

## **CHAPTER – IV**

### **RESEARCH METHODOLOGY**

#### **4.1 INTRODUCTION**

The review of related literature described in the previous chapter paved the way for a suitable method to be adopted for the present study. Methodology in research plays a significant role to solve the research problem systematically. In this methodology chapter, the various steps adopted by researcher are described. The methodology in research helps the researcher to take up the research methods and to conduct the research in the right direction. In order to develop a remedial multimedia package in learning English grammar at the engineering college level and to test it, a research attempt was made by the investigator.

This chapter includes the aspects like objectives, assumptions, research questions, hypotheses, research method, research design, construction of tools, validation of tools, developing and application of remedial package.

#### **4.2 STATEMENT OF THE PROBLEM**

As the title of the study is “Developing a Remedial Self-Learning Package for the Slow Learners in Written English at Engineering College Level”, the researcher attempted to develop a remedial package in the

multimedia format in order to meet out the needs of the students who were weak in English grammar.

Writing good English at the college level is difficult for the slow learners. The teachers should try out innovative techniques to teach grammar in an interesting way. This will yield an effective result in improving the writing skills of the learners.

### **4.3 OBJECTIVES OF THE STUDY**

The following were the objectives of the study:

1. To identify the slow learners and the errors committed by them in written English at the Engineering College level.
2. To categorise the errors committed by the slow learners.
3. To develop a remedial multimedia self-learning package for minimising those errors committed by the slow learners.
4. To apply the developed remedial multimedia self-learning package to the slow learners with a view to minimising their errors.
5. To identify the effectiveness of the remedial self-learning package in reducing the errors committed by the slow learners.
6. To identify the attitude of the students towards English in general.

### **4.4 ASSUMPTIONS OF THE STUDY**

The following were the assumptions of the study:

1. It assumed that the slow learners could be identified at the engineering college level.

2. It is assumed that students commit errors in written English and these errors can be reduced with self-learning remedial packages.
3. Assumed that there is a need to apply multimedia approach in the teaching of English.
4. It is possible to develop a multimedia package to minimise the errors of the slow learners.
5. It is possible that the developed multimedia package could be applied to the slow learners.
6. The effectiveness of the applied multimedia package could be identified.
7. It is assumed that the remedial multimedia package could create a positive attitude in the learners towards learning English.

#### **4.5 RESEARCH QUESTIONS**

The investigation was done to find out the answers to the following questions:

1. Could the slow learners at the Engineering College level be identified?
2. Could their errors in written English be culled out and categorized?
3. Could a multimedia remedial self-learning package be developed with a view to minimising their errors in English at the Engineering College level?
4. Could the developed multimedia remedial self-learning package be applied to the students to minimise their errors in English at the Engineering College level?

5. Could the effectiveness be identified in helping the students to minimise their errors in English?
6. Could the developed remedial package change the attitude of the learners towards learning English?

#### **4.6 HYPOTHESES**

The following were the hypotheses which were formulated to give specific directions to the study:

**a) General Hypothesis:**

Remedial self-learning multimedia package proves more effective in minimising the errors committed by slow learners in English at the Engineering College level.

**b) Specific Hypotheses:**

1. The experimental group achieves significantly better in the posttest than in the pretest.
2. The mean scores of the experimental group in the progressive test are significantly greater than its mean scores in the pretest.
3. The mean scores of the experimental group in the posttest are significantly greater than its mean scores in the progressive test.
4. There exists significant difference between the retention test scores and the posttest scores of the experimental group.
5. The experimental group commits significantly less number of errors in the posttest than in the pretest.
6. The errors committed by the experimental group in the progressive test are significantly less than their errors in the pretest.

7. The errors committed by the experimental group in the posttest are significantly less than its errors in the progressive test.
8. There exists significant difference among the experimental groups (CSE, IT, MECHATRONICS and CIVIL) in their posttest achievement scores.
9. The post-attitude scores of the experimental subjects towards English are greater than their pre-attitude scores.

#### **4.7 STEPS IN THE RESEARCH PROCESS**

The present problem involves the following steps:

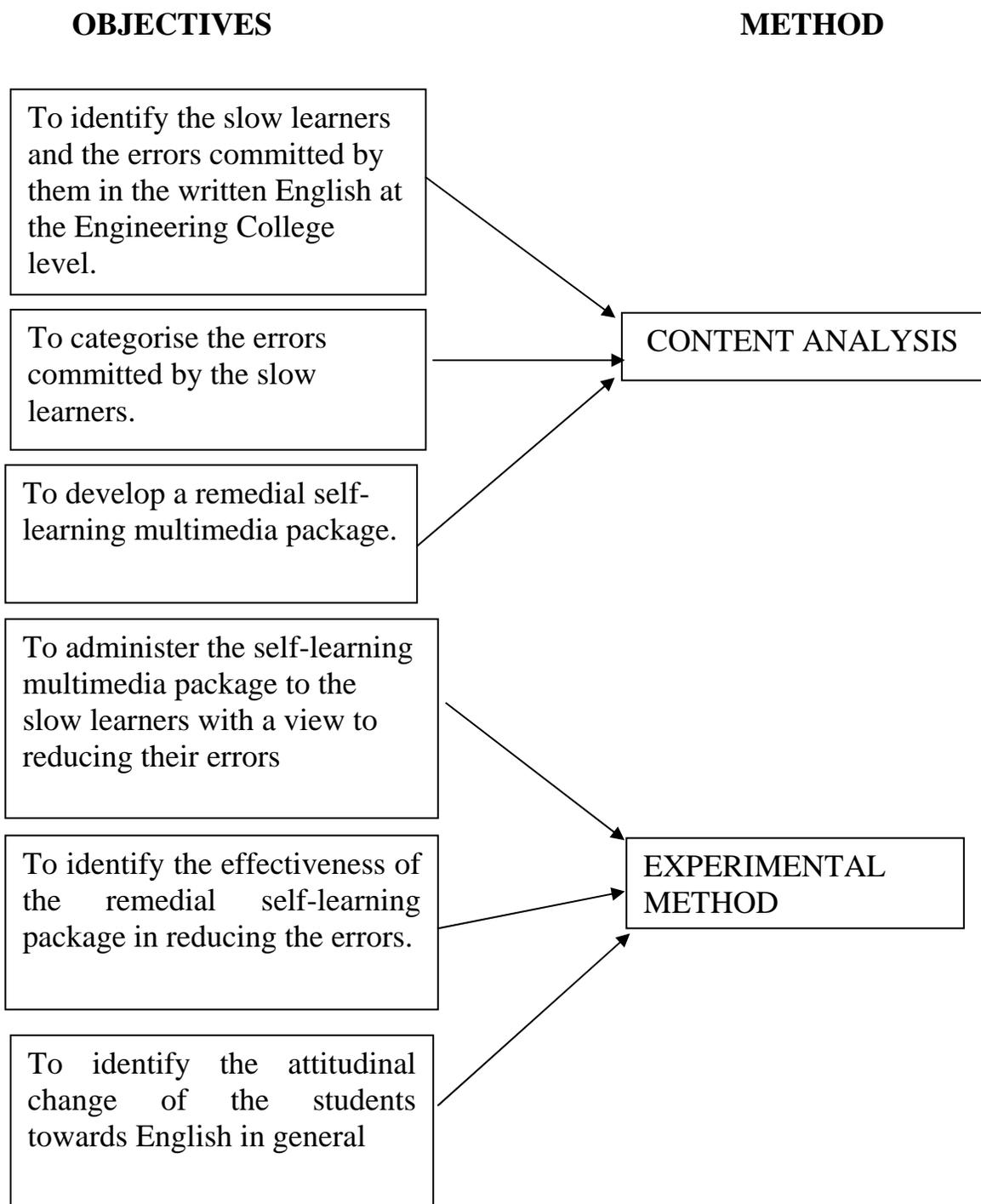
1. Identifying the slow learners.
2. Identifying the errors committed by the slow learners in written English.
3. Categorising the errors committed by the slow learners in written English.
4. Developing a remedial self-learning multimedia package in order to minimise their errors in written English.
5. Administering the self-learning multimedia package to the slow learners with a view to reducing their errors.
6. Identifying the effectiveness of the remedial self-learning multimedia package in reducing the errors.  
(i. Pretest, ii. Treatment, iii. Progressive test, iv. Treatment, v. Posttest, vi. Retention test)
7. Identifying the attitude of the students towards English in general.  
(i. Pre-attitude, ii. Post-attitude)

## **4.8 RESEARCH STRATEGY**

The research strategy was so premeditated as to realise the stated objectives of the study. As the present study was experimental in nature, experimental method was necessary to attain the objectives.

To fulfill the first, the second and the third objectives, content analysis was preferred. For fulfilling the fourth, the fifth and the sixth objectives, experimental method was preferred.

Figure 4.1 presents the research strategy.

**FIGURE 4.1 RESEARCH STRATEGY**

#### **4.8.1 CONTENT ANALYSIS**

Documents are an important source of data in many areas of investigation, and the methods of analysis are similar to those used by historians. The major difference between this type of research and historical research is that, whereas historical research often uses documentary analysis, it deals solely with past events. When documentary analysis is used as descriptive research, current documents and issues are the foci. The analysis is concerned with the explanation of the status of some phenomenon at a particular time or its development over a period of time. It serves a useful purpose in adding knowledge to fields of inquiry and in explaining certain social events. Its application to educational research is suggested in some of the studies listed as examples.

In documentary analysis, the following may be used as sources of data: records, reports, printed forms, letter, autobiographies, compositions, books, periodicals, bulletins, pictures and cartoons.

When using documentary sources, one must bear in mind that data appearing in print are not necessarily trustworthy. Documents used in descriptive research must be subjected to the same careful types of criticism employed by the historian. Not only is the authenticity of the document important, but the validity of its contents is crucial. It is the researcher's obligation to establish the trustworthiness of all data that he or she draws from documentary sources.

## **4.8.2 EXPERIMENTAL METHOD**

The investigator adapted experimental method for this study. Experimental research, to quote Best (2007), is the “description and analysis of what will be, or what will occur, under carefully controlled conditions.”

The experimental method involves two tests namely, pretest and posttest. The treatment is to be applied to the group that is under experimentation. After the period of treatment is over, the posttest scores are compared and contrasted with the pretest scores to find out whether there is any change or improvement in the experimental group. If there is any change identified in the experimental group, it is assumed that it is only due to the experiment or the treatment.

Of all the research methodologies, experimental research is unique in two very important aspects, it is the only type of research that directly attempts to influence a particular variable, and it is the only type that can really test hypotheses about the cause-and-effect relationships.

The present study fulfills the following four essential characteristics of an experimental research:

### **a) Manipulation of Independent Variable**

The experiment is a powerful research method. Experimentation provides a method of hypothesis-testing. An experiment involves the comparison of the effects of a particular treatment with that of a different treatment or of no treatment. In a simple conventional experiment, reference

is usually made to an experimental group and to a control group. These groups are equal as nearly as possible.

### **b) Independent and Dependent Variables**

Variables are the conditions or characteristics that the experimenter manipulates, controls or observes. The independent variables are the conditions or characteristics that the experimenter manipulates or controls in his or her attempt to ascertain their relationship to the observed phenomena. The dependent variables are the conditions or characteristics that appear, disappear or change as the experimenter introduces, removes or changes the independent variables.

In an educational research, an independent variable may be a particular teaching method, a type of teaching material, a reward or a period of exposure to a particular condition, or an attribute such as sex, or level of intelligence. The dependent variable may be a test score, the number of errors or measured speed in performing a task. Thus, the dependent variables are the measured changes in pupil performance attributable to the influence of the independent variables (Best and Kahn, 1992).

**c) Randomization**

An important aspect of many experiments is the random assignment of subjects to groups. Random assignment means that every individual who is participating in the experiment has an equal chance of being assigned to any of the experimental conditions.

Random assignment is a powerful technique for controlling the subject-characteristics' threat to internal validity, a major consideration in educational research.

**d) Control of Extraneous Variables**

Researchers in an experimental study have an opportunity to exercise far more control than in most other forms of research. They determine the treatment (treatments), select the sample, decide which group will get the treatment, try to control other facts besides the treatment that might influence the outcome of the study, and then (finally) observe to measure the effect of the treatment on the groups when treatment is completed. Hence, it is very important for researchers conducting an experimental study to do their best to control for that is, to eliminate or to minimize the possible effect of the threats (Fraenkel and Wallen, 1993).

### **4.8.3 TOOLS USED**

The following tools were used for the study:

- i) Test of General Intelligence Tool (TGI Tool) for identifying the slow learners (Borrowed, Appendix No.1).
- ii) A diagnostic test to identify the errors committed by the samples in written English (Constructed).
- iii) Achievement tests to understand the performance of the students before and after the treatment (Constructed and Validated, Appendix Nos. 3 & 4).
- iv) Attitude scale to find out the attitude of the treatment group towards learning English before and after the treatment (Constructed and Validated, Appendix No.2).

### **4.8.4 CONSTRUCTION OF TOOLS**

For this study, the researcher adopted the TGI tool (Test of General Intelligence, Appendix No. 1) for identifying the slow learners and constructed three tools namely, Achievement test 1 (for pretest and progressive test), Achievement test 2 (for posttest and retention test, Appendices No. 3 & 4) and Attitude scale (Appendix No. 2).

#### **a) Achievement Tests**

Achievement test attempts to measure what the individual has learnt in the present level of performance. It is helpful in determining the individual or group status in academic learning. In research, achievement

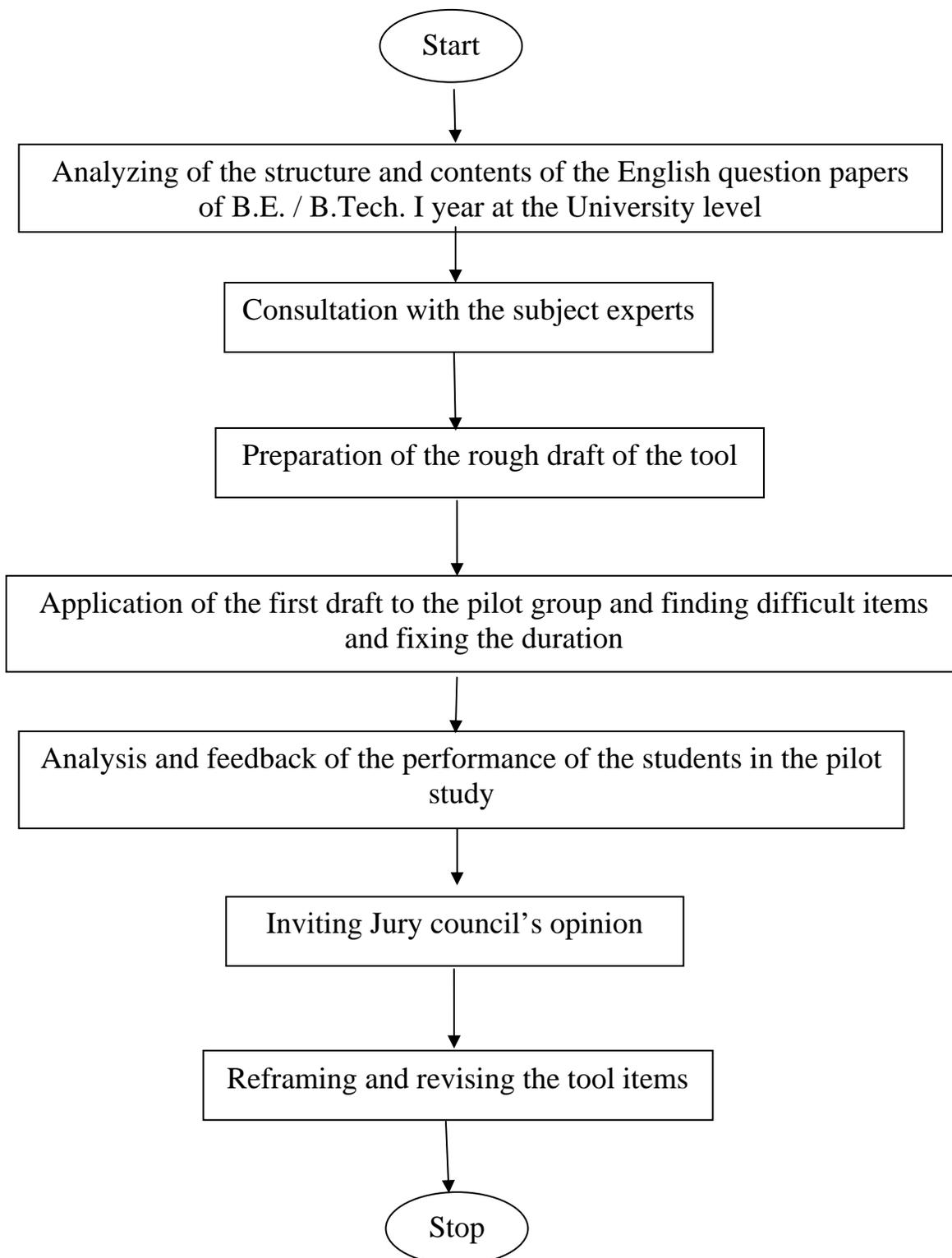
test scores are used repeatedly in evaluating the teaching methods and other factors considered to be important in educational practice.

The achievement test was conducted for a duration of two hours. The questions were in the form of ‘fill in the blanks’, ‘change the sentences’, ‘insert suitable articles, prepositions, ‘identify the preposition’, ‘subject-verb agreement’, ‘comparative adjective’, ‘jumbled sentences’, ‘correct the mistakes’, ‘dialogue writing’ etc. Four achievement tests namely, pretest, progressive test, posttest and retention test were conducted.

#### **i) Steps in Developing Achievement Test Tools**

In this research, the investigator constructed two achievement test tools. The steps in developing an achievement test are given in Figure 4.2:

**FIGURE 4.2 STEPS IN DEVELOPING ACHIEVEMENT TEST TOOLS**



## **ii) Validation of the Tools**

Validity is a relative term. A test is valid when the performances which it measures correspond to the same performances as otherwise independently measured or defined directly. Validity of a test refers to the extent to which the test achieves the purpose for which it is designed. In this research, the content validity of the achievement test tools was established through experts' opinion.

## **iii) Reliability of the Tools**

Reliability of the tool refers to the consistency of measurement observed from the same individuals on different occasions. A test is reliable to the extent that it measures accurately and consistently from one time to another. The reliability of the achievement test was ensured through internal consistency method, parallel method or test-retest method. In this study, the researcher administered the achievement tool for twenty-five students and followed the test-retest method for establishing reliability. The correlation coefficient ( $r$ ) was also calculated and found to be 0.99 and 0.80 which showed high reliability of the tools constructed.

## **b) Attitude Scale**

The logic behind the use of opinion to measure the attitude is that there is a positive correlation between what people say on a subject and what they will also think about it (Gilford, 1971).

Likert (1978) proceeded in the development of attitude scales along the lines more similar to those of ordinary test development. His items were

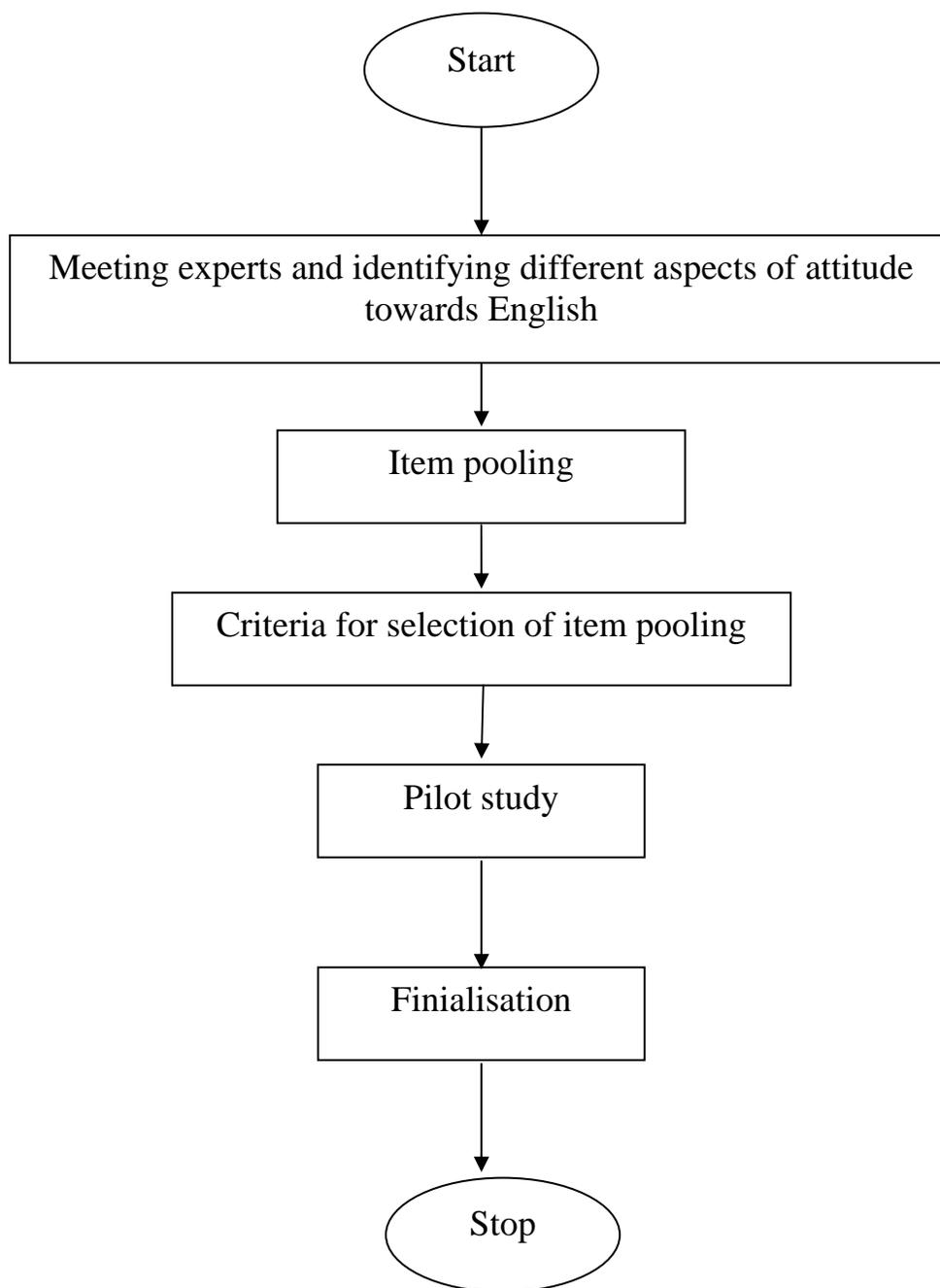
multiple choices with three responses or five responses. Since the investigator intended to apply the research tool on high school children she decided to use the Likert's (1978) first approach scaling method to get alternative responses what is called category-scale method and used these scale values as weight for responses.

The construction of attitude scale was to measure the students' attitude towards English in general in the pre and post-treatment period. The steps followed in constructing the scale is given in Figure 4.3. The development of the attitude scale passed through three main phases:

1. Pre-pilot phase
2. Pilot study phase
3. Finalisation phase

The pre-pilot phase was concerned with gathering of items. The following aspects were considered for the inclusion of the items in the attitude scale:

1. Attitude towards English in general.
2. Attitude towards English teaching method.
3. Attitude towards English professors.
4. Attitude towards communication skills.
5. Attitude towards English proficiency.
6. Attitude towards learning English grammar.

**FIGURE 4.3 STEPS IN CONSTRUCTING ATTITUDE SCALE**

### **i) Sources of Items**

The preliminary item pool was generated by drawing items from the following sources:

1. Discussion with the senior professors.
2. Discussion with the teacher educators.
3. Literature-reference.

Based on the information collected from these sources, statements were collected.

### **ii) Criteria for Selection of Items**

Once the statements had been collected, the statements were subjected to screening. Ambiguous, confusing and excessively long statements were eliminated. The following criteria had been laid down for the inclusion of statements in the pilot study:

1. Avoid statements that refer to the past rather than the present.
2. Avoid statements that are likely to be endorsed by almost everyone or no one.
3. Select the statements that are believed to cover the entire range of the effective scale of interest.
4. Keep the language of the statements, simple, clear and direct.
5. Statements should be short.
6. Each statement should contain only one complete thought.
7. Avoid words such as “all”, “always”, “none”, “never”.

8. Words such as “only”, “just”, “merely” should be used with care and moderation in writing statements.
9. Whenever possible, statements should be in the form of simple sentences rather than compound or complex sentences.
10. Avoid the use of words that is difficult to comprehend.
11. Avoid the use of double negatives.

### **iii) Criteria for Scoring the Attitude Scale**

The investigator constructed an attitude questionnaire to identify the students' attitude towards English. It was a four-point scale. There were twenty-five statements. For each statement, they were asked to mark a tick in the column denoting their feelings. The responses agreeing the point of view would be scored in the following manner:

- a) 4 points for “Fully Agree” response.
- b) 3 points for “Agree” response.
- c) 2 points for “Disagree” response.
- d) 1 point for “Fully Disagree” response.

The responses opposing the point of view would be scored in the following manner:

- a) 1 point for “Fully Agree” response.
- b) 2 points for “Agree” response.
- c) 3 points for “Disagree” response.
- d) 4 points for “Fully Disagree” response.

#### iv) Format of the Attitude Scale

The attitude scale questionnaire is in the following format:

**Table 4.1 Format of the Attitude Scale**

S.No.	Questions	Fully Agree	Agree	Disagree	Fully Disagree
1.	I like English.				
2.	I like my English teacher.				
.	.				
.	.				
25.	English is a hindrance to the mother-tongue.				

(Appendix No. 2)

#### v) Validity of the Attitude Scale

In the present study, the content validity of the attitude scale was established. Content validity involves the systematic examination of the content to determine whether it covers a representative sample of the domain to be measured (Anastasi, 1976).

Nunnally (1978) maintains that the content validity can be ensured by the systematic plan and procedures of test construction. According to Nunnally, two important standards are necessary to ensure the content

validity of a tool. The first one is the representative collection of items and the second one is the sensible method of tool construction.

In the present study, the aspects of English were decided from the printed sources in English, followed by senior teachers and experts in English language. Then pooling of items and the pilot study were done through the learner responses to items and the jury opinion. On the basis of the recommendations of the jury council, the attitude items were properly structured by eliminating ambiguous and overlapping items, modifying a few items and by rewording some. Hence, it can be said that the learner attitude scale possesses adequate content validity.

#### **vi) Reliability of the Attitude Scale**

First, the attitude scale was administered to a group of twenty-five students and their responses were culled out. Split-Half Method was followed and the Pearson's Product Moment Correlation ( $r$ ) was computed to find out the reliability of the attitude scale. The Pearson's Product Moment Correlation is applied to tests comprising items which elicit more than two categories of responses. Personality and interest inventory and attitude scales frequently permit three or more response categories (Ferguson and Takane, 1989). The computation of the coefficient is shown below:

$$r = 0.67$$

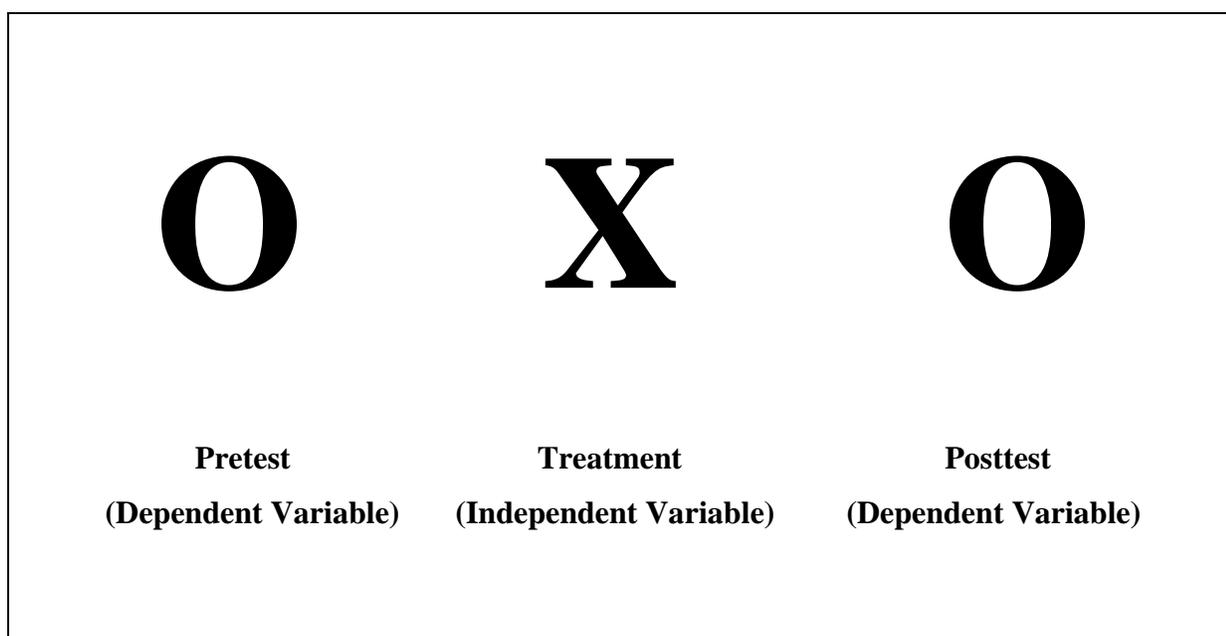
After calculating the Pearson's Product Moment Coefficient, Spearman- Brown's formula was applied. The reliability coefficient thus obtained was 0.80.

$$r'' = 2r / (1 + r) = 2 \times 0.67 / (1 + 0.67) = 0.80.$$

Hence, the learner attitude scale constructed by the investigator was a reliable tool as evidenced by the reliability coefficient (0.80).

#### **4.9 EXPERIMENTAL DESIGN**

The investigator selected **Single Group, Pretest - Posttest Design** for experimentation. The one group, pretest-posttest design involves three steps. The first step is the administration of a pretest measuring the dependent variable. The second step is the application of the experimental treatment (independent variable) to the subjects, and the final step is the administration of the posttest measuring the dependent variable again. Differences due to the application of the experimental treatment are then, determined by comparing the pretest and posttest scores. Figure 4.4 shows the one-group, pretest-posttest design employed for the study.

**FIGURE 4.4 ONE - GROUP PRETEST - POSTTEST DESIGN**

#### 4.10 SAMPLE

To select the sample for the study **Simple Random Sampling Technique** was adopted. Probability sampling is based on the concept of random selection. The other name for random sampling is probability sampling; it is also known as chance sampling. Under the sampling design, every item of the population has an equal chance of inclusion in the sample. Random sampling ensures the law of statistical regularity which states that if on an average, the sample chosen is a random one; the sample will have the same composition and characteristics as the population.

The population of the study was the first year students of Bachelor of Engineering. The institute where the researcher conducted the study, was in a rural area; most of the students were from various rural and urban areas. These students found difficulty in learning English especially writing. Hence, the researcher selected the sample randomly.

For this study, a sample of forty-five students from the first year of Bachelor of Engineering and Bachelor of Technology was selected by random sampling after the identification of slow learners. Four branches of engineering were considered for the sample as detailed below in table No. 4.2:

**Table 4.2 Distribution of Sample**

<b>S. No.</b>	<b>Branches</b>	<b>Number of Students</b>
1	Computer Science Engineering (CSE)	15
2	Information Technology (IT)	10
3	Civil Engineering (CIVIL)	10
4	Mechatronics Engineering (MCT)	10
Total		45

#### **4.11 IDENTIFICATION OF THE SLOW LEARNERS**

The slow learners were identified with the help of the TGI (Test of General Intelligence) tool. The test was conducted to measure the general mental ability of the students. There were six sub-tests and each sub-tests had ten questions. It was a standardized tool to test the general mental ability of the students, published by National Psychological Corporation, Agra, India.

A student who had obtained scores on intelligent tests below the average but above the limit was set for the mentally deficient. The rate of progress of such a student was slower than that of the average student, though he could learn within the scope of his capacity. The slow learners were generally weak in those subjects who needed a good deal of reading

and reasoning. These students needed help in enlarging their background of experiences which might facilitate in building reading vocabulary and interest. Learners with the IQ range of 50 – 70 (Cyril Burt, 1966); they were also labeled as backward learners, as their pace of learning was much slower than what was expected. The IQ was calculated by the formula:

$$IQ = \frac{\text{Mental Age}}{\text{Chronological Age}} \times 100$$

#### **4.12 IDENTIFICATION OF ERRORS COMMITTED BY THE SLOW LEARNERS THROUGH DIAGNOSTIC TEST**

After identifying the slow learners a diagnostic test was conducted to diagnose the errors committed by the learners in written English. This test threw light on the students' errors, thereby paving way for remedial teaching or package and to rectify those errors. The diagnostic test was conducted to identify the errors committed by the students in English grammar especially in the written English. The students were asked to write on anyone of the following topics:

- i) Global warming
- ii) My cherishable moments
- iii) My school days
- iv) My favourite hero
- v) My home town

vi) Festivals

vii) Sports and Games

viii) Impact of television on the youngsters

ix) Pollution

x) Pros and cons of internet

It was not a planned test but a test given without any prior information. The test was conducted for one hour duration. These test scripts were carefully corrected and the errors were categorised. The categorised errors are presented in table 4.3.

**Table 4.3 Areas of Errors Categorised**

<b>S.No.</b>	<b>Areas of Errors</b>	<b>Percentage of Errors</b>
1	Articles	13
2	Concord	06
3	Degrees of Comparison	08
4	Preposition	22
5	Sentence Formation	09
6	Singular / Plural	06
7	Spelling	08
8	Tenses	16
9	Voices	12

#### **4.13 CLASSIFICATION OF ERRORS**

Out of the nine areas of errors categorised above, the investigator selected four areas namely, Articles, Preposition, Tenses and Voices, because the error percentages were more in these areas. These four topics of grammar needed to be strengthened by giving thorough exhaustive training to minimize their errors in writing English in future. As the students performed poorly, these four areas were selected for treatment through multimedia package.

#### **4.14 DEVELOPMENT OF MULTIMEDIA PACKAGE**

In order to develop a multimedia package the following steps were followed:

**(i) Conventional or Earlier Strategies:**

1. Making the students to memorise the definition and the examples related to the grammar areas.
2. Administering the grammar after the completion of the instructions.
3. Asking the students to write imposition for the errors committed by them.

**(ii) Present Strategies:**

The teachers must develop their own form of multimedia package in their subjects to present them to the students.

For any novice in the field of multimedia package, C language is ideal. For the development of the multimedia package in macromedia flash player 7, very limited number of programming statements like IF ... THEN, GOTO, FOR ... NEXT, PRINT, CLS, LOCATE, INPUT, etc are enough. It is user-friendly. It is a robust language whose rich set of built-in functions and operators can be used to write any complex programme. The language used in macromedia flash player is C and C + +. C is highly portable. This means that the programmes written for one computer can be run on another with little or no modification.

Method of developing a multimedia package or otherwise the method of teaching through computer involves the following important modes as follows:

- (a) **Tutorial:** For the first time, the facts are presented to the students. Primary focus is on the student's acquisition of facts and concepts.
- (b) **Facts and concepts in the form of frames:** Each fact and idea is divided as informative frames.
- (c) **Feedback:** Each frame is followed with a question that has to be answered by the student.
- (d) **Drill and Practice:** Correct feedback allows the student to go to the next frame or else he has to learn the same frame.
- (e) **Dialogue:** This provides disciplined review of material with learner in command at the experimental stage of development.
- (f) **Problem-Solving:** Student's problem-solving environment is enriched by general purpose links, packages, etc.

**(g) Simulation:** Offers simulation models to create environment for study.

**(h) Inquiry:** The understanding of the student on the facts and concepts introduced to him will be tested by multiple choice questions.

The investigator prepared a package in the multimedia format by applying the **tutorial mode** in order to improve the effectiveness of learning English through computers.

Computer is a simply a computing machine. It is a data- processing device. It is used for storage generation and communication of information. Thus, a computer is an electronic device that processes raw data to generate meaningful information.

A student can use a computer as an efficient tool to discipline his own studies. He can store his own notes in the memory, can recall and refer them at his own will. He can refer to professional services available on Internet or Websites. He can check his progress by taking tests while drawing out question papers from the question bank stored in the memory of the computer. He can also take up tuitions from distant teacher at the available interactive website facilities. He can also refer to digital library. He can improve his study skills by referring to the available facilities.

A teacher can also make use of computer as a tool, to assist him in making his teaching effective. He can arrange slide shows, web – shows or virtual classroom shows while also providing the learning facilities as

discussed above. A teacher can maintain all assessment data and use it as a feedback to improve his own teaching performance.

A successful instruction must include the activities like presentation of information, guiding the student through initial use of information, gaining of fluency or familiarity through pupil practices and assessment of other methodologies.

In every subject area from language to social and physical sciences, the tutorials are being used. More pedagogy than drills or simulation is involved in tutorials. In pedagogy methods, various strategies are used in large numbers. Gagne and Rojas (1981) have made studies about tutorials that are better for presenting facts, learning rules and principles.

There are numerous instructional factors in relevance to tutorial instruction and they are organised and grouped according to the relevance. They are introduction, information, presentation, question and answer, judgment about responses, supplying feedback, arranging the lessons and conclusion.

The information through tutorial method are presented to the pupil in the form of text, graphics, sound or combination of all these. In a multimedia package of the tutorial mode, text is the common way of presenting information. Graphics and animation upgrade the instructions to a great extent about the objects and procedure as they are visually used.

The length of information presented is a critical factor that affects the quality of the tutorial. Whatever that occurs between two successive pupil responses is known as the length of presentation. To increase the frequency of pupil

interaction, each presentation should be short. The complex information should be broken into small steps with pupil activity relating to each and every step. The length of the presentation will depend upon the age and the level of the pupil. Longer presentations without losing interest can generally be dealt with by more matured pupils. Long sequence with variety of text of more than a page or two will overload the memory, create confusion and decrease the interest in the lesson. The length of presentation can be limited by programmed instruction. Little disadvantage is posed to the text by limitations of computer display, easily split up into pieces, problem for pictures and other graphics are frequently presented by them and when they are fragmented they lose their effectiveness. An awareness of all these are essential for authors that the quality of many lessons are increased by the simulations and presenting of too much information at the same time by the authors are prevented.

The main characteristics of the tutorials are as follows:

1. No prior knowledge of the major contents is presumed by the tutorials.
2. A new content may be introduced by using tutorials.
3. For review of reinforcement, tutorials are suitable.
4. Without teacher, tutorials may be intended for learning.
5. Presenting information and then, guiding the user and applying are possible through tutorials.
6. Only limited amount of practice and assessment are provided by tutorials.

A computer can be utilized into an effective instructional device by the suitable computer software. Care is needed for the selection of good computer software. The criteria for the selection of good computer software as suggested by Purushothaman and Stella (1995) are given below:

1. Content
2. Objectives
3. Specification of the target group
4. Text, graphics and sound
5. Flexibility and user – friendliness
6. Feedback
7. Reinforcement
8. Individualisation
9. Progress record

The developmental model of computer software packages involves five phases as suggested by (Lockard, 1992). Lockard's model is often called as ADDIE model where 'A' means Analyse, 'D' means Design, 'D' means Develop, 'I' means Implement and 'E' means Evaluate (**ADDIE**) **model – Analyse – Design – Develop – Implement – Evaluate**

In the **analysis phase**, the development of instructional problem, writing of the instructional objectives and development of the content are included.

In the **designing phase**, the decision about the events of instruction, preparing of structure charts, development of flow charts of the programmes, and designing the screen are included.

In the **development phase**, the development of the programmes preliminary administration like the pilot study and revision of the programmes are included.

In the **implementation phase**, the intended population or students are available for implementing the developed software by the investigator. The software packages are applied by the investigator to the experimental groups. The criterion-referenced tests in English developed by the investigator are used to measure the effect of this instructional software packages particularly the mastery of content among the learners.

In the **evaluation phase**, the software material is evaluated. The evaluation is done by 'Courseware Evaluation Proforma' developed by Kadiravan and Balasubramanian, (1999). This proforma is supplied to teachers, computer experts and educational technologies.

The development of multimedia package in tutorial mode involves the following steps:

**(iii) Steps to Develop the Multimedia Package:**

In order to develop the Multimedia package the following steps should be followed:

Evaluation methodologies include checklist, analytical review, observation and experiment. The North West Regional Educational Laboratory of USA has developed certain guidelines for finding out the quality of a multimedia package which are to be used for learning purposes.

So while choosing the package the teacher or student or the user should take care of aspects such as: (i) level of accuracy (ii) level of difficulty (iii) level of vocabulary used (iv) extent to which the packages are free from ethnic, sex and other stereotypes (v) level of clarity of presentation (vi) extent to which purpose is defined (vii) level of difficulty in relation to the concerned level of the student (viii) extent of availability of graphic presentation, colour and sound (ix) level of ability to motivate the students (x) level to which the creativity of the students' responses (xi) amount of provision for controlling the rate and sequence of presentation and reviews (xii) extent to which the programme is integrated with earlier experience of students (xiii) extent to which learning can be generalised to an appropriate angle of students (xiv) extent of provision for cues and prompts to tell the students to answer correctly (xv) extent of provision for use or access of the programme menu for help or to change activities (xvi) extent to which teacher can monitor the programme (xvii) extent to which provision exists to safeguard against mistakes committed by student so that the programme is not destroyed (xviii) extent of effectiveness of information displayed (xix) level of suitability for use by teachers (xx) extent of comprehensiveness and effectiveness of user support materials (xxi) level of reliability of the programme (xxii) level of appropriateness in use of relevant computer capabilities.

#### **4.15 SMALL GROUP TRY-OUT**

A small group try-out was attempted on a selected ten slow learners, who were not included in the sample of this study. A pretest was conducted on these ten students and the developed multimedia self-learning package, was applied for a duration of one month. After the treatment, a posttest was conducted. It was found that the posttest scores were greater than the pretest scores. Hence, the investigator attempted the final study that was, a large group try-out.

#### **4.16 FINAL STUDY (LARGE GROUP TRY-OUT)**

The success of the small group try-out of the multimedia self-learning package encouraged the researcher to go for the final study on the sample selected.

##### **4.16.1 ADMINISTRATION OF THE ATTITUDE SCALE BEFORE TREATMENT**

The structured attitude scale was applied to the treatment group to find out the group's attitude towards learning English at the entry level. The data collection was held in a cordial atmosphere. The subjects were encouraged to give free and frank responses. All the attempts were made to collect the objective data from the respondents. A close rapport was maintained with the subjects. No time limits were fixed for the subjects to respond to the attitude scale (Appendix No. 2).

#### **4.16.2 ADMINISTRATION OF THE PRETEST**

The pretest was administered to assess the students' entry level performance. The duration of the test was for two hours and during the test, effective supervision was provided (Appendix No. 3).

#### **4.16.3 APPLICATION OF THE MULTIMEDIA PACKAGE**

The researcher wanted to test the effectiveness of the developed multimedia package. The remedial package was administered to the students for four weeks. They learnt it at the comprehensive level and in an exhaustive way.

#### **4.16.4 ADMINISTRATION OF THE PROGRESSIVE TEST**

During the progress of the multimedia package, a progressive test was conducted to identify the progress of the learning of the students. The progressive test and the pretest tool were the same (Appendix No. 3).

#### **4.16.5 ADMINISTRATION OF THE POSTTEST**

After the treatment the investigator conducted a posttest to the students. The posttest tool was different from that of the pretest. Arrangement was made for an effective supervision during the course of the posttest too (Appendix No. 4).

#### **4.16.6 ADMINISTRATION OF THE ATTITUDE SCALE AFTER TREATMENT**

To study the attitudinal change in the students, the constructed and validated attitude scale was administered to them after the treatment (Appendix No. 2).

#### **4.16.7 ADMINISTRATION OF THE RETENTION TEST**

After a month of the treatment to the experimental group, a retention test was conducted to elucidate how far the students had retained the materials they had learnt through the multimedia package. The same tool used for the posttest was applied for the retention test (Appendix No. 4).

#### **4.17 CONCLUSION**

In this chapter, research methodology and the procedure for developing a multimedia self-learning package has been dealt with. The next chapter deals with data analysis. Data were analysed with the help of statistical techniques.