Chapter III
Design of the study

3.1.0 Chapter Preview

This chapter deals with the methodology of the study. The study in hand is concerned with content analysis of textbooks of environmental studies at primary stage in school of Rajasthan. The objectives of present study make it explicitly clear that it is a qualitative research requiring the collection of large quantity of perceptual information from textbooks of primary stage i.e. grade III, IV & V. The methodology is qualitative while the data analysis is quantitative. Strategy depends on the focus of the research and the main strategy for the present investigation is content analysis. The aim of the study is to provide an in-depth empirical information about the existing textbooks. Therefore, the strategies include a combination of theoretical and empirical methods. The method adopted for the study, the details of the sample, the data gathering tools and the statistical techniques employed for the analysis of data are described and presented below under appropriate heads.

3.1.1 Introduction

Problem of assessing the quality of textbook for ensuring effective teaching-learning interactions and outcomes are an important and timely focus for research and education particularly in environmental studies. To embark on an integrated problem the widely discussed question is whether there is a need to teach the new generation about the environment and if there is, what should be taught and how? Concern for environment can emanate only from a love for nature and an understanding of how nature works. It is of paramount importance to create this sort of love and concern for
nature in young minds so that they grow up with an awareness that would lead to action. In the Indian situation, at the primary stage the textbook continues to be the most essential and in majority of cases the only aid in the hands of the teacher and the learner through which the given curriculum is transacted. Therefore, in order to realize the purported role of textbooks, it is essential to ensure the effectiveness of teaching learning material. The methodology adopted to substantiate the appropriateness of textbook will help a lot in formulating the future textbook for environmental studies at primary level in the State of Rajasthan.

3.2.0 The Method

In order to achieve the objectives of this study, the I.K. Davies matrix method of content analysis was adopted, as it was considered to be the best to get the data. According to this technique, content is first of all divided into sub topics, which infer some meaning and discrimination form each other in sequential order and then each sub topic is divided into elements following sequential order. It can be diagrammatically represented as below:

```
    Topic
     |     |
Subtopic Subtopic
     |     |
E1 E2 E3 E4
```

Where E stands for Elements

3.3.0 Population and Sample:

3.3.1 Population

The population for the study was defined as “all the teachers serving at primary stage in schools of Rajasthan, which are following the suggested pattern of RBSE.
3.3.2 Sample Section

Simple random sampling technique was adopted to select a representative sample from the above population because of the homogeneous nature of the population. Jaipur city was selected for obtaining representative sample and it was obtained by using following formula:

\[
N^{2} \times 0.25 \\
\frac{n =}{[d^{2} \times (N-1)] + [Z^{2} \times 0.25]}
\]

\( n = \) Required sample size
\( d = \) Precision level (i.e. 0.05, 0.01, 0.10 etc.)
\( Z = \) Standardization value indicating a confidence level

\((Z= 1.96 \text{ at 95% confidence level and } Z = 2.56 \text{ at 99% confidence level})\)

\( N = \) Population size (Known or estimated)

Sample size was calculated at 95% confidence level and 5% precision level \((d = 0.05 \text{ and } Z = 1.96)\) for estimated population size of \(8634^{2}\).

\[
8634 \times (1.96)^{2} \times 0.25 \\
\frac{n =}{[0.05)^{2} \times (8634-1)] + [(1.96)^{2} \times 0.25]}
\]

\( = \) 368

The obtained sample size were dichotomized into Government and Private school teachers as shown below:

<table>
<thead>
<tr>
<th>Number of primary school teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Primary School Teacher (184)</td>
</tr>
</tbody>
</table>

---

2. Record of Shiksha Shankul, Govt. of Rajasthan as on 30th Sep. 2009 reveals that total number of Government primary school teachers in Jaipur city are 4317.
3.4.0 Tools of the study

The result of research depends upon the quality and appropriateness of the tools used, hence selection/development of the tool is an important step in research. It depends upon various factors such as the objectives of the study, availability of the test materials etc. Since the undertaken study is purely concerned with the qualitative analysis of the textbooks therefore, to verify the findings of analysis, Teacher’s Feedback scale was developed by researcher to inquire about the information regarding different aspects of textbook from school teachers teaching the same subject.

The scale developed covers following areas:

1. Objectives suggested by NCERT for the textbooks of classes undertaken for study.
2. Themes/sub themes suggested by NCERT for the development of textbooks of grades undertaken for study.
3. Diagrams given in the textbooks of grades included in study. This was further classified into:
   (a) Number of diagrams in each chapter.
   (b) Clarity of diagrams.
   (c) Colourfulness of diagrams.
   (d) Labeling of diagrams.
   (e) Cause and effect relationship of diagrams.
4. Examples given in textbooks of grades selected for study. This was subdivided into following heads;
   (a) Numbers of examples used
   (b) Kind of examples used i.e. whether it is experimental in nature, activity based or descriptive in nature.
5. Syntactical & printing aspects of textbooks of grades included in study, which was further subcategorized into:
   (a) Errors in terms of spellings, words and sentences
   (b) Printing Errors
6. Nature of content used in the textbooks of grades chosen for study. This was further subdivided into:-
(a) Nature of texts i.e. whether it is of experiment based, activity-based, descriptive or inter-personal communication based.
(b) Incorrect or irrelevant information.
(c) Language of the text.

7. Practice exercises of textbooks of grades undertaken for study. This was subdivided into:-
(a) Number of practice items
(b) Types of practice items.

3.5.0 Data Collection

Data for the study were collected in two ways:
3.5.1 From analysis of textbooks.
3.5.2 From Teacher’s feedback.

3.5.1 Analysis of Textbook

First data were collected by analyzing textbooks of grades taken in hand. For this purpose researcher devised different tables according to the essence of objectives. The details of the different tables developed are discussed as below:

(1) Table I – Evaluation of Themes (Appendix-I)

This table was developed for analyzing texts of the textbooks of concerned grades. The table was developed by taking into account the themes and sub themes suggested by NCERT. These themes and sub themes suggested by NCERT for grade III – V were coded for convenience (Appendix –Ia, Ib & Ic).

(2) Table II – Evaluation of diagrams (Appendix -II)

(3) Table III – Evaluation of examples (Appendix -III)

(4) Table IV – Evaluation of syntactical & printing aspects (Appendix -IV)

(5) Table V – Evaluation of nature of text (Appendix -V)
3.5.2 Teacher’s feedback Scale

Data were also collected by administering the Teacher’s Feedback scale developed by researcher on teachers teaching the textbook of environmental education at primary stage especially in grade III – V. Total numbers of teachers selected for study were 368 who were teaching in different schools of Jaipur city. 184 out of 368 were government teachers whereas rests of 184 were teachers teaching in private schools. Many difficulties regarding data collection were felt by investigator during data collection such as convincing school teachers for providing their feedback, not returning questionnaire and non-seriousness in completing the questionnaires.

3.5.3 The questionnaire: It’s first Draft

The first draft of the questionnaire used in this study was very comprehensive and to a large extent standardized, which was meant for eliciting perceptual information and data about feedback. This draft of the questionnaire had 38 items (Appendix-VII).

The title page of the questionnaire was designed in the manner of ‘Total Design Method’ suggested by Dillman (1987). It contained the theme, name of the study, name of the supervisor, investigator & University. Additionally, it also contained questions regarding personal information on the same page for convenience of the respondents.

3.5.4 The Questionnaire: It’s Development

Pre-tryout

The first draft of the questionnaire described above was pre-tried-out on a sample of 25 teachers. The purpose of this pre-tryout was two fold.

1. The identify language and structuring mistake or error.
2. To examine if the items or statements were relevant to teachers.

The analysis of the responses to the statements revealed that almost all statements were relevant to teachers as they attempted all statements. However, some language errors
were identified, which were further removed. The improved version was sent to 3 experts of the subjects for expert criticism. Finally, the identified errors were removed and were printed in the final form of the questionnaire (Appendix VIII).

### 3.5.5 Tryout

The printed questionnaire was tried out on a sample of 100 teachers. The purpose of this tryout was single fold i.e. **to collect data for estimating the reliability and validity of the questionnaire**.

The questionnaire was administered upon a group of 100 teachers of different schools during the month of July in 2010 in Jaipur district. For estimating the test-retest reliability, the developed tool was administered twice on an interval of one month. Its validity was also ensured at the same time. The item analysis related to this part is given in the following section.

### 3.5.6 Item analysis:

Based on item analysis, items are selected or rejected for the test under consideration. Item analysis is done by administering the test on a representative sample of population for which the test is being built and then the responses of those subjects are analysed statistically with respect to each item. About 40 different methods for item analysis are suggested in the literature on measurement in behavioural sciences. In fact, the variation in the item validity data from sample to sample is generally greater than that among the different methods. For this very reason, the choice of method is based upon the amount of labour required and availability of the specific computation devices. Thus, the investigator applied student ‘t’-test for item discrimination. The responses of 100 respondents who were administered “Teacher’s Feedback Scale” during tryout were used for each items. For this, the top 27% teachers constituted the top group and bottom 27% teachers constituted the bottom group. The mean scores of teachers in the upper group and lower group on each item were calculated. The SD of two groups on each item was also calculated. These mean scores obtained on each item of the upper group were compared with lower group mean scores by applying ‘t’-test. The ‘t’ value obtained for each of the items are presented in the table 3.1.
Table 3.1: Item analysis data and ‘t’- value on each item (tryout form)

<table>
<thead>
<tr>
<th>Item No.</th>
<th>‘t’ value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.47</td>
<td>S</td>
</tr>
<tr>
<td>2</td>
<td>2.00</td>
<td>S</td>
</tr>
<tr>
<td>3</td>
<td>2.15</td>
<td>S</td>
</tr>
<tr>
<td>4</td>
<td>2.79</td>
<td>S</td>
</tr>
<tr>
<td>5</td>
<td>1.56</td>
<td>Not selected</td>
</tr>
<tr>
<td>6</td>
<td>1.89</td>
<td>S</td>
</tr>
<tr>
<td>7</td>
<td>2.97</td>
<td>S</td>
</tr>
<tr>
<td>8</td>
<td>1.39</td>
<td>Not selected</td>
</tr>
<tr>
<td>9</td>
<td>2.87</td>
<td>S</td>
</tr>
<tr>
<td>10</td>
<td>1.49</td>
<td>Not selected</td>
</tr>
<tr>
<td>11</td>
<td>1.58</td>
<td>Not selected</td>
</tr>
<tr>
<td>12</td>
<td>2.56</td>
<td>S</td>
</tr>
<tr>
<td>13</td>
<td>1.28</td>
<td>Not selected</td>
</tr>
<tr>
<td>14</td>
<td>2.75</td>
<td>S</td>
</tr>
<tr>
<td>15</td>
<td>2.97</td>
<td>S</td>
</tr>
<tr>
<td>16</td>
<td>2.26</td>
<td>Not selected</td>
</tr>
<tr>
<td>17</td>
<td>2.48</td>
<td>S</td>
</tr>
<tr>
<td>18</td>
<td>1.51</td>
<td>Not selected</td>
</tr>
<tr>
<td>19</td>
<td>2.33</td>
<td>S</td>
</tr>
<tr>
<td>20</td>
<td>1.23</td>
<td>Not selected</td>
</tr>
<tr>
<td>21</td>
<td>2.11</td>
<td>S</td>
</tr>
<tr>
<td>22</td>
<td>1.37</td>
<td>Not selected</td>
</tr>
<tr>
<td>23</td>
<td>2.11</td>
<td>S</td>
</tr>
<tr>
<td>24</td>
<td>1.01</td>
<td>Not selected</td>
</tr>
<tr>
<td>25</td>
<td>2.77</td>
<td>S</td>
</tr>
<tr>
<td>26</td>
<td>1.31</td>
<td>Not selected</td>
</tr>
<tr>
<td>27</td>
<td>2.25</td>
<td>S</td>
</tr>
<tr>
<td>28</td>
<td>1.09</td>
<td>Not selected</td>
</tr>
<tr>
<td>29</td>
<td>1.33</td>
<td>Not selected</td>
</tr>
<tr>
<td>30</td>
<td>1.17</td>
<td>Not selected</td>
</tr>
<tr>
<td>31</td>
<td>2.07</td>
<td>S</td>
</tr>
<tr>
<td>32</td>
<td>1.43</td>
<td>Not selected</td>
</tr>
<tr>
<td>33</td>
<td>1.99</td>
<td>S</td>
</tr>
<tr>
<td>34</td>
<td>2.61</td>
<td>S</td>
</tr>
<tr>
<td>35</td>
<td>1.50</td>
<td>Not selected</td>
</tr>
<tr>
<td>36</td>
<td>2.87</td>
<td>S</td>
</tr>
<tr>
<td>37</td>
<td>1.49</td>
<td>Not selected</td>
</tr>
<tr>
<td>38</td>
<td>3.01</td>
<td>S</td>
</tr>
</tbody>
</table>

*S – Items selected for the final version
‘t’- value is the measure which discriminates between top and bottom group. If its value is equal to or more than 1.65 then the difference will be considered significant and the items will be selected otherwise it will be rejected.

3.5.6  The Final Draft

The final form of the teacher’s feedback Scale consisted of 24 items (for detail see the final draft attached in appendix-VIII). In this final draft, subjects were required to read each statement and to report their response on a five-point scale i.e. Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), & Strongly Disagree (SD).

3.5.7  Reliability

According to Kerlinger (1973), to be reliable, a measuring instrument should be relatively free from errors of measurement thus being both accurate and predictable. Stability of the scale “refers to the extent to which a measuring device yields consistent results upon testing & retesting” (Freeman, 1965). However, in this study the reliability of the questionnaire was established through “test-retest” method of predicting reliability. The details of this reliability is as follows:

3.5.8  Test – retest reliability

In order to establish test-retest reliability, the same sample were re-administered with the questionnaire after a gap of one month. The test - retest reliability coefficient of correlation was found to be 0.83. The index of test-retest reliability is fairly suitable to study the provided feedback.

3.5.9  Validity

Validity deals with the question as to whether a measure is in fact measuring what it purports or intents to measure. The content or face or logical validity for this questionnaire was established. The details are given below:

3.5.10  Content Validity

Content validity is essentially a matter of judgment by experts of the sampling adequacy of the content. This means that each item must be presumed of its relevance
to the construct being measured (Kerlinger, 1973). The content validity of the items was based on the judgments of the experts and the teachers selected as sample. The items were thoroughly evaluated and criticized by the experts and their relevance were also judged on the basis of the pre-tryout and theoretical works in the field of content analysis.

### 3.6.0 Statistical Techniques

In order to achieve the objectives laid-down, selection of statistical techniques are one of the important aspect of any research project/study as it adds credential. Since the study undertaken was qualitative in nature, the techniques were primarily percentage and the results obtained were presented by using chart.
References:


