# Education



# Effect of Six Thinking Hats Strategy on Development of Parallel Thinking in High School Students

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# ABSTRACT

The present study was designed to experiment the effect of De Bono's Six Thinking Hats strategy on the development of parallel thinking of high School students in relation to their level of intelligence. Two identical groups comprised of 48respondents in each i.e. Experimental and Controlled were drawn with the help of stratified random sampling techniques and level testing. While treatment tenure Experimental Groups were taught with Six Thinking Hats strategy and Controlled Groups were taught with traditional way in a controlled condition as requirement of experimental method. Result of the experiment then analyzed by repeated measures univariate factorial analysis with the help of SPSS version20.0. It was observed that Six Thinking Hats strategy has significant effects on development of parallel thinking. Level of intelligence has also found to be significant effect on development of parallel thinking.

# Keywords : Six Thinking Hats strategy, Parallel Thinking, Students

# 1. Introduction:

Thinking is an essential human activity. It involves the cerebral manipulation of information as when we form concepts, engage in problem solving, reason and make decision. Earlier supposed to be innate and inherent, it is now proved to be trainable and learnable. The traditions of western thinking have put very high emphasis on critical thinking, arguments, analysis and logic, but these are only a part of thinking and it is very dangerous to assume these are sufficient. In addition to argument we need exploration of the subject, in addition to analyse we need the skill of design, in addition to logic we need perception. Developing this type of thinking has already become pedagogical challenge to modern educators. In response to these thinking challenges, Edward De Bono introduced Parallel Thinking. Parallel Thinking means that any moment everyone is looking in the same direction . Early in 1980's De Bono invented Six Thinking Hats strategy which is very simple and practical way of carrying out Parallel Thinking. The six hats represent six modes of thinking and colour of each hat indicates direction to think, not a label for thinking. It helps people be more productive, focused and mindfully involved. This technique is extremely simple and it can be used in both schooling and in business management.

# 2. Significance of the Study:

In order to deal with rapidly changing world of today where new concepts and ideas are needed, educationists and philosophers are feeling urgent demand of a new type of thinking i.e. Parallel Thinking. There is a huge need to design new possibilities, not just to argue between two existing possibilities. Here Parallel thinking is an alternative to argument. Six thinking hats strategy is a practical way of carrying out Parallel thinking. It provides a very convenient way to switch thinking or to ask for a certain type of thinking, so this system separates ego from performance of a person and encourages parallel and full - spectrum thinking. Thus six thinking hats strategy is widely used in Business sector, but this method could be better when educationist would try this at school level. Many countries have started research programmes for developing Parallel thinking but a very few researches have been conducted in educational field on this method. After seeing its values and benefits in high school levels many

countries have adopted this method in school curriculum, like Venezuela (1995). At the department of Education, Tasmania (2005) had done work in this direction in English Learning Area. Till now, in India no research work has been done on this method. All these facts encouraged the investigator to make a humble attempt to find the effects of Six Thinking Hats strategy in teaching on development of Parallel Thinking in high school students.

## 3. Statement of the Study:

"Effect of Six Thinking Hats strategy on development of Parallel Thinking in High School Students."

#### 4. Operational Definitions of the Terms Used in the Study: Six Thinking Hats Strategy: There are six colored metamorphic hats. The colour of each hat also related to its function:

- White Hat: The white hat is concerned with objectives of facts and figures.
- Red Hat: The red hat gives the emotional view.
- Black Hat: It points out the weakness in an idea.
- Yellow Hat: The yellow hat is optimistic and covers positive thinking.
- Green Hat: It indicates creativity and new ideas.
- Blue Hat: The blue hat is concerned with control and conclusion.

**Parallel Thinking:** Parallel Thinking means that at any moment everyone is looking in the same direction.

## 5. Objectives of the Study

To study the main and interactional effect of Six thinking hats strategy on the development of Parallel Thinking in High School students.

## 6. Hypotheses of the Study

 ${\rm H_1}$  - There is no significant difference between Control and Experimental group with respect to parallel thinking after treatment.

H<sub>2</sub> - There is no significant difference between Pre and Post

test group with respect to parallel thinking after treatment.

H<sub>3</sub> - There is no significant difference between different levels of intelligence with respect to parallel thinking after treatment.

 $\rm H_4$  - There is no two-way and three-way interaction effect of Six Thinking Hats Strategy on development of Parallel Thinking in High School Students.

#### 7. Experimental Research Design and Methodology:

The experimental study uses Pre-test, Post-test Control Group Design. For the purpose of the present investigation a nested cum crossing design was employed. In order to analyze the data a 2X3X2 analysis of variance was used for the three independent variables viz. treatments, levels of intelligence and testing occasions. The variable of teaching strategy was studied at two levels, namely Six Thinking Hats and Convectional method of teaching. The variable of intelligence was studied at three levels, namely high, middle and low. The variable of testing occasions varied in two-ways i.e. Pre-test and Post-test.

#### 8. Tools Used

The following tools were used for the collection of data

Raven's Progressive Matrices was used to study the in-

- telligence of the students.Parallel Thinking Test was constructed by the investigator herself.
- Lesson Plans based on Six thinking hats strategy prepared by the investigator.

#### 9. Sample of the study

A sample of 96 students studying in class IX from G.B.S.S School of District Nangloi was taken for the collection of data.

#### 10. Procedure used in the Experiment

A. Pre-Test (Testing Occasion1)

Test: Parallel thinking

# **B. Treatment**

The experimental treatment involved the teaching of a selected context for the students of IX standard. The selected contents were taught by using Six thinking hats strategy to the Experimental group students and the same concepts were taught by using conventional method to the controlled group students.

#### C. Post-Test (Testing Occasion2)

Immediately after the completion of the treatment, the Experimental Group and the Control Group were Post-tested.

#### Test: Parallel thinking

# 11. Statistical Technique

Descriptive Statistics-Mean, SD and SEM were employed to describe the results in various groups.

Inferential Statistics- Repeated Measures ANOVA analysis was employed.

#### 12. Analysis and Interpretation

To test the hypotheses "whether the convectional and Experimental groups differ significantly after applying treatment with respect to dependent variable – Parallel Thinking – Mean, S.D. and +- values were calculated and results were presented in the table.

# Effect of Six thinking hats strategy on Parallel thinking

The results for summary of Three Way ANOVA (2X3X2) for parallel thinking are presented in Table 1. Table 1 indicates that the F-ratios were significant for all three independent variables i.e. different groups, the levels of intelligence and testing occasions but with great difference in degree. In order to interpret these results, F-ratios were supplemented with mean scores. The results for the mean scores have been entered in Table 2, 3 and 4. Wherever the F-ratios were significant for double and triple interaction, the results were interpreted with the help of mean scores and by plotting the graphs. The mean scores for significant double and triple interactions have been shown in Figure 1 and 2. The results, therefore, have been interpreted first of all for simple effects and then for double and triple interactional effects.

Table 1 Summary of	three-way	ANOVA	(2X3X2)	for Paral-
lel thinking of stude	nts			

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
A	4015.021	1	4015.021	40.071**	0.000
В	4572.823	2	2286.411	22.819**	0.000
С	13940.083	1	13940.083	2231.8**	0.000
AXB	37.260	2	18.630	0.186	0.831
BXC	1.073	2	0.536	0.086	0.918
AXC	3745.333	1	3745.333	599.653**	0.000
AXBXC	39.385	2	19.693	3.153*	0.047
Pupils (P) with in (AXB)	9017.875	90	100.199		
Residual (PXC) within (AXB)	562.125	90	6.246		

# \*Significant at 0.05 level of significance \*\*Significant at 0.01 level of significance

#### (i) Main Effect effects:

There are three independent variables i.e. (A) different treatment groups, (B) levels of intelligence and (C) testing occasions. The results are reported variable-wise.

(a) Effect of Different treatment groups (A): Table 1 reveals that the F-ratio was highly significant (df= 1/90) for the effect of different treatment groups (experimental and control group) in relation to the parallel thinking test scores (F= 40.071) at 0.01 level of significance. When this significant F-ratio was interpreted with the mean scores and S.D., it was inferred from Table 2 that the students of experimental group (A) achieved much higher mean scores (M=52.64) than their counterparts (A<sub>2</sub>) in control group (M=43.70). It means that the parallel thinking ability was much higher in experimental group.

#### Table 2 Mean scores of students on Parallel Thinking test for different treatment groups

Experimental Variable	Treatment Groups	Mean	SD	SE <sub>M</sub>	F-value	
Six Hates Thinking Strategy	Experimental $(A_1)$	52.64	9.393	0.958	40.071**	
	Control (A <sub>2</sub> )	43.50	15.739	1.606		

\*Significant at 0.05 level of significance \*\*Significant at 0.01 level of significance



(b) Effect of levels of intelligence (B): Table 1 reveals that the F-ratio was significant (df= 2/90) for the effect of levels of intelligence in relation to the parallel thinking test score (F= 22.819) at even 0.01 level of significance. When this result was interpreted by the mean scores and S.D., it was inferred

from Table 3 that the students with high intelligence achieved slightly higher mean scores (M=54.09) at parallel thinking test than their counterparts with medium (M=47.98) or low intelligence (M=42.14). It means that the intelligence affected the results on parallel thinking test significantly.

Table 3 Mean scores and SD for the parallel thinking of students for different intelligence levels

Independent Variable	Level	Mean	SD	SE <sub>M</sub>	F-value
Intelligence	High Intelligence (B <sub>1</sub> )	54.093	13.433	1.679	
	Average Intelligence (B <sub>2</sub> )	47.984	12.787	1.598	22.819**
	Low Intelligence (B <sub>3</sub> )	42.141	12.401	1.550	

\*Significant at 0.05 level of significance\*\*Significant at 0.01 level of significance



(c) Effect of Testing Occasions (C): Table 1 reveals that the F-ratio was significant (df=1/90) for the effect of testing occasions in relation to the parallel thinking test scores (F=2231.8) at even 0.01 level of significance. So we may say that there was a significant effect of testing occasion on the parallel thinking test scores. When this significant F-ratio was interpreted by the mean scores and S.D. it was inferred from table 4 that the students achieved higher mean scores at post-test (M=56.59) than at pre-test (M=39.55). It means that the parallel le thinking ability increased after the treatment i.e. post test.

Table 4 Mean scores of students on parallel thinking test for different testing occasions

Experimental Variable	Treatment Groups	Mean	SD	SE <sub>M</sub>	F-value
Testing Occasion	Testing Occasion1 $(C_1)$	39.552	8.234	0.840	2231.8**
	Testing Occasion2 $(C_2)$	56.593	12.793	1.305	

\*Significant at 0.05 level of significance\*\*Significant at 0.01 level of significance



ii) Two way Interactional effects: Table 1 shows that the two way interactional effects of different treatment groups and testing occasions (AXC) was significant. The effect has been

interpreted in the following paragraph.

# a) Interaction between different treatment groups and testing occasions (AXC)

Table 1 indicates that the interactional effect between different treatment groups and testing occasions (AXC) was highly significant (df=1/90) in relation to the parallel thinking test scores (F= 599.653) at 0.01 level of significance. When seen analytically the Figure 1 indicated that the significant differences existed among students of experimental and control groups when they were pre-tested and post-tested. The experimental group achieved the higher mean score on the post-test (M=65.5833) them their counterparts in control group (47.6042). It indicated that the six thinking hats strategy is helpful in improving parallel thinking test scores of the students.

# Figure1



iii) Triple interactional effect: Table 1 reveals that the interactional effect between different treatment groups, intelligence levels and testing occasions (AXBXC) was significant (df=2/90) on parallel thinking test scores (F=3.153) at 0.05 level of significance. The Figure 2 indicates that the significant differences existed among students of experimental and control groups of different intelligence levels when they were pre-tested and post tested.. The high intelligence experimental group achieved the higher mean score the post test (M=72.8750) than their counter pairs in control group (M=45.5625) on parallel thinking. It indicates that the Six Thinking Hats strategy was helpful in developing parallel thinking of the students. In order to interpret these results, mean scores were used. The same results were supported by plotting graphs of mean parallel thinking test scores of different treatments groups at different occasions for low, middle and high intelligence in figure 2. The lines in the graphs are approaching each other for all the three intelligence groups confirming a significant interaction between the variables, testing occasion and different groups.

## Figure 2



## 13. Main Findings of the Study:

There exists significant effect of Six Thinking Hats strategy on development of parallel thinking of high school students. Experimental group found as higher level of parallel thinking than controlled group.

There exists significant effect of level of intelligence on development of parallel thinking of high school students. High intelligent students displayed better level of parallel thinking than average and low intelligent students. There exist no significant two way interaction effects of Six Thinking Hats strategy between different treatment groups and intelligence on development of parallel thinking.

There exists significant two way interactional effect of six thinking hats strategy and occasion of testing on development of parallel thinking. Experimental Post-test (Testing Occasion2) groups shows higher level of parallel thinking than Controlled Post-test.

Three way interactional effects of Six Thinking Hats strategy on different treatment groups, intelligence and occasion of testing was found to be significant on the development of parallel thinking. Experimental Post-Test High Intelligent group was found to be high in development of parallel thinking than rest of the groups under investigation.

#### 14. Conclusion:

The analyses of data for parallel thinking test scores clearly shows that the students of experimental group achieved much higher mean scores than their counterparts in control group. So it is concluded that the parallel thinking ability was much higher in experimental group. It could be further noted that the students with high intelligence achieved slightly higher mean scores at parallel thinking test than their counter parts with medium or low intelligence showing that the intelligence affected the results on parallel thinking test significantly.

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It was also found that there was a significant effect of testing occasion on the parallel thinking test scores as was evident from the fact that the students achieved higher mean scores at post- test than at pre-test showing that the parallel thinking increased after the treatment i.e. post-test.

It was also seen that the experimental group achieved the higher mean score on the post-test them their counterparts in control group indicating that the Six Thinking Hats strategy is helpful in developing parallel thinking of the students.

The high intelligence experimental group achieved the higher mean scores on the post-test than their counterparts in control group on parallel thinking test scores. So the Six Thinking Hats strategy was helpful in developing parallel thinking of the students.

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