

COMPUTER BASED CONCEPT MAPPING: AN EFFECTIVE STRATEGY FOR INCULCATING SCIENTIFIC ATTITUDE AMONG SECONDARY SCHOOL STUDENTS

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ABSTRACT

The study investigates the effectiveness of Computer based Concept Mapping strategy on scientific attitude of secondary school students. The method employed was Experimental method and the Design selected was Pretest Posttest non equivalent groups design. The study made use of Lesson transcripts, computer based concept maps and scale on scientific attitude for Experimental and Control treatment. The sample included 68 students in the Experimental group and 68 students in Control group. The statistical method adopted was the test of significance of difference between means and ANCOVA. The findings revealed that Computer based Concept Mapping strategy used as Experimental treatment is more effective than Constructivist teaching strategy which is used as Control group treatment for enhancing scientific attitude of Students at Secondary school level.

Key words: computer based concept mapping strategy, scientific attitude, teaching biology

Education aims to modify the behaviour of a child. Behaviour is composed of many features. One of the important aspects is attitude. Behaviour of a person depends on attitude, ideas, persons or objects in his environment. Therefore, it is important for a teacher to understand the attitude and factors responsible for students' attitude. Scientific attitude is concerned with rational perception through the mind and with testing such perceptions through experiments and observations. The teacher through actions must be able to convince the students that scientific attitudes are an integral part of behaviour. Intellectual honesty, willingness to admit error, listening to others' ideas and dealing with facts in an unbiased way makes a favourable and lasting impression upon pupils. Scientific attitude is a setting of mind and a way of life. Attitude are difficult to distinguish from such affective attributes of personality like interest, appreciations, likes, and dislikes, opinions, values, ideas and character traits. A person having scientific attitude is never superstitious. His mind is like a sea with open mouth ready to gulp down new facts and have power of concrete and accurate observations and interpretations. One cannot suggest any hard and fast method to develop it. The teacher alone can

mould the delicate mind of students in such a way that science develops as a discipline, as an attitude of their mind at which they use in day to day problems.

Science became part of the school curriculum during the 19th century. Scientists argued the practical importance of science and favoured inductive methods of reasoning rather than deductive logic. Scientific concepts are the psychological tools that allow us to manipulate our environment consciously and systematically. Vygotsky believed that the proper development of child's mind depends on learning how to use the psychological tools and this will occur only if classroom instruction is properly designed. This means providing students with explicit and clear verbal definitions as a first step. The basic purpose of instruction then is not simply to add one piece of knowledge to another like pennies in a piggy bank but to stimulate and guide cognitive development. (Crain, 2005; Rogoff, 1990).

Need and Significance of the Study

Traditional classroom learning requires the student to capture the information when it is delivered. There is no option of revisiting the discussions other than referring to notes captured during the session or from memory. E-learning is expected to overcome this disadvantage by providing access to the sessions asynchronously after the virtual sessions. This asynchronous nature opens up another possibility of deferred learning at a convenient time of the students choosing. The emphasis on written word in E-learning should encourage deeper level of thinking among students. The fact that the student communicates their thoughts in writing to the teacher and the realization that those writings may be exposed fully or partially to the class permanently may result in deeper level of thinking and discussion.

The researcher assumes that computer based concept mapping strategy could be more useful for the solution of many problems faced by our ordinary classroom, since it involves student-teacher interaction, on the spot doubt clearance, exposure to all the possibilities of ICT like audio, video and animation. In this context, the investigator considered it necessary to develop a teaching learning strategy like computer based concept mapping strategy, which can convert the traditional classroom situations to electronic and smart classrooms.

Statement of the Problem

In the present study, Computer based concept mapping strategy is used as a strategy for

enhancing scientific attitude. So the study is entitled as, *Computer Based Concept Mapping: An Effective Strategy for Inculcating Scientific Attitude among Secondary School Students.*

Variables of the Study

Computer based Concept Mapping Strategy and Constructivist Teaching Strategy is the two levels of independent variable; scientific attitude is the dependent variable of the study.

Objectives of the Study

- To develop Computer based concept maps in the selected units in Biology for secondary school students.
- To find out the effectiveness of Computer based Concept Mapping strategy on scientific attitude of students at Secondary School level.

Hypothesis of the Study

There will be significant difference in the mean scores of scientific attitude between Experimental and Control group.

Methodology

Design

The present study uses the quasi experimental method of research using Pretest- Posttest Non equivalent Groups Design.

Sample

The sample selected consists of 68 students in the experimental group and 68 students in control group.

Tools

- Lesson transcript based on Computer based Concept Mapping Strategy
- Lesson Transcript based on Constructivist Teaching Strategy
- Scale on scientific attitude
- Computer based concept maps

Statistical Technique

- Test of significance of difference between means.
- ANCOVA

Procedure

For the present study the investigator randomly selected three divisions of standard IX with a total of 136 students. 68 students were given experimental treatment and 68 were given control treatment. The experimental group was taught using Computer- based Concept Mapping Strategy and the control group using Constructivist Teaching Strategy. A scale on scientific attitude was administered before and after the experimentation. The preliminary statistical analysis was conducted and the values maintained normality. The test of significance of difference between means and ANCOVA were used to compare the relevant variable between the experimental and control group. The data and results are consolidated and presented in Table 1&2.

Analysis and Interpretation of Data

Table 1

Comparison of Experimental and Control groups on scientific attitude using t-Test

Variable	Groups	No. of students	Mean	S.D	C.R	Level of significance
scientific attitude (before experiment)	Experimental	68	174.40	22.08	0.3	P>0.01
	Control	68	173.21	23.52		
scientific attitude (after experiment)	Experimental	68	200	21.92	3.83	P<0.01
	Control	68	186.35	19.56		

As per the data given in Table 1, the 't' value obtained for scientific attitude (before experimentation) is 0.3, which is not significant at 0.01 level. It can be noted that there is no significant difference in the mean scores of scientific attitude of students in experimental and control group before experimentation. This indicates that the two groups are almost equal with regard to scientific attitude. The 't' value obtained for scientific attitude after experimentation is 3.83, which is significant at 0.01 level. It can be noted that there is significant difference in the mean scores of scientific attitude after experimentation of students in experimental and control group.

Table 2

Summary of analysis of covariance for the scores of scientific attitude before and after experiment of pupils in the experimental and control groups

Source of variance	Sum of squares	df	Mean squares	F	Level of significance
between	5849.705	1	5849.705	17.581	0.01
within	44252.545	133	332.726		
total	5139298.00	136			

As per table 2 the obtained F (17.581) for the effect of computer based concept mapping strategy is found beyond the table value for 0.01 level of significance. The results of the F- test supports that the effect of computer based concept mapping strategy of secondary school students after controlling pretest scores, $F(1, 133) = 17.581, P < 0.01$. The result therefore suggest that the variation in the posttest scores of computer based concept mapping strategy cannot be attributed to the influence of pretest scores of computer based concept mapping strategy. Hence the results of ANCOVA suggest that when the linear adjustment is made for the effect of variation due to the difference in the pretest scores of the subjects on computer based concept mapping strategy, there exists statistically significant difference between the experimental and control group.

The above findings shows that the experimental group taught using computer based concept mapping Strategy is in an advantageous position in scientific attitude when compared to control group which is taught using constructivist teaching strategy, and the hypothesis is accepted.

CONCLUSION

In our present educational system, not only the matter of attitude to be stressed, but spatial emphasis should be put upon the development of scientific attitude. We can have a rather rapid scientific development, but we have not been so successful in securing the prevalence of scientific attitude. There is no doubt that science has changed human ideas very much. Scientific attitude is much the same as the intellectual attitude which can promote logical thinking and reasoning. Open mindedness and ability to willingly lead one's thoughts through new channels is a characteristic of all scientists and has made possible the rapid development of the scientific thought and discoveries which are particularly characteristic of this age. This study proved that computer based concept mapping strategy is one of the effective strategies that can promote inculcation of scientific attitude among

secondary school students.

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