"A spring of fresh water is a nuisance when it first issues from the ground, producing only mud and mite. It cannot be stopped by cement or earthfill, its flow will continue to seep around the edges. But when the spring is given a protective and delimiting margin and a channel is provided for its steam, it becomes a source of joy. The same is true of creativity."

-GOWAN
-DEMOS
-TORRANCE
CHAPTER V
RESEARCH DESIGN AND EXECUTION

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CHAPTER V

RESEARCH DESIGN AND EXECUTION

5.1 INTRODUCTION

Research design is a strategy on paper like an architect's plan. Certain fundamental steps of research design must be given due importance when proposed to be used. The operation of the design, that is planning must be carried out with patience and accuracy.

The first phase of the study i.e. development of divergent thinking programme have been described in the forgoing chapter. This chapter deals with the description of the second phase of the study, i.e. implementation of thinking programme and to study its effect on the creativity and creative personality of primary school children.

For validational study the following design was completed with the research tools and sampling procedure.

5.2 BASIC ELEMENTS OF RESEARCH METHOD

As described in chapter IV, this chapter deals with the 'put in practice' the four basic requirements in
research method, viz: Variables, Hypothesis, Research tools and Sample selection.

5.2.1 Variables Therein

Although, the research studies have, in general, supported the effectiveness of special programmes for creativity viz. Purdue Creative Thinking Programmes, Productive thinking programme, for the creativity of the school children. But very few attempts have been done in enhancing the creativity of pupils through thinking programmes based on the academic subject taught usually in school. Even then there are several major unsolved problems containing their creativity of the students.

B.K. Passi, in his talk 'All India Seminar on Creativity' held at Regional College of Education, Bhopal (1982) had stated the need of such programmes and its way of implementation to look after the creativity of the primary school students. So generalisation has decided to take the treatment as one of the independent variable.

As described in the review Chapter III, IQ is seemed to be an effective variables in nurturing and audiencing the creativity levels of the primary school students. To study the effect of these thinking programme the investigator has kept in view the pre-acquired creativity level of the students, so the pre-acquired creativity ability is also considered in the independent variable for this study.
The four variables and the levels of which they operate in the present study are shown in the following table.

**TABLE 5-1**

**VARIABLES AND THEIR LEVELS**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Variable</th>
<th>Nature of the Variable</th>
<th>No. of Levels</th>
<th>Name of Levels</th>
</tr>
</thead>
</table>
| 1       | Treatment : Creative Thinking Programme | Independent | 3 | i) Programme Discussion with Feedback.  
|         |                       |                        |               | ii) Programme without feedback  
|         |                       |                        |               | iii) No Programme |
| 2       | Reading Facility (RFI) | Independent | 2 | i) Good  
|         |                       |                        |               | ii) Poor |
| 3       | Creative Personality (CPI) | Independent | 2 | i) High  
|         |                       |                        |               | ii) Low |

The three levels treatment viz: (i) execution of creative thinking programme developed by the investigator and discussion along with the proper feedback,  
(ii) execution of creative thinking programme developed by the investigator without any feedback or discussion.  
(iii) No programme should be executed. The naturel
creativity should be measured by pre-acquired, creativity level.

The variables as per the description above incorporated in the study paved way to the formation of the hypothesis that were really to be tested after the data collection.

5.2.2 Hypotheses Built

The hypotheses formulated for this present study are mentioned below:

HO₁ There is a significant effect of Creative Thinking programme on the creativity of the primary school students.

HO₂ There is a significant effect of Creative Thinking Programme on creative personality of the primary School students of Class VII.

HO₃ There is no significant difference in Creativity of the students when Creative Thinking Programmes are executed without discussion and feedback.

HO₄ There is a significant difference in creativity of the students possessing reading facility after the Creative Thinking Programme was implemented.

HO₅ There is no first order interaction effect of treatment of Creative Thinking Programme and reading
facility on the creativity of the students.

$H_0_6$ There is no first order interaction effect of treatment of the Creative Thinking Programme and creative personality ability on the creativity level of the students after the treatment was given.

$H_0_7$ There is no first order interaction effect of reading facility and Creative personality ability on the creativity of the students after the treatment was given.

$H_0_8$ There is no second order interaction of treatment, reading facility and creative personality ability on the post-acquired creativity of the primary school students of class VII.

5.2.3 Tools Used

The following were the main tools which were used to observe the data for this study.

1. Creative Ability Test (CAT)  
   Developed by J.Z. Patel

2. Creative Thinking Programme (CTP)  
   Developed by the investigator

3. Reading Facility Inventory (RFI)  
   Developed by the investigator

4. Creative Personality Inventory (CPI)  
   Prepared by Eugene Raudeep
(1) Creative Ability Test (CAT)

This is classified in three sections, as shown below:

Section-1 : Verbal Creativity Test
Section-2 : Figural Creativity Test
Section-3 : Numerical Creativity Test

The question of every section is followed by the instruction given with illustrations.

- In Verbal Creativity Test there are two sub-parts-
  (a) Instances
  (b) Uses

  Each sub-part consists two questions.

- In figural creativity test, there are two sub-parts-
  (a) Line meaning
  (b) Pattern meaning

  These two sub-parts also consists two figures in each.

- In Numerical creativity test, there are two sub-parts-
  (a) Numerical
  (b) Operations

  These two sub-parts consist only one question in each, thus the whole test consists of ten questions.

Description of CAT

The CAT is classified as above. For each test, five minutes time limit is given for each question, so fifty minutes time is required for the completion of CAT. The test
reliability was found by test-retest and split-half method. The sub test scores vary from 0.73 to 0.93 and 0.77 to 0.90 respectively and factor scores vary from 0.86 to 0.94 and 0.82 to 0.90 respectively. The concurrent validity of CAT with different criteria measures varies from 0.66 to 0.77.

**Scoring of CAT**

As there is no right or wrong responses for the test, much can be exercised at the time of scoring. The scorer has to acquaint himself fully with the method of scoring and the use of scoring sheet. The following points had been kept in mind while scoring the test.

Each test item is to be scored for Fluency, Flexibility and Originality score. The total of these component scores become the creativity score for each item. Then the total of all the items scores become the total creativity score of the testee.

In score for fluency the investigator has gone through the responses to item in question carefully and struck off those which were irrelevant and or has been responded. Then he counted the remaining number of responses and entered that number as a fluency score, for the item, in the appropriate box on the answersheet.

In scoring for flexibility, the investigator first acquainted himself with the categories of responses given for each item in the scoring guide. For the shake of con-
venience, he noted bracket against each response. The alphabetic serial of the category to which it belongs whenever he came across a response which has not been mentioned in scoring guide, he had determined the category to which it would seem to belong.

When the response belongs to an entirely new category not considered in the scoring guide he had given it a new alphabetic serial and noted in the bracket against the response in question. After he had gone through all the responses to a given item, he counted the number of different categories used by the testee. This could be easily determined on the basis of the number of different alphabetic serials used. Then he counted the total number of different alphabet serial used and entered that number as the Flexibility score for the item in the appropriate box on the answersheet.

In scoring for Originality, the investigator had strictly followed the scoring guide. Every original responses such as mentioned in the scoring guide with underline were given one score of originality to each. When he came across such responses which were not mentioned in the scoring guide, he had briefly noted down them on the back side of the answersheet and after all the test scripts had been scored, he had decided on the basis of statistical scheme which of those was unique response and which was not, and categories for such new responses were also determined at the time of scoring and then added those scores by putting
(+ sign in the appropriate box where he had already noted the originality score based on the responses given in the scoring guide.

(2) **Creative Thinking Programme (CTP)**

Creative thinking programme is an enhance of the creativity of pupils.

The CTP series is essentially based on conceptual thoughts and certain situation. The content of CTP is explained in detail in chapter III.

Through this study, the students of primary school may think thoroughly on conceptual thoughts and situation. The main objective of this study is to make them think between the relation of situation and human activities that are interesting and novel. The children are expected to become more proficient in doing activities as the series of the programme progresses. The copies of all thirty lessons in details are shown in Appendix-1.

Each programme is followed by its activities PTA-1, 2, 3, 4, 5, 6. There are six activities in first programme and there are four activities in second and thrid programme, which may take about 45 minutes including suggestions. Investigator puts initiated limited content in the starting in each and every programme. The first, second and fifth activities are quite easy but third and fourth are quite
difficult because it is of divergent thinking type. In each programme, activities are given equal importance. Some are more complex and more closely related to our life and observation. Considerable effort has been made to develop or to keep the PTA.

(3) **Reading Facility Inventory (RFI)**

RFI is developed by the investigator. It is closely depend upon the activities of the reading facility provided by their parents. Reading facility is important aspect affecting to the creativity. The students who provided the most reading facility they achieved considerable effort develop to creativity.

In this inventory there are three sections affecting to the reading facility.

(a) Accommodation Facility
(b) Economical Facility
(c) Literally Facility

The copies of reading facility inventory in details are shown in Appendix-3.

(4) **Creative Personality Inventory (CPI)**

It is prepared by psychologist Eugene Raudsepp, Co-founder of Princeton Creative Research, Inc. He conducted creativity workshops for some of the country's largest industries. The CPI measures creative personality ability of the
students. It was found useful to the investigator to equate experimental and control group.

It is the inventory of creative personality. It does not require reasoning arithmatic or any other form of school achievement.

This inventory included mainly two sections:

(i) **Your Choice of Responses shows Creativity**

In this activity there are certain conceptual and situational statements regarding creative personality. The students should check the responses that they felt apply to them.

* e.g.

Do you spend many evening with friends?

(a) .... **YES**  (b) ...... **NO**

(ii) **Which traits describe you?**

In this activity there are given certain adjectives regarding creative personality. The students should check the adjectives that they believe describe them *e.g.*
Check the adjectives that you believe describe you.
- Determined
- Enthusiastic
- Sensitive
- Inventive
- Dependable
- Logical, etc.

The copies of Creative Personality Inventory (CPI) in details are shown in Appendix-4.

5.2.4 Sample Selection

It is very difficult to work on the total population for any research, as the factor like time, energy, finance, etc., are limited. Sometimes experimental design also puts restriction on the sample selection. Owing to these limitations it was decided to work on a sample for the present study. Sampling is a process of selection of subjects. The purpose of sampling is to study a small group i.e., assumed to be representative of the large group population from which it is drawn.

According to Borg¹

"The factor that must often differentiate between good and poor research is not the fund available the size of the sample or the sophistication of the statistics it is cure and thought that goes into research plan."

Now it is worth to fix the size of sample before selecting the sample for the study.

Edward de Bono\(^2\) opine

"There is no ideal size. Twelve people are a convenient number but a brainstorming session can work very well with as many as fifteen or as six."

This study concludes experiment method. It is the most exacting and difficult to all methods and also important from the scientific point of view. But the experimental method restricts the sample size as the programme are to be put on Anvil to study its effect.

Scoring procedures may be of various types among which the following classification is specific and useful too.

1. Random sampling
2. Stratified sampling
3. Quota sampling
4. Multi-Stage sampling
5. Systematic sampling
6. Cluster sampling
7. Purposive sampling

From these types, the investigator had to select such a sample, which would satisfy the following characteristics.

(a) In general, creativity of students should normally be distributed.
(b) Socio-economically the students should be from affluent group.
The school should be known to the experimenter for easy approach and full co-operation of the students as well as the staff.

The school should have co-educational system.

The school should have at least three classes of Std. VII to compare three treatments to be implemented.

Looking to the above requirements, the investigator selected the purposive sampling technique for this study. In most general sense, it means selection according to some purposive principles. Claims have been made that this method gives "more representative sample than objective method."

Garrett says:

"A purposive sample may be expressly chosen, because in the light of available evidence, it mirrors some larger group with reference to given clarification."

A school satisfying all the requisite conditions named "N.M. Nootan Sarva Vidyalaya, Visnagar" was selected for the purpose. There were four classes of Std. VII. As per the pre-determined purpose of the selection of sample the classes were formed according to the variability of creativity of the students. Total 150 students of Std. VII had

---

participated. The composition of the sample was found as shown in table 5.2 below.

**TABLE 5.2**

**COMPOSITION OF SAMPLE UNDER STUDY**

<table>
<thead>
<tr>
<th>CLASSES</th>
<th>VII A</th>
<th>VII B</th>
<th>VII C</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOYS</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>GIRLS</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>75</td>
</tr>
</tbody>
</table>

Out of these three groups A, B, C, two groups were selected as an experimental group and the rest as a control group. These designs are further classified in the Fig.51 i.e. Flow chart of sampling.

**FIG. 51 FLOW CHART**
CREATIVE ABILITY TEST (CAT)
PRE TEST

EXPERIMENTAL GROUP
TOTAL - 100

CONTROL GROUP
TOTAL - 50

VII C

CTP
WITH FEEDBACK
VII A
TOTAL - 50

CTP
WITHOUT FEEDBACK
VII B
TOTAL - 50

RFI
CPI

CAT
POST TEST
5.3  **STATISTICAL TECHNIQUES:**  
**EXPERIMENTAL DESIGN:**

Experimental design and statistical techniques to be adopted for the testing of the hypothesis. Main design and tools techniques are enlisted are discussed herein in brief, out of which the investigator has made use of the techniques keeping in view the needs of the method adopted. Research and explanation for making solution of these techniques are vividly set out under this chapter.

5.3.1  **Types of Design**

Types of experimental designs can be divided into groups as follows:

(i) Single Group Design
(ii) Separate Control Group Design

5.3.1.1  **Single Group Design**

Single Group experiments do not involve a separate control or comparison group. These designs are further classified in the following manner.

(a) One Shot Case Study

In this technique a single group or person is exposed to some experimental treatment. The one shot case study is so named because it is often used in case studies. It might also be appropriately called a single group after experiment to point out that observations are made after the introduction of the experimental variable.
(b) The one-group Pre-test, Post-test Design

It is one form of repeated measurement design, since there are two measurements for each S. There may be systematic differences in how $S_g$ respond to treatment-1 and treatment-2 that reflect differences.

(c) The Time Series Experiment

This is a type of cognitudinal research, where $S_g$ undergo repeated measurements both before and after the introduction of the experimental variable.

(d) The Equivalent Time-Sampling Design

One way to control history in some designs is to randomly vary the presentation of $X$. So that at times it is present and at times it is absent. An alternative possibility is to compare $X_1$ and $X_2$.

In this way experimenter treatments rather than of one treatment and a control. This method eliminated the effect of history because $X$ is presented more than one but it introduces a few other problems.

(e) The Equivalent Material Design

In single group repeated measurements design, the introduction of $X$ may carry over from one occasion to another This design is exactly the same as the above (d). Design except that different materials are introduced throughout the course of experiment.
5.3.1.2 Separate Control Group Designs

Such experiments required at least one comparison. Comparison may be between two or more experimental treatments or between groups exposed to X and groups not exposed. Some well-known techniques are like these.

(a) Static Group Comparison

When applied to the static group comparison the term "Pre-experimental" is unusually descriptive, because this type of design leaves many factors uncontrolled. The difficulty with the design is that the investigator has no way of knowing if the groups were equivalent before the introduction of X. Another difficulty with this design is mortality, but there could be no experimental mortality if groups remained unchanged throughout the entire experiment.

(b) The Pre-test, Post-test Control Group Design with Randomisation

This is the first "true experimental" design because major controls are provided for internal validity and for at least some sources of external validity. The effects of history can be disregarded because anything that affects the \(0_1 - 0_2\) difference is also likely to effect, difference between \(0_3\) and \(0_4\) assuming of course that experimental and control groups are tested together and at the same time.

(c) The Soloman Four Group Design

In an effort to eliminate some of the difficulties in
### Major Advantages and Disadvantages of Different Experimental Designs

<table>
<thead>
<tr>
<th></th>
<th>History</th>
<th>Maturity</th>
<th>Testing</th>
<th>Instrumentation</th>
<th>Regression</th>
<th>Selection</th>
<th>Mortality</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SINGLE-GROUP DESIGNS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. One-shot case study</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Does not allow for comparison of changes; no premeasures.</td>
</tr>
<tr>
<td>2. One-group pretest-posttest design</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>?</td>
<td>+</td>
<td>+</td>
<td>A type of repeated measurement design but with a single group.</td>
</tr>
<tr>
<td>3. Time-series</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>?</td>
<td>+</td>
<td>+</td>
<td>Leads to a complex statistical analysis.</td>
</tr>
<tr>
<td>4. Equivalent time samples</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Generalization is only to other groups which are repeatedly tested.</td>
</tr>
<tr>
<td>5. Equivalent materials design</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Generalization again restricted to groups tested repeatedly.</td>
</tr>
<tr>
<td><strong>SEPARATE CONTROL GROUP DESIGNS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Static-group</td>
<td>+</td>
<td>?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>Along with designs 1 and 2, this is a pre-experimental design.</td>
</tr>
<tr>
<td>7. Pretest-posttest control group design with randomization</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>A true experimental design; generalization restricted to other pretested groups.</td>
</tr>
<tr>
<td>8. Solomon four-group design</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Another true experimental design; requires use of multiple groups.</td>
</tr>
<tr>
<td>9. Posttest-only control group design</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>A third true experimental design.</td>
</tr>
</tbody>
</table>
generalising with above (b) design. Soloman proposed using four groups. In this technique the last two groups receive no pre-test and all the groups are initially equivalent through randomisation. Hence the investigator can determine the effect of pre-test $0_1$ and $0_2$. Most of the major variables are controlled here in this design, so Campbell and Stenly consider it to be a true experimental design.

(d) The Post-test only Control Group Design

In this technique only the last two groups in the Soloman four group design are employed, providing an experimental and a control group, but no pre-testing. This is the third and last of the true experimental designs.

(e) The Non-equivalents Control Group Design

This quasi-experimental design makes use of in-fact groups of classrooms which are formed on the basis of some natural grouping. Thus, experimental and control groups are not formed by randomly assigning $S_s$ although they could be matched. A minimum requirement for this technique is that pre-test scores for the experimental and control groups should be as similar as possibly.

(f) Separate sample pre-test post-test Design

At times experimenter may have to work with large but separate samples of groups of $S_s$ which cannot be selected at the same time. This technique allows the investigator to make a comparison between groups receiving $X$ and those not exposed to $X$. 
To get the comparative idea about all the described techniques table 5.3 is given on the next page. It gives major advantages and disadvantages of the experimental design.

Looking to the above, one can infer that separate control group design (i.e. technique from type ii) is the applicable type for the study undertaken. Moreover (b) technique i.e. the pre-test, post-test control group design with randomisation is the most suitable to be adopted for the research. Justification is the most suitable technique which can be given as:

(i) Selection is eliminated here because SS have been assigned at random to experimental and control groups.

(iii) Instrumentation can also be controlled by having the same observer participating with both groups.

(iii) There is a control group comprised of the same type of SS as are in the experimental group regression can be ruled out.

(iv) The experimental and control groups are tested together and at the same time.

(v) The effects of experimental morality can also be checked by examining, the pre-test scores of those who failed to show up for the post-test comparison.

5.3.2 ANOVA A Factorial Experiment

In some experiments, there are two or more independent variables, each of which is varied in two or more ways, called
levels. If experimenter takes all possible combinations of variables with levels and incorporate each combination as a separate experimental condition, the arrangement made, is known as Factorial Design. In a factorial experiment, the effect of number of different factors is investigated simultaneously, particularly with an aim to study not only the main effect of the factors involved but also interaction effects which are best studied with factorial design.

Allen L Edward defines the three models according to the levels of factors as below:

"When the levels of factors are not randomly selected, the ANOVA model is referred to as a fixed model, when the levels of each factor have been randomly selected from the large population, the ANOVA model is referred to as a random effect model. If the levels of some factors have been randomly selected and those of others have not, the ANOVA model is referred to as a mixed model."

In this study there are three groups: Two experimental groups and one control group, where two groups would get training through creative thinking programme developed by the investigator and other would not. Out of these two experimental groups one group would get a chance of discussion and

feedback on programme content, while second group would not get a chance of discussion and feedback but allow to use the Creative Thinking Programmes developed by investigator. Other two independent variables as discussed ahead, are Reading Facility and Creative Personality of the study. The investigator has decided to take two levels of each by considering above median and below median scores. Therefore ANOVA model of this study is a mixed model and hence it involves both fixed effects and random effects.

To study the effect of treatment (Creative Thinking Programme), Reading Facility and Creative Personality on the creativity of the students, 3 x 2 x 2 factorial design with a randomised group design has been employed as a statistical tool.

5.3.3 Statistical Technique in ANOVA

In this ANOVA technique, the treatment, reading facility and preacquired creative ability are the independent variables, while the creative ability is the dependent variable. The 3x2x2 factorial design has been developed in the given tabular form.
### TABLE 5.4
3x2x2 FACTORIAL DESIGN FOR DATA ANALYSIS

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>Treatment (Discussion Programme)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$A_1CTP$</td>
</tr>
<tr>
<td>Reading Facility</td>
<td>PCA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$C_1$</td>
<td>$x_2$</td>
</tr>
<tr>
<td></td>
<td>$B_1$</td>
<td>$M$</td>
</tr>
<tr>
<td></td>
<td>$N$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$C_2$</td>
<td>$x$</td>
</tr>
<tr>
<td></td>
<td>$E_2$</td>
<td>$N$</td>
</tr>
<tr>
<td></td>
<td>$C_2$</td>
<td>$x$</td>
</tr>
</tbody>
</table>
Before proceeding for F-test it would be proper to look into the assumptions underlying ANOVA technique. They are parametric assumptions: viz—

1. An equal unit scale is assumed for the measurement of the dependent variable.

2. Homogeneity of Variance is the basic assumption that is, the samples of the group coming from the same population have equal variance.

For the test of homogeneity the Fmax test can be used. The formula for Fmax (Allen L. Edward) is given below:

\[
F_{\text{max}} = \frac{\text{Maximum variance}}{\text{Minimum Variance}}
\]

If the Fmax value is not significant, the basic assumption (2) is found to be satisfied.

Hence ANOVA summary has been given to test whether the group means differ or not, in the following form.

**TABLE 5.5**

ANOVA SUMMARY SHOWING BETWEEN GROUPS AND WITHIN GROUPS

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean SS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The level of significance at 0.05 level and 0.01 level of confidence has been accepted in educational research.

Next, the summary of the complete ANOVA to test whether there exist the effect of independent variables or not and whetheere there exist any order of interactive effect of variables on the dependent variable, say creativity, would be of the form shown below:

**TABLE 5.6**

**SUMMARY OF THREE WAY ANOVA**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MSS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>A_1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A_2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RA R^2 B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACA C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A_1 x B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A_2 x B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A_1 x C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A_2 x C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B x C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A_1 x B x C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A_2 x B x C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The values of F are obtained by dividing each of the mean sum of squares (MSS) by error variance, i.e. within
groups mean square. The level of significance at 0.05 and 0.01 levels of confidence has been accepted to study the main effect and interactive effect on the creativity. Thus the hypothesis could be tested for acceptance or rejection.

5.5 EXECUTION OF CREATIVE THINKING PROGRAMME

The resultant work derived from the use of foregoing tools, techniques etc. is elaborately discussed in this chapter under four heads:

(i) Familiarisation with Programme
(ii) Experimental work
(iii) Response analysis
(iv) Observations during work

5.4.1 Familiarisation with Programme

Before implementation of creative thinking programme, the person incharge should be familiarised with the programme and its execution as shown in the programme booklet. This chapter includes in specific aspects of pre-experiments namely Introductions, Time schedule and The Programme Format.

5.4.1.1 Instructions

Stressing the importance of the directions given in the test manuual. Thorndike\textsuperscript{5} states:

\begin{quote}
\end{quote}
"It is very important that the instructions be clear and adequately detailed. When the test is of familiar form and the procedures are simple, a brief paragraphs of instructions will suffice."

As this type of programme seems to be new one, the instructions, needful and the details such as method of reading the informative paragraph explanations regarding the types of activities and importance of such work. The directions for the administering the creative thinking programme, they prepared minutely as shown in appendix-1.

5.4.1.2 Time Schedule

The Creative Thinking Programme includes three programmes having with ten lessons each, which is to be spread over ten weeks duration as determined in chapter IV. Flowchart will give the idea of a study at a glance. Problem items testing required one period of 40 minutes. In the beginning the implementation started with creative ability test CAT as a pre-testing.

It was given to all the three groups of students under study. All the three groups were so formed that they found homogeneous on the achievement test.

By the next week of the pre-testing, the two groups were selected randomly for experimentation and third group was treated as a control group. i.e. no such programme was to be given to the students of control group. One of the
experimental group received the feedback through discussion while the other experimental group did not receive. Both the groups required thirty periods for training to think differently in the various conceptual thoughts and situations. In the beginning three periods per week, so that the training periods lasted for ten weeks. The duration of each period was 40 minutes in the school time table. After completion of the programme the creative ability test was given to all the three groups to study the effect of programme. Thus the experimental work required ten weeks duration to train the students to think to measure the creative ability of the students.

5.4.1.3 Format of the Programme

The format of the programme was discussed in detail in chapter IV. The activities (Creative thinking) 1 and 2, in each programme pertain to conversion thinking where the programme had not to be more familiar with such activities or situations. Activities 3 and 4 pertain to divergent thinking and activities 5 and 6 pertain to creative personality. These activities need where the programmer is required to be more familiar with such activities.

Moreover, he had to respond to the stimulus in different ways. Last activity is of creative personality where the students have to think most logically.

The whole programme i.e. thirty lessons, consists
of 140 items. So the time required for training was 30 peri-
ods. Three periods per week. So that training lasted for
ten weeks i.e. 2 and half months.

Implementation started with CAT as pre-test. It was
given to all three classes of VII grade at a time in separate
classes. Three teachers of the school complex assisted the
investigator during the testing.

5.4.2 Experimental Work Done

On the first day of training the students were supp-
lying a small note-book as a answerbook for CAT. On
the front page of answer booklet, they were requested to give
their required personal data. A small form of data collected
is shown in Appendix-4.

Also the students were supplied with the programme
booklets containing items for giving answers. The investiga-
tor put ample below each item of CTP properly. They were
requested to give their personal data on the front page of
answer booklet. The investigator suggested to observe minu-
tely the cartoon picture of front page which create the curi-
osity of the concerned conceptual thought and situation. The
investigator established the rapport with some introductory
remarks, just as -

"Today we are going to do some work in a methodical
way. You will be supplied a problem you will have
to think about the problem and give the answer. On second page of each programme are given certain definition, thinking process of given problem and given a model solution of such type of problem. By giving the solution of such a problem, the students should inspire and motivate to give the answer of other experimental problems. For the programme-content read carefully and you will have to think about the solution and give the answer in the same booklet.

You are asked to think from different angles of the situation and thought of the given problem. This is not a test or an examination but a training. We shall work together for 2½ months. So please be honest in your work. Do not try to cheat or copy but write as many answers as you can, for each item in your programme book."

The time schedule for the execution of whole programme is shown in the table 5.7 to follow.
### TABLE 5.7
PROGRAMME WISE PERIOD DISTRIBUTION
(WEEKLY)

**FIRST PROGRAMME**

<table>
<thead>
<tr>
<th>Week</th>
<th>Period</th>
<th>Day</th>
<th>Lesson</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Oral</td>
<td>0</td>
<td>Preliminary items and Instruction</td>
</tr>
<tr>
<td>I</td>
<td>1</td>
<td>Monday</td>
<td>1</td>
<td>Recognise</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Wednesday</td>
<td>2</td>
<td>Analyse</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Friday</td>
<td>3</td>
<td>Compare</td>
</tr>
<tr>
<td>II</td>
<td>4</td>
<td>Monday</td>
<td>4</td>
<td>Select</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Wednesday</td>
<td>5</td>
<td>Find other ways</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Friday</td>
<td>6</td>
<td>Start</td>
</tr>
<tr>
<td>III</td>
<td>7</td>
<td>Monday</td>
<td>7</td>
<td>Organise</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Wednesday</td>
<td>8</td>
<td>Focus</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Friday</td>
<td>9</td>
<td>Consolidate</td>
</tr>
<tr>
<td>IV</td>
<td>10</td>
<td>Monday</td>
<td>10</td>
<td>Conclude</td>
</tr>
</tbody>
</table>

**SECOND PROGRAMME**

| IV   | 11     | Wednesday | 11     | Examine Both side                           |
|      | 12     | Friday    | 12     | Evidence : Type                             |
| V    | 13     | Monday    | 13     | Evidence : Value                            |
|      | 14     | Wednesday | 14     | Evidence : Structure                       |
|      | 15     | Friday    | 15     | A. D. I.                                    |
| VI   | 16     | Monday    | 16     | Being Right : 1                             |
|      | 17     | Wednesday | 17     | Being Right : 2                             |
|      | 18     | Friday    | 18     | Being Wrong : 1                             |
| VII  | 19     | Monday    | 19     | Being Wrong : 2                             |
|      | 20     | Wednesday | 20     | Out come                                    |
Table 5.7 cont'd

<table>
<thead>
<tr>
<th>Week</th>
<th>Period</th>
<th>Day</th>
<th>Lesson</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>21</td>
<td>Friday</td>
<td>21</td>
<td>Information</td>
</tr>
<tr>
<td>VIII</td>
<td>22</td>
<td>Monday</td>
<td>22</td>
<td>Questions</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Wednesday</td>
<td>23</td>
<td>Clues</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Friday</td>
<td>24</td>
<td>Contradiction</td>
</tr>
<tr>
<td>IX</td>
<td>25</td>
<td>Monday</td>
<td>25</td>
<td>Guessing</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Wednesday</td>
<td>26</td>
<td>Belief</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Friday</td>
<td>27</td>
<td>Ready-mades</td>
</tr>
<tr>
<td>X</td>
<td>28</td>
<td>Monday</td>
<td>28</td>
<td>Emotions</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Wednesday</td>
<td>29</td>
<td>Values</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Friday</td>
<td>30</td>
<td>Simplification and Clarification</td>
</tr>
</tbody>
</table>

TEN WEEKS

The execution of the programme was carried on as discussed below:

Zero Period

Before the implementation of CTP the investigator had kept zero period to establish the rapport with the experimental group during the zero period. The subjects under experimental condition were made aware of different types of thinking viz. Convergent thinking, Divergent thinking, and evaluating thinking which are the primary base for the CTP. The investigator had clarified these three terms with appropriate situational problem as mentioned below:
(i) Convergent Thinking:
   - How would you start to think about the certain situational problem?

(ii) Divergent Thinking:
   - Should guardian take care of their children about the study of school?

(iii) Evaluating Thinking:
   - Only the school teachers are responsible for the progress of the study of the children. Justify the statement suggesting the arguments on one side and other side. (Examine both sides)

The investigator had collected all the responses and put before the class for discussion to find out very uncommon responses and for the divergent thinking and logical thinking, while justifying the statements. Thus the students were familiar with the three types of thinking and the best rapport was established between the teacher and the taught. So much that the students could participate whole-heartedly throughout the experimentation of the CTP.

According to the time schedule of the programme implementation, the investigator had treated both the experimental groups on the same day every week.

FIRST PROGRAMME
First Period: Recognise

The first lesson of the first programme with activity from the booklet was distributed to each student of the
experimental group. The first lesson was based on "Recognise".

Recognition is possibly the most basic of all thinking operations, since it either precedes all others or is their aim. In every day life as soon as we recognise something we know how to deal with it. The process is usually unconscious. The recognition of concrete objects is not very important since unknown objects are relatively rare in ordinary life. What matters more is the recognition of situations and this may require conscious effort.

You have to recognise a problem situation before you can begin to try and solve it. You have to recognise a planning situation before you sit down to make a plan. It is this deliberate attempt to identify a situation in order to know what to do about it, this is practised in the lesson.

Before the implementation of this lesson the investigator had given certain clarification about the lesson. The concern useful definitions, thinking process of the lesson were summarise in the beginning of the lesson. By hints of lesson students were inspired and motivated to solve the given experimental problem.

Students were then asked to write down the imaginative solutions of the problems. The time duration of this activity based on divergent thinking was kept 6 minutes. In the activity, uncommon responses were collected and shown on the black board. They were as under:

(i) The students are only responsible for their progress
(ii) It is forbidden to take any book or paper in the examination hall.

(iii) An obedient student should always be honest in every activity of the school.

(iv) Ramesh works hard but could not get highest rank in his class.

Thus this activity was found to be difficult but after providing the stimulation the students could apply their imaginative thinking to solve the problem.

Creative Thinking Ability (CTA)

CTA 1.1

This activity required the higher level of knowledge, to think logically on the basis of past learning experience. The students were asked to give the causes on the basis of imaginative thinking.

CTA 1.2

The students were asked to explain the constructive situational effects on the conceptual thoughts and situations. Incubation period of 2 minutes was provided to think on CTA 1.2. The very uncommon responses were put before the whole groups.

CTA 1.3

This activity required evaluating thinking by justifying the given situations, rationally and applying the imaginative thinking in various modes. It was found that this item required great help from the teacher. The total time
required to complete the lesson was found nearly 46 minutes which was found enough as pre-determined period duration. At the end of the period the programme booklet were collected from the students with thanks.

Second Period : Analyse

In this period, the work was continued on the same line as lesson-1. The second lesson was based on 'Analyse'.

Most of the time we are analysing the complex environment into the separate pieces with which we can cope. In this lesson analysis is used in its most basic sense of dividing something up. The purpose of this division is to enable us to understand something, deal with it, or explore it more easily.

For the sake of convenience analysis is separated into two distinct types. The first type is, called 'Original part analysis and corresponds to the classical search for the true components that make up the situation.

The second type is called 'Perceived parts analysis and is a division not of the thing itself, but of the way it is looked at.

The students were familiar with such work ahead. Immediately students started next item which required the divergent way of thinking. Students gave different ideas on ways of analysis. Uncommon responses were collected and put before the group item 2.5 was evaluating thinking so the
students took more time while responding to 2.6. It was found to be very interesting. The lesson was found nearly 45 minutes to complete. At the end of the lesson, the programme booklets were collected from the students with thanks.

Third Period : Compare

This lesson deals with the conceptual thought 'Compare'. Comparison is an important part of thinking. The purpose of this lesson is to treat comparison as a deliberate operation instead of something that happens new and again.

When neither recognition nor analysis tell us enough about something we turn to comparison. We compare something new to something familiar in order to see if we can transfer knowledge from one to the other.

Two different situations can occur. In the first situation we start with something and look around for something with which to compare it. The comparison may cover several points and tell us a lot about the new thing.

Fourth Period : Select

This lesson consists in the conceptual situation 'Select'. Selection is another basic operation that comes into much of our thinking. The operations may appear in several guises as, selecting, choosing, judging, matching, or fitting, but the basic process is similar. It is a matter of having requirements and seeing how well they are met.
When something fits your requirements you choose or select it whether it is a bus, it is a house, a new job, a car. Selection is the broad process of trying to find something that fits your requirements. In practice three actual situations may occur:

(1) Testing to see whether something offered (as explanation, solution etc). fits or does not fit. "Is there a good fit?" The operation involves looking to see at which points the requirements are met and at which points they are not.

(2) Choosing from among different possibilities. "Which fits best?" The operation involves finding the priorities among the requirements (i.e. doing a fit on them) and then seeing which of the possibilities fits most of the priorities.

(3) Finding something to fit the requirements. 'What fits this?' The operation involves being conscious of the requirements and then looking for something that fits them.

The whole emphasis of the lesson is on 'requirements' and 'fit'. During the lesson the teacher can ask pupils to list requirements in order of priority. A clear view of requirements makes selection much easier.

The students took more interest to solve the problem. Uncommon response were collected and put before the group. The lesson was found nearly 44 minutes to complete. At the
Fifth Period: Find Other ways

The purpose of this lesson is to get pupils to make a deliberate attempt to look at things in different ways. It is not just a matter of looking for alternative when the obvious way is inadequate. The emphasis is on trying to find other ways even when there is no apparent need to do so. In any situation a pupil should be able to ask himself:

Are there other ways of looking at this?

Alternative ways of looking at something may come from many sources:

Lateral Thinking: Elections could be said to vote for the candidate they liked or they could be said to vote against the candidate they disliked.

Other Point of View (OPV): Strikes viewed as a genuine bargaining device by unions but as unnecessary work disruption by employers.

Different focus: A car looked at in terms of power and performance or in terms of comfort and appearance. Also as a means of getting to work or a source of traffic congestion.

Item 5.1 was found to be very interesting. Item 5.3 based on sources and the students gave correct response. While uncommon responses were collected and put before the group. The total time required to complete was 44 minutes. At the end of the period, the programme booklets were collected back.
Sixth Period: Start

This lesson deals with 'start'. This lesson is about the practical business of starting to think about something. The whole emphasis of the lesson is on encouraging the pupils to make definite, crisp and deliberate start.

Whenever a person is thinking about something, there must be a start. So why do we need to make deliberate what is automatic and obvious? Because the natural start is usually a matter of drifting into the subject at any point that happen to come to mind. In order to make a deliberate start you have to consider the type of situation and where you want to end. On the other hand a comparison may illustrate just one aspect and so enable us to see this more clearly. In this situation we ask the question: What is this like?

The second situation arises when a comparison is put forward as a basis for transferring experience. Two things may be said to be alike, for instance, the working capacity of men and women. In this situation we ask the question:

In what way are they similar?
In what way are the different?

The emphasis of the lesson is on making comparison into a deliberate operation with a definite outcome.

Students gave different ideas on the way of comparison after reading this conceptual situations.

Uncommon responses were collected and put before the groups. The lesson was found nearly 44 minutes to complete.
The programme booklets were collected from the students
with humble regards.

After some instructions by the teacher, the students
immediately started the lesson-reading keeping the imaginative
idea of the certain situations.

Item 6.3 was rather difficult but by the definite hint
of the teacher they solved the problem carefully. The responses of the students were more original. The lesson was completed nearly in 47 minutes. The programme booklets were collected from the students with highly respect.

Seventh Period: Organise

This lesson consists in 'Organise'.

This lesson follows on directly from the previous one: having decided how to start thinking about something the next step is to organise the framework for the rest of the thinking. The whole emphasis of the lesson is on having some definite and deliberate organisation. The important thing is that it should be definite and that there should be a deliberate effort to set up a plan. The plan includes operations, headings, questions etc. in a simple order. So whatever you are doing you know what is to be done next.

The first operation is to ask easy question: How do I organise this? The second operation is to consider the situation and put down some definite plan. The organisation need not be complicated, comprehensive or even right. The
important thing is to have a definite organisation. The pupils are encouraged to develop the deliberate habit of organising.

In this lesson, students read all the problems. Students thought about the various types of organisation and took more interest to response the problem. Uncommon responses were collected and put before the groups. The lesson was found nearly 46 minutes to complete which was enough as predetermined time duration. At the end of the lesson, programme booklets were collected from the students with thanks.

**Eighth Period : Focus**

This lesson deals with 'focus'. Like many others, sounds obvious it is a very important one. In discussion or personal train of thought the mind moves from one aspect of the situation to another. This is a natural flow and the people involved assume that they know what they are thinking about. But if you stop someone mid-thinking and ask "Exactly what are you looking at now"? the answer is usually very vague.

This lesson concerns with 'Focus' conceptual situation. This lesson was rather difficult or different by the changing the focussing view of the problem. By the humble guidance of the teachers the students were immediately followed the lesson. The responses of the students were more original. Uncommon responses were collected before the groups. The lesson was
completed in time. At the end of the period, the programme booklets were collected from the students with respect.

Ninth Period : Consolidate

This lesson deals with 'Consolidate'. The intention of this lesson is to encourage a deliberate pause for consolidation in a discussion or personal thinking about a matter. The emphasis is on the deliberate asking the question "How far have I got?"

A consolidation may include a list of points made and area considered. At times it may resemble a summary of conclusion, but the important difference is that it can be done at any time. By showing in a definite manner what has been discussed. A consolidation makes it easier to see what has so far been left out.

This lesson concerns with the situations to consolidate. First of all observe the various situations. Study minutely the situations. Arrange the every parts of the situations. Then by the view of Gestalt, consolidate the whole situations.

The students read the various situations given in the lesson. They responded by the various modes. The students felt some difficulty, but by the humble guidance of the teacher, they completed their lesson in time. The programme booklets were collected from the students with thanks.
Tenth Period : Conclude

This lesson deals with 'Conclude'. The whole emphasis of the lesson is on reaching a definite conclusion. The whole conclusion may actually say that this is itself a conclusion. In practice there can always be a conclusion of one sort or another. That is why the pupil notes offer a number of different types of conclusions. (Idea, Picture, Opinion-Judgement, Answer-solution, Operation-action) Similarly the suggestion in the pupil notes that conclusions may be definite tentative or chargeable is to get pupils away from the domestic conclusions are the only possible ones.

This lesson was rather similar to lesson - 9. Hence the students immediately follow the problem and gave responses originally.

The lesson was completed in time. And at the end of the period the programme booklets were collected from the students with thanks.

Eleventh Period : E.B.S. (Examine Both Side)

Second programme of this creative thinking programme is beginning with this lesson. The lesson consists of 'E.B.S. (Examine Both Side)'. The type of this second programme is rather differ from the first programme. Just as there was a certain conceptual statements. The statement would be justified by given one sided arguments and other sided arguments.

Eleventh lesson deals with E.B.S. (Examine Both Side).
Conceptual thought of this lesson is that the every situation should be seen with the both sides. There were four problems given in this lesson.

First of all, before the implementation of the first lesson of the second programme of CTP, the investigator had given certain instructions regarding the clarification about the type of the lesson. Students were then asked to write down the arguments or explanations responding the statement.

This was first a new innovative process. It was rather difficult to argue the statement. Then the teacher gave them certain hints. As and when the students gave their opinion the time duration of this activity based on divergent thinking was kept 6 minutes. The students were asked to apply their imaginative arguments.

In the activity, uncommon responses were collected and put before the group. The responses of the students were indeed original and just imaginative. So the students took more time to solve the statements. The lesson was found nearly 46 minutes to complete. At the end of the period, the programme booklet were collected from the students with humble regards.

Twelfth Period : Evidence : TYPE

Period 12 consists in evidence: TYPE. The word evidence covers all the ideas, points, support etc. put forward to make a case in an argument.
The purpose of the lesson is to get pupils to examine each piece of evidence put forward and to decide whether it is a FACT or an OPINION. FACT includes ordinary fact, personal experience, common experience, examples which have actually occurred. OPINION includes ordinary opinion, feeling, prejudice, belief and guesses. Anything which is subjective is an Opinion, anything which is objective is a fact.

The students first read the statement carefully and think about the certain arguments for the given statement. Some of them were gripped immediately, whereas some of them were puzzled into the statement. After a humble hints of the teacher, students immediately realised the whole fundamental statements. In the activity, uncommon responses were collected and put before the group. The period was completed in time, and the programme booklets were collected from the students with thanks.

Thirteenth Period : Evidence : VALUE

This time, the lesson deals with examining the importance of a piece of evidence to the arguments it supports. This importance is called Value. Three types of value are suggested.

KEY(Evidence) : The central point or key point on which the whole argument depends. If it was not there or was destroyed the argument would collapse.

STRONG(Evidence) : Gives strong support to the argument, but
no one piece of evidence is vital. Certainly needs to be considered.

(WEAK(Evidence) : May seem important or true, but really adds very little and could be ignored.

The purpose of the lesson is to get pupils to examine the evidence in a deliberate manner and to assess its value.

After some instructions, the students first read all the statements of the lesson carefully. Students thought rather about the statement. Though the item No.2 was rather difficult, the students realised the things by the help of their teacher. They completed their lesson in time and then the programme booklets were collected from the students with thanks.

Fourteenth Period : Evidence : STRUCTURE

This lesson deals with evidence : STRUCTURE. Some pieces of evidence stand on their own but others depend on some other piece of evidence.

The purpose of the lesson is to get pupils to look at the structure of evidence - at the way evidence is put together to make up the argument. With more able pupils it may be possible to look at the whole structure of evidence in an argument.

The lesson with activity from the booklet was distributed to each of the students. Students were then asked to
write down the argument of the statement. The time duration of this activity based on divergent thinking was kept 6 minutes. The students were asked to apply their imagination to given situational statement. In the activity uncommon responses were collected and put before the group.

Thus, this activity was found to be difficult but after providing the stimulation, the students could apply the imaginative argue to the given situational statement with great pleasure. The total time required to complete the programme was found nearly 45 minutes. At the end of the period, the programme booklets were collected from the students with thanks.

Fifteenth Period : A. D. I.

This period deals with A. D. I. i.e.

A = Agreement
D = Disagreement
I = Irrelevance

In an argument it is quite natural to assume that everything the other side says is wrong and must therefore be opposed. This makes agreement of compromise extremely difficult.

The purpose of the A.D.I. is to provide a deliberate device for mapping out the areas of agreement, disagreement and irrelevance. It does require an effort to find the areas of agreement between your own position and that of your
A pupil can be asked to "do an A.D.I". This means listing the points of agreement first, then the points of disagreement and finally the points which seem irrelevant.

The students read all the statement of the given lesson. They feel rather difficult but by reading again and again, they already realised the thing. They completed their lesson in time. And programme booklets were collected from the students with humble regards.

**Sisteenth Period : Being Right-1 (SHOW, REFER)**

This lesson deals with 'Being Right-1 (Show, Refer). The lesson consists with two of the main ways of proving a point or being right in an argument. The pupils are asked to observe an argument and then to comment on which way is being used. The two ways described in this lesson are: SHOW and REFER. SHOW includes showing what something means: Showing why an idea would work or would not work. Showing what would happen if an idea was carried out: Showing all the implications and logical deductions. In fact, 'show' covers all the usual ways of proving a point. REFER includes referring to some outside source of support for the arguments. It can mean bringing in facts and figures. It can bring in experts or authority. It can refer to personal experience. It can also refer to feelings or instincts.

After distributing the programme booklets, the students
read through lesson. Items were easy then the other lesson. Students narrated their arguments regarding the statement. The students took much interest in responding the comparative argument. The period was completed in time and programme books were collected from the students.

Seventeenth Period: Being Right-2 (NAME, JUDGE)

This lesson deals with the remaining two ways of being right: Name and Judge.

NAME: Someone identifies a situation and gives it a name. In this way the experience and value attached to the name become attached to the argument either in favour of something or against something.

JUDGE: Here a value-work or value-adjective is used directly to indicate whether something is good or bad. It is necessary to explain that both these ways of being right are very often abused.

After distributing the programme booklets the students read all the statements carefully. Then they tried to give some argument about the statement. Uncommon responses were collected and put before the group. Item-3 was rather difficult than other items. But by the help of the teacher the students made up their mind about the solution. The lesson was completed nearly in forty seven minutes. At the end of the period, the programme booklets were collected from the students with thanks.
Eighteenth Period: Being Wrong-1 (EXAGGERATE, MISS-OUT)

The emphasis of the lesson is on being able to recognise and pick out the 'EXAGGERATE and MISS-OUT' ways of being wrong. At first this applies to the other sides arguments, but once the concepts become clear it applies to one's own thinking. It is important to illustrate each way very clearly with definite examples and not to try and clarify the processes by distinguishing them from others.

Exaggerate: This involves straightforward exaggerate. It also involves taking things to extremes.

Miss-out: This involves looking at only part of the situation and ignoring or missing-out other parts or factors.

The programme booklets were distributed to the each student of the class. The students read all the statements carefully. Then they gave their arguments to the statements. Statements were easier than any others. The period was completed in time. The programme booklets were collected from the students with humble regards.

Nineteenth Period: Being Wrong-2 (MISTAKE, PREJUDICE)

This lesson is concerned with the remaining two ways of being wrong, i.e. Mistake and Prejudice.

Mistake: This covers all the examples of the ordinary type of error or mistake, viz. mistakes in facts, mistakes in identifications, misinterpretations, misunderstanding, getting things wrong in a variety of ways. Usually the mistakes are genuine.
Prejudice: This applies to those fixed ideas which are not the result of thinking and which cannot be altered by thinking. In practice, it may be difficult to distinguish between an idea that seems to be prejudice.

After distributing the programme booklets, the students read through the lesson. Items were rather simple. The students narrated their arguments regarding the statements. The students took much interest in responding to the comparative arguments. The period was completed in time and programme booklets were collected from the students with humble regards.

Twentieth Period: OUTCOME

The whole emphasis of this lesson 'out come' is to get pupils to make a conscious and deliberate effort to assess what has been gained from the argument. On the one hand it is very easy to feel that nothing at all has been gained and on the other hand it is easy to feel that something has been gained but does not need expressing in words.

As soon as a person decides which of these could be the outcome, he showed than concentrate on deliberately spelling it out.

The important point in the lesson is that every arguments does have some sort of out come and this can be stated in a definite manner.

The teacher distributed programme booklets to each student of the experimental group. Then the students read
the statement given in the lesson. The items were rather easier than former lesson. They completed their lesson in time. The programme booklets were collected from the students with thanks.

Twenty First Period : INFORMATION(FI & FO)

Third programme of this Creative Thinking Programme is beginning with this lesson, which deals with 'Information (FI & FO)'. The type of this third programme is rather differ from the second programme. Just as in this programme there was a certain conceptual thought and a situation. The students should the certain problems and give their imaginative thoughts justifying the statement of the problem.

Before the implementation of this lesson, the investigator had given certain instructions regarding the clarification of process of the lesson. Thinking definition, thinking concept of the process, modes of operations were summarised in the beginning of the lesson. By giving some useful information to the students, they were inspired and motivated to give the solution or explanation for asking problem.

Then the programme booklets were distributed to the students of the experimental group. Students read all the problems giving in the lesson. Students were then asked to write down the imaginative solution of the problem. The time duration of this activity based on convergent thinking was kept 6 minutes.
This was a new innovative process. It was rather difficult to give the answer. But providing the stimulation the students could apply their imaginative thinking to solve the problem. This activity required higher levels of knowledge to think logically on the basis of past thinking process. It was found that item required great help from the teacher.

The total time required to complete the lesson was found nearly 45 minutes which was enough as pre-determined time duration. At the end of the period, the programme booklets were collected from the students with thanks.

Project: After completing the lesson, there had been a group meeting to discuss a certain concept on project-process. The purpose of the project work was to allow the pupils to apply the process learned during the lesson. The practice items used in the lesson itself are intended as illustrations of the process. The project items are intended as an opportunity for the use of the process. Two items can be given to the pupils for them to work upon as individuals. The output should be in essay form or note form. The work can be done by assigned as 'home work'. One or other of the items is chosen either by the teacher or by each pupil for himself. The items could also be used for open class discussion. Here there were two items about the planning of the children, playground and career after the school study, for project discussion.

The investigator had discussed the point of view about
the playground and career after the school study. The topics were very interesting. The students took great pleasure. They gave highly responded in discussions. Then teacher gave the home work to write a short note on planning of the children playground, and career after the school study.

**Twenty Second Period : QUESTIONS (FQ & SQ)**

This lesson is concerned with drawing attention to the asking of questions. The best way we have for finding out the information that we think is missing is to ask questions. A distinction is made between two types of questions: The fishing question (FQ) and The Shooting question (SQ). Fishing question (FQ) are exploratory. We do not know answer. We may roughly know the area of the answer with an FQ we are exploring and trying to find things out. With a shooting question (SQ) we are not exploring but checking up on something. An 'SQ' always has a 'yes' or 'No' answer. So in a shooting question we know what the answer might be and we are just checking to see if it is so or not. A shooting question is specific and aimed.

The teacher distributed the programme booklets to each students of the experimental group. The students read the problem and try to think of the answer. The problems were rather difficult but by providing the certain stimulation they completed their lesson in time. Programme booklets were collected from the students with thanks. After completed the lesson, there were a project discussion on topic of "Shopping
at a cloth merchant shop. After discussion the teacher gave them homework to write a short note on 'Shopping the book'. The students took much interest in discussion.

Twenty Third Period: CLUES (CS & CC)

The purpose of this lesson is to encourage pupils to pick out clues and to consider the use of clues. There are two type of clues. One is Clues Separately (CS) and other is Clues Combined (CC).

Clues Separately (CS) means examining each clue as with a magnifying glass to try and find out all the things it could possibly mean. This is important.

Clues Combined (CC) means examining all the clues together to see what they add up to. The CC always follows after the CS. When the clues that have been examined separately are put together two things can happen.

The teacher distributed the program booklets to each students of the experimental group. The students read the problem and try to think of the answer. The problems were rather easier. They completed their lesson in time. Programme booklets were collected from the students with thanks.

After completion of the lesson there was a group meeting for the purpose of project discussion. The topic 'An Accident' was discussed with all concerned factors. Then teacher gave them a homework to write a shortnote on 'An Accident.
Twenty Fourth Period : CONTRADICTION (CO & FCO)

This lesson consists in contradiction. There are two types of contradictions (i) Contradiction (CO) (ii) False Conclusion (FCO).

The principle of a contradiction (CO) is two opposite things both cannot be right at the same time.

False Conclusions (FCO) are rather more difficult to explain than contradictions. A false conclusion may be what is known as a "Non-Sequitar". which means that one thing does not follow the other.

The programme booklets were distributed to the each students of experimental group. After the reading of the problems, they were asked to give their solution. The lesson was completed in time and the programme booklets were collected from the students with thanks. After completing the lesson, there was a project-discussion on the topic of 'Labour-welfare'. After the discussion the teacher gave them homework to write a short note on 'Labour Welfare'. The students took great interest in discussion.

Twenty Fifth Period : GUESSING (SG & BG)

This lesson deals with 'Guessing (SG & BG). The purpose of this lesson is to have a look at 'guessing'. We guess when we do not have enough information to be sure. Sometimes we are forced to make a guess. There is nothing wrong with guessing, provided we know that we are guessing and pro-
vided we try to get as much information as possible on which to base the guess. There are two types of guessing (i) Small Guessing and (ii) Big Guessing.

Small guessing (SG) : We may call the small guess (SG), a forecast, a supposition, an estimate or an expectation.

Big Guessing (BG) : We may call the Big guess, a gamble or taking a chance. When there is a little or no information, it must be a big guess. When we collect more information then the guess become smaller.

After some important discussions the programme booklets were distributed to each students of the experimental group. They read it thoroughly, they feel it rather difficult. But by providing such stimulation, they gave solutions. The lesson was completed in time. The programme booklets were collected from the students with thanks.

After completed the lesson, there had been a group discussion on project work on the topic "Principal's role in School Administration". Students took much interest in discussion. Then teacher gave them the same topic in the home work to write a short note.

Twenty Sixth Period : BELIEF (BP & BO)

This lesson deals with 'Belief' (BP & BO). Belief implied that we accept something as being true. For the purpose of this lesson, it is best to ignore weak or partial
This lesson is concerned with the origin of our belief. The belief provides two boxes.

(i) Belief Personal (BP): Belief personal (BP) is based on personal experience, feeling, or proof. A person does his believing for himself. He may collect a lot of information from other people.

(ii) Belief Others (BO): Belief others means that instead of a person doing his believing on his own, he takes over the beliefs of others.

Some people are indeed experts because they have specialised knowledge of experience.

After giving some important instructions, the programme booklets were distributed to each student of the experimental group. They read all items of the lesson, then they gave their responses regarding the problem. Uncommon responses were collected and put before the group. The lesson was completed within 46 minutes and the programme booklets were collected back from the students.

After completing the lesson there was arranged a group discussion on project work. The topic was "A Role of Library to build up the student career". After a healthy discussion the students gave good responses to discussion. Then the teacher gave them homework to write a short note on the above topic.

Twenty Seventh Period: READY MADE (RM-H, RM-S)

This lesson consists in "Ready-Mades (RM-H, RM-S)."
A ready-made is a piece of thinking that is taken over from someone else rather than constructed for oneself. There are two boxes of ready-made.

(i) Ready-made as a Help (RM-H). No one can know everything or find out everything for himself. We often have to use the information, belief or opinions offered by others.

(ii) Ready-made as a substitute (RM-S). When we use it not as a help to our thinking but as a substitute, then we call it a ready made as a substitute (RM-H). It is much easier to recognise an RM-S than an RM-H. If the opinion or belief is taken over without alteration or consideration it is an RM-S. If there is any thinking about it then it is an RM-H.

After some important discussions regarding the topic of the lesson, the programme booklets were distributed to each student of the experimental group. The students gave their responses very well. The lesson was completed in time. The programme booklets were collected from the students.

After completing the lesson a group discussion was arranged on the topic 'The general norms of the public examinations'. The students participated in discussion with great interest. Uncommon points were discussed by the help of personal care. The teacher gave homework to write a short-note on 'The general norms of the public examinations.'

Twenty Eighth Period : EMOTIONS (EM & EG)

This lesson is about the influences of emotions on thinking. Emotions give value to thinking. The purpose of
of thinking is really to perceive reality clearly enough for us to feel about it. The purpose of this lesson is to encourage pupils to recognise the emotions that are involved either in their thinking or the thinking of others. There are two boxes of emotions.

(i) Ordinary Emotions (EM): The ordinary emotions include anger, hatred, love, bear, joy, suspicion, jealousy, sorrow, remorse. These are the emotions which we refer to as feelings'. They may be pleasant or unpleasant. They are usually recognisable.

(ii) Ego-emotions (EG): The ego emotions are concerned exclusively with protecting the ego. The ego-emotions are concerned with status. The EG covers such things as, pride, loss of face, needing to be right all the time, not being made to look a fool, being paid attention, etc.

After discussing important points of the lesson, the programme booklets were distributed to each student of the experimental group. The students gave their responses regarding the problem. The lesson was completed in time. The programme booklets were collected from students with thanks.

After completing the lesson there was a group-discussion on project work on the topic 'Parent's Emotions'. The students took part in discussion with great pleasure. Then the teacher gave them a homework to write a short note on the same topic.
This lesson deals with values (VH & VL). Values are the most important thing in thinking. Our decisions, judgement, choices, actions are ultimately all based on the values we use. This point can be emphasised. Our thinking is designed to obtain the maximum amount of information from our experience. Once we have that information we act according to our values. There are two boxes of values.

(i) Value-High (VH): The examples given for high values (VH) are those which most people would accept as high or important values; health, honesty, happiness, success, money, what people think, etc.

(ii) Value-Low (VL): The examples given for low values (VL) are more difficult because one does not consciously put a low value may be given.

After some discussion about the lesson, the programme booklets were distributed to each student of the experimental group. The lesson was completed in time. The Programme booklets were collected from the students with humble regards.

After completed the lesson, a group discussion was arranged for project work on topic "High values of Head-master of a School". The students gave their responses about the topic. Then the teacher gave them a home-work on the same topic for writing a short note.

Thirtieth Period: Simplification and Clarification

This is the last lesson of the Creative Thinking
Programme. This lesson deals with simplification and clarification. A simplification is usually shorter than the original. It may incorporate much of the original in a simple statement, but you have to know the subject very well in order to understand the simple statement. Thus, simplification is the opposite of complication.

With clarification the effort is to make things more clear. The result may well be a statement which is much longer than the original. Different points which are mixed up in the original information might be spelled out separately in order to avoid confusion. Thus, clarification is the opposite of confusion.

After giving some important clarification about the lesson, the programme booklets were distributed to each student of the experimental group. The students got confusion in item-3, but after providing stimulation they completed their lesson in time. Uncommon responses were collected and put before group. The programme booklets were collected from the students with thanks.

After completed the lesson there was a group discussion for project work about the topic "Is examination indeed needed?" The students participated in discussion and gave their responses and certain arguments were raised about the topic. Then the teacher gave a home work to write a short note on "Is examination indeed needed?".

This was the last period and teacher thanked the
students for co-operation.

After the completion of the CTP, the CAT was administered to all the students for post-test study.

5.4.3 RESPONSE ANALYSIS

The programme was not to be standardized at this level. So the response analysis should not be based on statistical calculation like reliability, validity or norms establishment. This programme is meant for the creativity development. Due to this reason it was necessary to analyse the responses according to the level of creativity. As per suggestions of B.K. Passi the responses less than 10% were to be considered as highly creative and the responses having percentage between 11% to 28% were called normally creative or common responses. Considering this suggestion as a guideline the responses of all the items were classified into the following three categories:

(i) 0 to 15% responses highly creative
(ii) 16 to 30% responses creative
(iii) above 30% responses non-creative

The responses of the last number i.e. (iii), category were neglected for all the 3 types of programmes and the

responses of the 1st and 2nd categories were listed as shown in Appendix-III.

5.4.4 OBSERVATION

The following important observations were made from the implementation of the programme.

(1) As the atmosphere was kept free for the treatment of group students, some so called naughty or mischievous students gave unexpectedly very good responses during the training programme. Moreover some students who were found idle in the beginning of the time limit proved quite creative and outstanding in their responses at the end.

(2) Some female students participated in the discussion during the training imparted in the interval between two writing time limits which mislead the investigator into impression that they were less creative. The completion of some items, however, were very good. Rapport was established with the researcher and various responses were obtained from them.

(3) The programme proved to be very interesting and creative too in respect of all the students of VII grade.

(4) The programme was found to be a little tough and confusing to many students and they developed a kind
of conversion to this type of programme. Some really brilliant students, however, could give creative responses.

5.5 RESUME

In this chapter, the plan was designed with the help of selected tools, samples and hypotheses which are narrated to present their importance and due weightage. Separate control group design is accepted and the selection of the statistical technique ANOVA was found fit on the basis of its multiple advantages. The organization and implementation procedures were carried out with due care.

In the next chapter, the data obtained on CAT were put to statistical analysis to study the hypotheses put forth.