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METHODS AND PROCEDURES
METHODS AND PROCEDURE

This chapter deals with the method & procedure viz: design of the study, sample & sampling techniques, tools used to collect the data.

DESIGN OF THE STUDY

For carrying out any kind of research it is important that first of all a design is chalked out for research.

According to Best (1963) all research involves the elements of observation, description & the analysis of what happens under certain circumstances. A rather simple three point analysis maybe used to classify educational research practically all studies fall under one, or a combination of these types.

1. Historical research describes what was the process involves investigation, recording analyzing & interpreting the events of the past for the purpose of discovering generalizations that are helpful in understanding the past, understanding the present & to a limited extent in anticipating the future.

2. Descriptive research describes what is. It involves the description, recording, analysis & interpretation of conditions that exist. It involves some type of comparison or contrast & attempts to discover relationships between existing non manipulated variables.

3. Experimental research describes what will be when certain variables are carefully controlled or manipulated. The focus is on variable relationships. As defined here deliberate manipulation is always a part of experimental method.

This research study falls in the second category of research viz Descriptive research as it has certain characteristics which distinguish it from
other types of research. These characteristics are:

1. They are non-experimental, for they deal with the relationships between nonmanipulated variables in a natural, rather than artificial setting. Since the events or conditions have already occurred or exist, the researcher selects the relevant variables for an analysis of their relationships.

2. They involve hypothesis formulation & testing.

3. They use the logical methods of inductive - deductive reasoning to arrive at generalizations.

4. They often employ methods of randomization so that error may be estimated when inferring population characteristics from observations of samples.

5. The variables & procedures are described as accurately & completely as possible so that the study can be replicated by other researchers.

Thus this study is descriptive in the sense that:

(i) It is non-experimental.

(ii) It involves formulation of hypothesis & testing.

(iii) It employs the method of randomization in (a) selection of school; (b) selection of sample.

This study is also an ex-post-facto or explanatory observational study as it seeks to find answers to questions through the analysis of variable relationships. Also an attempt was made to determine the factors associated with occurrences, outcomes, conditions, or types of behavior. Since it is often impracticable to arrange occurrences an analysis of past events may be the only feasible way to study causation.

Thus the present study is descriptive, ex post facto, explanatory
study coupled with the techniques of causal-comparative relationship.

**Sampling**

The primary purpose of research is to discover principles that have universal application, but to study a whole population in order to arrive at generalizations would be impracticable, if not impossible. Some populations are so large that their characteristics could not be measured before the measurement had been completed the population would have changed.

A population is any group of individuals that have one or more characteristics in common that are of interest to the researcher. The population may be all the individuals of a particular type or a more restricted part of that group.

A sample is a small proportion of a population selected for observation & analysis. By observing the characteristics of the sample, one can make certain inferences about the characteristics of the population from which it is drawn.

Various techniques have been devised for obtaining a sample which will be representative of its population. The adequacy of a sample i.e. its lack of bias will depend upon our knowledge of the population as well as upon the method used in drawing the sample. Commonly used sampling techniques are random, stratified or quota, incidental & purposive.

For this study the investigator used the method of random sampling for the selection of the sample, a purposive sample for the selection of school and incidental sampling technique was used for the selection of class.

**Random Sampling**

The term "random" does not imply that the sample has been chosen in an offhand, careless or haphazard manner. Instead it means that we rely upon a certain method of selection called "random" to provide an
unbiased cross section of the larger group or population. The criteria for randomness in a sample are met when (1) every individual (or animal or thing) in the population or supply has the same chance of being chosen for the sample & (2) when the selection of one individual or thing in no way influences the choice of another. Randomness in a sample is assured when one draws similar & well shaken up slips out of a hat, or number tables. In each of these cases selection is made in terms of some mechanical process & is not subject to whims if any, of the experimenter.

In the present study the sample selection was done with the help of odd-even method of randomisation keeping in view the nature of the study, which demanded a cross section of population.

**Incidental sampling**

The term "incidental sampling" (also called "accidental sampling") should be applied to those groups which are used chiefly because they are easily or readily obtainable. School children, college sophomores enrolled in psychology classes, and laboratory animals are available at times in numbers, and under conditions none of which may be of the experimenter's choosing. Such casual groups rarely constitute random samples of any definable population. SE formulas apply with a high degree of approximation - if at all - to incidental samples. Generalization based upon such data are often misleading. In this study incidental sampling technique was used for the selection of the class.

**Purposive Sampling**

A sample maybe expressly chosen because, in the light of available evidence, it mirrors some larger group with reference to a given characteristic. News paper editors are believed to reflect accurately public opinion upon various social and economic questions in their sections of the country. A sample of housewives may represent accurately the buyers of
canned goods, a sample of brokers, the opinion of financiers on a new stock issue. If the saying "As Maine goes, so goes the Nation" is accepted as correct, then Maine becomes an important barometer (a purposive sample) of political thinking. Random sampling formulas apply more or less accurately to purposive samples. In this study purposive sampling was done in the selection of cities i.e. Chandigarh & Ahmedabad.

Field of investigations

Selection of schools

First of all out of a large numbers of schools i.e. Government, Government aided & private schools, the Kendriya Vidyalayas were selected because the population of these schools is fairly representative of the social strata, as there are mostly children of the employees of central government, defence (army, air force & navy) studying in these schools.

Secondly the sample was drawn from the union territory of Chandigarh which is the capital of Punjab & Haryana. Sample was also taken from Ahmedabad the erstwhile capital of Gujarat state, for the simple reason that investigator had an easy access to both the places. Thus the technique of selection of schools was purposive in nature.

Selection of class

The field of investigation was delimited to class XI of senior secondary stage of the schools for the simple reason that the outgoing classes i.e. X or XII were not spared by the authorities for the purpose of data collection. Thus the technique of selection of class was incidental depending on the availability of the class. Therefore this is incidental sampling.
Table 2.1

BREAK UP OF SAMPLE

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of school</th>
<th>XIA Stu. taken</th>
<th>XIB Stu. taken</th>
<th>XIC Stu. taken</th>
<th>Total stu. taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kendriya Vidyalaya No.1 Chandigarh</td>
<td>40</td>
<td>25</td>
<td>40</td>
<td>75</td>
</tr>
<tr>
<td>2.</td>
<td>Kendriya Vidyalaya Sector 31</td>
<td>40</td>
<td>25</td>
<td>40</td>
<td>75</td>
</tr>
<tr>
<td>3.</td>
<td>Kendriya Vidyalaya Sector 47</td>
<td>35</td>
<td>20</td>
<td>35</td>
<td>60</td>
</tr>
<tr>
<td>4.</td>
<td>Kendriya Vidyalaya Army, Ahmedabad</td>
<td>40</td>
<td>25</td>
<td>40</td>
<td>75</td>
</tr>
<tr>
<td>5.</td>
<td>Kendriya Vidyalaya Shanibaug, A'bad</td>
<td>40</td>
<td>25</td>
<td>40</td>
<td>75</td>
</tr>
<tr>
<td>6.</td>
<td>Kendriya Vidyalaya Airforce, A'bad</td>
<td>38</td>
<td>20</td>
<td>37</td>
<td>60</td>
</tr>
</tbody>
</table>

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TOOLS USED TO COLLECT DATA

Five types of tools have been used in the study:


2. Classroom environment scale (1986) to study the classroom environment of the students by R. Moos.

3. Raven's progressive matrices (1938) was used to find out intelligence of adolescents.

4. Deo-Mohan's achievement motivation scale (1986) was used to find out the achievement motivation of all the students.

5. Deo Mohan socio-economic status scale (1992) was used to find out the socio-economic status of all the students.
The family environment scale comprises ten subscales that measure the social environmental characteristics of all types of families. The ten FES subscales assess three underlying domains or sets of dimensions, the relationship dimension, the personal growth dimensions and the system maintenance dimensions.

**FES subscales and Dimension Descriptions**

**Relationship Dimensions**

1. **Cohesion**
   
   The degree of commitment, help, and support family members provide for one another.

2. **Expressiveness**
   
   The extent to which family members are encouraged to act openly and to express their feelings directly.

3. **Conflict**
   
   The amount of openly expressed anger, aggression, and conflict among family members.

**Personal Growth Dimensions**

4. **Independence**
   
   The extent to which family members are assertive, are self-sufficient, and make their own decisions.

5. **Achievement Orientation**
   
   The extent to which activities (such as school and work) are cast into an achievement-oriented or competitive framework.

6. **Intellectual-Cultural Orientation**
   
   The degree of interest in political, social, intellectual and cultural activities.
7. **Active-Recreational Orientation**
   The extent of participation in social and recreational activities.

8. **Moral-Religious Emphasis**
   The degree of emphasis on ethical and religious issues and values.

**System Maintenance Dimensions**

9. **Organization**
   The degree of importance of clear organization and structure in planning family activities and responsibilities.

10. **Control**
    The extent to which set rules and procedures are used to run family life.

**Administration**
    Administration was done according to instructions given in the manual.

**Reliability**
    Test-re-test reliabilities are all in an acceptable range, varying from a low of 0.68 for independence to a high of 0.86 for cohesion.

    The classroom environment scale comprises nine subscales that measure the social environmental characteristics of all types of classrooms. The nine CES subscales assess involvement, affiliation, teacher support, task orientation, competition, order and organization, rule clarity, teacher control and innovation.

**CES Subscale and Dimension Descriptions**

**Relationship Dimensions**

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1. Involvement
   The extent to which students are attentive and interested in class activities, participate in discussions, and do additional work on their own.

2. Affiliation
   The level of friendship students feel for each other, as expressed by getting to know each other, helping each other with homework, and enjoying working together.

3. Teacher Support
   The amount of help and friendship the teacher manifests towards students; how much the teacher talks openly with students, trusts them, and is interested in their ideas.

Personal Growth/Goal Orientation Dimensions

4. Task Orientation
   The amount of emphasis on completing planned activities and staying on the subject matter.

5. Competition
   How much students compete with each other for grades and recognition and how hard it is to achieve good grades.

System Maintenance and Change Dimensions

6. Order and Organization
   The emphasis on students behaving in an orderly and polite manner and on the overall organization of assignments and classroom activities.

7. Rule Clarity
   The emphasis on establishing and following a clear set of rules and on students knowing what the consequences will be if they do not follow them; the extent to which the teacher is consistent in dealing with students who break rules.
8. Teacher Control

How strict the teacher is in enforcing the rules, the severity of punishment for rule infractions, and how much students get into trouble in the class.

9. Innovation

How much students contribute to planning classroom activities, and the extent to which the teacher uses new techniques and encourages creative thinking.

Administration

Administration was done according to the instructions given in the manual.

Reliability

Test-re-test reliability ranges from a low of 0.72 to a high of 0.90.

DEO-MOHAN ACHIEVEMENT MOTIVATION (n-Ach) SCALE (1986)

Deo Mohan Achievement Motivation (n-Ach) scale (1986) was used to study the achievement motivation of adolescents. The present scale was prepared with 115 items. For item analysis and item discrimination values, Tohson's U.L.I. method was applied, taking 27% upper-lower achievers out of a group of 46 boys and girls. Out of 115 items, those which yielded negative or zero values were rejected outright. Finally 50 items were chosen after careful scrutiny having the distribution as follows:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Factor</th>
<th>No. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic Motivation</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Need for achievement</td>
<td>4</td>
</tr>
</tbody>
</table>
3. Academic challenge 4
4. Achievement anxiety 1
5. Importance of grades/marks 2
6. Meaningfulness of task 4
7. Relevance of school/college to future goals 2
8. Attitude towards education 4
9. Work Methods 5
10. Attitude towards teachers 3
11. Interpersonal relations 4
12. Individual concern 2
13. General interests 4
14. Dramatics 2
15. Sports etc. 5

Total 50

In the final scale out of 50 items, 13 are negative and 37 are positive items. Hindi version of the scale was also prepared for the convenience of the respondents for the present study, English version of the scale has been used.

Reliability

Test retest method was applied to obtain the reliability coefficient of the scale. Taking different sets of sample, the administration of the scale was repeated on several occasions. The results are given below.

<table>
<thead>
<tr>
<th>Sample</th>
<th>N</th>
<th>Interval</th>
<th>r</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed group</td>
<td>51</td>
<td>4 weeks</td>
<td>.69</td>
<td>.01</td>
</tr>
</tbody>
</table>
The co-efficient of reliability are sufficiently high and the scale can be considered as reliable.

Validity

As far as the validity of the scale is concerned, in the first instance, the item validity established by the high-low discrimination method was accepted as the validity of the whole measure. Besides this scale was also used for validating the projective test of achievement motivation. the co-efficient of correlation between the scale and the projective test was observed to be .54 which speaks for the validity of the scale also. the validity being of concurrent nature. Finally the scale scores were also correlated with the scores obtained by administering the aberdeen Academic Motivation Inventory of Entnistle (1968) yielding a co-efficient of correlarion as .75 for a mixed sample of 93; this correlation is high enough to establish the validity of the scale.

STANDARD PROGRESSIVE MATRICES (Raven's Standard Progressive Matrices)

The S.P.M. (set of A, B, C, D & E) or SPM, is a test of person's capacity at the time of the test to apprehend meaningless figures presented for his observation, see the relations between them, concern the nature of the figure completing each system of relations presented and by so doing, develop a systematic method of reasoning. The scale consists of 60 problems divided into five sets of 12. In each set the first problem is as nearly as possible self evident. The problems which follow become progressively
more difficult. The order of the item provides training in the method of working. The five sets provide 5 opportunities for grasping the method and five progressive assessments of a person's capacity for intellectual activity. To ensure sustained interest from fatigue the figures in each problem are boldly presented accurately drawn and as far as possible pleasing to the eye.

Everyone, whatever his age, is given exactly the same series of problems, in the same order and is asked to work at his own speed, without interruption from the beginning to end of the scale. As the order of the problems provides the standard training in the method of working, the scale can be given either as an individual, an self administered or as a group test. A person's total score provides an index of his intellectual capacity to relatively little influence from the cultural environment in which the individual grew up, or his education. The contribution which each of the five sets make to the total provides a means of assessing the consistency of the estimate and the psychological significance of discrepancies in the test results. As an un-timed "capacity" test and even as a 20 min. "speed" or "efficiency" test the results have been found to be more reliable and psychologically valid than one might expect from sixty problems arranged in five sets of overlapping difficulty. It must however, be kept in mind that the scale is intended to span the whole range of intellectual development, rather then to differentiate clearly between the individual persons.

The scale has a re-test reliability varying with age from 0.83 to 0.93. It correlates 0.86 with Terman Merill scale and has been found to have a 'g' saturation of 0.82.

Administration of the test

Administration of the test was done as per the instructions given
in the manual.

**DEO MOHAN SOCIO - ECONOMIC STATUS SCALE (Revised)**

1992 Dept. of Education, Punjab University, Chandigarh.

Socio-economic status scale is the indication of the social as well as the occupational status of the subjects.

In this study Deo Mohan socio-economic status scale (Revised 1992) was used. The investigator use this scale to find out the effect that socio-economic status has over the general scholastic achievement.

**Reliability**

The test was standardized on 129 school and college students. Reliability was found applying test - re-test method at the intervals of 6 weeks, reliability co-efficient of the method is 0.91. Validity co-efficient of the test 94 which was validated against Kupperswami's socio economic status scale on first 3 items i.e. income occupation & education.

Norms:- Mean =64 SD-25 low score below 40; overage 40-85; high above 85 Norms were prepared on sample of 400 students population of XI class.

**Scoring Procedure**

The data collected with the help of various tools as family environment scale; classroom environment scale; Deo-Mohan achievement motivation scale; Deo-Mohan socio-economic status scale & Raven's standard progressive materials were scored strictly in accordance with the directions given in their respective variables.

**STATISTICAL TECHNIQUES EMPLOYED TO ANALYSE THE DATA**

In accordance with various objectives of the study & to test various hypotheses, various statistical techniques were employed to analyse the data.
Descriptive analysis

Means, standard deviations, SE's SK, KU were employed to study the nature of variables.

Comparitive analysis

i T-ratios were employed to compare the different socio-economic groups on all the variables viz academic achievement, variables of family environment, variables of classroom environment, achievement motivation & intelligence.

ii To compare total boys & total girls on the variables of family environment, classroom environment, achievement motivation, intelligence & socio-economic status.

iii To compare the student samples of both Chandigarh & Ahmedabad on all the variables viz academic achievement, variables of family environment, variables of classroom environment, achievement motivation & intelligence.

Bivariate analysis

Co-efficients of correlations were employed to study the nature & degree of relationship between the variables under study.

Multivariate Analysis

Stepwise multiple regression & multiple correlations were worked out to find the predictors of academic achievement.

Factor Analysis

factor analysis was done to study the constellation of variables, and structure of variables under different canopies of factors keeping in views the dependent variable viz achievement & its constellation with independent variables of family environment, variables of classroom environment, achievement motivation & intelligence.
Table 2.2
Comparison between Chandigarh & Gujarat State on total sample on all variables

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Variable</th>
<th>Chandigarh</th>
<th>Ahmedabad</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>1</td>
<td>Academic Achievement</td>
<td>61.75</td>
<td>11.63</td>
</tr>
<tr>
<td>2</td>
<td>Cohesion</td>
<td>6.41</td>
<td>1.51</td>
</tr>
<tr>
<td>3</td>
<td>Expressiveness</td>
<td>4.99</td>
<td>1.39</td>
</tr>
<tr>
<td>4</td>
<td>Conflict</td>
<td>3.97</td>
<td>1.73</td>
</tr>
<tr>
<td>5</td>
<td>Independence</td>
<td>5.55</td>
<td>1.68</td>
</tr>
<tr>
<td>6</td>
<td>Achievement Orientation</td>
<td>5.95</td>
<td>1.58</td>
</tr>
<tr>
<td>7</td>
<td>Int. Cult. Orientation</td>
<td>6.03</td>
<td>1.76</td>
</tr>
<tr>
<td>8</td>
<td>Act. Recr. Orientation</td>
<td>5.43</td>
<td>1.60</td>
</tr>
<tr>
<td>9</td>
<td>Moral Religious emphasis</td>
<td>5.38</td>
<td>1.60</td>
</tr>
<tr>
<td>10</td>
<td>Organization</td>
<td>6.27</td>
<td>1.78</td>
</tr>
<tr>
<td>11</td>
<td>Control</td>
<td>4.96</td>
<td>1.59</td>
</tr>
<tr>
<td>12</td>
<td>Involvement</td>
<td>6.39</td>
<td>1.89</td>
</tr>
<tr>
<td>13</td>
<td>Affiliation</td>
<td>6.53</td>
<td>2.05</td>
</tr>
<tr>
<td>14</td>
<td>Teacher Support</td>
<td>5.41</td>
<td>1.96</td>
</tr>
<tr>
<td>15</td>
<td>Task Orientation</td>
<td>6.03</td>
<td>1.60</td>
</tr>
<tr>
<td>16</td>
<td>Competition</td>
<td>6.93</td>
<td>1.74</td>
</tr>
<tr>
<td>17</td>
<td>Order &amp; Organization</td>
<td>5.87</td>
<td>1.91</td>
</tr>
<tr>
<td>18</td>
<td>Rule clarity</td>
<td>6.34</td>
<td>2.91</td>
</tr>
<tr>
<td>19</td>
<td>Teacher Control</td>
<td>5.70</td>
<td>1.70</td>
</tr>
<tr>
<td>20</td>
<td>Innovation</td>
<td>5.48</td>
<td>2.92</td>
</tr>
<tr>
<td>21</td>
<td>Achievement motivation</td>
<td>142.97</td>
<td>25.77</td>
</tr>
<tr>
<td>22</td>
<td>Intelligence</td>
<td>45.31</td>
<td>8.82</td>
</tr>
<tr>
<td>23</td>
<td>Socio Economic Status</td>
<td>63.87</td>
<td>25.32</td>
</tr>
</tbody>
</table>

Discussion based on Table 2.2

The objective

The objective of this analysis on Table 2.2 was to compare the two samples from Chandigarh and student sample from Ahmedabad on all
the variables family environment, classroom environment, achievement motivation, intelligence and socio economic status to see if any differences existed on any of the variables.

It was necessitated because of the fact sample was drawn from two different states. If the two groups would have exhibited any difference on the variables under study it could not have been possible to combine the two groups for further analysis.

**Discussion based on Table 2.2**

On observing the Table 2.2, no significance difference on any of the variables of family environment, classroom environment, achievement motivation, intelligence and socio economic status were observed. This gave the investigator green signal to combine the two samples for further analysis.