CHAPTER – 4
RESEARCH PLANNING AND PROCEDURE

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CHAPTER – 4
RESEARCH PLANNING AND PROCEDURE

4.0 INTRODUCTION:

This chapter consist the detailed information regarding population, drawing of sample and sampling technique, how the test was administered and experiences during the administration. A meticulous care was taken in selecting the sample to conduct the field study of this research. Analyses of scores reflect the effect of independent variable on proficiency scores of science teachers. This effect was helpful in establishing norms of test which can guide us in finding out relative standing of any secondary school science teacher in group and, also in the development of proficiency of science teachers. Norms are tables of information necessary for the interpretation of the test scores and are obtained by giving the particular test to a large and representative sample of the population. Sampling of the population was done with great care and as it is distributed over a large population. The condition under which the test is administered rigidly followed, so norms furnish a reliable and useful basis for information. This chapter throws light on it.

4.1 POPULATION:

In any research the most important factor is the universal set of subjects to whom the results are to be applied call it is as population of the study. The term ‘Sampling’ means the selection of a part of group or an entirely with the sole aim of collecting complete information. This entirely or totality of all members is known as ‘Population’.

“A population is any group of individuals that have one or many characteristics in common that are of interest to the researcher.” (1)

Looking to the present scenario, researcher decided to standardize the constructed teaching proficiency test for the secondary school science
teachers of Gujarati medium and so target population for this study will be the secondary school science teachers of Gujarati medium schools following Gujarat state board textbooks, situated within Gujarat State.

4.2 **SELECTION OF THE SAMPLE:**

Sampling is the only process available for making inferences about large population. It is impossible to cover the entire population under study by the investigator. And so to better accuracy, save time, energy and economy representative of the population has to be selected on which research can be carried out and acquired results can be entered to the population.

As stated by Sirois, Schmutte & Sprinthall

"A sample is a smaller number of observations taken from the total number making up a given population."\(^{(2)}\)

To ensure that samples represent the population, individuals have to be selected randomly although various sampling procedures being used. Various sampling methods are categorized as (1) Probability sampling (2) Non-probability sampling.

In the present study, investigator has used probability sampling method and technique used for the sampling is stratified random cluster sampling technique. For the final run of administration of teaching proficiency test of targeted population i.e. Gujarat State had to consider and representative sample had to be drawn. The investigator studied the geography of Gujarat from its map. Gujarat state was divided among four Zones:

(1) **North Zone**    (3) **West Zone**
(2) **Middle Zone**    (4) **South Zone**

From each zone districts were selected as per the size of the zone. Out of the total of 26 districts of Gujarat state four were selected randomly. Each selected district was further classified into urban and rural areas. List
of secondary Schools selected from various districts of Gujarat is shown in appendix - A.

Detailed information related to the sample for the final run is mentioned in table: 4.2.

**TABLE: 4.2**  
**SAMPLE FOR FINAL RUN**

<table>
<thead>
<tr>
<th>Area</th>
<th>Types of School</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>Grantable</td>
<td>168</td>
<td>140</td>
<td>308</td>
</tr>
<tr>
<td></td>
<td>Self-financed</td>
<td>145</td>
<td>124</td>
<td>280</td>
</tr>
<tr>
<td>Rural</td>
<td>Grantable</td>
<td>156</td>
<td>135</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>Self-financed</td>
<td>135</td>
<td>126</td>
<td>261</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>604</strong></td>
<td><strong>525</strong></td>
<td><strong>1129</strong></td>
</tr>
</tbody>
</table>

4.3 **VARIABLE UNDER STUDY:**

Variables are the conditions or characteristics that the experimenter manipulates, controls, or observes. The independent variables are the conditions or characteristics that the experimenter manipulates or controls in his or her attempt to ascertain their relationship to observed phenomena. The dependent variables are the conditions or characteristics that appear, disappear, or change as the experimenter introduces, removes, or changes independent variables.\(^{(3)}\)

The variables of this research are as follows:

- **Dependent variable** : Teaching Proficiency of science teacher
- **Independent variables:**
  - **Area of the school** : Urban & Rural
  - **Types of School** : Grantable & Self–financed
  - **Gender** : Male & Female
4.4 TOOL OF THE RESEARCH:

The purpose of the test is to measure the secondary school science teacher proficiency, based on the objectives the investigator developed measurement tool.

After getting the clear concept of functioning component of teaching proficiency of secondary school science teacher, next step was to construct items. Investigator constructed component wise items and send it to the subject experts, resource persons, experienced science teachers and the secondary school principals.

Experts’ valuable suggestions were taken into consideration and the test was refined as per it. Final version of the test took form with the valuable guidance of guide. Following steps were performed by the investigator for preparing final version of proficiency test.

Step : 1 Selection of Components.
Step : 2 Preliminary draft of the teaching proficiency test
Step : 3 Sending for suggestion of experts
Step : 4 Review the suggestion and done necessary corrections
Step : 5 Pre pilot study
Step : 6 Pilot study
Step : 7 Item analysis by the significant level

The final version of teaching proficiency test consisted of two sections, which are as follows:

Section: 1 containing five components. Each component containing ten checklist types of items and.

Section: 2 containing questions, for the component “teaching aids & content”, which are based on specific objectives. Functioning component wise proficiencies of items for the final test is given in table: 4.4.
TABLE : 4.4
SECTION WISE NUMBER OF ITEMS FOR THE FINAL TEST

<table>
<thead>
<tr>
<th>Component</th>
<th>Section: 1</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Planning of teaching</td>
<td>10</td>
</tr>
<tr>
<td>II</td>
<td>Presentation of Lesson</td>
<td>10</td>
</tr>
<tr>
<td>III</td>
<td>Attitudes</td>
<td>10</td>
</tr>
<tr>
<td>IV</td>
<td>Laboratory (procedure &amp; use)</td>
<td>10</td>
</tr>
<tr>
<td>V</td>
<td>Evaluation</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Section: 2</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI</td>
<td>Teaching aids &amp; content</td>
<td></td>
</tr>
<tr>
<td>A:</td>
<td>Identification of the laboratory apparatus</td>
<td>05</td>
</tr>
<tr>
<td>B:</td>
<td>Interpretation of the figure</td>
<td>01</td>
</tr>
<tr>
<td>C:</td>
<td>Drawing a neat labeled diagram</td>
<td>01</td>
</tr>
<tr>
<td>D to I:</td>
<td>Specialization for science teaching</td>
<td>10</td>
</tr>
</tbody>
</table>

Total 67

Detail information about construction and standardization of teaching proficiency test for secondary school science teacher is discussing in chapter: 5.

4.5 ADMINISTRATION OF TEACHING PROFICIENCY TEST:

In accordance with the nature of the data required and planning of the study, data was collected from different areas of the Gujarat state. To collect data for the current study, self developed teaching proficiency test was used. Permission was sought from the school principal before hand, of the science teachers for the selected secondary schools. As per the sample
mentioned in table: 4.2, test was administered under the direct supervision of the investigator. At some areas investigator took help of teacher educators and school teachers. Necessary instruction with final version of the teaching proficiency test, in appendix - H.

Following steps were followed to administer the test in final run:

1. When science teachers were seated, the teaching proficiency tests were distributed. They were instructed to read the instructions and fill up the personal details.

2. After distributed teaching proficiency test, science teachers were asked to start answering. The starting time was noted at this moment.

3. After completion of 80 min., science teachers were to return teaching proficiency test.

4. Finally, investigator collected the teaching proficiency tests filled with the answer on it.

4.6 DATA ANALYSIS:

The most state-of art and proper methods should be applied to analyze the data. An accurate result depends on the analysis of data. The following are the main characteristics of the Data analysis:

1. Analysis of data is one of the most important aspects of research.
2. It is highly skilled and technical job.
3. It demands a deep and intense knowledge on the part of the researcher and the data to be analyzed.
4. The data to be analyzed and interpreted should be reproducible and should be readily disposed to quantitative treatment.
5. The hypothesis should be more specific.
6. The task of analysis is incomplete without interpretation.
7. The task of analysis and interpretation should be designed before the data are actually collected.\(^4\)
Measurement in education provides us first raw scores. These scores are the direct count of correctly attempted items. In order to make these scores readily interpretable and to know the relative standing of science teacher, raw scores need conversion. The conversion of score results to either percentile score, normalized T-score or standard score.

To establish the norms, it is important to determine whether there are any significant differences between means of these samples?

“A composite procedure for testing simultaneously the difference between means is Analysis of Variance (ANOVA). The ANOVA technique is important in the context of all those situations where we want to compare more than two populations. Therefore, one quite often utilizes the ANOVA technique and through it investigates the differences among the means of all the population simultaneously.” (S)

Keep in mind with the main objectives of all the statistical techniques used in the research work are as follows.

1. For the construction & standardization of the teaching proficiency test
   - Item analysis was done by using ‘t’ test, at 0.01 and 0.05 significant levels, Suggested by Allen Edward.
   - To calculate reliability of the teaching proficiency test, researcher used product moment method. and calculate r.

2. To study the effect of the area of the secondary schools, types of secondary school and gender of the secondary school science teacher on science teaching proficiency, Analysis of Variance (ANOVA) technique was used. Before the ANOVA technique homogeneity of variance, Bartlett’s test was done.

ANOVA technique helps us to tell whether any of the difference between means of the given samples is significant, and interaction effects of independent variables.
Main objective for computing ANOVA:

- To study the teaching proficiency of secondary school science teachers in terms of their gender, area of the school, and types of school & interaction of independent variable. And,

- To establish norms for teaching proficiency after observing the effects of independent variables on teaching proficiency.
CHAPTER REFERENCE


