CHAPTER III

THE RESEARCH DESIGN
THE RESEARCH DESIGN

The chapter entitled, The research design provides a brief picture of the method used in conducting the research, the sample and the tools used in conducting the research. It also gives the procedure adopted for the collection of the data along with the statistical techniques used and the rationale underlined them. Here the study aims at comparing the achievement of the students teachers enrolled through formal and non formal modes in relation to their attitude towards teaching and adjustment. The ambit of the research is confined to a descriptive analytical subject. The relevant tool for measuring the achievement of the students enrolled into two streams was constructed by the Researcher and for measuring the Attitude towards teaching and adjustment, already available tools were used by the researcher to collect the data. These tools were administered upon a sample of about 600 B.Ed. students teachers, 300 belonging to each stream. The results of the tests were compiled and the statistical analysis was done for all the 600 students teachers belonging to the formal and non formal streams.
3.1 METHOD USED

Method used is always according to the nature of the study. Taking into consideration the nature of the present study, normative survey method was used for the collection of data. All the three tools were administered upon the sample and the data was collected by the Investigator.

3.2 THE POPULATION

Population refers to any defined aggregate or whole. In the present study, the population comprises, student-teachers belonging to formal stream of various colleges of education affiliated to M.D. University, Rohtak and the student teachers of the non formal stream enrolled with the Directorate of Distance Education of M.D. University, Rohtak.

3.3 THE SAMPLE

In order to ensure the representativeness of the population, the researcher first selected the regular colleges of Education of M.D.
University, Rohtak on the basis of their districtwise representation. Moreover, it would not be possible for the investigator to go to all the students of all the 14 colleges of Education affiliated to the M.D. University, Rohtak. Therefore the researcher identified a sampling frame.

There are six districts in which the University has 14 affiliated colleges of education. Districtwise distribution of the colleges is given below :-

**TABLE - 1**

**DISTRICT-WISE DISTRIBUTION OF THE COLLEGES IS AS UNDER :-**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>NAME OF THE COLLEGE AND DISTRICT-PLACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>K.M. COLLEGE OF EDUCATION, BHIWANI</td>
</tr>
<tr>
<td>2.</td>
<td>GOVT. COLLEGE OF EDUCATION, BHIWANI</td>
</tr>
<tr>
<td>3.</td>
<td>SARASWATI COLLEGE OF EDUCATION, CHARKHI DADRI (BHIWANI)</td>
</tr>
<tr>
<td>4.</td>
<td>SHIVA COLLEGE OF EDUCATION, TAIGOAN, (FARIDABAD)</td>
</tr>
</tbody>
</table>
5. R.B.S. COLLEGE OF EDUCATION, REWARI
6. S.P. COLLEGE OF EDUCATION, REWARI
7. R.L.S. COLLEGE OF EDUCATION, SINDHRAWAI, (GURGAON)
8. C.R. COLLEGE OF EDUCATION, ROHTAK
9. VAISH COLLEGE OF EDUCATION, ROHTAK
10. ARYA VAISH KANYA COLLEGE OF EDUCATION BAHADURGARH (JHJAJAR)
11. G.B. COLLEGE OF EDUCATION, ROHTAK
12. B.P.S. COLLEGE OF EDUCATION, KHANPUR KALA SONEPAT
13. TIKA RAM COLLEGE OF EDUCATION SONEPAT
14. HINDU COLLEGE OF EDUCATION, SONEPAT

Out of these six districts, the districtwise selection was made. Out of 3 colleges in District Bhiwani, one college was selected. Out of three colleges of Sonepat, 2 colleges were taken out the two colleges of Mahendragarh district, one college was choosen, out of the colleges in Rohtak, 2 colleges were choosen and out of the two colleges in Faridabad and Gurgaon, one college was choosen by the
Thus, in all 7 regular colleges of Education affiliated to M.D. University, Rohtak were selected by draw of lots for drawing out the sample of the 350 students teachers of the regular stream.

### TABLE - 2

**District-Wise distribution of the Colleges of Education selected for the study :-**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>NAME OF THE COLLEGE AND DISTRICT-PLACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>GOVT. COLLEGE OF EDUCATION, BHIWANI</td>
</tr>
<tr>
<td>2.</td>
<td>SARASWATI COLLEGE OF EDUCATION, CHARKHI DADRI</td>
</tr>
<tr>
<td>3.</td>
<td>SHIVA COLLEGE OF EDUCATION, TAIGOAN, FARIDABAD</td>
</tr>
<tr>
<td>4.</td>
<td>R.L.S. COLLEGE OF EDUCATION, SINDHRAWAI, GURGAON</td>
</tr>
<tr>
<td>5.</td>
<td>R.B.S. COLLEGE OF EDUCATION, REWARI</td>
</tr>
<tr>
<td>6.</td>
<td>ARYA VAISH KANYA COLLEGE OF EDUCATION BAHADURGARH (DIST. JHAJJAR)</td>
</tr>
</tbody>
</table>
7. G.B. COLLEGE OF EDUCATION, ROHTAK
8. B.P.S. COLLEGE OF EDUCATION, KHANPUR KALAN, SONEPAT
9. TIKA RAM COLLEGE OF EDUCATION SONEPAT

**TABLE - 3**

**COLLEGE WISE DISTRIBUTION OF THE STUDENTS**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>NO. OF STUDENTS</th>
<th>MALE/FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>GOVT. COLLEGE OF EDUCATION, BHIWANI</td>
<td>35/15</td>
</tr>
<tr>
<td>2.</td>
<td>SARASWATI COLLEGE OF EDUCATION, CHARKHI DADRI</td>
<td>30/20</td>
</tr>
<tr>
<td>3.</td>
<td>SHIVA COLLEGE OF EDU., TAIGOAN FARIDABAD.</td>
<td>28/22</td>
</tr>
<tr>
<td>4.</td>
<td>R.L.S. COLLEGE OF EDU., SINDHRAWAI, REWARI</td>
<td>24/26</td>
</tr>
<tr>
<td>5.</td>
<td>R.B.S. COLLEGE OF EDUCATION, REWARI</td>
<td>22/28</td>
</tr>
<tr>
<td>6.</td>
<td>ARYA VAISH KANYA COLLEGE OF EDUCATION,</td>
<td>50girls</td>
</tr>
</tbody>
</table>
BAHADURGARH.

7. G.B. COLLEGE OF EDUCATION, 35/15
ROHTAK

8. B.P.S. COLLEGE OF EDU., 28/22
KHANPUR KALAN, SONEPAT

9. TIKA RAM COLLEGE OF 35/15
EDUCATION SONEPAT

Total 450 209/241

For drawing a sample of distance teaching mode, from the sample, there are students teachers enrolled through distance teaching of M.D. University, Rohtak randomised cluster sampling was used. First of all a list of all the personal contact programme teaching centres of those districts of Haryana from where these sample of students teachers of regular students was taken and the same was prepared. Then by random method one centre in each selected district was choosed and all the student teachers of humanity and science groups , whose number was about 50 in each centre was taken for the collection of data.
3.4 TOOLS USED IN THE STUDY

The following tools have been used in the present study for the collection of data:

A. B.Ed. Achievement test constructed by the Researcher herself.
B. Attitude towards teaching by Dr. S.P. Ahluwalia
C. Adjustment inventory by Dr. A.K.P. Sinha & Dr. R.P. Singh

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>TOOLS USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACHIEVEMENT TEST (Dependent Variable)</td>
<td>Constructed by the Researcher</td>
</tr>
<tr>
<td>ATTITUDE TOWARDS TEACHING (Independent Variable)</td>
<td>DR. S.P. Ahluwalia</td>
</tr>
<tr>
<td>ADJUSTMENT INVENTORY (Independent Variable)</td>
<td>DR A.K. Sinha &amp; Dr R.P. Singh</td>
</tr>
</tbody>
</table>
A. ACHIEVEMENT TEST:

In this study, the researcher has constructed the achievement test having Multiple Choice Test Items for measuring the achievement of B.Ed. student-teachers of both the streams. The investigator has used the Multiple Choice Test Items under the Selection type items. These items have been chosen because these items are the most likely used. They can be designed to measure a variety of learning outcomes for example, knowledge, proficiency and provide the higher quality items. In the Encyclopaedia of Educational research by Harold E. Mitzen Multiple Choice items have the following advantages over other type items:

1. Multiple Choice Test Items can be used to assess the wide range of skills.
2. With the use of these items, large sample of knowledge can be assessed in a brief period.
3. These items are efficient to score even for large number of takers.
4. These types of items can be made highly reliable.
Moreover, it has been mentioned that it is very difficult to prepare Multiple Choice Test Items but it is very easy to score them. Therefore, Multiple Choice Test Items have advantages over the other types so the researcher has constructed the achievement test having Multiple Choice question only in the first four compulsory papers of the B.Ed. syllabus of the formal and non-formal Streams.

The following steps were followed for the construction of achievement test:

PRELIMINARY PLANNING AND SELECTION OF THE CONTENTS

This phase consisted:

* Detailed study of the whole syllabi of different compulsory subjects.
* Detailed study and analysis of the literature related to test construction and its standardisation.
* Analysis of curricula, text-books, research studies etc.
Preparation of blue-print, by taking into consideration the relative importance of various units, which was then discussed with various educationists dealing with the subjects.

Paper-wise Blue Print (Unit wise distribution of items in the achievement test) is given in the following tables

**TABLE - 4**

UNIT-WISE DISTRIBUTION OF THE ITEMS IN THE ACHIEVEMENT TEST

(PAPER - I : EDUCATION IN THE EMERGING INDIAN SOCIETY)

<table>
<thead>
<tr>
<th>UNIT NO.</th>
<th>NO. OF ITEMS</th>
<th>NO. OF ITEMS SELECTED</th>
<th>WEIGHTAGE in (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>8</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>2.</td>
<td>16</td>
<td>8</td>
<td>32%</td>
</tr>
<tr>
<td>3.</td>
<td>12</td>
<td>6</td>
<td>24%</td>
</tr>
<tr>
<td>4.</td>
<td>8</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>5.</td>
<td>4</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>6.</td>
<td>2</td>
<td>1</td>
<td>4%</td>
</tr>
</tbody>
</table>
TABLE - 5

UNIT-WISE DISTRIBUTION OF THE ITEMS IN THE ACHIEVEMENT TEST

(PAPER - II: EDUCATIONAL PSYCHOLOGY)

<table>
<thead>
<tr>
<th>UNIT NO.</th>
<th>NO. OF ITEMS (Try out test)</th>
<th>NO. OF ITEMS (Final form)</th>
<th>WEIGHTAGE in (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>4</td>
<td>16%</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>2</td>
<td>8%</td>
</tr>
</tbody>
</table>
### TABLE - 6

UNIT-WISE DISTRIBUTION OF THE ITEMS IN THE ACHIEVEMENT TEST

(PAPER - III A : INDIAN EDUCATION SYSTEM, STRUCTURE AND ITS PROBLEMS)

<table>
<thead>
<tr>
<th>UNIT NO.</th>
<th>NO. OF ITEMS</th>
<th>SELECTED ITEMS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Try out test)</td>
<td>(Final form)</td>
<td>in (%)</td>
</tr>
<tr>
<td>1.</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>2.</td>
<td>10</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>3.</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>4.</td>
<td>12</td>
<td>6</td>
<td>24%</td>
</tr>
<tr>
<td>5.</td>
<td>16</td>
<td>8</td>
<td>32%</td>
</tr>
</tbody>
</table>
**TABLE - 7**

UNIT-WISE DISTRIBUTION OF THE ITEMS IN THE ACHIEVEMENT TEST

(PAPER - IV : ESSENTIALS OF TEACHING-LEARNING)

<table>
<thead>
<tr>
<th>UNIT NO.</th>
<th>NO. OF ITEMS SELECTED (Try out test)</th>
<th>NO. OF ITEMS SELECTED (Final form)</th>
<th>WEIGHTAGE in (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>6</td>
<td>24%</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>3</td>
<td>12%</td>
</tr>
</tbody>
</table>
PREPARATION OF ACHIEVEMENT TEST:

For calculating the data for the present study regarding the achievement of the B.Ed. student-teachers of both the streams, the investigator has to prepare the achievement test in all the four compulsory papers of the B.Ed. course, because no standard Achievement Test for measuring the achievement of the B.Ed. student-teachers was available. There was a dire need to direct an achievement test to measure the achievement of the B.Ed. student-teachers. The items used in the achievement test are classified as selection type items.

PREPARATION AND EDITING OF TEST ITEMS

* Writing of items by the investigator. The number of items framed was three times the number required for the final test.
* Submission of items to authorities for critical evaluation.
* Revision of items in view of suggestions received from the subject experts.
* Preparation of experimental form of test.

ADMINISTRATION OF EXPERIMENTAL FORM AND PREPARATION OF TENTATIVE FINAL FORM:

* Framing of different instructions to be given to the testees. Administration of experimental form over 50 students of B.Ed. programme.

* Deletion of ambiguous items and modification of the items which had language difficulty.

* Revision and final editing of the items for tentative final form.

For this the investigator particularly kept in mind the following points:

i. The statements of the items were clearly and concisely worded.

ii. There was no ambiguity in meaning and construction of the statements.

iii. The statements were related directly to the topic.
iv. The irrelevant statements were avoided.

v. The statements were arranged properly and systematically under several problem areas.

vi. The sequence of the items was maintained in such a way that they were educationally sound.

vii. Efforts were made to test as much information as possible.

The number of items in the tentative final form was almost double the number required in the final form.

TRY OUT OF THE TEST

The test was administered over a representative sample of students of B.Ed. programme of M.D. University, Rohtak. As for item analysis, the researcher needed 370 test papers, the test was administered over 400 B. Ed. pupil teachers so as to keep margin for discarding the spoilt ones. The testees were given following instructions:-

* This is a test of what you have learned during the B.Ed. programme. The result of this test will be used for research purpose only.
* This test has four compulsory papers.
* In each of the four parts, there are 25 multiple choice. For each item select the answer that best completes the statement, or answers the question, and encircle the letter of that answer.
* Do not make unnecessary haste/delay to finish the test.
* Since your score will be the number of items answered correctly. Be sure to answer every item.

TIME LIMIT

For taking the try out test no time limit was kept. The test was administered and was taken back from the students after they had completed the test. On an average the students took three and a half hours to complete the test.

SCORING

The test papers were scored with the help of scoring key already prepared by the researcher on the basis of 1 mark for a correct answer and a zero for an incorrect one.
MEASUREMENT OF DISCRIMINATION AND DIFFICULTY

VALUE OF THE TEST ITEMS

For measuring the difficulty value and discrimination power, the following procedure was adopted :-

a. Selected 370 test papers randomly.

b. All the 370 scored test papers were arranged in descending order from the highest score to the lowest score.

c. Counted off 27% of the total number of test papers from the top of the stock. This formed the upper group.

d. Counted off 27% of the total number of test papers from the bottom of the stock. This formed the lower group.

e. Put aside the middle group i.e. 46% papers of the total, since it is not used in the item analysis.

f. For each item counted the number of students, in the upper group and in the lower group, who answered the item correctly and recorded the same as PU i.e. Proportion of students in the upper group who answered the item correctly and PL i.e. proportion of the students in the lower group who answered the item correctly.
g. Following formula was applied for determining the difficulty value $d_v$ of each item:

$$
\frac{PU + PL}{2}
$$

where:

$\begin{align*}
   dV & = \text{Difficulty value of the item} \\
   PU & = \text{Proportion of correct responses to the item in the upper group.} \\
   PL & = \text{Proportion of correct responses to the item in the lower group.}
\end{align*}$

h. The formula applied for determining the discriminating power is as follows:

$$
D = PU - PL
$$

Where

$\begin{align*}
   D & = \text{Index of discriminating power}
\end{align*}$
PU = Proportion of correct responses to the items in the upper group
PL = Proportion of correct responses to the items in the lower group

i. For determining the difficulty value and discriminating power, although our calculation is based on the upper and lower groups only and middle 46% are discarded, it provides a close approximation of the estimate that would be obtained with the total group.

In this regard, it becomes essential to quote that:

Davis (1951) computed the reliability coefficient of a group of typical item difficulty indices estimated in this way and has found it is to be 0.98, when the sample included 100 examinees in the highest 27% and 100 examinees in the lowest 27 group.
ITEM SELECTION FOR THE FINAL DRAFT

The items for the final tests were selected on the basis of the following criteria:

DIFFICULTY VALUE

Since "difficulty" refers to the percentage answering the item correctly, the smaller the percentage figure, the more difficult the item. Only those items were retained, the difficulty value of which ranged from 0.2 to 0.8 as the items having difficulty value below 0.2 are considered to be very difficult and above 0.8 very easy.

DISCRIMINATION POWER

The discriminating power of an item is reported as a decimal fraction; maximum positive discrimination is indicated by an index of 1.00. This is obtained only when all students in the upper group answer the item correctly and no one in the lower group does.
Zero is obtained when an equal number of students in each group answer the item correctly. Negative discriminating power is obtained when more students in the lower group than in the upper group answer correctly. Both of these types of items were deleted from the test and only those items whose discriminating power ranged from 0.1 to 0.6 were retained.

**RELIABILITY**

By reliability is meant the degree to which the test agrees with itself. To what extent can two or more forms of the test be relied upon to give the same results; or the same test to give the same results when repeated? If the scores on the test are stable under these conditions, the test is said to be reliable. In a word, reliability means consistency.

The absence of reliability in a test is a sign of weakness. Although high reliability is no guarantee that the test is good, low reliability does indicate that it is poor.
There are many ways by which reliability of a test can be found out. The reliability of a test can be found out. The reliability of this achievement test was found out by test-retest method.

This method has certain limitations, for example in the case of achievement test, this delay is likely to introduce other variables, the pupils may discuss the test between trials, do extra study or do other things that effect a change in the status of their knowledge. In addition to this, their physical and mental conditions may also effect the test. But in spite of these limitations the method has many advantages. Firstly, construction of two or more than two forms is always not possible and usually it is a troublesome job. Secondly, even if there is only one form, the split half technique may not be possible or feasible in all cases, as one to one matching is difficult to obtain.

The researcher used this method because of its superiority over other methods.

This method was used as only one form of the test was required, no matching between the items was required and it was easy
to administer the test to the respondents even twice. Also, the gap between the first and the second test would not make the difference because the respondents cannot talk with each other so easily.

The reliability of the measures of this achievement test, which was found out to be 0.71, using the test-retest method.

**VALIDITY**

'Validity' refers to the degree to which the test or other measuring instrument measures, what it claims to measure. In a way, validity means "Truthfulness". No matter what other merits the test may possess, if it lacks validity, it is worthless.

According to Linguist (1951) - The content of an achievement test is often formulated by the analysis of curriculum and text books and by the pooled judgement of recognised authorities in the field. Under these circumstances, a well constructed test may constitute the best available measure of criterion in a sense that the test itself defines...
the function it is to measure. Such test may be described as self defining.

Guilford (1954) also says "There are some measures whose validity is taken for granted, for example achievement test scores."

In view of the above viewpoints the validity of the achievement test used for the present study was taken for granted, because it was an achievement test and was constructed, keeping in view the weightage of the different portions of the syllabi. Thus, the content validity method was used for determining the validity of the achievement test constructed by the investigator.

**FINAL FORM OF ACHIEVEMENT TEST**

A. It consisted of 100 items (25 items in each subject)

B. The scoring key was prepared for it.

C. The instructions to be given to the testees were printed on the cover page of the test.

D. The time limit for the test was two and a half hours.
B. TEACHING ATTITUDE INVENTORY:

For measuring the attitudes of B.Ed. student-teachers towards teaching profession. Teacher Attitude Inventory (TAI) constructed and standardized by Dr. S.P. Ahluwalia has been used by the researcher.

The inventory has 90 item Likert instrument consisting of six sub-scales. Each scale has 15 statements that pertain to a particular aspect of prospective and practising teacher's professional attitudes. The six aspects deal with the inventory are, attitude towards:

1. Teaching Profession
2. Class-room Teaching
3. Child-Centred Practices
4. Educational Process
5. Students
6. Teachers

Out of 90 items, 56 are in positive declarative form, 34 of them are in negative form. 43 meant to assess attitude in favourable
direction and 46 in unfavourable direction. Thus the favourable and
unfavourable items adequately measures the aforesaid six selected
areas.

The TAI consists of a bilingual (English and Hindi) re-usable
test booklet with a separate answer sheet.

RELIABILITY

Reliability of the inventory was estimated by the split-half (odd
even) method and found to be 0.789 (corrected to 0.80) for a sample
of 239 prospective teachers.

The test-retest reliability coefficients after the interval of 3
months and 9 months are found to be 0.59 (N=102) and 0.64 (N=290).

VALIDITY

The inventory appears to have content validity and the method
of selecting items supports this supposition.
For determining the concurrent validity the scores on TAI were compared with the scores on the Hindi Adaptation of the MTAI developed by Dr. M.C. Joshi. The Obtained correlation coefficients for perspective teachers (N=79) came out to be positive but low.

The high discriminatory power of the items is a testimony of its internal consistency.

**RESPONSE MODE**

Likert continuum strongly agree, agree, undecided, disagree and strongly disagree has been provided for each item. The subject responds to each item by putting a tick mark (✓) in the square of the chosen alternative against the serial number of the attitude statement in the answer sheet. Subjects are required to respond to all the items likewise. They do not have the option to leave any item unanswered. The subjects are not permitted to make any mark on the test-booklets as they are reusable.
INSTRUCTIONS FOR THE TEST

The experimenter distributed the test-booklet and answer-sheet to each subject. After all subjects had received the proper test materials the experimenter said, "Don't open it unless told to do so. This inventory consists of 90 statements aimed to identify the professional attitudes of the teachers. There is considerable disagreement as to what these attitudes should be; therefore there are no right or wrong answers. What is wanted is your own individual feeling about the statements. Read each statement and decide how you feel about it. Then mark your answer in the space provided on the answer sheet.

Think in terms of the general situation rather than specific one. There is no time limit but work as rapidly as you can. Please respond to every item".

After giving the instructions the experimenter asked them to turn over the page and said,
"If you strongly agree, put tick (✓) mark in the space under Strongly Agree (SA). If you agree, put a tick (✓) mark in the space under Agree (A). If you are undecided or uncertain, put a tick (✓) mark in the space under Undecided (U). If you disagree, put a tick (✓) mark in the space under Disagree (D). If you strongly disagree, put a tick (✓) mark in the space under Strongly Disagree (SD)".

"Remember you have not to make any mark in this booklet. Now read each statement carefully and record your response on the answer sheet."

SCORING

Each item alternative is assigned a weight ranging from 4 (Strongly Agree) to 0 (Strongly Disagree) for favourable items. In the case of unfavourable items range of weights is reversed i.e. from 0 (Strongly Agree) to 4 (Strongly Disagree). The attitude score of a subject is the sum total of item scores of all the six sub-scales. The theoretical range of scores is from 0 to 360 with the higher score
indicating the more favourable attitude towards teaching and allied aspects.

C. ADJUSTMENT INVENTORY FOR COLLEGE STUDENTS (AICS):

Adjustment inventory by Dr. A.K.P. Sinha & Dr. R.P. Singhal has been used to measure the adjustment of the B.Ed. student-teacher of the formal and non-formal streams. The inventory has 102 items having five different areas of Adjustment, such as Home - 16 items Health - 15 items, Social - 19 items, Emotion - 31 items and Education - 21 items. Each has weight of one score.

Low scores indicate satisfactory Adjustment in all the areas except in social adjustment, where the scores indicate Aggressive behaviour and high scores indicate submissive and retiring behaviour.

The validity of the adjustment inventory of college students was based on biseareal correlation method and the correlation was found to be moderate positive. Correlating inventory scores with the hoste Superintendent rating also validated the inventory. Rating. The lov
scores in the area reveal better adjustment and the high scores reveal poor adjustment in the area. The following table corroborates this statement.

**TABLE - 8**

**CLASSIFICATION OF ADJUSTMENT IN TERMS OF CATEGORIES.**

<table>
<thead>
<tr>
<th>SCORES</th>
<th>CATEGORIES</th>
<th>DESCRIPTION</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>EXCELLENT</td>
<td>12 &amp; BELOW</td>
<td>13-27</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>GOOD</td>
<td>13-28</td>
<td>28-42</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>AVERAGE</td>
<td>29-45</td>
<td>42-57</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>46-61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>VERY</td>
<td>62 &amp; ABOVE</td>
<td>58 &amp; ABOVE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>UNSATISFACTORY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The adjustment inventory has been designed for the use with Hindi knowing college students of India. The test seeks to segregate normal form of poorly adjusted, college students of all grades in respect of five areas of adjustment (home, health, social, emotional, education). The test is helpful in screening the poorly adjusted
students, who may need further psychodiagnostic study and counseling.

The inventory has been prepared in Hindi as well in English and it has 102 items (Home - 16, Health - 15, Social - 19, Emotion - 31 and Education - 21). While constructing items, care was taken to employ ampler Hindi Words of every day use. Also, care was taken to formulate items keeping in view the local conditions and the problems facing the students population in this country.

In the beginning a list of 201 items was prepared. The list was presented to a group of 5 judges and only those items were retained about which the judges were unanimous for their retention. This led to elimination of 35 items out of 201. The remaining 166 items were subjected to item analysis. Item analysis was done by calculating biserial correlation of each item (I) with the total scores on the inventory and (ii) with the area total scores. The significance of a biserial at .001 level was fixed as the criterion for retaining an item. This led to the elimination of 64 items out of 160.

SAMPLE

The final test of 102 item was administered on a randomly selected representative sample of 2280 (1550 M, 7300 F) students of Patna and Magadh Universities. The Chi-square test was applied to determine the normality of the distributions of the scores of the subjects of the two sexes in respect of the total inventory as also the
five separate areas of the inventory. The values of Chi-square thus calculated showed that the distributions were not departing significantly from normality.

RELIABILITY

Coefficient of reliability was determined by (i) split half method (ii) Hoyt's analysis of variance method (iii) K-R Formula 20. Test retest reliability was also determined by administering the test after a period of 3 weeks on 228 students which is 10 percent of the total sample. The following table gives the reliability coefficient determined by different methods.

**TABLE - 9**

Reliability Coefficients of the inventory by using different methods.

<table>
<thead>
<tr>
<th>Method Used</th>
<th>Home (a)</th>
<th>Health (b)</th>
<th>Social (c)</th>
<th>Emotional (d)</th>
<th>Educational (e)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split half</td>
<td>.87</td>
<td>.83</td>
<td>.96</td>
<td>.95</td>
<td>.97</td>
<td>0.94</td>
</tr>
<tr>
<td>Test Retest</td>
<td>.85</td>
<td>.82</td>
<td>.95</td>
<td>.94</td>
<td>.96</td>
<td>0.93</td>
</tr>
<tr>
<td>Hoyt's method</td>
<td>.86</td>
<td>.85</td>
<td>.95</td>
<td>.95</td>
<td>.94</td>
<td>0.94</td>
</tr>
<tr>
<td>K-R Formula 20</td>
<td>.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE - 10

CLASSIFICATION OF ADJUSTMENT
IN TERMS OF CATEGORIES

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>DESCRIPTION</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>EXCELLENT</td>
<td>12 &amp; BELOW</td>
<td>13-27</td>
</tr>
<tr>
<td>B</td>
<td>GOOD</td>
<td>13-28</td>
<td>28-42</td>
</tr>
<tr>
<td>C</td>
<td>AVERAGE</td>
<td>29-45</td>
<td>42-57</td>
</tr>
<tr>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>46-61</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>VERY UNSATISFACTORY</td>
<td>62 &amp; ABOVE</td>
<td>58 &amp; ABOVE</td>
</tr>
</tbody>
</table>

'D' which stands for unsatisfactory, and 'E' which stands for very unsatisfactory adjustment. This categorization was done by dividing the base line of the normal curve into five equal units, each unit benign equal to 1.2, table 5 presents the classification of adjustment for total-scores.

### TABLE 11

Classification of Adjustment in terms of Categories

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>DESCRIPTION</th>
<th>RANGE OF SCORES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>EXCELLENT</td>
<td>12 &amp; BELOW</td>
</tr>
<tr>
<td>B</td>
<td>GOOD</td>
<td>13-28</td>
</tr>
<tr>
<td>C</td>
<td>AVERAGE</td>
<td>29-45</td>
</tr>
<tr>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>46-61</td>
</tr>
<tr>
<td>E</td>
<td>VERY UNSATISFACTORY</td>
<td>62 &amp; ABOVE</td>
</tr>
</tbody>
</table>
Table 12 shows the classification of adjustment for males and females separately in respect of the five areas: Home, Health, Social, Emotional and Educational.

**TABLE 12**

CLASSIFICATION OF ADJUSTMENT IN TERMS OF CATEGORIES IN FIVE AREAS

<table>
<thead>
<tr>
<th>AREA</th>
<th>CATEGORIES</th>
<th>RANGE OF SCORES</th>
<th>DESCRIPTION</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home a</td>
<td>A</td>
<td>EXCELLENT</td>
<td>0-1</td>
<td>0-1</td>
<td>0-1</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>GOOD</td>
<td>2-3</td>
<td>2-3</td>
<td>2-3</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>AVERAGE</td>
<td>4-7</td>
<td>4-5</td>
<td>4-5</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>8-9</td>
<td>6-8</td>
<td>6-8</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>VERY UNSATISFACTORY</td>
<td>10 &amp; ABOVE</td>
<td>9 &amp; ABOVE</td>
<td>9 &amp; ABOVE</td>
</tr>
<tr>
<td>Health b</td>
<td>A</td>
<td>EXCELLENT</td>
<td>0-1</td>
<td>Zero</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>GOOD</td>
<td>2-3</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>AVERAGE</td>
<td>4-5</td>
<td>3-6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>6-8</td>
<td>7-9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>VERY UNSATISFACTORY</td>
<td>9 &amp; ABOVE</td>
<td>10 &amp; ABOVE</td>
<td>10 &amp; ABOVE</td>
</tr>
<tr>
<td>Social c</td>
<td>A</td>
<td>EXCELLENT</td>
<td>0-2</td>
<td>0-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>GOOD</td>
<td>3-6</td>
<td>4-6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>AVERAGE</td>
<td>7-9</td>
<td>7-9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>10-12</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>VERY UNSATISFACTORY</td>
<td>13 &amp; ABOVE</td>
<td>13 &amp; ABOVE</td>
<td>13 &amp; ABOVE</td>
</tr>
<tr>
<td>Emotional d</td>
<td>A</td>
<td>EXCELLENT</td>
<td>0-1</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>GOOD</td>
<td>2-7</td>
<td>2-7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>AVERAGE</td>
<td>8-15</td>
<td>8-14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>16-21</td>
<td>15-21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>VERY UNSATISFACTORY</td>
<td>22 &amp; ABOVE</td>
<td>22 &amp; ABOVE</td>
<td>22 &amp; ABOVE</td>
</tr>
<tr>
<td>Educational e</td>
<td>A</td>
<td>EXCELLENT</td>
<td>0-1</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>GOOD</td>
<td>2-4</td>
<td>2-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>AVERAGE</td>
<td>5-9</td>
<td>5-8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>UNSATISFACTORY</td>
<td>10-14</td>
<td>9-12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>VERY UNSATISFACTORY</td>
<td>15 &amp; ABOVE</td>
<td>15 &amp; ABOVE</td>
<td>15 &amp; ABOVE</td>
</tr>
</tbody>
</table>
Means and SDs of the population upon which norms is based is given in table 13.

TABLE 13

<table>
<thead>
<tr>
<th>ADJUSTMENT AREA</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEAN</td>
<td>SD</td>
</tr>
<tr>
<td>'a () Home</td>
<td>4.95</td>
<td>2.82</td>
</tr>
<tr>
<td>'b () Health</td>
<td>4.26</td>
<td>2.64</td>
</tr>
<tr>
<td>'c () Social</td>
<td>8.14</td>
<td>2.48</td>
</tr>
<tr>
<td>'d () Emotional</td>
<td>11.21</td>
<td>5.65</td>
</tr>
<tr>
<td>'e () Educational</td>
<td>7.25</td>
<td>3.90</td>
</tr>
<tr>
<td>TOTAL</td>
<td>36.67</td>
<td>13.69</td>
</tr>
</tbody>
</table>

'a () Home Adjustment: Low scores indicate satisfactory adjustment. Individuals scoring high tend to be unsatisfactorily adjusted towards their home surroundings.

'b () Health Adjustment: Low scores indicate satisfactory health adjustment and high scores unsatisfactory adjustment.

c () Social Adjustment: Individuals scoring high are submissive and retiring. Low scores indicate aggressive behaviour.

d () Emotional Adjustment: High scores indicate unstable emotion. Individuals with low scores tend to be emotionally stable.

e () Educational Adjustment: Individuals scoring high are poorly adjusted toward their curricular and curricular programmes. Persons with low scores are interested in the educational activities.

The inventory is intended as an aid in counselling college students whose personal problems pertain to any of categories included in the test. The use of Deonagri letters, corresponding to the five measures of adjustment, as well as the numbers, enable the
test user to discover readily the particular question relating to each measure. The total score may be taken to indicate the general adjustment status.

INSTRUCTIONS FOR TEST ADMINISTRATOR

1. It is a self-administering inventory. The examiner should read the instructions given on the front page and the examinees should also read them silently along with the examiner.

2. There is no time limit for answering it. Ordinarily an individual takes 18 minutes in completing the test.

3. Examinees should be instructed to interpret the meaning of the sentences themselves. However, meaning of the difficult words, if any, should be given by the examiner.

4. Co-operation of the examinees in answering the inventory is very essential. The examiner should assure them that their answers and scores would be treated with strictest confidence.

5. The examiners should indicate frankly and honestly the purpose of the test, if any question regarding this is raised by the examinees.

6. There is no need of telling why letters and numbers are placed before the questions. If, a question is asked about these the examiners should tell the meaning of the letters.
INSTRUCTIONS OF RESPONDENTS

1. Do not open or turn any page of this booklet until you are told to do so.

2. Do not make any mark in this booklet and handle it with care.

3. You have this booklet in which some questions relating to your personality are given and your answers are to be marked on the separate answer sheet provided.

4. You will find two cells against each question on the answer sheet, Look from your side left hand cell in indicating "YES" response while right hand cell in indicative of "NO" response. Out of these two cells, you have to draw a circle around any one which is applicable on you. Keep in mind that no item is false of true. What is true concerning you, draw a circle around that only. If the answer of a question is "YES" about you, draw a circle around on left hand cell and if it is "NO" draw a circle on right hand cell.

5. Your responses will be kept in complete secret, so answer them without any hesitation.

6. There is no time limit, but try to finish it as early as possible.

INSTRUCTIONS FOR SCORING

The inventory is reusable with answer sheet for responses given by the examinee. Transparent scoring keys are provided for each areas
and the responses marked under circle is considered and each has assigned a weightage of One (1) score.

### 3.5 PROCEDURE FOR DATA COLLECTION

For the present research study, the data was collected from B.Ed. pupil-teachers enrolled with the regular colleges of education, M.D. University, Rohtak and Directorate of Distance Education, M.D. university, Rohtak. Sample was drawn using the randomised cluster method of sampling and the selected pupil-teachers were asked to fill in the required proformas. The investigator himself administered the tests with the help of fellow professionals from the colleges of education affiliated to M.D.University, Rohtak and teaching staff of the various colleges.

As three sets of data, pertaining to:

- a. Scholastic Performance
- b. Attitude towards Teaching
- c. Adjustment
The work of data collection was completed in four parts:

I. The first part comprised the collection of data regarding the Achievement of B.Ed. student-teachers, for which the selected student-teachers were given an achievement test comprising of four compulsory papers.

II. The second part comprised of collection of data regarding the teaching attitude of B.Ed. pupil teachers. For this, Teacher Attitude Inventory (TAI) of Dr. S.P. Ahluwalia, was administered upon the pupil-teachers and their answer sheets were collected.

Thus, each B.Ed. student-teacher selected for the present investigation had to complete all the four parts of the data. The answer sheets collected from all the student-teachers were scored and the data was organised for its analysis in this in accordance with the objectives of the study. The entire process of data collection took about one year.
3.6 STATISTICAL TECHNIQUES USED

MEAN, MEDIAN, MODE & S.D. TECHNIQUES WERE USED

It is the rejection/acceptance of hypotheses which ultimately determines the contribution of the investigation in the scientific development of a particular area. In the present investigation also, various statistical techniques have been employed, as per design of the study, for testing various hypotheses, so as to arrive at certain conclusions. The main techniques that have been employed include ‘t’ test, Pearson's Product Moment Method for computing coefficient of correlation & Multiple Correlation.
CORRELATION

Correlation is concerned with describing the degree of relation between two variables. The degree of relationship between the two variables is measured by computing the coefficient of correlation. A coefficient of correlation is a single number that tells us to what extent two variables or things are related and to what extent variations in one variable go with variations with the other. There are various techniques of computing the correlation coefficients of bivariate distribution.

When the relationship between two sets of measures is linear, i.e. can be described by a straight line and also when the scores of two variables are distributed normally or atleast not badly skewed, Pearson's Product Moment technique can be used for computing the correlation coefficient between two sets of data. As the data in the present investigation has satisfied both the conditions, the Pearson's Product moment method has been employed for determining the coefficients of correlation between scholastic performance and teaching aptitude, scholastic performance and attitude towards
teaching, scholastic performance and reading interest, teaching aptitude and attitude towards teaching, reading interest and teaching aptitude and reading interest and attitude towards teaching. The size of the sample (N) being quite large, scatter diagram has been prepared which may also be interpreted as bivariate frequency distribution.

The following formula has been used for obtaining the precise index of correlation of bivariate distribution.

\[
r = \frac{N(x'y' - (x')(y')}{\sqrt{[N(x'2 - ((x')2)] [N(y'2 - ((y')2)]}}
\]

where:

- \( r_{xy} \) = Coefficient of correlation between the variables of \( X \) and \( Y \)
- \( N \) = Number of individuals measured
- \( x \) = frequency on \( X \) scale
- \( y \) = frequency on \( Y \) scale.
- \( X' \) = An individual's score deviation, in step intervals from an arbitrary origin on \( X \) scale.
- \( Y' \) = An individual's score deviation, in step intervals from an arbitrary origin on \( Y \) scale.
't' TEST

't' test is used to ascertain whether two observed statistics, such as two means, two correlation coefficients etc. indicate differences in a corresponding pair of parameters.

In the present study 't' tests have been employed to test the significance of difference between mean scores of B.Ed. student-teachers of the formal and non-formal modes in respect of Achievement, attitude towards teaching and Adjustment. It has also been used for testing the significance of difference between the two means.

\[
t = \frac{M_1 - M_2}{\sqrt{\frac{\delta_1^2}{N_1} + \frac{\delta_2^2}{N_2}}}
\]

Where:

- \(M_1\) = Mean of Group I
- \(M_2\) = Mean of Group II
- \(\delta_1\) = Variance of Group one
- \(\delta_2\) = Variance of Group two
- \(N_1\) = Number of cases in first sample
- \(N_2\) = Number of cases in Second sample