CHAPTER III

METHODOLOGY

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CHAPTER III
THE METHODOLOGY

3.1 INTRODUCTION

After the survey of the available literature in the field, a researcher generally designs his study. The purpose of this chapter is to provide an overview of the design of the study, for this purpose researcher selects the method and the sample, collects and constructs the required tools and decides the plan for the collection and analysis of data. The nature of the problem determines as to which design is appropriate and how that design should be tailored to meet the needs of the researcher. The present chapter initially discusses the methods used in the study. The sampling technique and the size of the sample are discussed at the second stage. Thirdly the needs and steps of construction and standardization of the tool have been discussed. The techniques used for the analysis of data have been discussed at the end of the chapter.

Such a process has the following benefits:
(i) It provides a systematic plan of procedure for the research to follow. (ii) It ensures a steady and continuous progress towards the goal set-up. (iii) It provides a basis for evaluation of the proposed study.

The major methodological issues involved in this research are as under:

3.2 METHODS

Various methods can be employed in behavioural research. Each method has its own qualities and
limitations. It is for the researcher to select one or more suitable methods, keeping in view the needs and objectives of the study. The investigation is contemporary. The data needed to resolve the questions of the study have been generated in the present settings. Hence the methods required for the present study come under the broad heading of 'Survey'. Best (1963, p.106) defines in brief that 'Survey' is extensive and cross-sectional dealing with a relatively large number of cases at a particular time, and yielding statistics that are abstracted from particular cases. Fox (1969, p.423) describes three major types of survey. They are descriptive, comparative and evaluative. A descriptive survey describes a specific set of phenomenon at one point of time, Fox has further classified descriptive surveys into four types. They are mass survey, correlated survey, case-study survey and retrospective survey.

According to Good (1972, p.207) the terminology of descriptive studies include such expressions as descriptive survey, normative survey status of trend etc. For such study where the sample is very large, Fox uses the term 'Mass Survey'. But if norms are also derived from the data described the relative characteristics of persons within the group then the study is a 'Normative survey'.

As the present study was intended to find out information regarding the extent of the attitudes towards the educational hazards possessed by the higher secondary students and teachers of Raipur division, a large sample was selected. In the process of standardization of the test of
the attitude, norms within groups were determined the relative positions of subject in the present research is a 'Normative survey'.

(a) Normative Survey Method:

It is generally used to secure evidence concerning an existing situation and to identify the standards of norms with which comparisons, in present conditions, can be made.

To answer the test of the questions of the present investigation, 'Comparative survey method' has been used.

(b) Comparative Survey Method:

It is used in those researches where an experiment can not or should not be conducted. This method is suitable for researches which concern the relationship between variables. It has certain characteristics of descriptive, correlational and experimental researches because contrasted groups are studied.

According to Fox (1969, p. 445) "A comparative survey is that in which the researcher takes at least two entities, now in existence and establishes a formal procedure for obtaining criterion data, on the basis of which he can compare the entities and come to some conclusions as to which is best." In the present study the boys and girls, male and female teachers, urban, rural and tribal students and the urban, rural and tribal teachers were compared to know which of these groups possess the most favourable attitude towards educational hazards. The purpose was to
investigate the attitude of the male and the female teachers and the boys as well as of girls towards environmental hazards to education. To achieve this objective 'comparative survey' studies have been made.

The present study was largely based on the normative survey method. Whenever necessary, a comparative survey study was also made to the selected samples of students and teachers.

The two types of survey methods have been combined to carry out the present study.

3.3 DESIGN AND SAMPLE

In this study there are three independent variables i.e. status, area and sex. Attitude is the dependent variable. The present investigation was designed to study the influence of sex, rural/urban/tribal population on the attitude of students and teachers towards environmental hazards to education. For this purpose investigator opted 2x3 factorial design.

According to Young (1949) "A statistical sample is a miniature picture or cross-section of the entire group or aggregate from which the sample is taken".

In survey researches data are not collected from the whole population, if it is very large. The process would be both expensive and time consuming. The data are collected from a representative group of the population, known as 'Sample'. The technique for selecting this group is called 'Sampling'. 
The whole group from which the sample is to be selected is technically called 'universe' or 'population'. In the context of the present study, the universe covered is that of Higher Secondary School students and teachers of Raipur educational division.

3.3.1 The Sampling Technique

Sampling is an important aspect of research. There are various methods available in the literature of educational research for this purpose. The best method in which each individual of the population stands equal chance of being selected in the sample, is the 'random method'. But this method has two major limitations, they are (i) It is practically impossible to select a few pupils from each class-section of every school of a Division, and (ii) It may not be possible to have various types of groups of students needed for achieving the objectives of the study. Hence generally, this method is not used in those educational researches where various types of student population and schools are taken into consideration.

In order to draw an adequate and representative sample and to keep it free from bias, the techniques of stratified random sampling and purposive sampling were used.

In the present investigation, therefore stratified random samples and purposive samples were drawn. When the population is divisible into various groups on the basis of certain criteria, such as sex, developmental level, culture, status etc., the stratified sampling is the most
suitable. Classification of the population into sub-populations (called strata) on the basis of some criteria is known as stratification. Stratified random sampling ensures representativeness and avoids bias. The following steps for the purpose of sampling were taken: (i) First of all, all the places of Raipur educational division were classified into three strata - urban area, rural area, and the tribal area. This classification was done on the basis of population. (ii) Approximately fifteen percent of the total number of higher secondary schools were selected from urban, rural and tribal population. That is 25 higher secondary schools of the total 168 Hr,Sec. schools as mentioned in the list published by the M.P Board Of Secondary Education Madhaya Pradesh, Bhopal in 1994, were thus selected. Six secondary schools from urban, six from rural and six from tribal areas were taken for students sample and eight schools from urban, eight schools from rural and 9 schools from tribal areas for teachers sample were selected for the study. Another consideration in the selection of the schools from the different strata was to include various types of schools such as the government, private aided, private unaided, boys', girls' and co-educational. Hence purposive samples were taken. In this way efforts were made to make the samples of the study as representative as possible in terms of the variables related to the phenomena under study (a condition given by Fox, 1969, p.322). The number of each type of school from each area was also kept comparable. (iii) A sample of 300 students and 240 trained teachers from twenty
five government and aided secondary schools of Raipur educational division representing urban, rural and tribal population was taken for conducting this study.

The area and sexwise specification of the sample is given in Table 3.1.

<table>
<thead>
<tr>
<th>AREA</th>
<th>STUDENTS</th>
<th>TOTAL STUDENTS</th>
<th>TEACHERS</th>
<th>TOTAL TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BOYS</td>
<td>GIRLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>RURAL</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>TRIBAL</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>TOTAL</td>
<td>150</td>
<td>150</td>
<td>300</td>
<td>120</td>
</tr>
</tbody>
</table>

3.4 TOOLS

In every research a valid and reliable tool is needed for the collection of data. The type of tools depends upon the nature of the study. For survey studies among the more common data collecting tools are questionnaires, check lists, rating scales, attitude scales, interview schedules, observation schedules, opinionnaires etc. The nature and the kind of study should be determining factors in the selection of an available standarized tool in the construction of a tool.

In the present investigation for identification of environmental hazards (EH) to education the investigator prepared interview schedules for teachers,
students and guardians. On the basis of interview and review of the related studies, one questionnaire was developed for the judges. Thus the hazards were identified. After identification of the hazards to education, the researcher constructed the, 'Environmental Hazards Attitude Scale (EHAS)' for measuring the attitude. The procedure for the construction and description of the tool is discussed in the following paragraphs.

3.4.1 Construction Of The Environmental Hazards Attitude Scale (EHAS)

Before enlisting the actual steps of the construction of the EHAS, it was thought better to discuss in brief, the meaning of the term attitude scales, the types of attitude scales and the rational for constructing the most suitable type of scale for the present study, and that is Likert type scale.

3.4.1.1 Attitude scale

According to Edwards (1969,p.9-10) "A well constructed attitude scale consists of a number of items that have been just as carefully edited and selected in accordance with certain criteria as the items contained in any standardized psychological test ".

The items making up an attitude scale are known as statements. A statement may be defined as any thing that is said about a psychological object, which is often called a ' Universe of content '. In the scaling method the subject is required to react with expressions of approval or disapproval, agreement or disagreement, belief or disbelief
to a set of carefully standardized statements. The pattern and summation of reactions to set of statements provide a way of inferring the individual's attitude concerning the psychological object.

3.4.1.2 Types Of Attitude Scales

Generally the following methods are used for measurement of attitude:

(a) Thurstone's method of equal appearing intervals:

First of all statements connected with the subject matter are collected. These statements are given to experts, who are well versed in the subject matter and they act as judges. The judges are asked to arrange the statements in eleven groups by putting at one extreme the most favourable attitude and on the other the least favourable attitude, the neutral position being at the centre. The judges are to perceive these categories as separated by equal steps on a continuum of favourability. For items that are retained, each is given its median scale value, between one and eleven as established by the judges. The scale is administered by asking subjects to put a check mark after studying all the statements. The subjects score on the scale is the mean or the medium value of the opinion endorsed.

(b) Likert's Method Of Summated Ratings

The first step in constructing a Likert type scale consists of collecting a number of statements about a subjects. It is important that they express definite favourability or unfavourability towards a particular point of view. The subjects are asked to respond to them on a five
point scale viz.. strongly agree, agree, undecided, disagree and strongly disagree. The scales are scored by assigning value from one to five on these alternatives. If the coefficient of correlation is high or 't' value is more than 1.75 this statement is selected for scale. Likert scale is reliable and takes much less time to construct. It offers an interesting possibility for the student of opinion research.

(c) Rating Scale:

The rating scale involves qualitative description of a limited number of aspects of a thing or of traits of a person. In these scales particular concept is presented and the rater places the rates along some numerical scale. The rater might be a teacher or a member of the rater's group, alternatively self rating might be used. Rating scales have several limitations, hence they do not appear to have been widely used in research.

(d) Bogardus's Social-distance Scale:

Another approach to the description and measurement of social relationships is the social-distance scale, development by E.S Bogardus. This device attempts to measure to what degree an individual or a group of individuals is accepted or rejected by another individual or the group.

(e) Osgood's Semantic Differentials

Previously it was used for measurement of meaning and now recently its item has been used for measuring the attitude. Subjects are asked to rate given concept or a series of bipolar rating scales. The bipolar objectives which
have been used in the scales are fair, unfair, clean-dirty, strong-weak etc.

(f) Guttman's Scalogram Analysis Or A Cumulative Scale:

Guttman (1944-45) proposed a non-metric method for scaling attitudes items. In developing the scale, number of monotone items are formulated. The set of items administered to a group of subjects and their response patterns are analysed to determine whether they are scalable or not.

Besides these 'free response method' of attitude measurement and sentence completion tests are also used. They are scorable from negative through neutral, to positive attitudes towards various objects and hence they are called scales. Such tests are known as semi-projective techniques. The Thurstone's method or Likert's methods is generally used in educational researches. In the present investigation, Likert's methods of summated ratings is used.

3.4.1.3 Rationale For Using Likert Type Of Scale

The research studies in the field of attitude scale construction proved that Likert method of summated ratings is simpler and easier to apply in the development of an attitude scale rather than the method of equal-appearing intervals. Edwards and Kenney (1946,p.169) proved that, "the time required to construct an equal-appearing interval scale is approximately twice than that of summated ratings".

Edwards (1969,p.162) also estimates that "the scales constructed by the method of summated-ratings will yield reliability coefficients as high as or higher than
those obtained with scales constructed by the method of equal-appearing intervals".

3.4.1.4 Steps In The Contruction Of Environmental Hazards Attitude Scale (EHAS)

The following are the steps taken by the investigator to construct EHAS.

(1) Deciding the universe of content

The first step in the construction of a tool is always to decide about the areas which cover the content to be measured. In the present investigation for the purpose of deciding this Universe of content, the available researches which have already been given in chapter II were studied. Freeman (1927) explained that environment is a powerful determinant of behaviour. Belay (1957), Pace (1970), Stern (1970) said that poor educational environment is obstacle in the progress of individual. Karmyogi (1974), Karbdikar (1975), Prakash (1975), Mohanty (1976), Rai (1979), Shah (1981), Agarwal (1984) studied the educational problems. Gupta (1984) and others identified most important factors of institutional environment, educational facilities, political influence, school building, library, laboratory, playground and teaching methods. As most of the above-mentioned persons are authorities in the field of education, their research findings were made the basis, for determining the components of the attitude scale.

The investigator intended to attempt a study of the environmental hazards which could be specified, out of the educational problems that have been previously studied.
To identify the environmental hazard in the present context that finds coherence to the attitudes of students, teachers and other educational authorities, the investigator has taken up two tasks: (a) First of all the investigator prepared the interview schedules for twenty teachers, twenty guardians and twenty students of different population. After analysis of the interview schedule eight components were drawn out. They were surroundings of institution, lack of physical facilities, over crowded classes, television, examination system, unemployment, politics and methods of teaching. (b) On the basis of the result of the interview and related findings of studies, the investigator prepared questionnaire for judges (Appendix A). The judges were educationists, psychologists, professors and principals. After having administered the questionnaire on twenty judges, the investigator identified the hazards. Those components were selected on which 90% of the judges expressed agreement. In fact these hazards are causing hindrance in the development of education. Mainly six hazards were selected for the construction of tool.

(i) Surroundings of the institution.
(ii) Physical facilities.
(iii) Television.
(iv) Over crowded classes.
(v) Politics and political power.
(vi) Methods of teaching.

(2) Defining the 'Universe of Content'.

Before preparing items on the above mentioned
components, they were defined in clear terms. The following
definitions were given to each component.

(i) Shops, hotels, factory, pan-stall, tea-stall, residential
houses etc. constitute the surroundings of the educational
institution.

(ii) The condition of school buildings, size of the class
room, libraries, laboratories, apparatus, instructional aids,
furniture and playground are the physical facilities. At
present they are not satisfactory. It is becoming worse day
by day specially in rural and tribal areas.

(iii) Due to television, the reading habits of the students
and teachers have suffered a lot. Students do not play games
they just imitate things shown on the T.V., wasting their
valuable time. Most people like to view films and serials and
only few of them seem to enjoy educational telecasts.

(iv) There are more than 50 students in a class. The results
of interview with teachers and students, proved that maximum
classes have 60 to 80 students, so the teachers can not pay
attention on each student individually.

(v) Now-a-days politics has entered into education too. The
teachers, student leaders, higher officials of educational
institutions are being used by the politicians for their
selfish motives. Political power interference has influenced
administration, admission of students, transfer of teachers,
appointment of teachers, promotion rules etc. which are prone
to their moods and intentions.

(vi) In most of the schools, teachers follow the same
traditional ways of teaching. They do not adopt the suitable,
modern and latest techniques of teaching. Use of proper teaching aids is lacking. Most of the students are least interested in classroom teaching.

(3) Construction of Items.

After defining the components of the attitude more than one hundred and twenty items or statements were constructed. While preparing the items for the scale the criteria mentioned by Thurstone and Chave (1929), Likert (1932), Wang (1932), Bird (1940), Edwards and Kilpatrick (1948) and Anastasi (1982) were taken into consideration:

(i) Items or statements were written in simple clear and direct language.

(ii) Items that refer to the past rather than to the present were avoided.

(iii) Items were constructed on the basis of daily life situation related to three places i.e. school, home and society.

(iv) Almost equal number of items were constructed in all the six components.

(v) Double negative items were avoided.

(vi) Items that were likely to be endorsed by almost everyone or by almost none were avoided.

(vii) Items that may be interpreted in more than one way were avoided.

(viii) Items containing universals such as all, always, none and never were avoided.

(ix) Items that are factorial or capable of being interpreted as factual were avoided.
(x) Items that are irrelevant to the object under consideration were avoided.

(xi) Each statement contained only one complete thought.

(xii) When ever possible, statements were written in the form of simple sentence rather than in the form of compound or complex sentences.

(xiii) Both positive (favourable) and negative (unfavourable) items were prepared.

(4) Preparation of the First Draft of the Environmental Hazards Attitude Scale (EHAS) and it was tried out.

On the basis of above points in constructing an attitude scale more than 120 items were prepared to form a preliminary form of attitude towards EH to education.

This preliminary form was then given to specialists who were working in the field of test construction and language expertise. Thus the first draft of EHAS contained 98 items. First draft was administered on 10 teachers and 20 students of a local school to see its practicability and readability.

(5) Second Draft of the EHAS and its Tryout

On the basis of the analysis of the result of the first tryout some items were rejected and some others were modified. Thus the second draft containing 84 items were obtained. It was then administered on 50 students and 20 teachers in real testing conditions. It was followed by an interview. Again some of the items containing difficult words were removed.

(6) Third Draft of the EHAS and its Tryout
It contained 76 items about educational hazards. The statements formed a Likert type scale (1932) with five possible responses and numerical value given to each statement—strongly agree (5), agree (4), uncertain (3), disagree (2), strongly disagree (1). For negatively worded statements, the numerical values of the responses were reversed.

**TABLE NO. 3.2**

<table>
<thead>
<tr>
<th>Nature of statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favourable</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Unfavourable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

This draft was finally edited and printed. The response sheet was also edited again so that it was easier for the responded to answer. The personal data items for the respondents were also written at the top of the answer sheets. It contained items like the name, age, class, permanent place of living (urban/rural/tribal), name of the school and the date of administration of the test. The response sheet also contained space for examiner's use, where he could put scores obtained by respondent in various aspects of the test. Proper place for serial is also given at the top corner of response sheet.

Each item of this draft was again analysed to see two things
(i) Whether each item measured the attitude towards EH to education.

(ii) Whether an item is positive or negative. This analysis was mainly performed to know whether there is a balance representation of the universe of contents or not. There were 41 favourable and 35 unfavourable items in third draft of EHAS.

(7) Final Tryout of The EHAS

Third draft of the tool was used for the two purposes. First it was used for the final tryout of the test, and second, for the collection of the data for the main body of research. These two objectives were achieved by analysing the data after its administration over the sample of 80 students and 40 teachers of secondary schools belonging to the different schools and area. Then to get a systematic sample of 120 subjects, their score sheets were taken and then scored. For this purpose two stencilled scoring keys, one for favourable and the other for unfavourable items, prepared by the investigator, were used.

**TABLE NO. 3.3**

Samples of Students and Teachers for Final Tryout

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Students</th>
<th>Teachers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Male</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>2.</td>
<td>Female</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
Table No. 3.4 shows an example of two particular statements. Items No. 1 reflects the interest towards attitude. It being a favourable statement the respondent expressed agreement with the statement got a score of 4. Item No. 2 is an example of unfavourable attitude the respondent expressed disagreement with the statement and got a score of 4.

**TABLE NO. 3.4**

Example of Statement Scoring

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Favourable</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Unfavourable</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(8) Item Analysis

After scoring of these 120 sheets, the item analysis was performed by calculating 't' value using the technique given by Edward (1969, p. 152-154). The calculation of 't' value for the eighteenth item in the questionnaire is given in table 3.5 as an example.

Edwards (1969, p.153) states that, "The value of 't' is a measure of the extent to which a given statement differentiates between the high and low groups. As a crude and approximately rule of thumb, we may regard any 't' value equal to or greater than 1.75 as indicating that the average response of the high and low groups to a statement differs significantly, provided we have 25 or more subjects in the high group and also in the low group".
**TABLE NO. 3.5**

Calculation of 't' Value of Item No. 18

<table>
<thead>
<tr>
<th>Response Categories</th>
<th>Score</th>
<th>For Top Group</th>
<th>For Bottom Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>f</td>
<td>fx</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>1</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Agree</td>
<td>2</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Uncertain</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>4</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>5</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>91</td>
</tr>
</tbody>
</table>

Statement- 'The youths are learning to smoke, drink, suicide and to murder from the television.'

\[
t = \frac{\text{Ef.XT} - \text{Ef.XB}}{\sqrt{\left[\frac{\text{N.Ef.XT}^2 - (\text{Ef.XT})^2}{\text{N}}\right] + \left[\frac{\text{N.Ef.XB}^2 - (\text{Ef.XB})^2}{\text{N}}\right]}}
\]

Here 't' is discriminating value

- XT represents scores for top group
- XB represents scores for bottom group
- N represents the total number of cases in each group

Twenty eight items with the lowest 't' values in the test were rejected. In all 48 items were kept for final scoring purpose and for the analysis of the data. Hence in the final form of the test, no item has a 't' value less than the critical value 1.75 as given by Edwards.
After eliminating 28 items the remaining items were renumbered. It formed the final form of the EHAS. The new scoring keys (stencils) were also prepared.

Finally for EHAS 48 items 28 positive and 20 negative were selected to study the attitudes towards EH. Reliability coefficients of the test were calculated to estimate the suitability of the test for final analysis. The results obtained are summarized below:

Split half (odd - even) reliability
(a) Calculated from Spearman Brown formula = 0.765
(b) Calculated from Guttman's formula = 0.742

The results show that the test has sufficiently high reliability. Hence it was used for the purpose of final analysis of the data.

3.4.2 Standardization of the Environment Hazards Attitude Scale (EHAS)

Standardization of the EHAS was done by calculating reliability coefficients and by estimating various types of validities. For this purpose data obtained from the total sample of 540 respondents were taken into consideration.

3.4.2.1 Reliability of the EHAS

Test reliability lets that to what extent individual differences of scores can be assigned to chance errors. In tests that have a high coefficient of reliability, errors of measurement have been reduced to a minimum. Reliable tests, whatever they measure, yield comparable scores upon repeated administration.
The reliability of test is defined by Guilford (1965), "Reliability is the proportion of the true variance in obtained test scores".

Four methods which are generally used to test the reliability are:

(i) Test-retest method

In this case the same evaluation device is used with the group. The agreement between the scores of two tests are determined by means of co-efficient of correlation.

(ii) Split-Half method

In this method, the test is divided into two simple parts, usually two halves are formed by pooling the odd and even items in separate halves because it is difficult to determine difficulty level of items for this purpose. The co-efficient of correlation is computed between the scores of odd and even items.

(iii) Alternate of Parallel form method

This method can be used only in those cases where two forms of the test have been prepared. Correlation can be obtained between the two forms.

(iv) Method of rational equivalence

This method is also known as Kuder-Richardson reliability or inter item consistency. It is a method based on single administration. It is based on consistency of response to all items. Inter item consistency is found through the formula developed by Kuder and Richardson (1937).

In the present study, the investigator used the following two methods:
(a) Split-half method

This method is the most used method for determining the reliability of a test. In the present study the test scores were divided into odd and even halves by the investigator. The students' and teachers' data related to the three sets of scores were obtained from the calculation as is given in Table 3.6.

TABLE NO. 3.6

Students Data Related to the two halves of the Test

<table>
<thead>
<tr>
<th>Sample</th>
<th>Items</th>
<th>No. of Cases</th>
<th>Mean</th>
<th>S.D.</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odd</td>
<td>300</td>
<td>86.41</td>
<td>8.321</td>
<td>89.239</td>
</tr>
<tr>
<td></td>
<td>Even</td>
<td>300</td>
<td>85.509</td>
<td>8.224</td>
<td>87.634</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>300</td>
<td>171.919</td>
<td>14.83</td>
<td>210.928</td>
</tr>
</tbody>
</table>

\[ r_{\text{odd and even number}} = 0.61 \]

Teachers

<table>
<thead>
<tr>
<th>Sample</th>
<th>Items</th>
<th>No. of Cases</th>
<th>Mean</th>
<th>S.D.</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odd</td>
<td>240</td>
<td>86.245</td>
<td>7.642</td>
<td>58.400</td>
</tr>
<tr>
<td></td>
<td>Even</td>
<td>240</td>
<td>86.815</td>
<td>8.146</td>
<td>66.357</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>300</td>
<td>173.06</td>
<td>14.12</td>
<td>202.208</td>
</tr>
</tbody>
</table>

\[ r_{\text{odd and even number}} = 0.638 \]

From the above data coefficient of reliability was calculated as follows:

(i) Spearman - Brown Formula (Guilford, 1982, p. 378)

\[ r_{\text{ttt}} = \frac{2r}{1 + r} \]

where 'rtt' is the coefficient of the total test, \( r \) is the coefficient of correlation between two halves of the test.
for students: \( \text{rtt} = 0.757 \)

for teachers: \( \text{rtt} = 0.788 \)

(ii) Guttman's Formula (Guliksen 1965, p. 199)

\[
\text{rtt} = 2x \left[ \frac{1 - \frac{\sigma^2_o + \sigma^2_e}{\sigma^2_t}}{1} \right]
\]

Where \( \sigma^2_o, \sigma^2_e \) and \( \sigma^2_t \) are the variances of the odd, even and the total test. While \( \text{rtt} \) represents the reliability of the total test.

Hence for students \( \text{rtt} = 0.755 \)

for teachers \( \text{rtt} = 0.766 \)

The values of students 0.757 and 0.755, values for teachers 0.788 and 0.766 indicate that the internal consistency of the test is high.

(2) Test - Retest Reliability

The test-retest reliability coefficient is simply the correlation between the scores obtained by the same group of persons on two administrations of the test. In the present study the time interval between the two administrations of the test was four weeks.

The respondents of four schools of different types as stated earlier in Table No. 3.3 were given the test. The scores of 120 respondents were tabulated with their previous scores i.e. the scores of the third administration of the test. Pearson's product-moment coefficient of correlation was then calculated to obtain the reliability of coefficient. The value of 'r' for the students came out as 0.788 and the teachers 0.791. It shows that the test has a very high coefficient of stability.
The split half reliability and test-retest reliability on EHAS for students and teachers came out quite satisfactory.

3.4.2.2 Validity of the EHAS

Validity of a test is determined by measuring the extent to which it matches with a given criterion. Guliksen (1959) has defined validity as, "the correlation of the test with some criterion".

According to Freeman (1939) validity is the first necessary condition of valid test that it must have an adequate degree of reliability. If the reliability coefficient of test is zero, it cannot correlate with anything. A test that correlates poorly even with itself cannot correlate well with a measure of another variable.

Some important methods of measuring validity are as under:

(i) Predictive validity    (ii) Concurrent validity
(iii) Content validity    (iv) Construct validity

In the present study the suitable external criterion for judging the criterion related validity was not available. Hence the investigator with an attempt to validate the constructed tool i.e. EHAS for students and teachers, has employed the methods of face validity and content validity.

(1) Face Validity of EHAS

The constructed tool (EHAS) has sufficient face validity because of the following reasons.

(a) The very words of the items and the construction of
sentences obviously refer to the EHAS or to one of its components, for example, "The youths are learning to smoke, drink, suicide and to murder from the television".

(b) It contains six components related to teachers and students attitude towards EH to education.
(c) The items are related to daily life situations of the respondents, involving the expression of EHAS.

2. Content Validity of the EHAS

It has been stated earlier that for defining the universe of content for the EHAS, the available literature to present study was surveyed and the judges opinion was sought. Then the components were decided and the items were prepared on the basis of decided components. These components were surroundings of the institution, physical facilities, television, over crowded classes, politics and political power and methods of teaching. EHAS was constructed by 48 statements and each component having eight statements(Table No. 3.7)

<table>
<thead>
<tr>
<th>Components</th>
<th>No. of Items</th>
<th>S.No.of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Surroundings of the Institution</td>
<td>8</td>
<td>1 to 8</td>
</tr>
<tr>
<td>2. Physical Facilities</td>
<td>8</td>
<td>9 to 16</td>
</tr>
<tr>
<td>3. Television</td>
<td>8</td>
<td>17 to 24</td>
</tr>
<tr>
<td>4. Over Crowded Classes</td>
<td>8</td>
<td>25 to 32</td>
</tr>
<tr>
<td>5. Politics and Political Power</td>
<td>8</td>
<td>33 to 40</td>
</tr>
<tr>
<td>6. Methods of Teaching</td>
<td>8</td>
<td>41 to 48</td>
</tr>
</tbody>
</table>
Then also content validity was calculated with the help of three experts. The percentage of agreement between investigator and experts, and between experts have been calculated. The average scoring ranged between 90 to 100 percent which is quite satisfactory.

3.5 TECHNIQUES

After dealing with the methods and the tools of the study, the techniques utilized for the treatment of the data of present investigation are discussed in this section. Statistical techniques have been utilized at various stages of the study, i.e. in item analysis, in estimation of reliability and validity of the tool, in testing the hypotheses and in reaching the conclusions of the study.

The various statistical techniques and the rationale, the purpose and the procedures of their use have been discussed in the following pages.

3.5.1 Frequency Distribution

This technique was used to classify the raw scores in various categories, so that the interpretation becomes meaningful. Frequency polygons were prepared on the basis of frequency distributions.

3.5.2 Measures of Central Tendencies

(a) Mean: Means of scores were obtained by various groups of the sample and the total sample of the study, because it is a basic statistic for further statistics needed for drawing conclusions.
(b) Median and Mode: The median and mode were also calculated for the grouped data obtained from the total raw scores. Because they help in judging the normality of a distribution.

3.5.3 Measures of Variability

Range and standard deviations were calculated for finding the variability among the data. Range was needed to classify data and to prepare frequency polygons. Standard deviations were calculated for various groups of data for further statistics like 't' test etc.

3.5.4 Skewness and Kurtosis

These two statistics help in seeing the normality of scores. With the help of skewness we can see the intensity and the direction of the deviation of the scores from the normal distribution.

Kurtosis shows the degree of steepness of the distribution curve.

3.5.5 Standard Error of Mean

It is the ratio of the standard deviation to the square root of the degree of freedom. It helps in determining the amount of probable error in estimation of population mean from the sample mean.

3.5.6 Significance of Difference Between two Means

When two groups are to be compared on the basis of their mean scores, the 't' is calculated. The assumption for 't' are (i) homogeneity of variance (ii) normality of distribution and (iii) the independence of groups. When the data satisfy these assumptions 't' is
calculated.

3.5.7 Analysis of Variance

When more than two groups are compared simultaneously statistics of analysis of variance (ANOVA) is used. In the present study subjects were compared for their EH attitude scores on the basis of status (teachers and students), sex (male and female) and area (urban, rural and tribal). Before employing the ANOVA care was taken to see that the assumptions underlying this statistics are met.

3.5.8 Pearson's Product Moment Correlation

When relationship between two variables related to a group of students is seen and when the 'N' is large, then Pearson 'r' is calculated. In the present study this coefficient was calculated for finding the relationship between two halves (odd and even) of the EHAS.

3.6 DATA COLLECTION PROCEDURE

Data is very essential for an investigation. In the present study, it has served the following purposes:

(i) to provide solid foundation for the study.
(ii) to provide definite direction to a research inquiry.
(iii) to substantiate the various arguments in research findings.
(iv) to use data for the estimation of population parameters in order to draw generalization.
(v) With the help of statistical data the hypotheses of investigation were tested.
After getting the tool constructed in the final form, data were collected from the eleventh standard students (boys and girls) and the Higher Secondary School teachers (male and female). From each school having either one or two class sections, depending upon the strength of the students and accordingly teachers were selected. Before applying the tool, students and teachers were told about the purpose of present study and were assured by the investigator that the information furnished by them will be kept secret.

As the tool required about thirty five to forty minutes for the complete administration on a class of about thirty students the data from all the subjects were collected within one and a half month to eliminate the effect of age and other distraction on the subjects due to time-interval.

All the precautions, needed for administrating the test were taken. The response sheets were scored with the help of the scoring keys.

3.7 TABULATION OF THE DATA

After scoring the response sheets the scores were tabulated along with other information obtained from the analysis of the personal data bank, given at the top of response sheets. It was necessary for the classification of the data about various groups on the basis of different variables. The data for this purpose were coded directly in the data coding sheets for the following analysis:

(1) Total attitude scores obtained by each of the 540
subjects.

(2) **Frequency distributions of these scores including percentage frequencies and cumulative frequencies for the total sample.**

(3) **Frequency distribution of the attitude scores of different groups of subjects based on variables sex, status and area.**

(4) **Mean, standard deviation and variance of the attitude scores for various groups of subjects based on variables - sex, status and area.**

(5) **Coefficient of correlation between total scores obtained in odd items and in even items of EHAS for split-half reliability.**