

MIND MAPPING: A METACOGNITIVE APPROACH TO ELEVATE ACHIEVEMENT IN MATHEMATICS OF SECONDARY SCHOOL STUDENTS



Anupam Sain¹✉ and Dr. Kusum²✉

¹Research Scholar, Department of Education, Panjab University, Chandigarh, India. Tel.: 9888831724

²Associate Professor, Government, College of Education, sector 20-D, Chandigarh, India. Tel.: 9878104782



ABSTRACT

Metacognitive Strategies have always played a vital role in teaching learning process. Mathematical learning is solely based on these strategies. Several metacognitive approaches have been adopted by teachers to elevate the learning levels of students in mathematics. The basic feature of mathematics learning is to enable human mind to think logically. Mind mapping provides the students enough space to think about his thinking while learning mathematics. In this study the investigator aims find the answer for the question that how the learning levels of students can be augmented using Mind mapping as a metacognitive approach? For this an Experiment was conducted on secondary school students of Sangrur district in Punjab. This paper provides a brief overview of the study.

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Corresponding Author

Anupam Sain, anu.sn23@gmail.com

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1. INTRODUCTION

In Mathematics Learning metacognitive strategies have played an indispensable role. A metacognitive approach in mathematics correlates with fundamental components of metacognition that are applicable to student for mathematics learning. There are numerous mechanisms affect the learning of mathematical concepts and processes, comprising cognitive development, neurological development, syntax, and perceptive. Self-monitoring and self-control over thinking are two most important components in metacognitive strategies. Mind Maps were originated by Tony Buzzan. Mind mapping is a technique of connecting main ideas using pictures, lines and links. A principal idea is connected through lines to other ideas which in turn are connected with other allied ideas. A mind map construction needs self-monitoring and self-control over thinking process which brings mathematics in metacognitive strategies.



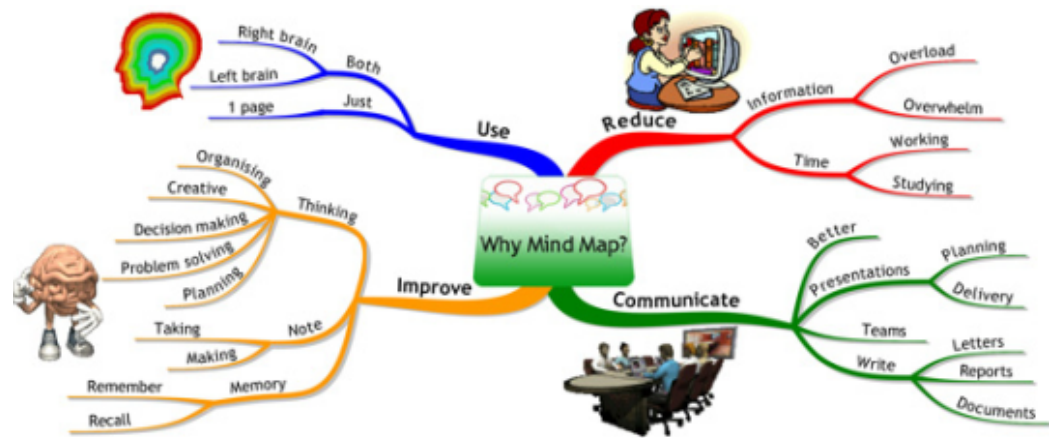


Figure 1 Importance of Mind Maps in Learning <http://www.mind-mapping.co.uk/mind-map-examples/>

2. SIGNIFICANCE OF STUDY

Since decades mathematics learning have been linked with traditional learning techniques. Those traditional techniques have made mathematics a rigid subject where students feel themselves abide by the rules. Students some time got bored with them and lose interest in the subject. Mind mapping provides the students a chance to express their own ideas and demonstrate their creative skills along bounded with mathematics principals. Mind maps helps students in development of cognitive abilities using their metacognition processes. This study was conducted to enquire the relationship between mathematics achievement and Mind Mapping.

3. OBJECTIVES OF THE STUDY

- To develop a Mind Mapping programme in Mathematics
- To study the mathematics achievement of students.
- To study the effect of Mind mapping on Mathematics Achievement.
- To compare the effect of Mind Mapping and Traditional teaching method on annual scores in mathematics of secondary school students.

4. HYPOTHESIS OF THE STUDY

- There will be no significant effect of Mind Mapping on mathematics achievement of secondary school students.
- There will be no significant effect of Mind Mapping and Traditional teaching method on male and female secondary school students.
- There will be no significant effect of Mind Mapping on annual scores in mathematics of secondary school students.

5. DESIGN OF THE STUDY

The study was based on experimental research. Pre-test - post-test two group design was

adopted for the study. The experimental group was exposed to mind mapping, whereas control group was exposed to traditional teaching strategy.

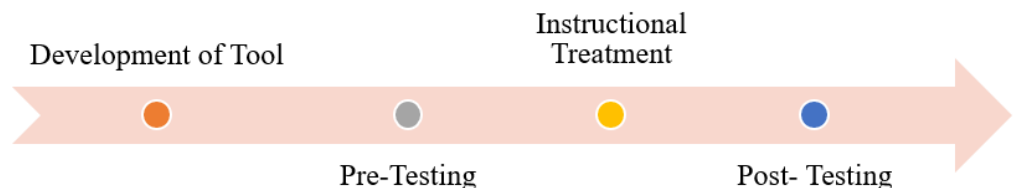
6. RESEARCH TOOLS

- Mind Mapping Programme
- Mathematics Achievement Test
- Achievement in mathematics of students in final term Examination

7. SAMPLE OF THE STUDY

This study was conducted in Sangrur district of Punjab. The population for the study was all the 9th grade students of Sangrur district. Purposive Sampling Technique was used for in the study. The study was conducted on random sample of 100 Secondary school students of class IX from Govt. Schools of Punjab.

8. PROCEDURE



9. HYPOTHESES TESTING

Hypothesis-1

There will be no significant effect of Mind Mapping on mathematics achievement of secondary school students.

The researcher explored the of difference between post test scores and annual term mathematics achievement scores with two factor analyses of variance for repeated measurements on a single factor using ANOVA test. The analysis of scores showed a significant difference in achievement scores in mathematics. These results rejected the null hypothesis.

Table 1 Comparison based on Experimental and Control groups' results of pre-test and post-test-scores in mathematics

Source of Variance	Sum of squares	df	Mean Sq.	F	P	Significance
Between groups Experimental and Control groups	1890.39	1	1890.39	8.35	.007	.152
Error	10649,74	99	105.645			
In Groups						
Measure (pre-test-post-test)	13867.54	1	13867.54	251.63	.000	.795
Group* Measure	1690.95	1	1690.95	40.33	.000	.398
Error	3484.54	99	34.18			
Total		100				

Hypothesis-2

There will be no significant effect of Mind Mapping and Traditional teaching method on male and female secondary school students.

To explore the effect of gender on achievement scores in mathematics Analysis of Variance test and Scheffe test were applied for data analysis. The test results showed that there was no significance difference on achievement in mathematics in terms of gender. These results accepted the null hypothesis.

Table 2 Comparison of post-test scores based on gender

Variable Gender	Source of Variance	Sum of squares	df	Mean Sq.	F	P
	Between groups	3846.356	3	1,182.09	7.98	.000
	In Groups	8859.356	97	91.993		
	Total		100	34.18		

Hypothesis-3

There will be no significant effect of mind mapping on annual scores in mathematics of secondary school students.

In order to assess significant difference between annual scores in mathematics averages of the experimental group and the control group, the independent sample tests were performed. The analysis showed that there is a significant difference between groups in favour of experimental group The experimental group scored an average of 89.70 while the control group scored an average score of 72.30.

Table 3 Comparison of Annual Scores of both groups

Leven Test							
Groups	n	x	SS	F	P	T	P
Experimen	50	89.70	12.62	.01	.952	2.95	.19
Control	50	72.30	11.28				
Total	100						

10. CONCLUSION

The study revealed that Mind Mapping provided the students a chance to self-regulate and control their thinking patterns. Mind mapping significantly affected the achievements of students. Following facts were revealed by the experiment.

- Mind Mapping augmented the level of Mathematics Achievement of the students.
- The gender did not dominate the Mathematics Achievement of Experimental group.
- Mind Mapping instigated positive effect on Academic Achievement.

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