"Interaction is probably the most important central theme. Murphy's position on this matter is that the growth and development of the personality is controlled by interaction. The genetic potential is realized through interaction in the environment. It is interaction that supplies the self-fulfilment within one's "Life Space."

MURPHY, 1958
CHAPTER VII

OBSERVATIONS AND CONCLUSIONS

7.1 INTRODUCTION

7.2 SUMMARY OF THE RESEARCH WORK

7.3 GENERAL OBSERVATIONS

7.4 STATISTICAL OBSERVATIONS AND CONCLUSIONS

Study-1 Study-6
Study-2 Study-7
Study-3 Study-8
Study-4 Study-9
Study-5 Study-10

7.5 FINDINGS AND DISCUSSION

7.6 EDUCATIONAL IMPLICATIONS

7.7 SUGGESTIONS FOR THE FURTHER RESEARCHERS
CHAPTER VII

OBSERVATIONS AND CONCLUSIONS

7.1 INTRODUCTION

Keeping in view the process of creative thinking, the investigator believes that cycle of four overlapping stages: preparation, incubation, illumination and verification characterises most creative responses. Preparation involves the investigation of the problem in all direction including a full understanding of what the problem is. Incubation is the letting go of the problem by the conscious mind and 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. Thus, the creative thinking is the three phase thinking: Convergent thinking, Divergent thinking and Evaluating thinking.

A good number studies have been carried out abroad, to examine the impact of the creative thinking programmes on the creativity. This research study taken by the investigator was an attempt to investigate the impact of creative thinking programme in developing the creativity level of Gujarati speaking school children. The brief summary of
the research work is stated in forthcoming paragraphs.

7.2 SUMMARY OF RESEARCH WORK

The statement of this research study indicates the development of creative thinking programme and also indicates to see its impact on the creativity levels of primary school students of std. VII. Here, investigator used CTP prepared by himself in verbal form such that it would feel rather easy and simple to understand. This was done with view to conform the importance of developing and nurturing the divergent thinking skill alongwith the convergent thinking and evaluating thinking skills required in learning of developing subjects.

The creative thinking programme (CTP) is developed by the investigator on the basis of the creative thinking programme prepared by Covington and his associates. The set of booklet material designed primarily for seventh grade students, provides systematic instructions and carefully guided practice in the skills of creative thinking, viz. Convergent thinking, Divergent thinking and Evaluating thinking. The three programme booklets containing ten lessons, are individual self administered and self paced and each lesson requiring approximately 40 minutes. Each lesson has six activities items. Out of which 1st and 3rd items deal with Convergent thinking, 2nd and 4th deal with Divergent thinking and last 5th and 6th deal with Evaluating thinking.
This programme gives the students the thrill of discovery and helps to develop a sense of confidence in his ability to cope with difficult and challenging intellectual tasks.

The tools used for the study were:

1. Creative Thinking Programme (CTP) developed by the investigator.
2. Creative Ability Test standardized by J.Z. Patel.
3. Reading Facility Inventory developed by the investigator.
4. Creative Personality Inventory by Eugene Randseep, co-founder Princeton Creative Research Inc., translated by the investigator.

The design used for the study was an Experimental Factorial Design (3x2x2) corresponding to the three independent variables:

(i) Treatment (CTP) varied at three levels.
(ii) Creative personality varied at two levels.
(iii) Reading facility varied at two levels.

A total of 150 students from the VII grade classes participated in the study. These students generally were average and above average in intellectual ability. On the basis of pre-test scores on creative ability test the students were divided into three equal groups, out of
which one is control group. One experimental group was treated randomly with CTP, along with feedback thereafter, and CTP while the other experimental group was treated with CTP without feedback. The control group dealt with no programme was administered.

After the administration of the whole programme the creative ability test was executed to the students of all the three groups under treatment. This creative test measures the creative ability of the students acquired after the execution of CTP. These 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 differences between any two specific subgroups. All these results have been presented in the various tables and discussed in the main body of the thesis under chapter VI. The inferences warranted by statistical analysis have been summarized in the coming caption after general observations made by him during the development and execution of creative thinking programme (CTP).

7.3 GENERAL OBSERVATIONS

In the process of creativity training the teacher plays an important role as the open class-room climate
induces the students to think freely. The teacher is the same here throughout the training period of ten weeks. Moreover, necessary instructions to maintain proper classroom climate were imparted to students. Some points out of 20 essential points as listed in the II chapter were taken into consideration for open classroom climate. They are as under:

1. Make students more alert to environmental stimuli.
2. Be more sensitive for new ideas and encourage the pupils to develop all their creative talents.
3. Develop creative classroom atmosphere a free, relaxed and unhurried one.
4. Develop tolerance of new ideas.
5. Encourage students to note their ideas in concrete form whenever possible.
7. Develop constructive criticism- not just criticism.

Such a healthy and creative atmosphere encouraged the students to think in various dimensions of life. Consequently they try out numerous and varied responses in pilot tryout.

During the pilot tryout the following observations were made:

1. Most of the students took deep interest in these
type of programmes.
(2) They liked to read and observe the picture given.
(3) They felt free to think as the activity items 2, 4, concern with divergent type of thinking.
(4) They found some difficulty to understand some situation.
(5) They were happy with the thought provoking questions posed before them.
(6) They could response the activity items 1 and 3.
(7) In the beginning the students took more than 40 minutes to complete the lessons of first programme.
(8) They were able to complete the last ten lessons of the third programme within fixed duration of time.
(9) They were anxious during this tryout for being kept away from loss of their regular period in the school.

In the beginning of the training programme CTP, the students were not happy with such work, but after a few days a little more understanding and interest were appeared on their faces. It could be reflected in giving the varied and novel responses of the questions posed before them. The discussion followed by the programme was carried poorly in the beginning, but later on the students were accelerated to take part in the discussion followed by programme. By the end of the training, the treatment group students were
accelerated to take part in the discussion followed by programme. By the end of the training, the treatment group students were filled with more enthusiasm as compared with the control group students of the same school. Here, is a supporting statement to the above observation given by R.P. Crawford.¹

"A person starting to teach creative thinking encounters blank looks on the faces of his students during the first few weeks. After a few weeks the blank looks fade and by the end of the semester, the students usually have a surprisingly large number of workable ideas."

In the process of implementation, a rapport between the teacher and taughts of the experimental groups was established and it resulted into two way communication to ask the question and to respond the question.

At the completion of the experiment students were asked for more such programmes to the investigator. This shows a little success of the programme. The statistical observations would give a clear and perfect picture of its effect.

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 briefly given below:

**Study-1 : Treatment v/s Creativity**

The hypothesis for the study is:

\[ H_{0_1} : \text{The Creative Thinking Programme (CTP) increase the level of creativity of the students.} \]

Investigator studied this \( H_{0_1} \) in the form of null hypothesis as stated below.

\[ H_{0_1} : \text{There is no significant difference between experimental and control group students on their creativity level.} \]

The data for the hypothesis are listed below:

**Data**

(a) The table 6.6 shows that \( F_{obs} (6.89) \), \( F_{tab} (6.68) \) at 0.01 level

(b) Table 6.2 shows that

\[ \bar{X}_{exp.Gr.} (206.95) \geq \bar{X}_{Con.Gr.} (148.92) \]

Hence, the observations and conclusions made are as follows:

**OBSERVATIONS**

The null hypothesis \( H_{0_1} \) is rejected.
CONCLUSIONS

(a) The alternate hypothesis $H_{a1}$ is accepted.

(b) The variable treatment (CTP) and (No CTP) has significant effect on the creativity level of the students.

(c) The mean difference in creativity scores is in favour of experimental group students.

(d) The relationship between two groups is shown symbolically as below:

$\text{(Experimental Group)} \succ \text{(Control Group)}$

But treatment variable for experimental group is varied at two levels:

(i) CTP alongwith discussion and feedback.

(ii) CTP only.

To study the effect of feedback on the creativity level of students, when CTP was given, the investigator studied the following null hypothesis -

$H_{01}$: There is no significance difference between the two experimental groups students when the feedback is carried on one group.

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

Data: (a) Table 6.6 shows that-

$F_{obs} (4,83) \prec F_{tab} (6,68)$ at 0.01 level
(b) Table 6.7 shows that-
\[ \overline{X}_{\text{CTP with F.B.}} (206.95) > \overline{X}_{\text{CTP without F.B.}} (171.50) \]

(c) The N.K. Value for the mean difference score between these two experimental group students is 5.86 (table 6.8) which is significant at 0.01 level.

Hence observations and conclusions are made as below:

**OBSERVATIONS**

The null hypothesis \( H_0 \) is rejected.

**CONCLUSIONS**

(a) The alternate hypothesis \( H_a \) "There is a significant mean difference between two experimental groups on the creativity level of the students" is accepted.

(b) The variable treatment - feedback and no feedback has significant effect on the creativity level of the students.

(c) The mean difference in creativity scores is in favour of the experimental group to whom the feedback is facilitated along with the CTP.

(d) The relationship between these two experimental groups is shown symbolically as below:
\[ (\text{Exp.Gr. CTP with F.B.}) > (\text{Exp.Gr. CTP without F.B.}) \]
In short all the three treatment groups differ significantly at 0.01 level.

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

(Exp.Gr.CTP with F.B.) > (Exp.Gr.CTP with F.B.) > (Con.Gr. with F.B. / No Pro.)

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 students.

Qu.1 Is there a linear or quadratic relations between the three treatment groups (CTP with F.B., CTP without F.B., No CTP)?

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

Data: Table 6.9 shows that -

(i) F linear = 17.2102 significant at 0.01 level.
(ii) F quadratic = .2824 Non significant.

Hence, the observations and conclusions drawn are as below:

OBSERVATIONS

"The trend of creativity level across the three
treatment is Linear" is accepted.

CONCLUSIONS

(a) The trend of creativity level developed during three treatments is linear one.

(b) Creative Thinking Programme (CTP) shows better effect on creativity level, if it is used along-with feedback and shows still better if it is used alongwith the feedback. But the rate of enhancement of creativity in both the cases are significantly same.

Study-3 Creative Personality v/s Creativity

Creative personality level is the independent variable while creativity score acquired after the administration of CTP is the dependent variable. The hypothesis for this study is stated below:

H₀ : There is no significant mean difference in creative personality and creativity scores of the students.

The data for the hypothesis H₀ is noted below:

Data: (i) Table 6.6 shows that -

\[ F_{obs} (76.39) \geq F_{tab} (6.68) \text{ at 0.01 level} \]

(ii) Table 6.7 shows that -

\[ \bar{X}_{HC} (201.48) \geq \bar{X}_{LC} (140.12) \]
Hence the observations and conclusions drawn are as under:

**OBSERVATIONS**

The null hypothesis $H_0$ is rejected

**CONCLUSIONS**

(a) The following alternate hypothesis $H_a$ "There is a significant increase in creativity scores due to creative thinking programme (CTP)" - is accepted.

(b) The creative thinking programme shows highly significant effect in enhancing the creativity level of the students.

(c) The relationship between these groups are shown below:

\[(\text{High CR,Gr}) \succ (\text{Low CR,Gr.})\]

In short, the creativity level of students can be enhanced to a greater extent by such creative thinking programme (CTP). This is but natural for playing a role of divergent thinking factor in CTP.

**Study-4  Reading Facility v/s Creativity**

The hypothesis for this study is -

$H_{O_3}$: There is no significant mean difference in creativity scores of students possessing good and poor reading facility.
The data for the hypothesis are listed below:

Data:
(i) Table 6.6 shows that-
\[ F_{obs}\ (20.67) \geq F_{tab}\ (6.68) \text{ at } 0.01 \text{ level}. \]
(ii) Table 6.7 shows that -
\[ \overline{X}\ (G.R.F.)\ (179.52) \geq \overline{X}\ (P.R.F.)\ (147.67) \]

The observations made and the conclusions drawn are as under:

**OBSERVATIONS**

The null hypothesis \( H_{03} \) is rejected.

**CONCLUSIONS**

(a) The alternate hypothesis -
\[ H_{a3} "\text{There is a significant mean difference in creativity scores obtained by good and poor reading facility of students".} \]

is accepted.

(b) Reading facility, the third variable has a significant effect on the enhancement of creativity level of the students.

(c) The good R.F. group students shows better progress in creativity than the poor R.F. group students.

(d) The relationship between these two groups are shown below:

\[ (\text{Good R.F. Gr.}) \geq (\text{Poor R.F. Gr.}) \]
In short, the students who possess the good R.F. show the increase in the creativity levels.

Study-5  Treatment x Creative Personality (A x B)

The hypothesis for the study is -

\[ H_0^4 : \] "There is no significant interaction effect of treatment and Creative personality of students on their creativity scores."

The data obtained for this hypothesis are shown below:

Date : Table 6.6 shows that -

(i) For \( A_1B \) (Treatment x Creativity)
   \[ F_{obs} (0.81) < F_{tab} (3.68) \] at 0.05 level.

(ii) For \( A_2B \) (Programme x Creativity)
   \[ F_{obs} (1.14) < F_{tab} (3.68) \] at 0.05 level

The observations made and the conclusions drawn are shown below:

**OBSERVATION**

The null hypothesis \( H_0^4 \) is accepted.

**CONCLUSIONS**

(i) There is no significant joint effect of all the Treatment x Creative personality levels on the creativity levels of the students.

(ii) There is no significant joint effect of programme x
Creative personality levels on the creativity levels of the students.

Study-6 Treatment x Reading Facility (A x C)

The hypothesis for the study is -

$H_{0_5}$: "There is no significant interaction effect of treatment and reading facility of students on their creativity scores."

The data for $H_{0_5}$ are listed below:

Data: Table 6.6 shows that -

(i) For $A_1C$ (Treatment x R.F.)

$F_{obs}$ is negligible.

(ii) For $A_2C$ (Programme x R.F.)

$F_{obs} \left(2.01\right) \lt F_{tab} \left(3.68\right)$ at 0.05 level.

Observation

The null hypothesis $H_{0_5}$ is accepted.

Conclusions

(i) The main effect of treatments and reading facility on creativity are found independently significant while their joint effect on creativity is non significant.

(ii) The interactive effect of treatment programme and reading facility is not significant but it tends
nearer to the level of significant at 0.05. So it is worth while to replicate the study to see this interactive effect.

Study-7 Creative Personality v/s Reading Facility

Table 6.6 shows that-

Fobs is 0.01 whixh negligible and hence it is concluded that there is no interactive effect of creative personality x Reading facility of the students on their creativity level. Hence H06 is accepted.

Study-8 Treatment x Creative Personality x Reading Facility

Table 6.6 shows that -

(i) For A1BC Fobs = 2.12 is not significant
(ii) For A1BC Fobs = 0.48 is also non significant.

Hence the null hypothesis H07 is accepted and it is concluded that there is no interactive effect of treatment, creative personality and the reading facility of the students on their creativity level.

Study-9 CR-BLOCKS v/s Creativity

The hypothesis for this study is -

H08 There is no significant mean difference in the Creativity scores of the students of different CR-Blocks.
The data for testing this hypothesis are listed below:

Data: Table 6.10 shows that -

(i) Mean of LCPR, LCGR, HCPR & HCGR are 129.76, 155.46, 196.46 and 221.46 respectively.

(ii) N.K. Value for the mean difference between LCPR & LCGR is 2.59 which is not significant.

(iii) N.K. Value for the mean difference between HCGR & HCPR is 1.51 which is not significant at 0.01 level.

(iv) The rest three N.K. values are 3.94, 1.35 and 2.86 which are not significant at 0.01 level.

OBSERVATION

(i) The mean difference between HCPR and LCGR (257) is not significant, whatever the difference observed is due to chance factor.

(ii) The rest all the five mean differences (64.66, 93.95, 38.96, 67.28, 28.32) are significant.

CONCLUSIONS

(i) The students of LCPR and LCGR groups had not shown significant mean difference in their creative ability.

(ii) The students of LCGR and HCGR groups had shown
significant mean difference in their creative ability.

(iii) The students of HCGR groups are superior to the students of rest three groups in their creative ability.

(iv) The relationship between 4 CR-Blocks are shown below:

\[(HCGR) \succ (HCPR) \succ (LCGR = LCPR)\]

**Study-10  Trend of Creativity Across 4 CR-Blocks**

To study the functional relationship of creativity across the Reading Facility blocks, the following question was posed:

**Question:** Is the trend across 4 CR-Blocks, Linear, Quadratic or Cubic?

The data needed for the solution of the question are listed below:

**Data:** Table 6.11 shows that -

(i) For linear trend the contrast sum is 9483 and F linear is 47.8825.

(ii) For quadratic trend the contrast sum is 21 and F-Qua. is 0.00117.

(iii) For cubic trend the contrast sum is 939 and F cub is 0.4694 i.e. NS.
**OBSERVATION**

Flin = 47.8825 is significant while other two Fs are not significant.

**CONCLUSIONS**

(i) The 4 CR-Blocks, HCGR, HCPR, LCGR & LCPR are in the ascending order of the mean scores on creative ability test. The trend of the creativity across these CR-Blocks is Linear in nature.

(ii) This Linear trend suggests that creativity can be enhanced by such creative thinking programme (CTP) techniques.

**7.5 FINDINGS AND DISCUSSION**

From the above observations and conclusions the researcher made some important outlook views. The findings of this study are as under:

(i) A Creative Thinking Programme (CTP) is a powerful mean to develop the creativity of the primary school students.

(ii) Creative personality ability inheritedly plays much more role in the advancement of creativity of the students. They acquired high level of creativity after implementing the CTP.
(iii) Reading facility plays its role in developing the creativity of the students.

(iv) The main effect of treatment, Creative personality level and reading facility 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 a few illustrations of the similar programmes which have been carried out in different places. They all go to strengthen the results obtained by the investigator.

(1) A long range of study by General Electrics shows that company engineers who had received creativity training produced 3 times more patenable inventions than those who did not received this training.²

(2) A study of Creative Thinking Programme (CTP); done by Covington university of California has showed that creative thinking could be developed by such training in primary school students.³

-----------------------


Feldhusen J.F. and his associates had developed the purdue creative thinking programme (PCTP) in purdue University 1970. They have established that such programme can develop flexibility, fluency elaboration— the components of the creativity.  

Bhaskar S.B. 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 primary school students.

Nir Pharke (1979) and Patel J.Z. (1985) had established the same impact of such general programme developing the creativity levels of children in their study.

Jarial G.S. 1981 had studied the development of creativity of children by preparing programmes based on school subjects— Science and Language.

So, this study undertaken by the investigator is provided worth for its educational implication.

The present class-room teaching appears to be very low on motivation, for the teacher, directed as well as dominated provides less opportunity for student involvement and student initiative. This results in low pupil interest and mainly convergent in nature. The first objective of the research therefore, was to find out the extent to which the theoretically postulated creative teaching practices in the present class-room. The divergent thinking programme would provide a new direction to the conventional way of teaching.

Under the present critical situation when the national policy of education in India (1986) put emphasis on the self learning, self evaluation, child centred education and thinking process. This type of programmes would be helpful to motivate the students, to create open class-room climate and to fulfil the objectives laid down in the national policy of education.

The result of this study here proved that this short term programmes has increased the creative ability of the students. So any educational person can use such programmes for Gujarati school students applying any of the following ways:

(1) During day to day teaching one can spare 10-15
minutes within a period to pose a question aiding the divergent thinking programme of the students.

(2) One can implement the programme during a term. A period of 35 minutes per week may be allotted in regular school time table for the purpose.

(3) It is possible to introduce such thinking programmes when the school have a spare period per week for co-curricular activities. This activity would raise the interest in the students and enhance the divergent thinking in general.

Thus by the end of the school education, this group of students will become creative citizen of the nation. And so further researches in the field should be continued in this line.

7.7 SUGGESTIONS FOR FURTHER RESEARCHES

This research has produced some positive and encouraging results and hence it deserves a few suggestions for further researches. They are enlisted hereunder:

(1) The same study should be replicated on larger sample.

(2) Rural area should be introduced instead of urban area alone to study the effect of CTP.
(3) All the groups of the B.C. Students from Socio-Economic level should be selected as a sample to study its effect on creativity level of the students.

(4) The creative thinking programmes should be prepared by covering the various subjects of secondary school.

(5) The impact of CTP can be studied on the various creative components levels of the students.

(6) A correlational study of academic performance and attitude of the students towards the creative thinking programme can be undertaken.

(7) The post effect of such training programme might be found out as a follow up work.

At a time of modern national culture over the high degree of creativity, it is so essential in the field of Science and technology and hardly less essential in Government business and other areas. Education in Creative Thinking may do much to unlock the door to a vast treasure house of latent ability.