CHAPTER 7
CHAPTER VII

OBSERVATIONS AND CONCLUSIONS

7.0 Introduction

7.1 Summary of the Research Work

7.2 Statistical Observations and Conclusions

Study - 1: Treatment x Creativity

2: Trend of Creativity x Treatment

3: Initial Creativity x Acquired Creativity

4: SEX x Creativity

5: Treatment x Initial Creativity

6: Treatment x SES

7: Initial Creativity x SES

8: Treatment x Creativity x SES

9: CSES Blocks V/s Creativity

10: Trend of Creativity across 4 CSES Blocks

7.3 Findings and Discussion of the Study

7.4 Educational Implications

7.5 Suggestions for the further researches
7.0 Introduction:

Creative thinking is the process of bringing a problem before one's mind clearly (as by imagining, visualizing, supposing, musing, contemplating etc.) and then originating or inventing ideas, concept, realization or picture along new or unconventional lines. It involves study and reflection rather than action. During the process of enhancing creative thinking, the researcher believes that, cycle of four overlapping stages: preparation, incubation, illumination and verification characterizes most productive responses. Preparation involves the investigation of the problem in all directions, including a full understanding of what the problem is. Incubation is the letting go of the problem by the conscious mind allowing it to ferment, below the level of consciousness. Illumination is being struck by a solution in a eureka-like experience. Verification is the evaluation of its solution, its refinement, the working out of its implication.

A few studies have been carried out abroad as well as in India to examine the impact of such Creative Thinking Programmes on the creativity level of the children. The project study taken by J. Z. Patel (1986) was the first attempt to investigate the effect of Creative Thinking Programmes on the creative level of Gujarati pupils. This research study taken by the investigator was one more attempt to investigate
the impact of CoRT Thinking Programme on the creativity level of the children. The brief summary of the research work is stated in forthcoming caption.

7.1 **Summary of the Research Work:**

The present study indicates the adaptation of the CoRT Thinking Programme (CoRT TP) and to study its effect on creativity level of the Primary School children. Investigator here used CoRT TP adapted by him. The CoRT TP is an innovative concept designed by Edward de Bono, who worked on lateral thinking. It is a refreshing new breakthrough in education and has become the most widely-used method for the teaching of thinking. The CoRTP helps children to broaden their perception and creativity. It teaches them the art of effective thinking and shows them how to apply this new skill virtually to academic subjects, as well as day-to-day problems faced outside the classroom. CoRTTP gives children the confidence to see themselves not in terms of 'I am intelligent' or 'I am not intelligent,' but rather in terms of 'I am thinker!' The CoRTTP lessons provide a great way to improve the performance of just about all students at all grade levels. The CoRTTP gives the children the thrill of discovery and helps them to develop a sense of confidence in their ability to cope with difficult and challenging intellectual tasks. The CoRT TP has introduced a revolutionary breakthrough in the art of thinking and learning.
The tools and scale used for the study were:

2. Social Economical Status Scale developed by B.V.Patel and I.A. Vora.
3. CoRT Thinking Programme, (CoRTTP) adapted and developed by the investigator.

The design used for the study was an Experimental Factorial Design (3 x 2 x 2) corresponding to three independent variables:

1. Treatment (CoRTTP) varied at three levels.
2. Initial Creativity Ability varied at two levels.
3. Social Economical Status varied at two levels.

A total of 163 children from the VII grade classes participated in the study. On the basis of pre-test scores on creative ability test, the children of the sample were divided into three equal groups i.e.,

1. Experimental Group with Feedback
2. Experimental Group without Feedback
3. Control Group.

One Experimental Group was treated randomly with CoRTTP along with feedback, while the other Experimental Group was treated without feedback. The Control Group has not been treated with such programme. After the execution of the developed programmes, the creative ability test was administered to the children of
all the three groups, under treatment. The creative test measures the creative ability of the children acquired after the execution of CoRTTP.

Children's creativity scores were subjected to the statistical technique of ANOVA (F-test) to study the overall significance of difference in the main and the interaction effects of these three independent variables, and subsequently the Newman-Keul test was applied in order to examine the significance of difference between any two specific sub-groups. All these results have been presented in the various tables and discussed in the main body of the thesis under Chapter VI. The inferences narrated by statistical analysis, which have been summarized in the coming caption after general observations made by investigator during the development and execution of the CoRT Thinking Programme.

7.2 Statistical Observations and Conclusions:

The present study deals with effectiveness of the CoRT Thinking Programme (CoRTTP) on the creativity level of the children, on the basis of data obtained in the previous Chapter VI. The statistical observations and conclusions are discussed according to the study-wise hypotheses formulated. They are shown below:

Study - 1: Treatment V/S Creativity:

The hypothesis for the study is

$H_{A1}$: There is a significant effect of CoRT Thinking Programme
on Creativity of the children.

Investigator studied this $H_A$ in the form of null hypothesis as stated under:

$H_{01}$: There is no significant difference between experimental and control group children on their creativity level.

The data for the $H_{01}$ are listed below:

**Data:**
(a) The table 6.6 shows that $F_{obs} (76.90) > F_{tab} (7.01)$ at .01 level.
(b) Table 6.2 shows that $\bar{X}_{Exp. Gr.} (203.85) > \bar{X}_{Cont. Gr.} (143.65)$.

Hence, the observation and conclusions are made as follow:-

**Observation:**

The null hypothesis $H_{01}$ is rejected.

**Conclusions:**

1. The alternate hypothesis $H_{A1}$ is accepted.
2. The variable treatment (CoRTTP) and (No CoRT TP) has significant effect on the creativity level of the children.
3. The mean difference in creativity scores is in favour of experimental group children.
4. The relationship between two groups is shown symbolically as under:
   Experimental Group $>$ Control Group
But treatment variable for experimental group is varied at two levels.

(i) CoRTTP along with Feedback, and
(ii) CoRTTP along without Feedback.

To study the effect of Feedback on the creativity level of the children, when CoRTTP was given, the investigator studied the following null hypothesis -

$$H_{02} : \text{There is no significant difference in the creativity of the children who receive Feedback along with programme and those who do not.}$$

The data for this hypothesis $H_{02}$ are listed below:

**Data:**

(a) Table 6.6 shows that

$$F_{\text{obs.}} (96.89) > F_{\text{tab}} (7.01) \text{ at .01 level.}$$

(b) Table 6.7 shows that

$$\bar{X} (\text{P with FB}) (234.86) > \bar{X} (\text{P without FB}) (172.89)$$

(c) The N.K. value for the mean difference score between these two experimental group children is 6.47 (Table: 6.8) which is significant at 0.01 level.

Hence, the observation and conclusions drawn as as below.

**Observation:**

The null hypothesis $H_{02}$ is rejected.
Conclusions:

1. The variable treatment (Feedback and No Feedback along with CoRTTP) has significant effect on the creativity level of the children.

2. The mean difference in creativity scores is in favour of the experimental group whom the Feedback is provided along with the CoRTTP.

3. The relationship between these two experimental groups is shown symbolically as below:

\[(\text{Exp. Gr. - P with FB}) > (\text{Exp. Gr. P without FB})\]

In short all the three treatment groups differ significantly at .01 level. (Table 6.6: A₁).

The relationship between all the three treatment groups is shown as below:

\[(\text{Ex. Gr. P with FB}) > (\text{Exp. Gr. P without FB}) > (\text{Cont.Gr. NP})\]

Study - 2: Trend of Creativity Across Treatments:

As the three treatment groups differ significantly the investigator posed a question to investigate the trend of the creativity when the three different treatments were given to the children.

Que. Is there a Linear or Quadratic relations between the three treatment groups (P with FB, P without FB and N.P.)?

The data for the solution of the question posed are
shown below:

**Data:** Table 6.9 shows that

(i) $F_{linear} = 166.65$ significant at .01 level 
(ii) $F_{Quadratic} = 7.145$ significant at .01 level.

Hence observation and conclusions are made as below:

**Observation:**

"The trend of creativity level across the three treatments is rather more Linear than the Quadratic one" is accepted.

**Conclusions:**

1. The trend of creativity level developed during three treatment is linear one.
2. CoRT Thinking Programme shows better effect on creativity level, if it is used without Feedback and shows still better if it is used along with the Feedback.

But the rate of enhancement of creativity in both the cases are significantly different.

**Study - 3: Initial Creativity V/S Acquired Creativity:**

Initial creativity level is the independent variable while creativity score acquired after the administration of CoRTTP is the dependent variable. The hypothesis for this study is stated below.
Ho₃: There is no significant mean difference in Initial Creativity and acquired creativity scores of the children.

The data for the hypothesis is stated below:

**Data:**

1. Table 6.6 shows that
   \[ F_{obs.} (30.37) > F_{tab.} (7.01) \text{ at } 0.01 \text{ level} \]
2. Table 6.7 shows that
   \[ \bar{X}_{HC} (201.67) > \bar{X}_{LC} (165.93) \]

Hence, the observation and conclusions drawn are as under:

**Observation:**

The null hypothesis is rejected.

**Conclusions:**

1. The following alternate hypothesis Ha "There is a significant increase in creativity scores due to CoRT Thinking Programme (CoRTTP)" - is accepted.
2. The CoRT Thinking Programme shows highly significant effect in enhancing the creativity level of the children.
3. The relationship between these groups are shown below:
   \[ (\text{High Cr. Group}) > (\text{Low Cr. Group}) \]

In short the creativity level of the children can be enhanced to a greater extent by such CoRT Thinking Programmes (CoRTTP).
Study - 4: SES V/S Creativity:

The hypothesis for this study is stated below:

\( H_0^4 \): There is no significant effect of CoRT Thinking Programme on creativity of children having different levels of Socio-Economical Status (SES).

The data for the hypothesis are shown below:

Data: (i) Table 6.6 shows that
\[ F_{\text{obs.}} (0.35) > F_{\text{tab}} (7.01) \] at 0.01 level.

(ii) Table 6.7 shows that
\[ \bar{X} (H \text{ SES}) (185.50) > \bar{X} (L \text{ SES}) (182.10) \]

The observation and the conclusions drawn are as under:

Observation:

The null hypothesis \( H_0^3 \) is accepted.

Conclusions:

(1) There is no significant effect of CoRT Thinking Programme on Creativity of children having different levels of Socio-Economic Status (SES).

(2) Socio-Economic Status, the third variable has not significant effect on the enhancement of creativity level of the children.

(3) The high SES group children shows slightly more progress in creativity then the low SES group children. The mean
difference between the two levels is 3.4, which is occurred accidently.

In short, the children who possess the SES above 73 and below 73 show no more difference in the creativity levels.

**Study - 5: Treatment x Initial Creativity (A x B):**

The hypothesis for the study is stated below:

**H$_{05}$**: There is no significant interaction effect of Treatment and Initial Creativity level of the children on their creativity scores.

The data obtained for the $H_{05}$ are listed below:

**Data:** Table 6.6 shows that

1. For A, B (Treatment x Creativity)
   
   $F_{obs.} \ (5.27) > F_{tabl} \ (3.98)$ at 0.05 level.

2. For $A_2 B$ (Programme x Creativity)
   
   $F_{obs.} \ (0.01) > F_{tabl} \ (3.98)$ at 0.05 level.

Hence, the observation and conclusion drawn are as under:

**Observation:**

The null hypothesis $H_{04}$ is accepted.

**Conclusion:**

The joint effect of treatment (CoRT TP) and the Initial Creativity was found effectively on the creativity of the primary school children, eventhough the main of the treatment is found to be effective on the creativity level.
Study - 6: Treatment x SES (A x C):

The null hypothesis for the study is stated below:

Ho₆: There is no significant interaction effect of Treatment and SES on the creativity of the children.

The data obtained for the Ho₆ are shown below:

Data: Table 6.6 shows that

(i) For A₁C (Treatment x SES)

F \text{obs} (2.93) < F \text{tab} (3.98) at .05 level.

(ii) For A₂C (Programme x SES)

F \text{obs} (0.02) < F \text{tab}(3.98) at 0.05 level.

Hence, the observation and conclusions drawn are as under:

Observation:

The null hypothesis Ho₆ is accepted.

Conclusions:

(1) The main effect of treatment and SES on creativity are found not significant but it tends nearer to the level of significant at 0.05, and their joint effect on creativity is also not significant.

(2) The interaction effect of treatment programme and SES is not significant. So it is worth while to replicate the study to see this interaction effect.
Study - 7: Initial Creativity x SES (B x C):

The hypothesis for the study is stated below:

\[ H_{07} : \text{There is no significant interaction effect of SES and Initial Creativity level of the children on their creativity scores.} \]

The data obtained for \( H_{07} \) are listed below:

**Data:** Table 6.6 shows that

(i) For BC (Basic Creativity x SES)

\[ F_{\text{obs.}} (1.84) < F_{\text{tab}} (3.98) \text{ at 0.05 level.} \]

Hence, the observation and conclusions drawn are shown below:

**Observation:**

The null hypothesis \( H_{07} \) is accepted.

**Conclusions:**

1. The interaction effect of Initial Creativity and SES of the children on their creativity level is not significant.

Study - 8: Treatment x Creativity x SES:

Table 6.6 shows that:

(i) For A,B,C, \( F_{\text{obs}} = 0.14 \) is not significant at 0.05 level.

(ii) For A, B,C, \( F_{\text{obs.}} = 2.08 \) is also not significant at 0.05 level.
The conclusions are made as under:

(1) There is no interaction effect of Treatment, Basic Creativity and SES of the children on their creativity level.

Study - 9: C SES Blocks V/S Creativity:

The hypothesis for this study is stated below:

\( H_0 \): There is no significant mean difference in the creativity scores of the children of different C SES Blocks.

The data for testing this hypothesis are listed below:

Data: Table 6.10 shows that:

(i) Mean of LCL SES, LCH SES, HCL SES and HCH SES are 168.15, 163.71, 196.05 and 207.29 respectively.

(ii) NK value for the mean difference between LCL SES and LCH SES is 0.88 which is not significant.

(iii) NK value for the mean difference between HCH SES and HCL SES is 2.25 which is not significant.

(iv) The rest four NK values are 6.47, 5.58, 7.83 and 8.72 which are significant at 0.05 level.

Hence, the observations and conclusions drawn are as under:
Observations:

(1) The mean difference between HCL SES and LCH SES (4.44) is significant.

(2) The rest all five mean differences (27.90, 39.14, 32.34, 43.58 and 11.24) are significant.

Conclusions:

(1) The children of LCL SES and LCH SES groups had not shown significant mean difference in their creative level.

(2) The children of LCH SES and HCH SES groups had shown significant mean difference in their creative level.

(3) The children of HCH SES group are superior to the children of rest three groups in their creative level.

(4) The relationship between 4 SES Blocks are shown

\[ \text{HCH SES} > \text{HCL SES} > \text{LCH SES} > \text{LCL SES} \]

Study - 10: Trend of Creativity across 4 C SES Blocks:

To investigate the functional relationship of creativity across the creativity SES blocks, the following question was posed:

Que. Is the trend across 4 C SES Blocks Linear, Quadratic or Cubic?

The data needed for the solution of above question are listed below.
Data: Table 6.10 shows that:

(1) For linear trend, the contrast sum is 3145 and the F linear is 29.48.

(2) For quadratic trend, the contrast sum is 329 and F quadratic is 1.61.

(3) For cubic trend, the contrast sum is (-1215) and F cubic is 4.40.

Hence, the observations and conclusion are made as follow:

Observations:

(1) The trend among four SES Blocks is found to be linear.

(2) The four blocks are observed to have existence according to the ascending order of creativity and socio-economic status.

Conclusion:

(1) Trend across the four blocks from the scores, it is concluded that the creativity levels and SES play their role in nurturing creativity of the children even the main effect of SES does not show the significant effect. So this finding instigate to replicate study with the larger sample.
7.3 **Findings and Discussion of the Study:**

From the above observations and conclusions the investigator has made by the bird-eye-view, the findings of this study, which are as follow:

1. The CoRT Thinking Programme is a powerful tool to increase the creativity ability of the primary school children.

2. Initial Creative ability inherited, plays much more role in the enhancement of creativity of the children. They acquired high level of creativity after execution of the CoRT Thinking Programme.

3. The SES of the children has not played its role in developing the creativity of the children. The SES bar-level was kept the median to divide the whole group into two groups.

4. The main effect of Treatment, Initial Creativity level is so high that the first order and the second order interaction effect was found mostly negligible.

It would be in the fitness of things to cite few illustrations of the similar programmes which have been carried out in India and Abroad. They all go to strengthen the results obtained by the investigator.

1. A long range of study by General Electrics (U.S.A. 1962) concluded that company engineers who had received creativity
training produced 3 times more patenable inventions than those who did not have this training.¹

2. A study of Productive Thinking Programme (RPT) done by Covington, Crutchfield and Davis of University of California in 1966 has showed that productive thinking could be developed by such training in primary school children.²

3. Feldhusen J.F. and his associates had developed the purdue Creative Thinking Programme (PCTP) in purdue can develop Flexibility, Fluency and Elaboration, the components of the Creativity.³

4. G.C. Vora (1984) has studied such problems by developing the divergent thinking programmes through the general content in Mathematics and showed that such programmes enhance the creativity levels of school children.

5. D.D. Patel (1988) has studied the effect of productive thinking programme in Geography on creativity of students showed that such programme is powerful mean to develop the creativity of the secondary school students.


³ J.F. Feldhusen, D.J. Trifinger and S.J. Bahaka, Purdue Creative Thinking Programme and Manual; Purdue University, revised, 1982.
M.N. Deshmukh (1978), Nir Pharake (1979) and J.Z. Patel (1985) had established the same impact of such general programmes, developing the creativity ability of children in their study. G.S. Jarial (1981), S.B. Bhasker and Dinesh D. Patel (1988) had studied the development of creativity of children by preparing programmes based on school subjects, viz., Science, Geography and Language. So this study made by the investigator is provided worth for its educational implications.

7.4 Educational Implications:

More and more educators have been debating the question of whether creative thinking can be effectively taught – whether imaginative ability in problem-solving can be deliberately developed through instruction and practice. Science research has now helped to answer this question. The present classroom teaching appears to be very low on motivation for the teacher, directed as well as dominated provides less opportunity for children's involvement initiative. So the researcher has decided to provide the CoRT Thinking Programme as a new direction to the conventional way of teaching. This programme would be helpful to motivate the children to create open classroom climate and to fulfil the objectives laid down in the national policy of education.

The results of the study have proved that this short term programme has increased the creativity ability of the
children. So, any educational person can use such programme for Gujarati primary school students applying any of the following ways:

* It is possible to introduce such thinking programme when the schools have a fixed period per week for co-curricular activities. This activity would raise the interest of the students and enhance the creative thinking in general. By the end of school education these students would become the creative citizens of the nation.

* During day-to-day teaching, any teacher spare 15 minutes per week within the educational period to pose a question from this creative thinking programme. This involvement of the students in thinking would provide highly motivating opportunities to achieve as many as good and appropriate responses to the stimulus.

* In order to improve creative thinking of the children in the class-room, one can implement the programme during any term of any academic year. A period of 35 minutes per week may be allotted in regular time-table or after the school hours. The responsibility of successes for administering of these programme on the shoulder of the school teachers.

Looking to the greatness of educational implications, such special programmes and other strategies for the training of creativity could be evolved, in the line with the programme
of the study. So, the investigator has decided to suggest for the further researches in the field of creativity.

7.5 **Suggestions for the further researches:**

More intensive and valuable research work is desired by the researcher worker in this field of creativity and its development. In fact this investigation has produced some positive and encouraging results, deserves a few suggestions for further researches. They are enlisted below:

1. To study the effect of CoRT Thinking Programme on the creativity level of primary school children other than class VII.

2. The same tool i.e., CoRT Thinking Programme might be used for the secondary school children to study the effect on their creative level.

3. The same study should be carried out on a larger sample i.e., at district or State level.

4. Rural area should be introduced instead of only urban area to study the effect of CoRT TP.

5. All the groups of intelligence level should be selected as a sample for the replication.

6. The impact of CoRT TP can be studied on the various creative components levels of the children.
7. To study the effect of CoRTTP on the verbal, Figural and Numerical creativity of the children.

8. An investigation into the impact of CoRT TP on creativity in relation with school performance and sex.

9. A comparable study of the effect of the CoRTTPThinking Programme and Creative Thinking Program (J.Z. Patel) can be undertaken.

10. A correlational study of academic performance and creative attitude of the children after implementing the CoRT TP can be undertaken.

11. A case study of children whose creativity performance is found better after the training is over.

12. Post-effect of the training programme might be found out as a follow-up.

These suggestions for further research work only mean that research on any subject has no end. Further research starts where the previous research stops. So, the investigator recalls the swords of Swami Vivekanand:

"Arise, Awake and stop not till the goal is reached."

This can give inspiration to all those who may undertake the researches regarding creativity in future.