CHAPTER - IV

4.0 DESIGN AND PROCEDURE OF THE STUDY

4.1 FIRST PHASE -

(A) Preparation of the Programme

(B) Writing the Programme

(A) Preparation of the Programme

4.1.0 Selection of research areas

4.1.1 Identification of objectives

4.1.2 Selection of content

4.1.3 Defining objectives in behavioural terms

4.1.4 Construct a test of Entering Behaviour

4.1.5 Construct a test of Terminal Behaviour

(B) Writing the Programme.

4.2 SECOND PHASE -

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4.2.1 Tools of the study

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4.0 DESIGN AND PROCEDURE OF THE STUDY

The procedure, an important phase of research and the design of the study, is of prime importance in attracting any research problem in a scientific manner. Kerlinger (1973)\(^1\) defined research design as "the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance". The plan includes an outline of what the investigator will do from writing the hypothesis to the final analysis of the operation of variables. The strategy implies how the research objectives will be reached. Shulman (1970)\(^2\) suggested a scheme for examining the variables which should be considered in formulating propositions about the best form of instruction, particularly when the practitioner is confronted with a contrasting array of positions. The scheme is depicted in the following manner.
In this study the type of subject matter was the selected areas of environmental education - food and water. Type of instructions were Simple Text (ST) and Programmed Text (PT). Here the term Simple Text means that Portion of the content which constitutes the original matter. Objectives of each research area were selected in behavioural terms.

The process of development of post-literacy material of environmental education has been undertaken in two phases. The procedural strategy is given below which was adopted in completion of the study.

The design of the study is set under the following heads:

4.1 **FIRST PHASE** :

The first phase involved:

(A) Preparation of the Programme

(B) Writing the Programme

(A) **Preparation of the Programme** :

Preparation of the Programme consists of following steps that may be described as follows:

4.1.0 Selection of research areas for the proposed post-literacy material.

4.1.1 Identification of objectives.

4.1.2 Selection of content.
4.1.3 Defining objectives in behavioural terms.

4.1.4 Construct a test of Entering Behaviour.

4.1.5 Construct a test of Terminal Behaviour.

(B) Writing the Programme

4.2 SECOND PHASE:

The second phase involved:

4.2.0 The sample

4.2.1 Tools of the study

4.2.2 Selection of experimental design

4.2.3 The collection of data

4.2.4 Scoring

4.2.5 Statistical Procedure

4.1 (A) Preparation of the Programme -

4.1.0 (a) Selection of research areas:

The Directorate of Adult Education proposed a plan to prepare post-literacy material for neo-literates about 100 areas during 1984. The researcher selected two areas Food and Water for the preparation of post-literacy material which is given in point No. 4.2 in the list of Directorate of Adult Education, New Delhi. (Appendix - 1).
4.1.1 (b) **Identification of Objectives**

An objective is the statement that describes what the pupil will do, or be able to do. Every curriculum is intended to achieve certain educational objectives. As far as this study was concerned, the main purpose of this study was to develop knowledge, basic understanding and awareness of the bio-physical environment so that they might be able to solve their environmental problems. The subjects of this study were neo-literates which belonged to the age-group 15 - 35. Thus keeping in mind about nature, past experiences, interests and needs of the learners, objectives of post-literacy material have been identified. For the identification of the objectives, a preliminary draft containing possible specific objectives of research area 'food' and 'water' was developed by the researcher. 30 objectives for the research area 'food' and 30 objectives for the research area 'water' were kept in priliminary draft. These objectives were related to knowledge, understanding, awareness, attitude and skills of neo-literates. (Appendix -3, A, C Part).

After realising the short comings in the preliminary draft, the researcher modified the draft as a whole. In order to explore all the possible situations in systematic manner the objectives were categorised in a hierarchial manner -
Knowledge, understanding, skill and application. 
10 or 12 objectives were kept under each category.
(Appendix 4 - A and C Part)

The total number of objectives in each category were as follows:

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>CATEGORY</th>
<th>TOTAL NUMBER OF OBJECTIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For research area 'Food'</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Objectives related to knowledge</td>
<td>12</td>
</tr>
<tr>
<td>2.</td>
<td>Objectives related to Understanding</td>
<td>11</td>
</tr>
<tr>
<td>3.</td>
<td>Objectives related to Skill</td>
<td>11</td>
</tr>
<tr>
<td>4.</td>
<td>Objectives related to Application</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Total number of Objectives</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>For research area 'Water'</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Objectives related to Knowledge</td>
<td>11</td>
</tr>
<tr>
<td>2.</td>
<td>Objectives related to Understanding</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Objectives related to Skill</td>
<td>10</td>
</tr>
<tr>
<td>4.</td>
<td>Objectives related to Application</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Total number of Objectives</td>
<td>41</td>
</tr>
</tbody>
</table>
Thus the final draft containing 43 Objectives for research area 'food' and 41 Objectives for research area 'water' was developed by the researcher.

4.1.2 Selection of Content:

The term content includes facts, concepts, definition and principles. The content of the curriculum should include those items which are helpful to achieve the educational objectives of the curriculum. In order to fulfil the objectives of the study, content for the research area 'food' and 'water' was selected. First of all suitable topics were selected 23 topics for research area 'food' (Appendix 3 - Part B) and 23 topics for research area 'water' were selected. (Appendix 3 - Part D).

For the specification of each topic the content was arranged in units. 9 Units for the research area 'Food' and 'Water' were selected. In order to cover maximum content of both the research areas, all the units were further divided into 4 or 5 sub-units. Open ended items were kept for the research area 'Food' and 'Water'.
In order to improve the selected objectives and content, the researcher submitted the final draft for open criticism and healthy suggestions to the experts, adult education functionaries and researchers. They were requested to rank the selected objectives and to give weightage to each unit to achieve the objectives that they had ranked. Providing an opportunity of open ended item was also given to them to write the content of their own choice.

(Appendix 4 - Part B & D)

4.1.3 Defining Objectives in behavioural terms:

The most characteristic feature of Programme Text (PT) is its emphasis on the importance of specifying general educational objectives in terms of specific behaviour. Each general objective describes various aspects of the process, covering many points without making them explicit. For the specification of the general objectives, it is essential that objectives must be stated in meaningful terms in the form of observable and measurable behaviours. Meaningful objectives describe the outcomes, depicting what will be the behaviour of the neo-literate as a result of the process.

As far as this study is concerned the objectives selected for each unit for the preparation of the post-
literacy material were defined in behavioural terms. These behavioural objectives for each unit were able to explain the final behaviour of the learner that the researcher proposed to develop in neo-literates through Programmed Text (PT). For the development of the Programmed Text (PT), two terms, called 'Task Description' and 'Test Analysis' were used for writing the objectives in behavioural terms. These two terms need clarification.

**TASK DESCRIPTION**:

'Task Description' explain about the final behaviour of the learner which is known as 'Terminal Behaviour' of the learner. Robert Mager (1962) and Robert Miller (1962), have described the procedure of 'Task Description'. However, Mager's method of describing 'Task Description' is more acceptable to the programmes than that of Miller's procedure. Mager's procedure of 'Task Description' includes the following three ingredients:

(a) the terminal performance which the programme attempts to produce.

(b) The condition under which behaviour are to occur.

(c) criteria of the acceptance of the student's performance.
TASK ANALYSIS:

In order to develop terminal behaviour of the learner, it is expected that learner must have mastery over the sub-tasks relevant to the terminal behaviour. For that, task should be analysed before it can be effectively learnt. The 'Task Analysis' identifies the sub-tasks which must be learnt before learning the terminal task. These sub-tasks are identified through 'Task Analysis'. For further clarification of both, examples of 'Task Description' and 'Task Analysis' are given below:

**TASK DESCRIPTION**

Neo-literates will be able to describe about the meal planning.

**TASK ANALYSIS**

1. Neo-literates will be able to know the importance of the meal planning.

2. Neo-literates will be able to understand that meal planning is helpful in providing balanced diet to family members within limited resources.

3. Neo-literates will be able to prepare meal planning for adequate nutrition within available resources.

4. Neo-literates will be able to improve the health status using meal planning as a means to select proper commodities for regular meal.
4.1.4 **Construct of a Test of Entering Behaviour:**

The entering behaviour describes the position of the learner before entering the programme. The entering behaviour suggests where the student is at the beginning. This behaviour is related to previous experience, aptitude, age, interests, ability and a level of attainment in a particular subject of learners for whom the programme is planned.

In order to know the entering behaviour of the neo-literates, the researcher prepared pre-tests. All the possible items related to different units of research area 'food' and 'water' were kept in pre-tests (Appendix - 5).

4.1.5 **Construct of a Test of Terminal Behaviour:**

Terminal behaviour is the end product of the process. This behaviour explains where the learner will be at the end of the process. Terminal behaviour explains about the success of the programme.

For this study the researcher prepared post-test of each unit related to research area 'food' and 'water'. All the items related to each frame were kept in each respective post-test. The main purpose of framing post-test was to check the change of the behaviour of neo-literates.
(B) Writing the Programme:

Before constructing the Programme Text (PT) the researcher contacted the adult education Officers at their offices and enquired about the material which is being imparted through adult education programme. It was found that the material on research area 'food' and 'water' was not available. The material that was available in adult education centres contained the related concepts in small quantity. Hence, researcher developed the content on 'food' and 'water' in Simple Text (ST) form (Appendix-6). Keeping in mind the basic principles of Programming, the developed content was converted into Programmed Text (PT). The content was thoroughly analysed and divided into meaningful segments called 'Frames'. Each frame was presented with correct and incorrect responses. A space is given with each frame for writing the correct response. Neo-literates were also provided with correct response after each and every frame, so that they could compare their own response with correct response. All the frames were kept in a sequence. To evaluate the effectiveness of the developed 'Programmed Text' evaluative exercise was developed for each and every unit. Each exercise consists of short answers type questions, matching columns and fill in the blanks. (Appendix - 7 to 24 )
3.2 **SECOND PHASE**:

4.2.0 **THE SAMPLE**:

The sample of the study consisted of one hundred neo-literates. These neo-literates were selected from the centre running under the scheme of National Literacy Mission in Agra district. The population of the study was not universally distributed, so the Purposive Sampling Method was used for the sample.

4.2.1 **TOOLS OF THE STUDY**:

The following tools and measures were utilised for the present study:

(i) Pre-tests of research area 'Food' and 'Water'.

(ii) Post-tests of each unit related to research area 'Food' and 'Water'. (Appendix - 25)

(iii) Achievement score of the Neo-literate Men and Women of Group A and Group B in the research area of 'Food' and 'Water'.

**MEASURE OF ACHIEVEMENT**:

The achievement of Neo-literates in all the units of research area of 'Food' and 'Water' was measured with the help of achievement tests developed by the researcher. For matching both the group A and group B, the researcher prepared
two pre-tests, one for the research area of Food and other one in the research area of Water. The researcher adopted the same process for the construction of all tests. The following steps were adopted while developing the tests:

**STEP - I**

The first step of the test construction was the preparation of blueprint of all the tests. While making the blueprints of the tests, all the cognitive aspects of the educational objectives were taken into consideration (bloom-1960).

**STEP - II**

According to the blueprint, 75 multiple choice items were included in each pre-test in the research area of 'Food' and 'Water'. In other post-tests of different units, the multiple choice items were varied. In different blueprints, the researcher included 40 items of multiple choices in Unit No. 1, 4, 5, 6, 7, 8, 9, and 75 items in Unit No. 2 and 3 in the research area of Water. The researcher also included 40 items in Unit No. 5, 6, 7, 9; 75 items in Unit No. 1, 3; 175 items in Unit No. 2, 4, and 9 in the research area of 'Food'. The language of the items was kept very simple so that there could not be any confusion for the respondents.

**STEP - III**

Now this list of items was given to the senior teacher and adult education functionaries in the field of respective subjects to know their reactions against the format.
of questions and their distractors. On the basis of their opinions and suggestions, some of the items of the tests of the different Units in the research area of Food and Water were deleted as they were somewhat vague in nature. 4 items were deleted from the tests which had 40 items, 10 items were deleted from the tests which had 75 items and 15 items were deleted which had 150 items in the blueprints of the different tests.

STEP - IV (TRY-OUT) :

After excluding vague items, 65 items were left in both the pre-tests, 36 items, 65 items and 135 items were included in other post-tests of different Units in the research area of 'Food' and 'Water'. Each multiple-choice itself had its four alternatives i.e. Ka, Kha, Ga, and Gha. One of them is correct. The respondents had to mark (✓) against right response. Instruction for answering the questions and the approximate time limit were given in the question-booklet. The marks given to the correct response of post-tests of different units of the research area of 'Food' and 'Water' were varied. 1 mark given to the correct response of tests which had 50 items. 2 marks given to the tests which had 25 items and ½ mark given to the tests which had 100 items in the research area of 'Food' and 'Water'. Both the pre-tests in the research area of 'Food' and 'Water' had only 50 items respectively.
1 mark was given to the correct response. Total marks of all tests were 50. The researcher distributed these question booklets to the neo-literate, and read the instruction written in the question booklet.

**STEP - V (ITEM ANALYSIS)**:

Item analysis was done by taking 27 percent of the Neo-literate who scored highest and 27 percent of Neo-literate who scored the lowest. This was done to select the items which discriminate the best among the low and high achievers.

**STEP - V (FINAL FORMAT OF THE TEST)**:

After item analysis, the researcher included 50 items in both the pre-tests, 25 items in the tests of Unit No. 1, 4, 5, 6, 7, 8 and 9 in the research area of 'Water'; and 25 items in the tests of Unit No. 5, 6, 7 and 9; 50 items in the tests of Unit No. 1, 3 and 100 items in the tests of Unit No. 2, 4, and 8, in the research area of 'Food' in the field of environmental education.

**RELIABILITY**:

The reliability of the test was calculated by Split-half method.

The reliability of both the pre-tests in the research area of food and water were 0.82 and 0.80 respectively.
In the research area of 'Food' the reliability of the post-tests were as follows:

**TABLE - 4.1**

<table>
<thead>
<tr>
<th>RESEARCH AREA 'FOOD'</th>
<th>RELIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>0.78</td>
</tr>
<tr>
<td>Unit 2</td>
<td>0.80</td>
</tr>
<tr>
<td>Unit 3</td>
<td>0.79</td>
</tr>
<tr>
<td>Unit 4</td>
<td>0.80</td>
</tr>
<tr>
<td>Unit 5</td>
<td>0.79</td>
</tr>
<tr>
<td>Unit 6</td>
<td>0.81</td>
</tr>
<tr>
<td>Unit 7</td>
<td>0.82</td>
</tr>
<tr>
<td>Unit 8</td>
<td>0.81</td>
</tr>
<tr>
<td>Unit 9</td>
<td>0.79</td>
</tr>
</tbody>
</table>

In the research area of 'Water' the reliability of the tests were as follows:

**TABLE - 4.2**

<table>
<thead>
<tr>
<th>RESEARCH AREA 'WATER'</th>
<th>RELIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>0.80</td>
</tr>
<tr>
<td>Unit 2</td>
<td>0.81</td>
</tr>
<tr>
<td>Unit 3</td>
<td>0.82</td>
</tr>
<tr>
<td>Unit 4</td>
<td>0.81</td>
</tr>
<tr>
<td>Unit 5</td>
<td>0.78</td>
</tr>
<tr>
<td>Unit 6</td>
<td>0.83</td>
</tr>
<tr>
<td>Unit 7</td>
<td>0.81</td>
</tr>
<tr>
<td>Unit 8</td>
<td>0.80</td>
</tr>
<tr>
<td>Unit 9</td>
<td>0.81</td>
</tr>
</tbody>
</table>
VALIDITY :

The test showed high content validity because the course content was included on the basis of well-prepared programmed text developed by the researcher for the neo-literates in the research area of 'Food' and 'Water' in the field of environmental education.

4.2.2 SELECTION OF EXPERIMENTAL DESIGN :

Experimental design is the blueprint of the procedures that enable the researcher to test hypothesis by reaching valid conclusions about relationships between independent and dependent variables. Kerlinger (1973) defined research design as "the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and control variance". The plan includes an outline of what the investigator will do from writing the hypothesis to the final analysis of the data. The structure refers to scheme of the operation of variables. The strategy implies how the research objectives will be reached.

Selection of a particular design is based upon the purposes of an experiment, the type of variables to be manipulated', and the conditions, or limiting factors under which it is to be conducted.
POST-TEST-ONLY CONTROL GROUP DESIGN:

For this study, the Post-test only Control Group Design was used. In this experimental design, two groups are involved. Group 'B' receives the experimental treatment while the other Group 'A' does not, and then both groups are post-tested on the dependent variable. Both groups were matched equally on the basis of their entering behaviour of the achievement score of pre-test. Some achievement score has been taken for both groups 'A' and 'B'. A diagram of this design is as follows:

```
Treatment group       R     X₁     O
Control group         R     X₂     O
```

Each of group of this consists of 50 neo-literates. The control group was taught through Simple Text (ST). The experimental group was taught through Programmed Text (PT). Post test was given, for each unit of the content covered under research area food and water, to both the groups.

The independent variables in the present study were content in the form of Simple Text (ST) and the Programmed Text (PT).

The dependent variables in this study were scored on post-tests.
The entering behaviour of neo-literates was treated as control variables in this study.

4.2.3 COLLECTION OF DATA:

The procedure adopted by the researcher for collection of the data can be summarised in the following lines:

The control and the experimental group selected for the purpose of the research were taught under two settings. The control group was taught by Simple Text (ST) using traditional method of teaching. After teaching each unit of each research area, the progress of the neo-literates for each unit were evaluated through evaluative exercises. After it, post-test was administered on the control group. The neo-literates were requested to give the responses on post-test within the given time. In this manner data were collected from control group.

For experimental group, the researcher gave the Programmed Text (PT) of each unit to each neo-literate. They were introduced with general rules of the Programmed Text. Neo-literates were requested to read each frame and fill the blank space, given with each frame. They were informed to cover the responses with the help of a card provided by the researcher and remove the card after writing response in blank space. They were also requested to verify their responses, comparing with the correct responses given on the left hand side margin of the
next frame. For the adequate revision of the text, an evaluative exercise was also provided to neo-literates. After it a post-test was also administered on experimental group. Neo-literates were requested to give the responses on post-test within the given time.

In this manner, the data of the present study was collected from each unit.

4.2.4 **SCORING:**

The researcher collected the data through post-test for each unit of research areas 'food' and 'water'. Fifty marks were allotted for each post-test. The number of items were not equal in post-test of each unit. There were 25 items, 50 items and 100 items in different units. For the post-test containing 25 items, two marks were given to each item, one mark was given to each item in those post-test which had 50 items, and half mark was given to each item in those post-test which had 100 items for correct responses. The researcher also prepared scoring key for each post-test (Appendix-26). With the help of this scoring key, the researcher, evaluated the achievement scores of group A and group B (Appendix-27).

The researcher provided duration of one minute for each item for giving the correct responses in each post-test. The post-tests containing 25 items were given 25 minutes. The post-test containing 50 items were given 50 minutes and the post-
test containing 100 items were given 100 minutes for giving the correct responses by neo-literates.

4.2.5 **STATISTICAL PROCEDURE** :

Mean, S.D. and t-tests were used to analyse the data.

In order to determine the significant differences between the means of the achievement score of different groups of Neo-literate. Man and Women in the research area of 'Food' and 'Water' taught through Simple Text and Programmed Text, the researcher utilised 't'-test. The 't'-values were computed with the help of the following formula.

\[
't' = \frac{M_1 - M_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}
\]

(Mc Nemar, 1962, P. 102)