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CONCEPT MAPPING IN TEACHING SCIENCE AMONG IX STD STUDENTS

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DOI: <https://doi.org/10.5281/zenodo.810318>

Abstract

Concept Map is a graphic device in which the concepts are linked by propositions leading to the precision and enhancement of meaning of the concept.” It is a schematic device for representing a set of concept meanings embedded in a hierarchy from most general concept to specific concepts of a learning unit. The study aimed to examine the concept mapping in teaching science among IX std students. The investigator adopted experimental method to study the concept mapping in teaching science among ix std students. For this study a sample of 60 IX std students from schools which are situated in Coimbatore district in Tamil Nadu. The findings reveal that is inferred that there is a difference in concept mapping in teaching science among ix std students.

Keywords: Concept Map; Teaching; Science; Students; Graphic Device.

Cite This Article: R. Sangeetha, and Mrs. T. Sangeetha. (2017). “CONCEPT MAPPING IN TEACHING SCIENCE AMONG IX STD STUDENTS.” *International Journal of Research - Granthaalayah*, 5(5)SE, 98-101. <https://doi.org/10.5281/zenodo.810318>.

1. Introduction

A concept map is a graphical representation of the relationship among terms. This will sound familiar if you have used graphic organizers or visual learning tools such as Inspiration software. In our research, we use a type of concept map in which students are provided only the terms. Although there are many variations in the way you can design concept map activities, open-ended activities that allow students to construct their own map structure are the most revealing. As students are introduced to new science concepts, they embark on a cognitive process of constructing meaning, reflect on their understanding. In sum, concept maps allow students to think deeply about science by helping them to better understand and organize what they learn, and to store and retrieve information more efficiently. Students also articulate and challenge their thoughts about science when they discuss their maps with each other. Concept mapping naturally integrates literacy and science by providing a starting point for writing about science.

2. Design of the Study

In this study, the experimental method was adopted by the investigator. From the experimental method, the Parallel Group Design is chosen for this study. Control group and Experimental group are the two groups of parallel group design. A parallel group study is a simple and commonly used clinical design which compares two treatments. Usually a test therapy is compared with a standard therapy. The allocation of subjects to groups is usually achieved by randomization. The groups are typically named the experimental group and the control group. Parallel group designs do not require the same number of subjects in each group, although often similar numbers are observed. The design is commonly used in randomized controlled trials. Statistical analysis often adopts t-test of the between group difference in the outcome, which is usually a mean or a proportion.

Hypothesis 1: There is no significant difference between the pre test and post test scores of the control group of IX standard, exposed to teaching of science using conventional teaching, and the pre test and post test scores of the experimental group of IX standard, exposed to teaching of science using concept maps.

Table 1: Pretest and Post test Mean Scores of Control and Experimental Groups

Method of instruction	Pretest			Post test			't' value	df	'p' value
	N	Mean	SD	N	Mean	SD			
Concept map	37	34.65	4.60	37	43.16	5.37	6.0511**	36	≤ 0.0001
Conventional teaching	23	36.57	3.87	23	38.35	4.04	16.8201**	22	
Total	60			60					

** - Significant at 0.01 level

The above table shows that the calculated 't' value for the pretest and post test scores for the experimental group was 6.0511 and for the control group, it was 16.8201 respectively. The calculated 't' values were greater than the table value of 2.5758 at 0.01 level of significance. The 'p' value was found to be ≤ 0.0001 . This shows that the difference in pretest and post test mean scores is statistically significant. The pretest mean scores for the group instructed through Concept maps was 34.65 which had increased to 43.16 in the post test and for the group exposed to Conventional teaching, it was 36.57, which had increased to 38.35 respectively. The increase in the post test mean scores was the highest for the group instructed through Concept maps. The higher post test mean scores may be due to the techniques used in Concept mapping which had helped the students in retention.

Hence, the hypothesis stated as: *"There is no significant difference between the pre test and post test scores of the control group of IX standard, exposed to teaching of science using conventional teaching, and the pre test and post test scores of the experimental group of IX standard, exposed to teaching of science using concept maps"* was rejected.

Hypothesis 2: There is no significant difference between the pre test and post test scores of the control and experimental groups of boys of IX standard, in the teaching of science.

Table 2: Pretest and Post test Mean Scores of Boys in Control and Experimental Groups

Method of instruction	Pretest			Post test			't' value	df	'p' value
	N	Mean	SD	N	Mean	SD			
Concept map	13	32.00	3.74	13	41.31	5.57	10.0892**	12	≤ 0.0001
Conventional teaching	15	35.73	4.23	15	37.33	4.50	4.1246**	14	= 0.001
Total	28			28					

** - Significant at 0.01 level

Table 2 shows that the calculated 't' value for the pretest and post test scores for boys instructed through Concept maps was 10.0892 and for those taught through Conventional teaching, it was 4.1246. The calculated 't' values were greater than the table value of 2.5758 at 0.01 level of significance. The 'p' value was found to be ≤0.0001 and equal to 0.0001 for the scores obtained by boys instructed through Concept maps and Conventional teaching respectively. This shows that the difference in pretest and post test mean scores is statistically significant. The pretest mean scores for boys instructed through Concept maps was 32.00 which had increased to 41.31 in the post test, and for those exposed to Conventional teaching, it was 35.73 which had increased to 37.33 respectively. The boys exposed to teaching through Concept maps had recorded the highest post test mean scores, whereas those exposed to Conventional teaching recorded the lowest score. Concept maps proved to be more effective by improving students' comprehension in the teaching of science.

Hence, the hypothesis stated as: *"There is no significant difference between the pre test and post test scores of the control and experimental groups of boys of IX standard, in the teaching of science"* was rejected.

Hypothesis 3: There is no significant difference between the pre test and post test scores of the control and experimental groups of girls of IX standard, in the teaching of science.

Table 3: Pretest and Post test Mean Scores of Girls in Control and Experimental Groups

Method of instruction	Pretest			Post test			't' value	df	'p' value
	N	Mean	SD	N	Mean	SD			
Concept map	24	36.08	4.43	24	44.17	5.10	13.5712**	23	≤ 0.0001
Conventional teaching	8	38.13	2.64	8	40.25	2.12	1.7738 ^{NS}	7	= 0.0978
Total	32			32					

** - Significant at 0.01 level

NS-Not Significant

Table 3 depicts that the calculated 't' value for the pretest and post test scores for the girls exposed to Concept maps was 13.5712 and for the girls taught through Conventional teaching, it was 1.7738 respectively. The calculated 't' value for the scores obtained as a result of instruction through Concept maps was greater than the table value of 2.5758 at 0.01 level of significance,

whereas it was lesser than the table value of 2.5758 for the scores obtained as a result of exposure to the Conventional method of teaching. The 'p' value was found to be ≤ 0.0001 , and it was statistically significant only for the scores obtained for instruction through Concept maps and not significant for that of Conventional teaching. The pretest mean scores for girls instructed through Concept maps was 36.08 which had increased to 44.17 in the post test and for those exposed to Conventional teaching, the pretest mean score was 38.13 which had increased to 40.25 for the post test. The post test mean score for the group instructed through Concept maps was the highest. The results showed that Conventional teaching was not effective as it is evident from the post test mean score which is the lowest and from the 't' value which is not significant. The girls who were exposed to teaching using Concept maps seemed to enjoy the class and thus had improved scores.

Hence, the hypothesis stated as: *"There is no significant difference between the pre test and post test scores of the control and experimental groups of girls of IX standard, in the teaching of science"* was rejected.

3. Conclusion

The study clearly reveals that there is a significant impact of instruction through Concept maps in teaching science among IX std students. The demographic variables gender and locality also have significant impact in the instruction through Concept maps in teaching science among IX std students.

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