



## Effectiveness Of Concept Mapping In Teaching Environmental Education Subject

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### Abstract:

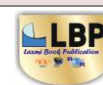
*In present study research aimed to study the effectiveness of concept mapping in teaching Environmental Education. For the study, 71 M. Ed. Student teachers were selected from Jalgaon city. 'Randomised Control Group Pre-test Post-test Design' was used. The content sample 'Environmental Education and Pollution' was selected. It includes concept of environmental education, pollution, types of pollution, causes and effects of pollution. The achievement test of 40 marks was prepared on this content. Before teaching, the achievement test was administered to two randomly selected groups of M. Ed. Student teachers as pre-test. The experimental group was taught by using concept mapping strategy and controlled group was taught without using concept mapping strategy for two weeks the same content. For actual teaching to experimental group, concept map of each sub point was prepared.*

While teaching, the concept was presented to explain the structure of related concepts. Student teachers were participated in actively & enthusiastically in learning. They clarified their doubts and discuss with the teacher and each other. After teaching one concept, the next concept were linked by using concept mapping, the concepts were joined to previous concepts gradually. They were asked to prepare concept maps. At the end of teaching, the same test was administered to both the groups as post-test and data was collected. It was found that the concept mapping strategy is effective for teaching environmental education at M. Ed. Student teachers. The concept mapping strategy is more effective than conventional method for teaching Environmental Education at M. Ed. Student teachers.

### INTRODUCTION

Today man is living in a world of crises. Global problems relating to degradation of natural resources and pollution have increased dramatically. Fresh water scare city on a global scale, deforestation, degradation of coastal areas, soil depletion, & loss of biodiversity are the major problems. Air, water, sound, soil pollution has reached such levels that have resulted in serious health problems as well as negative impact on environment. In such a scenario, the importance and need for environmental education can hardly be stressed at present. In order to protect & conserve the environment, enabling people to lead quality life, emphasis has been given to environmental education in formal system of education. Hence, there is a need

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for interested teachers & teacher educators the effective teaching strategies or techniques for teaching environmental science subject. Taking in to consideration this situation, the researcher decided to study the effectiveness of concept mapping in teaching environmental science subject at M. Ed. Level.

Concept mapping is based on Ausubel's Meaningful Verbal Learning Theory, which is an important cognitive theory that emphasizes teaching & learning effectively. He proposed that meaningful learning occur when new knowledge is consciously linked to relevant concepts proposed by learning. Concept mapping is a process, which involves the identification of key concepts in domain of knowledge & the organization of these concepts into hierarchical arrangement. Novak (1979) advised concept mapping as a cognitive tool to promote meaningful learning. He believed that concept mapping is important not only teaching science but also in other disciplines like social science, environmental science, mathematics etc. Teachers use different strategies for different subject. They are teacher-centred & learner-centred. Apart from these strategies, we have some other strategies like constructivism, meta-cognitive process strategy, social science inquiry strategy etc. The purpose of training colleges is to promote effective teaching to students so as to inspire the learner to learn independently. In order to promote learning, there has always been search for more potential ways of instruction. The analysis of studies of Raghavan, Andral (1991), Kumudha, G. (1999), Patankar, P. S. & et. Al. (2005), Mary, R. S. & Ray, I. P. (2007) and Dammani, Kiran & Agnihotri, Kamakshi (2009) revealed that concept mapping strategy acts as a useful tool for enhancing the performance of the student in any subject. Hence concept mapping strategy can be applied to all subjects.

### **RATIONALE**

Researcher reviewed the related researches for developing environmental attitude, awareness and sense of responsibilities towards protection of environment & conservation of nature. Dunlop and Hepperman (1975), Bryan & Hungerford (1977), Geisler et. al. (1977), Crompton & Sellar (1981), Jaus (1984), Speward & Spelman (1986), Howe & Disinger (1998), Van, <atre (1990), Dresner & Gill (1994), Chelliah (1982), Driver & Johnson (1984), Van, Liere & Noe (1981), Mathews & Riley (1995), Dutt (1998), Bongere (1998), Palmbrge & Kuru (2000) and Patankar (2000) made attempts to study the effect of outdoor educational programme on attitude and awareness about environment of the students. They found a significant effect of these programmes on the environmental awareness of the students.

Kalimuthu (1991), Singh (1995), Rastogi et.al (1999), Chetan (1996), Chandra & Padey (1996), Karndikar (1997), Patankar (2000), Gihar (2002), Kukreti et.al. (2002), Kukreti et.al. (2004), Kukreti and Gihar (2004) have conducted their researches to find out the effect of audio/video programmes on environmental awareness and attitude of the students. Their studies found significant & positive effect of audio/video programmes on environmental knowledge, awareness attitude and sense of responsibility towards environmental protection & conservation.

Patel (1997), Sibley (1974), Keswekar (1996) reported that the multimedia package was found more effective than the traditional lecture method in creating environmental awareness in students.

Bryant & Hunger Ford (1988), Sharma (1979), Sultan (1979), Bhargawa (1981) studied the effect of instructional material on developing environmental attitude of the students. All these researches found a significant & positive relationship between instructional material & environmental attitude of the students. The review shows that very few researches are done on use of concept mapping in teaching of environmental science. So, the present study is very necessary in the field of teacher education.

### **OBJECTIVES**

In present study, the following objectives were decided.

1. To study the effectiveness of concept mapping in understanding the concepts in teaching Environmental Education at M. Ed. Level.
2. To study the sex difference in effectiveness of concept mapping in understanding the concepts in teaching Environmental Education at M. Ed. Level.

### **HYPOTHESES**

The following hypotheses were formulated in the present study.

1. There is no significant difference between pre-test mean scores of the group of student teachers taught by using concept mapping (experimental group) & the group of student teachers taught without using concept mapping (control group).
2. There is no significant difference between pre-test & post-test mean scores of the group of student teachers taught by using concept mapping (experimental group).



3. There is no significant difference between pre-test & post-test mean scores of the group of student teachers taught without using concept mapping (controlled group).
4. There is no significant difference between post-test mean scores of the group of student teachers taught by using concept mapping (experimental group) & the group of student teachers taught without using concept mapping (control group).
5. There is no significant sex difference in effectiveness of concept mapping in understanding the concepts in teaching Environmental Education at M. Ed. Level.

### SAMPLE

A group of 40 M. Ed. student teachers selected from Department of Education, North Maharashtra University, Jalgaon, which was treated as experimental group. A group of 31 M. Ed. student teachers selected from KCE's College of Education, Jalgaon, which was treated as controlled group. Total 71 M. Ed. Student teachers were selected in the sample.

### DESIGN

In present study, 'Pre-test Post-test Control Group Design' was used.

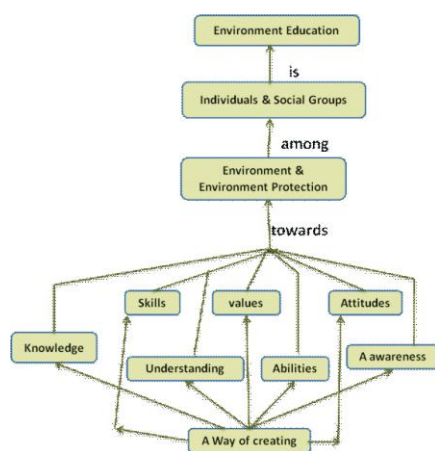
### TOOL

The data was collected through the achievement test prepared on the content 'Environmental Education & Pollution' for 40 marks.

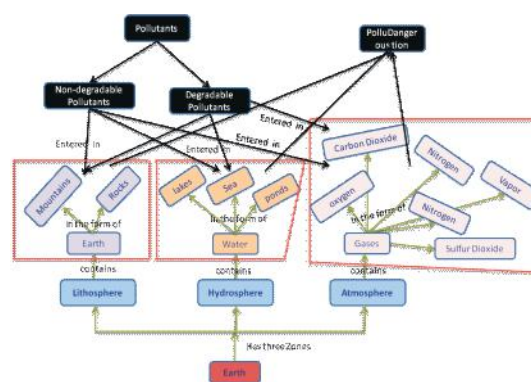
### PROCEDURE

The content sample 'Environmental Education and Pollution' was selected. It includes concept of environmental education, pollution, types of pollution, causes and effects of pollution. The achievement test of 40 marks was prepared on this content. Before teaching, the achievement test was administered to two randomly selected groups of M. Ed. Student teachers as pre-test.

The experimental group was taught by using concept mapping strategy and controlled group was taught without using concept mapping strategy for two weeks the same content. For actual teaching to experimental group, concept map of each sub point was prepared. While teaching, the concept was presented to explain the structure of related concepts. Student teachers were participated in actively & enthusiastically in learning. They clarified their doubts and discuss with the teacher and each other. After teaching one concept, the next concept were linked by using concept mapping, the concepts were joined to previous concepts gradually. They were asked to prepare concept maps.



Environment Education



Environmental Pollution

At the end of teaching, the same test was administered to both the groups as post-test and data was collected.

**ANALYSIS & INTERPRETATION OF DATA**

The collected data was analysed statistically by using 't' test.

1. There is no significant difference between pre-test mean scores of the group of student teachers taught by using concept mapping (experimental group) & the group of student teachers taught without using concept mapping (control group).

**TABLE NO. 1**  
**THE MEAN, STANDARD DEVIATION, AND 'T' VALUE OF PRE-TEST SCORES OF EXPERIMENTAL GROUP & CONTROLLED GROUP**

Group	No. Of Students	Mean	SD	't' value	Df	Table 't' value	Significance
Experimental group	40	19.25	5.95	0.31	69	2.00 at 0.05 level	Not significant
Controlled group	31	18.82	5.70				

The above table indicates that the 't' value (0.31) is not significant even at 0.05 level of significance. The result indicate that there is no significant difference between pre-test mean scores of the group of student teachers taught by using concept mapping (experimental group) & the group of student teachers taught without using concept mapping (control group). Hence the two groups do not differ significantly with respect to initial academic achievement.

1. There is no significant difference between pre-test & post-test mean scores of the group of student teachers taught by using concept mapping (experimental group).

**TABLE NO. 2**  
**THE MEAN, STANDARD DEVIATION, AND 'T' VALUE OF PRE-TEST & POST-TEST SCORES OF EXPERIMENTAL GROUP**

Experimental Group	No. Of Students	Mean	SD	't' value	Df	Table 't' value	Significance
Pre-test	40	19.25	5.95	11.48	78	2.65 at 0.01 level	Significant
Post-test	40	32.50	4.23				

The above table indicates that the 't' value (11.48) is significant at 0.01 level of significance. The result indicate that there is significant difference between pre-test & post-test mean scores of the group of student teachers taught by using concept mapping (experimental group). Hence it can be concluded that the concept mapping strategy is effective for teaching Environmental Education at M. Ed. Student teachers.

1. There is no significant difference between pre-test & post-test mean scores of the group of student teachers taught without using concept mapping (controlled group)

**TABLE NO. 3**  
**THE MEAN, STANDARD DEVIATION, AND 'T' VALUE OF PRE-TEST & POST-TEST SCORES OF CONTROLLED GROUP**

Controlled Group	No. Of Students	Mean	SD	't' value	Df	Table 't' value	Significance
Pre-test	31	18.82	5.70	2.74	60	2.65 at 0.01 level	Significant
Post-test	31	22.65	5.32				



The above table indicates that the 't' value (2.74 ) is significant at 0.01 level of significance. The result indicate that there is significant difference between pre-test & post-test mean scores of the group of student teachers taught without using concept mapping (controlled group).

1. There is no significant difference between post-test mean scores of the group of student teachers taught by using concept mapping (experimental group) & the group of student teachers taught without using concept mapping (control group).

**TABLE NO. 4**  
**THE MEAN, STANDARD DEVIATION, AND 'T' VALUE OF POST-TEST SCORES OF EXPERIMENTAL GROUP & CONTROLLED GROUP**

Group	No. Of Students	Mean	SD	't' value	Df	Table 't' value	Significance
Experimental Group	40	32.50	4.23	8.41	69	2.65 at 0.01 level	Significant
Controlled Group	31	22.65	5.35				

The above table indicates that the 't' value (8.41 ) is significant at 0.01 level of significance. The result indicate that there is significant difference between post-test mean scores of the group of student teachers taught by using concept mapping (experimental group) & the group of student teachers taught without using concept mapping (control group). Hence it can be concluded that the concept mapping strategy is more effective than conventional method for teaching Environmental Education at M. Ed. Student teachers.

1. There is no significant gender difference in effectiveness of concept mapping in understanding the concepts in teaching Environmental Education at M. Ed. Level.

**TABLE NO. 5**  
**THE MEAN, STANDARD DEVIATION, AND 'T' VALUE OF POST-TEST SCORES MALE & FEMALE STUDENT TEACHERS IN EXPERIMENTAL GROUP**

Group	Gender	No. Of Students	Mean	SD	't' value	df	Table 't' value	Significance
Experimental Group	Male	19	33.57	4.28	1.74	38	2.65 at 0.01 level	Not Significant
Experimental Group	Female	21	31.31	3.94				

The above table indicates that the 't' value ( 1.74) is not significant at 0.01 level of significance. The result indicates that there is no significant difference between post-test mean scores of the group of male and female student teachers taught by using concept mapping. Hence it can be concluded that the concept mapping strategy is equally effective for male & female student teachers in teaching Environmental Education at M. Ed. level.

## RESULTS AND DISCUSSION

As per analysis and interpretation of data, the following results were drawn.

1. There is no significant difference between pre-test mean scores of the group of student teachers taught by using concept mapping (experimental group) & the group of student teachers taught without using concept mapping (control group). Hence the two groups do not differ significantly with respect to initial academic achievement.

2. The concept mapping strategy is effective for teaching Environmental Education at M. Ed. Student teachers.





3. The result indicate that there is significant difference between pre-test & post-test mean scores of the group of student teachers taught without using concept mapping (controlled group).
4. The concept mapping strategy is more effective than conventional method for teaching Environmental Education at M. Ed. Student teachers.
5. There is no significant gender difference in effectiveness of concept mapping in understanding the concepts in teaching Environmental Education at M. Ed. Level.

From the above analysis, it can be said that, the use of concept mapping is effective in acquiring new concepts in Environmental Education subject. These findings are supported by the results Al-Jarf, R. (2009), Anokhin, P. K. (1973), D'Antoni, A. V., Zipp, G. P., Olson, V. G. (2009), Evrekli, E., Balim, A. G. and Inela, D. (2009), Toi, H. (2009), Raghavan, Andal (1991), Kumuha, G. (1999), Patankar, P. S., Baviskar, C. R. & Padmini, M. S. (2005) and Damani, Kiran & Agnihotri, Kamakshi (2009). The possible reason behind it may be as the classes are usually dominated by teacher-centered, direct instruction and often rely heavily on textbooks for the content of the course. Information and instruction are separated in two parts that make up a whole concept. The teachers seek to transfer their thoughts and meanings to the passive students. There is little room for student-initiated questions, independent thought or interaction between students. But concept maps are most valuable when the key objectives is to be develop a comprehensive understanding of all concepts involved in a subject area. It links the new knowledge with existing previous knowledge and meaningful relationship can be developed which is helpful in understanding and remembering the concepts, processes, principles etc. Therefore, it can be concluded that the use of concept mapping in understanding & acquiring the new concepts in Environmental Education.

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