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Effectiveness of Creativity Training Program on Concept Map Performance of Secondary School Students

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Abstract

The present study was designed to experiment the effect of De Bono's CoRT Thinking Program on the Concept Map Performance of Senior Secondary School students of grade IX and X in relation to their level of intelligence. Two identical groups comprised of 51 respondents in each i.e. Experimental and Controlled were drawn with the help of multiclustered random sampling techniques and level testing. While treatment tenure Experimental Groups were taught with CoRT Thinking Program and Controlled Groups were taught with traditional way in a controlled condition as per requirement of experimental method. Results of the experiment were then analyzed by different statistical techniques. It was observed that CoRT Thinking Program has significant effects on concept map performance. Level of intelligence has also been found to have significant effect on some component of concept map performance.

Key words: CoRT Thinking Program, Concept mapping, Level of Intelligence, Secondary School Students.

Introduction

During past few decades, curricula have increasingly reflected the belief that students should understand the 'facts' rather than rote memorization. The National Curriculum Framework -2005 also proposed a shift in the various approaches to teaching and learning of facts. This shift is from behaviorist approach to constructivist approach (individual constructs his own knowledge through meaningful interaction with the world. New knowledge is built through active experience on the basis of their prior knowledge¹. For this very purpose, many schools have adopted alternate teaching-learning strategies that help the learner expand his horizon of knowledge and understanding.

One of the strategies that have evolved as a useful tool in leading students towards meaningful learning is Concept Mapping. It is seen as a useful tool for helping students learn about the structure of knowledge and the process of knowledge production i.e. metaknowledge⁹. In contrast to the students who learn by rote, the students who employ meaningful learning are expected to retain knowledge for a long time and are able to learn new things easily.

The use of concept maps as a teaching strategy was first developed by J.D. Novak in the early 1980s, derived from Ausubel's Learning Theory which places central emphasis on the influence of students' prior knowledge on subsequent meaningful learning. Concept maps are diagrammatic representations, which show meaningful relationship between concepts in the form of propositions, which are linked together by words, circles and cross-links^{9, 10, 11}. Concepts are arranged hierarchically with the super-ordinate concepts at the top of the map and sub-ordinate concepts at the bottom that are less inclusive than higher ones. 'Cross-links' are used to connect different segments of concepts. These connections result into

new synthesis of old concepts. In short, concept maps are assessed on the basis of many components: hierarchy, propositions, cross-links and examples⁹.

Concept Mapping is a technique or way for visualizing concepts and propositions in a schematic form. In other words, it provides a schematic summary of learning that has occurred after a learning task has been completed. Besides this concept mapping is also an evaluation tool. It has been used as an assessment tool for understanding learners' learning patterns.

Moreover, in a society characterized by uncertainty and rapid change, the ability to think creatively is becoming the key to success and satisfaction, both professionally and personally. For today's children, nothing is more important than learning to think creatively – learning to come up with innovative solutions to the unexpected situations that will continually arise in their lives. Unfortunately, most schools are out-of-step with today's needs: they were not designed to help students develop as creative thinkers. For half a century, authors stressed the importance and urgency for teachers to be creative. School and, in particular, the classroom has been seen as a privileged context for promoting creativity in order to enhance social and individual progress.

There it must be acknowledged that there are many instructions, techniques, and teaching methods which have been suggested to develop and strengthen creative abilities. Many creativity training programmes are commercially available (e.g. the Purdue Creativity Program PCP, the Productive Thinking Program PTP, and the Cognitive Research Trust CoRT). These programmes include activities to teach cognitive skills that lead to creative thinking.

CoRT is an acronym for Cognitive Research Trust that De Bono established at Cambridge, England; the CoRT program was first established in 1973, and copied on a CD-Rom in 2000^[5,6]. It is an instructional program on thinking skills that is used by several million school children in many different countries and cultures (De Bono, 1983). There are six sections in the program with each section comprising ten lessons. Taken together, the units cover a considerable range of themes relevant to thinking.

CoRT 1, entitled Breadth, emphasizes thinking about a situation in many different ways that a person might ordinarily neglect. CoRT 2, entitled Organization, offers ten lessons designed to help the student direct attention effectively and systematically to a situation, without loss of focus. CoRT 3, Interaction, is concerned with matters of adequate evidence and argument (De Bono, 2000). CoRT 4, Creativity, offers a number of strategies for generating ideas one might otherwise not think of; it also devotes some attention to the editing and evaluation of ideas (De Bono, 1984). CoRT 5, Information and Feeling, is concerned with a variety of themes; some involve affective factors that impinge on thinking, while others rehearse themes taken up in the earlier units. CoRT 6, Action, presents a general framework for attacking problems. It can be used to knit the strategies introduced in the previous lessons together^[5, 6].

Rationale of the study

Much of the work on the topic has been done in abroad. Few studies on the use of concept mapping have been found in India. Dr. Rao (2008) studied the effect of concept mapping in science on science achievements, cognitive skills and attitude of students. Ahuja (2007) studied the effectiveness of concept mapping in learning Science. Kharatmal (2009) developed concept map on cell structure and function. Kharatmal and Nagarjun (2009) worked together on a proposal to refine concept mapping for effective science learning. In all these studies the results show that concept mapping has a positive effect upon the learning of students as an instructional tool. No study until now has been found in area of concept mapping with creativity training effects and concept map as an assessment tool³.

To sum up, there is dearth of research in the area of creativity with concept mapping. The concept maps represent the meaningful learning by the students and the way the students organize the knowledge. And if creativity training is given to the students, the creative thinking skills will enhance and the concept map performance of students will improve. That is

why an attempt is made to see the effect of creativity training programme upon concept map performance of secondary school students.

Statement of the Study:

In the context of the above rationale, the problem can precisely be stated as follows:

“Effectiveness of Creativity Training Program on Concept Map Performance of Secondary School Students”

Objectives of the Study

To study the main and interactional effect of Creativity Training Program on Concept Map Performance of Secondary School students.

Hypotheses of the Study

There is no significant effect of Creativity Training Program on Concept Map Performance of Secondary School Students.

Research Design and Methodology:

In this experimental study Pre-test Post-test Control Group Design was used. The researcher used quantitative approach to compare the pre test- post test scores of two groups namely the students who were given training in creative thinking called the experimental group and the students who got no such training called the control group. These students were categorized further on intelligence as high, middle and low intelligent. All the groups thus formed were parallel with respect to sex, age, qualifications, and socio-economic status yet all these categories were different from each other, which is one of the characteristic of nesting design. Groups were taught through two approaches- creativity training program and conventional method. The design resembled nesting-cum-crossing (as per Lewis, 1968). The experiment resembled four way factorial (2X2X3X2) nesting-cum-crossing design.

Tools Used

The study employed two types of tools i.e. treatment tools and measuring tools.

Treatment Tools:

It was used to give training to the students. It included lesson plans based on CoRT Thinking Program involving mainly CoRT I, IV and VI.

Measuring tools:

To see the effectiveness of the training program, different measuring tools were used. Criterion Concept Maps for both classes were constructed by the investigator herself. General Mental Ability Test developed by S. Jalota was used to study the intelligence of the students and to know their socio economic status, Socio- economic status scale developed by Kulshreshtha was used.

Sample of the study

A sample of 204 students studying in class IX and X (102 students each) from private schools of urban area of district Kurukshetra was taken for the collection of data.

Procedure used in the Experiment

The experiment was conducted in three phases. In the first phase, the students were distributed into two groups on the basis of general mental ability scores: control group and experimental group. Both of the groups were given pre test i.e. a test in concept map performance. In the second phase, the experimental group students were given training with the help of a lesson plans on creative thinking. However, the students of control group were taught in a conventional manner in their

class. In the third phase, both groups were administered the post test i.e. Concept Map Performance Test. Thus the data was collected on two occasions. One was pre-test (before the treatment) called as occasion I. The other one was after the treatment called occasion II.

Statistical Technique used

Keeping in view the objectives and design of the study, apart from the measuring of central tendency and dispersion, the following statistical techniques were employed to analyze the data.

- 1) In order to find the effect of creativity training program, multivariate ANOVA (2X2X3X2) was employed.
- 2) Whenever F-ratio was found significant, it was supplemented with mean scores in order to understand the direction of significance.

Findings

The interactional effect between different groups and testing occasions was found to be highly significant ($df = 1/192$) in relation to the concept map performance test scores ($F=338.04$) at both levels of significance. The creativity training program was found to be highly effective in developing concept mapping ability. From the analyses of mean scores, it was found that the students of experimental group achieved higher scores ($M=21.8$) than control group ($M=15.0$). So, it was concluded that creativity training program was effective in enhancing overall concept mapping ability of experimental group.

The analyses further clarified that significant difference existed among the students of control and experimental group when they were pre –tested and post- tested. The experimental group achieved higher mean score ($M=22.7$) on the post test than their counterparts ($M=14.2$). So, it is evident that creativity training program was helpful in increasing concept mapping ability of secondary school students.

Further, it was noticed that class and intelligence was not found to affect the results concept map performance test. There was no significant difference between the class IX & X and level of intelligence regarding the same. But when triple interaction between the classes, intelligence levels and methods was considered, it was found that class X students of middle intelligence group achieved highest scores ($M=23.7$) in overall performance. The low intelligence group who were taught through conventional method of class IX control group achieved lowest scores ($M=12.1$). Moreover, the students of both grades who were taught through conventional method achieved lower in all the three intelligence groups than the students who were taught the creativity training program.

Overall this has been clear from analysis that concept mapping ability with regard to summative score has shown good impact of creativity training program over the conventional method of teaching. This indicated that creativity training program was proved to be most effective in enhancing concept mapping ability than conventional method of teaching after the experiment.

General analysis suggested that overall mean scores of experimental group were also better than control group who were taught through the conventional method of teaching. It was found that the students achieved higher in the proposition factor followed by hierarchy and cross link factor. Example factor was not having any influence of class and intelligence level.

Conclusion

From the analysis, it was concluded that creativity training program has affected the concept map performance of students in a positive manner. The study has implications for student-teachers, teachers, trainee teachers, parents, administrators, teacher educators, policy makers and even the curriculum makers.

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