CHAPTER IV

PLANNING AND PROCEDURE

4.0 INTRODUCTION
4.1 OBJECTIVES OF DEVELOPING CTI
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4.0 INTRODUCTION

After reviewing the related studies, the next step in the process of research is the planning and procedure of the study. The planning helps the investigator in the preparation of the research design for the problem under study.

The planning is the fundamental and essential step of any research work before the implementation. Without planning the result of the study will not come to see the light of the day. The planning is a necessary aspect even of an ordinary day-to-day work. It is an essential step in any kind of research without that the satisfactory result would not be possible. It is obviously true that the careful and thoughtful planning of work helps to save time, energy and economy. No work can be successfully finished without it being well planned.
Research design is a mapping strategy like the architect's plan. The researcher must consider certain fundamental steps those are essentially the same regardness of the type of research design. Borg stated very important point that:

"The factor that most often differentiate between good and poor research is not the funds available, that size of the sample or sophistication of the statistics, it is the care and thought that goes into research plan."

Thus, planning is an essential step in the process of research. In other words, planning is a mapping strategy.

As McGrath puts it: "The activities related to design in research are comparable to those of the architect in designing an intricate structure. As the architect in designing before construction activities get underway, so should the researcher do his designing, before he gets his project under way."

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A research plan serves a number of different purposes. Travers\(^3\) states:

(1) The research plan helps the investigator to organize his idea in a form whereby it will be possible for him to look for flow and inadequacy.

(2) The research plan provides an inventory of why has to be done and what materials have to be collected as a preliminary step in the undertaking of the study.

(3) The research plan is a document that can be given to others for comment and criticism.

A good research work can not just happen. It includes a number of operations carried out with patience and accuracy. For such a serious work, planning requires almost care and insight.

The title of the present study is "A Study of the Effect of a Creative Teaching Model in Science on the Achievement and Attitude of Students of Class VII."

The study consists of two parts:

(1) The development of Creative Teaching Ideas in Science for Std. VII.

(2) To study the effect of Creative Teaching Model on the achievement and attitude of students.

4.1 OBJECTIVES OF DEVELOPING CTI

The creative teaching ideas were to be developed by investigator to improve the achievement and attitude of students towards science. This general aim leads to the following specific objectives.

(1) To develop thinking ability of the students.

(2) To develop creative teaching ideas that give importance to the learners.

(3) To develop the creative teaching ideas that could be used without disturbing the regular structure of classroom teaching.

(4) To develop the creative teaching ideas that are unexpensive and simple to use.

(5) To develop the creative teaching ideas which could be used by an ordinary teacher in an ordinary classroom.
4.2 PLANNING OF CREATIVE TEACHING IDEAS

In the beginning the investigator studies the various models of teaching. All the available models of teaching can be classified into four groups. They are:

1. The Historical Models,
2. The Philosophical Models,
3. The Psychological Models, and

Most of the above mentioned models laid emphasis on one aspect or the other of teaching learning process.

The Historical Models of Teaching have some features of the Basic teaching model of Glaser. They laid emphasis on speaking, writing and reasoning. The feedback and evaluation procedures are not satisfactory.

The Philosophical Models of Teaching are lacking in making provision for learner's innovation and development of his attitude.

The Psychological Models of Teaching explain the teaching and learning conditions still they lack one important aspect or the other. Some models do not deal with objectives or assessment.
Among the modern models of teaching the creative teaching model developed by F.E. Williams was found suitable for the development of cognitive affective behaviours of the pupils. In the educational system of the country like India the curriculum, syllabus, textbooks and examinations are designed by the respective state department of education. The teacher can not make radical change in them. But teacher can supplement them with appropriate instructional materials and activities. In looking to this the creative teaching ideas were developed on the basis of Williams Model. The content of the ideas was selected from the syllabus and textbook of Science for standard seventh of Gujarat State.

4.3 **TOPICS OF CREATIVE TEACHING IDEAS**

The investigator had designed to prepare sixteen creative teaching ideas from five topics- two of Chemistry, two of Physics and one of Biology related to the science for standard VII. The topics selected for the preparation of the creative teaching ideas are given below.
1. Elements, Compounds and Mixtures,
2. Acids, Bases and Salts,
3. Light,
4. Reflection of light, and
5. Physiological processes.

4.4 PUPILS' BEHAVIOURS

The following cognitive and affective behaviours of pupils were expected to be developed through creative teaching ideas.

Cognitive Behaviours:
1. Fluent Thinking
2. Flexible Thinking
3. Original Thinking
4. Elaborative Thinking

Affective Behaviours:
1. Curiosity (Willingness)
2. Risk Taking (Courage)
3. Complexity (Challenge)
4. Imagination (Intuition)
4.5 **TEACHER’S BEHAVIOURS**

To teach the content matter for developing cognitive affective behaviours of pupils, appropriate behaviours of the teacher are needed. Williams described the teacher’s behaviours as strategies of teaching or modes of teaching. The Williams’ model had eighteen strategies of teaching. Out of them the following nine strategies of teaching or modes of teaching were selected.

1. Attributes
2. Analogies
3. Discrepancies
4. Provocative Questions
5. Organized Random Search
6. Skill of Search
7. Intuitive Expression
8. Evaluate Situation
9. Visualization Skill

4.6 **THE FORMAT OF CREATIVE TEACHING IDEAS**

The series of creative teaching model consists of sixteen ideas. Each idea is classified to indicate a thinking process (cognitive) with feeling process (affective).
Certain teaching strategies are listed for developing the pupils' behaviour through content of the subject. The illustration of idea is given here to make the description clear:

Idea: 1:

To Encourage: Original Thinking and Complexity
Through Unit: Elements, Compound and Mixture
Using: Discrepancies
: Provocative Questings
Time: 1 (one) Hour.

There are many objects around us. e.g. air, water, rocks, minerals, animals and plants. All these objects can be classified into elements, compounds and mixtures.

When an object is made of only one kind of atoms, it is called an element.

Copper, Gold, Silver, Iron are elements in solid state, which are the other elements in solid state?

Mercury, bromine are the elements in liquid state.

Give the names of other elements in liquid state.
Oxygen, hydrogen, chlorine are the elements in gaseous state. State the other elements in gaseous state.

When two or more elements combine, they form a compound. Water is a compound. Every molecule of water is made of two atoms of hydrogen and one atom of oxygen.

Sulphuric acid (H₂SO₄) is a compound. Of what elements is it formed? How many atoms of each element are there in a molecule of Sulphuric acid? What does H₂SO₄ suggest?

The strategy used by the teacher either produces the affective behaviour which brings forth the cognitive behaviour or first produces the cognitive behaviour which brings out the affective behaviours according to William. Both go together.

4.7 **TIME PERIOD FOR THE EXPERIMENT**

Next question to be answered is how much time the pupil needed for the experiment so that the effect of the

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ideas could be measured.

There is no general agreement among the authorities regarding the minimus period. Guilford\(^5\) thinks that a period of one month is enough for all levels.

Torrance\(^6\) claims that a period of two months is needed for the experiment.

After taking into consideration various factors like facility of the schools, convenience of the schools, pupils readiness, content mater included in the ideas the investigator took three months for the experiment. The investigator started the experiment in the month of July 1993 and completed it in the month of September 1993.

4.8 **BLUE PRINT OF THE IDEAS**

A blue print of creative teaching model is shown in Table 4.1 and Table 4.2.


<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Strategy</th>
<th>Fluent</th>
<th>Flexible</th>
<th>Original</th>
<th>Elaborative</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Attributes</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Analogics</td>
<td>3</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Discrepancies</td>
<td>4, 7, 9</td>
<td>1, 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Provocative</td>
<td>12</td>
<td>1, 14</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Organized</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random Search</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Skill of Search</td>
<td>10</td>
<td>3, 11</td>
<td>2, 14</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>Intuitive</td>
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<td>13</td>
<td>5, 6</td>
</tr>
<tr>
<td></td>
<td>Expression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Evaluate</td>
<td>4, 10</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Visualization</td>
<td>3</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skill</td>
<td></td>
<td></td>
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</table>
### TABLE 4.2

**PUPILS' AFFECTIVE BEHAVIOURS**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attributes</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Analogies</td>
<td>3</td>
<td></td>
<td></td>
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<td></td>
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</tr>
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<td>3</td>
<td>Discrepancies</td>
<td>4,7</td>
<td>1,9</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Provocative Questions</td>
<td>12,14</td>
<td>1</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Organized Random Search</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Skill of Search</td>
<td>14</td>
<td>8</td>
<td>11</td>
<td>2,10,16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Intuitive Expression</td>
<td>12</td>
<td>5,8</td>
<td>6,9</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Evaluate Situation</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>10,15</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Visualization Skill</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.9 PRE-PILOT TRYOUT OF IDEAS

The investigator had prepared creative teaching ideas on the science of Std.VII. The manuscript containing all these ideas were prepared with pencil sketches. This manuscript was tried out on a very small group of pupils of Std. VII, the science teachers and the experts in the field with the following objectives.

(1) To see whether the pupils understood the illustrations.

(2) To check whether the ideas suit well with the understanding of the pupils.

(3) To confirm whether the pupils follow the ideas.

(4) To trace out if any ambiguity in the ideas.

(5) To know whether different persons have to suggest anything before the ideas are to be mimiographed.

(6) To determine appropriate period required to complete all the ideas.

In order to fulfil the above objectives, pre-pilot tryout of ideas was conducted on a very small group as shown in the table 4.3.
### TABLE 4.3
THE SAMPLE FOR PRE-PILOT TRYOUT OF IDEAS

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Persons</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pupils of Std.VII</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Teachers of Science</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Experts</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

At the time of pre-pilot tryout of ideas following points were observed.

1. It would require one hour time to complete each idea by the students.

2. The experts had suggested to add illustrations and also modified some of ideas.

3. In some of the ideas it was observed that the strategies were not proper and were changed accordingly.

4. Some long ideas were minimised keeping in mind the time limit.

From the above observations and suggestions made by the teachers and experts, the investigator had made the necessary modification.
The statistical calculation was not involved in the pre-pilot try out. But on the basis of observations and suggestions, the ambiguities found in the ideas were removed and the necessary modifications were made in the pre-pilot ideas. The manuscript of the creative teaching ideas had been prepared with complete care.

4.10 PILOT TRYOUT OF IDEAS

The investigator undertook the pilot tryout of the creative teaching ideas to remove ambiguities, to enhance clarity and to study pupil's reaction.

The pilot tryout of the ideas was administered with the following objectives:

1. To get an idea of the administration of creative teaching ideas.
2. To see whether the provided illustrations fulfil the purpose of clarifying the concepts.
3. To observe the reaction of students regarding the creative teaching ideas as this would be their first experience.
4. To get an idea of appropriate time duration to be required to complete the whole experiment.

For this, a representative sample was selected from the population viz., the students of Std. VII of Anand High School, Anand.

The sample for the pilot tryout consists of forty students, which of them twenty were boys and twenty were girls. The sample was kept small to maintain a healthy interaction in the classroom. The students under pilot study were asked to come in a zero period of one hour duration.

During the pilot try out, the investigator made the following observations:

1. The introductory part was properly followed by the pupils.

2. The illustrations based on the new knowledge were clearly understood.

3. The creative teaching ideas could be implemented on any type of pupils, i.e. low, average and high intelligent without any difficulty.
4. The students displayed enthusiasm and carried out activities easily.

5. It required enough practice to acquaint the students with the procedure of answering the problem as they were new for this type of experiment.

6. The students showed interest in learning through creative teaching ideas.

7. All the ideas were found interesting and easy to understand.

8. After completing some ideas students were able to think Fluent — Flexible — Original — Elaborative.

Considering the observations during the pilot tryout, the necessary modification were made in the creative teaching ideas. The final form of the creative teaching ideas had been mimeographed with complete care. The number of ideas and their content remained the same. They are appended in Appendix A.
4.11 SUMMARY

This chapter contains the stages of development, pre-pilot tryout, the pilot tryout and reaction of teachers experts and the students who participated in both the tryouts. Out of these efforts the final form of creative teaching ideas had involved. The experimental design and execution of the creative teaching ideas are presented in the next chapter.