Chapter - III

RESEARCH METHODOLOGY

3.1 Introduction

“What else shall beautify a home? But the flame of a lovely lamp
What else shall adorn the mind? But the light of wisdom deep.”

These words of Swami Chinmayananda express the deep insight of the researcher who takes the job of doing research with a small lovely lamp to adorn mind through the light of wisdom deep present in nature. Today in present world there has been a blast of knowledge bomb. The area of knowledge is spreading its wings everywhere and covering all the aspects. In our country after the independence the speed with which it is progressed is due to the knowledge where it solved many problems facing our country and is trying to solve the various problems that are arising through the help of Educationist. The Educationist, studies the various problems through research and tries to solve them or rather find solution to the problems.

Research is an intellectual activity that is responsible for bringing to light new knowledge. Research is also responsible for correcting the present mistakes removing existing misconception and adding new learning experience to the existing field of knowledge. The application of scientific method in solving the problems is research. It is a formal, systematic and intensive process of carrying on the scientific method of analysis. Knowledge can be gained in many ways like Intuition, revelation, authority, logical manipulation of basic assumption, informed guesses, observation, reasoning by
analogy etc. One of the branches of research known as empirical research is highly
goal-oriented technique.

The following are the important definition of Research.

**J. Francis Rummel**:

Research is an endeavour attempt to discover, develop and verify knowledge. It
is an intellectual process that has developed over hundred of years ever changing in
purpose and form and always researching for truth.\(^1\)

**I. V. Redman and A.V. H. Mory**:

“Research is a systematized effort to gain new knowledge.\(^2\)

In a systematic research, the elements of the general system are as follows –

![Diagram](Fig. 3.1: Showing systematic process for carrying out any research.)

The systematic process of research and the scientific method lead into the
general activities involved in conducting a research study. The activities, which are
similar to the steps described earlier, are elaborated upon in this section. These
activities are not limited to a specific type of research, such as ethnographic or
experimental research, but apply generally to others too. Activities may receive varying
emphasis, however, depending on the type of research.
3.2 Educational Research

M. Traverse Says,

“Educational Research is that activity which is directed towards the development of science of behaviour in Education situation.”

According Monroe,

“The final purpose of Educational Research is to ascertain principles and develop procedures in the field of Education.”

3.2.1 Characteristics of Educational Research

Research is conducted by individuals, scholars, practitioners of various disciplines which can be done in libraries, laboratories, classrooms, streets, cities etc. In Educational Research the knowledge of methodology is invaluable, which is essential for research, thesis, dissertation and sometimes to propose theory in Education by professional Educators. Educational Research is complex and demanding. The general characteristic of Educational Research is as follows.
3.2.2 Need For Educational Research

This age being declared as ‘ICE’ age where,

I - Information       C - Communication       E - Entertainment

There has been tremendous progress in the field of knowledge and information. It is growing with high pace giving rise to competition in scientific as well as research field. To keep up the speed and quality we have to keep up to with the developed countries of the world. After independence the growth is very slow and lagging so this various innumerable queries and problems that require urgent attention, for them Educational Research is necessary. The best tool in front of socialist, educationist and the government is “Educational Research”.

3.3 Research Methods

Research Methods are most important in any research process. They describe various steps and plans to adopt in solving a research problem such as: the ways in which the problems are formulated, the definition of the terms, the choice of subject for investigation, the validation tools, the data collection, analysis and interpretation and the process of inferences and generalizations.

There are three basic categories or Research methods.
Fig. 3.3: Showing Research Methods

1. **Historical Method**: Which provides a method of investigation to discover, describe and interpret what existed in the past.

2. **Experimental Method**: Which provides a method of investigation to derive basic relationship among phenomena under controlled conditions or more simply to identify the conditions underlying the occurrence of a given phenomenon.

3. **Descriptive Survey Method**: Which provides a method of investigation to study and describe what exists at present.

### 3.3.1 Selection of Research Method

The most appropriate research methodology has to be selected by the researcher for the research problem. As the topic for Research is important so also the method for research is important. After careful observation and study of the research problem, researcher under the esteemed guidance of the experts has decided to use “Descriptive Survey Method” this is so because the topic for research is "A Study of Traditional Learning and E-Learning of Final Year Students of Medical, Dental and Engineering and Their Efficacy on Their Academic Achievements" that requires to conduct a survey in the Medical, Dental and Engineering colleges of Vidarbha region in order to collect the data by using the research opinionnaire for student and lecturers. Also collect the final examination marks of final year students to find the efficacy of
Traditional learning and E-learning on their academic achievement and to interpret the collected data in descriptive manner.

3.3.2 Descriptive Survey Method

John W. Best describes Survey Method as follows –

“The Survey Method gathers data for a relatively large number of cases at a particular time. It is not concerned with characteristics of individuals as individuals. It is concerned with the generalized statistic that results when data are abstracted from a number of individual cases. It is essentially cross-sectional.”

In *International Dictionary of Education* by J. B. Thomas, A. R. Marshal describes Survey Research:

“Survey Research is Research or investigation of an educational problem using scientific methods of sampling and carefully planned methods of questioning.”

3.3.3 Importance of Descriptive Method in Research Study

A descriptive research describes and interprets ‘what is’. It concerned with conditions or relationship that exist, opinions that are held, processes that are going on, effects that are evident, or trends that are developing. Descriptive research deals with the relationship between variables, testing hypotheses and development of generalisation of principle or theories that have universal validity. Descriptive research also involves events that are already taken place and may be related to present condition. The descriptive survey research is particularly appropriate in behavioural
sciences because many of the experimental studies cannot be experimented either in the laboratory or on the actual field. The prevailing research method of behavioural sciences is a descriptive survey under the condition that naturally occurs in the colleges, classroom or in the home, office and the factory. Descriptive survey research can systematically examine and analysed the human behaviour.

The researcher wants to study the attitude of the final year students and lecturers towards Traditional learning and E-learning and find their effect on students academic achievement. The researcher use similar techniques of observation, description and analysis therefore the descriptive research is the appropriate method for the study undertaken for the research.

3.4 Population and Sample of the Research Study

As we know the population refers to the total number of items of which information is desired. The population can be defined as :

John Best;

“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.”

For the selection of population first researcher collected the names and addresses of all colleges of Dental and Engineering affiliated to two universities of Vidarbha region namely: Sant Gadge Baba Amravati University, Amravati, Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur and colleges of Medical in Vidarbha region
affiliated to University of Health Sciences, Nashik of Maharashtra. This formed the population for the present study.

### 3.4.1 Sample for the Research Study

Sample is nothing but a part of a whole. Sample can be defined as:-

**John Best;**

“A sample is a subset of the population to which the researcher intends to generalize the results. A sample is either taken at random and sometimes random sampling is avoided.”

There are around 7 Medical, 4 Dental and 20 Engineering i.e. total 31 colleges in three Universities of Vidarbha region. The researcher for the selection of Medical and Engineering colleges used lottery method, and purposive sampling method for the selection of Dental colleges. Among 31 colleges 12 colleges in three Universities were selected given at least 38.70% weightage to each University mention below.

### Table No. 3.1

**Showing College wise Sample for Research Study**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Faculty</th>
<th>Total No. of Colleges</th>
<th>Total No. of colleges selected</th>
<th>Total No. of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Medical</td>
<td>12</td>
<td>4</td>
<td>260</td>
</tr>
<tr>
<td>2</td>
<td>Dental</td>
<td>7</td>
<td>4</td>
<td>260</td>
</tr>
<tr>
<td>3</td>
<td>Engineering</td>
<td>4</td>
<td>4</td>
<td>260</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>12</td>
<td></td>
<td>780</td>
</tr>
</tbody>
</table>

The researcher selected the following sample of 780 final year male and female students from total 1862 students among the 12 colleges of Medical, Dental and
Engineering. i.e. sample of 390 male and 390 female students were selected from various 12 colleges of Medical, Dental and Engineering given 42% weightage to the selected sample from the population of 1862 mention below.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of College</th>
<th>No. of Students Available</th>
<th>Students Selected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>Sipna Shikshan Prasarak Mandal’s College of Engineering and Tech., Amravati.</td>
<td>250</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>Govt. College of Engg., Amravati.</td>
<td>300</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Panjabrao Deshmukh Smruti Medical College, Amravati.</td>
<td>85</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>Vidaya Youth Welfare Societies, Dental College, Amravati.</td>
<td>45</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Yashwantrao Chavan College of Engg., Nagpur</td>
<td>450</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>Govt. Medical College, Nagpur</td>
<td>120</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Govt. Dental College, Nagpur</td>
<td>82</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>8</td>
<td>Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha.</td>
<td>73</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>S. P. Dental College, Sawangi (Meghe), Wardha.</td>
<td>127</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>10</td>
<td>Jamnalal Goenka Dental College, Akola</td>
<td>55</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>11</td>
<td>Jawaharlal Darda Institute of Engg. &amp; Technology, Yavatmal.</td>
<td>200</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>12</td>
<td>Govt. Medical College, Yavatmal.</td>
<td>75</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1862</td>
<td>390</td>
<td>390</td>
</tr>
</tbody>
</table>
For the sampling of lecturers the researcher select 5 lecturers from each above college by purposive sampling method i.e. total 60 lecturers from the 12 colleges of Medical, Dental and Engineering mention below.

Table No. 3.3
Showing Lecturers Sample for Research Study

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the College</th>
<th>Total No. of Lecturers</th>
<th>Total No. Lecturers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Medical</td>
<td>90</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Dental</td>
<td>80</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Engineering</td>
<td>120</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>290</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

3.5 Selection of Research Tool

The different means developed and used by the researcher to collect information and numerical data on various topics related to the problem is called “Research Tools.”

The tool should be reliable, valid and yield results, through qualitative and quantitative tools.

According to John Best –

“Like the tools in carpenters chest each research tool is appropriate in a given situation to accomplish a particular purpose.”

One of the major objectives of the research study was to study the attitude of final year students of Medical, Dental and Engineering and Lecturers towards
Traditional learning and E-learning and their efficacy on students academic achievement.

According to Burns (1997)\(^{11}\) “attitudes are evaluated beliefs which predispose the individual to respond in a preferential way”. In the present study according to Breckler (1984)\(^{12}\) and Jones and Clarke (1994)\(^{13}\), affect, behavioural and cognition are distinguishable, yet interrelated components of attitude. Breckler provides a continuum by which to measure these attitudinal components

1) Behavioural attitude can range from favorable and supportive (e.g., keeping, protecting) to unfavorable and hostile (e.g., discarding, destroying).

2) Affective attitude can vary from pleasurable (feeling good, happy) to unpleasurable (feeling bad, unhappy).

3) Cognitive or thoughts attitude may vary from favorable to unfavorable (e.g., supporting versus derogating arguments). Educators have known that learner attitudes and responses are interconnected and that a positive correlation exists between the two. Therefore researcher developed a attitude scale and opinionnaire. There are numbers of techniques to develop attitude scale out of which some are mention below: \(^{14}\)

The Thurston Method (1929)

The Minnesota Scale (1936)

The Likert Technique (1932)

Researcher has preferred to develop the scale with Likert technique, as it is a more refined technique. It resembles simple questionnaire but it involves better techniques of item selection. Each scale is a series of statements ranging from as few
as 18 items to as many as 200 items. Each statement is either definitely favorable or definitely unfavorable. The subjects indicate his response to each statement usually on a five-point scale mentioned below:

Table No. 3.4
Scoring for Likert Scale Technique

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Responses</th>
<th>Favorable Statement Scoring</th>
<th>Unfavorable Statement Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strongly Agree (SA)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Agree (A)</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Undecided (U)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Disagree (D)</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Strongly Disagree (SD)</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

3.6 Construction of Research Tool

To construct the perfect research tool, researcher has developed two research tools:

1. Attitude scale of Traditional learning and E-learning for Students.
2. Opinionnaire of Traditional learning and E-learning for lecturers.
3. Collection of final examination marks obtained by the final year students of Medical, Dental and Engineering to find the effect of Traditional learning and E-learning on academic achievement.
Out of these two research tools first two tools were opinionnaire and third was list of marks of final examination of students of Medical, Dental and Engineering.

### 3.7 Construction of Attitude Scale of Traditional Learning and E-Learning for Students (ASTES)

The first step in the Likert scale preparation is the collection of number of statements. The first part of the scale was about the information of the students. Second part consist of multiple choice items based on personal computer learning attitude and opinionnaire suggested by Likert technique on the major three factors of E-learning i.e. Behavioral factor, Affective factor and Cognitive factor. While framing the items care was taken that they do not carry dual meaning. It was seen that items are not ambiguous.

A preliminary scale was constructed on the three factors of E-learning contains 65 items mentioned below.

**Table No. 3.5**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Attitudinal Components</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Behavioural items</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Affective items</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Cognitive Items</td>
<td>25</td>
</tr>
</tbody>
</table>
First of all researcher studied literature related to traditional learning and E-learning and items were prepared in the form of statement. Each statement was in the form of definitely favorable or definitely unfavorable. Such 65 statements were given to experts for judgment. They discarded 8 statements, as they were found inappropriate and suggest some improvement and linguistic changes in the remaining statement. The statements are then randomly arranged in the scale.

**Table No. 3.6**

**Showing Number of items of scale after discarding by experts**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Attitudinal Components</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Behavioural items</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Affective items</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>Cognitive Items</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>57</td>
</tr>
</tbody>
</table>

3.7.1 **Pilot Study of ASTES**

The scale with 57 items was then given a trial run among the group of 300 male and female final year students of Medical, Dental and Engineering randomly selected from various colleges from Amravati, Akola, Nagpur, Yavatmal and Wardha. The filled-up questionnaire were collected and evaluated. Essential modifications were made and the final scale was ready for final trial run.
These 57 items of the scale were favorably and unfavorably worded and arranged randomly. Favorable items were scored as 5, 4, 3, 2, 1 for SA, A, UD, D, SD; and unfavorable items were scored as 1, 2, 3, 4, 5 for SA, A, UD, D, SD respectively. The total score of the respondent was obtained by adding the score given for each item in the scale. The total score varied from 57 to 285, showing lower attitude to higher attitude towards E-learning.

These papers were then scored and each item was correlated with the total score of the test. An item that did not correlate with the total score of the test was discarded. This internal consistency procedure eliminated ambiguous item and those not of the same type as the rest of the scale.

3.7.2 Item Selection of ASTES

Researcher used Davis method for item selection. It is the basic method of item analysis. The scored papers were arranged in decreasing order of total score. Then 27% of the subject scoring highest and 27% of the subject scoring lowest in the scale were selected to form higher and lower group. 27% of the subjects with the highest score and 27% of the subjects with the lowest score served as criterion group. Discriminating value for each item was determined by calculating ‘t’ on the basis of responses of upper and lower group. Item with C.R. value significant at 0.05 level of significance were finally selected for the scale.
3.7.3 Final Form of the ASTES

The attitude scale of Traditional learning and E-learning for students (ASTES) in its final form was consisting of 52 highly discriminating favorable and unfavorable items (Appendix -I). The list of final three group items is listed below:

Table No. 3.7

Showing number of final items of scale

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Attitudinal Factors</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Behavioural items</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Affective items</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Cognitive Items</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>52</td>
</tr>
</tbody>
</table>

3.7.4 Distribution of ASTES Statements

This attitude questionnaire of traditional learning and E-learning for students (ASTES) had 29 favorable and 23 unfavorable items i.e. total 52 items in its final form, which can be identified with their serial number as under:

Table No. 3.8

Showing number favorable and unfavorable items used in ASTES

<table>
<thead>
<tr>
<th>Statements</th>
<th>Serial Number in the Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable items</td>
<td>8, 9, 10, 11, 13, 14, 16, 17, 18, 20, 21, 22, 25,</td>
</tr>
</tbody>
</table>
### 3.7.5 Reliability and Validity of ASTES

Reliability refers to the accuracy of the measurement. It also refers to the extent to which a test is internally consistent.

**According to Anastasi (1968)**

“Reliability means consistency of scores obtained by same individual when reexamined with the test on equivalent items or under other variable examining conditions.”\(^{15}\) The reliability of the scale has been assessed through

I) Split Half Method and II) Internal consistency

**I) Split Half Method**

For split half reliability the scale items were divided into two equivalent halves. Scores on the odd numbered of items can be correlated with scores on the even numbered items and the correlation found for these half-test items. From the reliability of the half-test, the self-correlation is then estimated by the Spearman-Brown Prophecy formula. The Spearman-Brown Prophecy formula for estimating reliability of two comparable halves of the test is given below:

\[
2 r
\]

\[
r_{II} = \frac{2 r}{r + 1}
\]
Where,
\[ r_{11} \]  = Reliability coefficient of the whole test.
\[ r \]  = Reliability coefficient of the half-test, found experimentally.

As the scale divided into behavioural, affective and cognitive group, the researcher computed the split half reliability coefficient for the above three factors of scale. The purpose was to determine the extent to which items within each attitudinal groups related to each other. Following table shows the result of the internal correlations and reliability coefficient of these grouped items.

### Table No. 3.9

**Showing reliability analysis of ASTES**

<table>
<thead>
<tr>
<th>Attitudinal Components</th>
<th>No. of Items</th>
<th>Coefficient of Correlation</th>
<th>Spearman-Brown Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural Items</td>
<td>18</td>
<td>0.648</td>
<td>0.787</td>
</tr>
<tr>
<td>Affective Items</td>
<td>14</td>
<td>0.651</td>
<td>0.789</td>
</tr>
<tr>
<td>Cognitive Items</td>
<td>20</td>
<td>0.660</td>
<td>0.795</td>
</tr>
<tr>
<td><strong>Total Items</strong></td>
<td><strong>52</strong></td>
<td><strong>0.881</strong></td>
<td><strong>0.896</strong></td>
</tr>
</tbody>
</table>

From the above table the items used to determine the Behavioural, Affective and Cognitive attitudes of scale have good internal consistency of 0.787, 0.789 and 0.795 respectively. Thus the items used to determine these attitudinal components were very reliable. The obtained coefficient of reliability of the whole test on a sample of 300
students is 0.896 and coefficient of correlation on same sample is ‘r’ = 0.811 which is again very reliable.

II) Internal consistency

From the above table 3.9, the items used to determine the Behavioural, Affective and Cognitive attitudes of scale have good internal consistency and the coefficient of correlation is 0.648, 0.651 and 0.660 respectively. Also the Internal consistency of the scale was checked by evaluating the coefficient of correlation between the total score and score on each item (Appendix - II).

3.7.6 Validity of ASTES

The first and the necessary condition for a test to be valid is its reliability. The validity of the scale has been assessed in the following manner

Content Validity

Only those items have been included in the scale, which were judged as relevant by the judges. And the discriminative value of each item assessed through the contrasted group technique. Only highly discriminative items were retained (Appendix - III).

3.8 Construction of Opinionnaire of Traditional Learning And E-Learning for Lecturers
Lecturers attitude opinionnaire of Traditional learning and E-learning consisted of two part viz. personal information format and opinionnaire suggested by Likert technique.

First researcher had studied literature related to traditional learning and E-learning and items are prepared in the form of statement. Each statement was in the form of definitely favorable or definitely unfavorable. Such 55 statements were given to experts for judgment. They discarded 5 statements, as they were found inappropriate and suggest some improvement and linguistic changes in the remaining statement. The statements are then randomly arranged in the scale.

3.8.1 Pilot Study of Opinionnaire

The opinionnaire for lecturer with 55 items was then given a trial run among the group of 18 lecturers of Medical, Dental and Engineering randomly selected from various colleges from Amravati, Nagpur and Wardha. The filled-up opinionnaire were collected and evaluated. Essential modifications were made and the final opinionnaire was ready for final trial run.

These 55 items of the opinionnaire were favorably and unfavorably worded and arranged randomly. Favorable items were scored as 5, 4, 3, 2, 1 for SA, A, UD, D, SD; and unfavorable items were scored as 1, 2, 3, 4, 5 for SA, A, UD, D, SD respectively. The total score of the respondent was obtained by adding the score given for each item in the opinionnaire. The total score varied from 55 to 275, showing lower attitude to higher attitude towards E-learning.
These papers were then scored and each item was correlated with the total score of the test. An item that did not correlate with the total score of the opinionnaire was discarded. This internal consistency procedure eliminated ambiguous item and those not of the same type as the rest of the opinionnaire.

3.8.2 Item Selection of Opinionnaire

The scored papers were then arranged in decreasing order of total score. Then 27% of the subject scoring highest and 27% of the subject scoring lowest in the opinionnaire were selected to form higher and lower group. 27% of the subjects with the highest score and 27% of the subjects with the lowest score served as criterion group. Discriminating value for each item was determined by calculating ‘t’ on the basis of responses of upper and lower group. Item with C.R. value significant at 0.05 level of significance were finally selected for the opinionnaire.

3.8.3 Final Form of Opinionnaire

The attitude opinionnaire of traditional learning and E-learning for Lecturers in its final form was consisting of 45 highly discriminating favorable and unfavorable items (Appendix - IV).

3.8.4 Distribution Of Opinionnaire Statements

This Likert type attitude opinionnaire of traditional learning and E-learning for lecturers had 30 favourable and 15 unfavourable items i.e. total 45 items in its final form, which can be identified with their serial number as under.

Table No. 3.10
Showing number favorable and unfavorable items used in the Research Opinionnaire

<table>
<thead>
<tr>
<th>Statements</th>
<th>Serial Number in the Opinionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable Items</td>
<td>1, 2, 3, 6, 7, 8, 9, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30, 31, 32, 34, 36, 38, 39, 42, 43, 45</td>
</tr>
<tr>
<td>Unfavorable Items</td>
<td>4, 5, 10, 11, 12, 16, 27, 28, 29, 33, 35, 37, 40, 41, 44</td>
</tr>
</tbody>
</table>

3.8.5 Reliability and Validity of Opinionnaire

The reliability of the opinionnaire has been assessed through Split Half Method.

**Split Half Method**

For split half reliability the questionnaire items were divided into two equivalent halves and the correlation found for these half-test items. From the reliability of the half-test, the self-correlation is then estimated by the Spearman-Brown Prophecy formula. The obtained coefficient of reliability of the whole test on a sample of 18 Lecturers is 0.963 and coefficient of correlation on same sample is ‘r’ = 0.933 which is very reliable.

3.8.6 Validity of Opinionnaire

The first and the necessary condition for a test to be valid is its reliability. The validity of the Opinionnaire has been assessed through content validity.

**Content Validity** - Only those items have been included in the scale, which were judged as relevant by the judges.
3.9 Collection of Final Examination Marks

To get more reliable information the researcher collect the marks of final examination of final year selected students of Medical, Dental and Engineering to understand the difference between their opinions regarding effectiveness of academic achievement towards E-learning and Traditional learning and actual achievement (Appendix - V).

3.10 Administration of the Tests

For the evaluation and implementation of E-learning at various Medical, Dental, and Engineering colleges were visited. After taking the permission from the Principals of various Medical, Dental, and Engineering colleges the researcher first decided the number of students from the desired class by using stratified random sampling method and then decide time of their free period about at least 45min. to solve both the test schedule from students. The setting arrangement of the selected students was done in a separate class to get more reliable information. Meanwhile the researcher also distributes the research questionnaire to the 5 lecturers in each college by using stratified random sampling method. The tests were filled in the presence of researcher from the students and lecturers. From the above the researcher found that the response of male and female students and lecturers of Engineering, Medical and Dental was good.

To give the final touch to the present study the researcher collects the final year examination marks of the students of Medical, Dental and Engineering after completion.
of their final exam and compute the effectiveness of academic achievement towards E-learning and Traditional learning.

3.11 Statistical Treatment Given to the Test

The researcher selects the following statistical treatment for the selected sample of students and Lecturers:

1. For the first attitude scale ASTES, CR (Critical Ratio) value, F-ratio value, Chi-square values and Percentage values was calculated.
2. For Lecturers opinionnaire of Medical and Dental and Engineering percentage values and Chi-square values was calculated.

References


7. Ibid, 114


10. Ibid, 276.


