and private schools are 41.94 and 42.85 respectively. The t-value of mean difference on interest in science is 0.46, which in comparison to the table value is found to be lower, hence insignificant at 0.05 level of significance. Hence, the result indicates that the experimental groups of both the schools do not differ significantly in their interest in science after they are subjected to concept mapping strategy for teaching the content.

**HYPOTHESIS- III**

**There is no significant gender difference in the interest in science of experimental groups of VIII$^{th}$ class students.**

To find the difference in interest in science among girls and boys when taught through concept mapping of teaching; pre –test and post- test scores of experimental groups of government and private school were analyzed. The resultant scores are tabulated as follows:

**Table 1.5 : t-ratio of Pre-test Score of Experimental Group Girls and Boys in Science Interest Test.**

| Pre-test | N | Mean | SD | $SE_D$ | t-ratio |
|---|---|---|---|---|---|
| **Girls Experimental Group (Government &** | 32 | 32.90 | 7.40 | | |

| | | | | | |
|---|---|---|---|---|---|
| **Private School)** | | | | 1.75 | 1.67** |
| **Boys Experimental Group (Government & Private School)** | 38 | 35.02 | 7.24 | | |

****** Not Significant at 0.05 level

(Critical Value 2.00 at 0.05 and 2.65 at 0.01 level, df 68)

Table 1.5 reflects that the mean scores of girls of experimental groups of government and private school in Science Interest Test is 32.90 and that of the boys is 35.02. The t-value is 1.67 which is insignificant at 0.05 and 0.01 levels for 68 df. This indicates that girls and boys of experimental groups of both the schools are having similar interest in science.

**Table 1.6 : t-ratio of Post-test Score of Experimental Group Girls and Boys in Science Interest Test.**

| **Post-test** | **N** | **Mean** | **SD** | **$SE_D$** | **t-ratio** |
|---|---|---|---|---|---|
| **Girls Experimental Group (Government & Private School)** | 32 | 40.37 | 7.98 | 1.91 | 1.92** |
| **Boys Experimental Group (Government & Private School)** | 38 | 44.05 | 8.02 | | |

****** Not Significant at 0.05 level

(Critical Value 2.00 at 0.05 and 2.65 at 0.01 level, df 68)

Table 1.6 reveals the mean score of girls on Science Interest Test of experimental groups of government and private school after the content being taught through concept mapping is 40.37 and that of boys is 44.05. t-ratio for the significance of mean score difference in interest in science among girls and boys is 1.92 which in comparison to table value is found to be insignificant. Hence, the hypothesis **"There is no significant gender difference in the interest in science of experimental groups of VIII$^{th}$ class students of government and private schools when taught through concept mapping"** stands accepted.

On comparing the pre -post mean scores from the table 5.9.1and 5.9.2 it is found that there is increase in mean scores of girls from 32.90 to 40.37 and of boys from 35.02 to 44.05 which shows the effectiveness of concept mapping in enhancing the interest in science among girls and boys. But the difference in mean scores of girls and boys is not

significant. It shows concept mapping has evidenced to be effective equally for both the girls and boys.

## CONCLUSION

**1.**In both the schools no. of students having lower level of interest in science gets decreased and the no. of students in average and higher level of interest gets increased. This clearly shows the effectiveness of concept mapping in raising the interest of students in science.

**2**.On analyzing the post-test scores of Science Interest Test of experimental groups of government and private school after the content is being taught to them with concept mapping strategy, it is concluded that concept mapping has proved to be an effective strategy in increasing the interest in science of the students. Thus, the teachers should seriously think about executing the subject matter of science through concept mapping strategy.

**3.**It is found that no significant gender difference is observed in the interest in science of girls and boys of $8^{th}$ class control groups of government and private school before and after the content was taught through conventional method of teaching

## EDUCATIONAL IMPLICATIONS

**1.**Concept mapping has played a major role in breaking the gender stereotype notion about the interest in science. It can be used in Mathematics and other subjects too.

2.Concept mapping not only enhances interest , but also produces an active learner.

3. Through concept maps, teachers are able to access learners' knowledge and reveal unique thought processes and also surface misconceptions harboured by the learner.

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