CHAPTER III

METHODOLOGY

3.1.0 INTRODUCTION

Research methodology provides logical and systematic way to solve a problem. It is a predetermined way through which the research is to be carried out. This chapter deals with the plan and the procedures adopted by the investigator to achieve the objectives of the present study. The present study is experimental in nature. This chapters includes design of the study, population, sample, tools and techniques used for collecting data and the procedure of data analysis.

3.2.0 DESIGN OF THE STUDY

In the present study the researcher has made an attempt to implement the experiment through the whole academic year on the experimental group. Therefore, sample of the present study was taken purposively considering the convenience of the researcher. Hence, quasi-experimental design was adopted as the sample of the study was taken purposively because '*Quasi experimental design is often used in classroom experiments when experimental and control groups are such naturally assembled groups as intact classes, which may be similar'* Best and Kahn (1996). Due to the typical nature of the study, only a modified post-test equivalent-controlled group design was followed in this research. To make the experiment and control group equivalent, Intelligence test of Raven's Standard Progressive Matrices was conducted. The design of the study is presented as follow

O_1	X	T_1O_5
O_2	X	T_2O_6
O_3	C	T_1O_7
O_4	C	T_2O_8

Where, O_1, O_2, O_3 and O_4 were pretest (Intelligence Test)
T_1 and T_2 were two different types of post testing
O_5, O_6, O_7 and O_8 were posttests
X stands for Experimental Group and
C stands for Control Group

Following the above experimental design, two groups were selected purposively one as experimental group and another as control group. On the basis of the intelligence score both the groups were made equivalent in the beginning of the academic year. The experimental group was taught throughout the whole year in the developed environment for teaching English and the control group was taught as usual in the traditional classroom environment. During the whole academic year achievement tests were administered twice. Achievement test-1 in English was administered after semester I and achievement test-2 in English was administered after semester II. Both the achievement tests were of higher cognitive level. In both semester-I and semester-II, the experimental group was further randomly divided into two equal groups. One group was administered with the achievement test in English as close book testing (CBT) and the other group was administered with the achievement test in English as open book testing (OBT). Similarly, in semester-I and semester-II the control group was also divided randomly into two equal groups. In control group also, one group was administered with the achievement test in English as close book testing (CBT) and the other group was administered with the achievement test in English as open book testing (OBT).

3.3.0 POPULATION OF THE STUDY

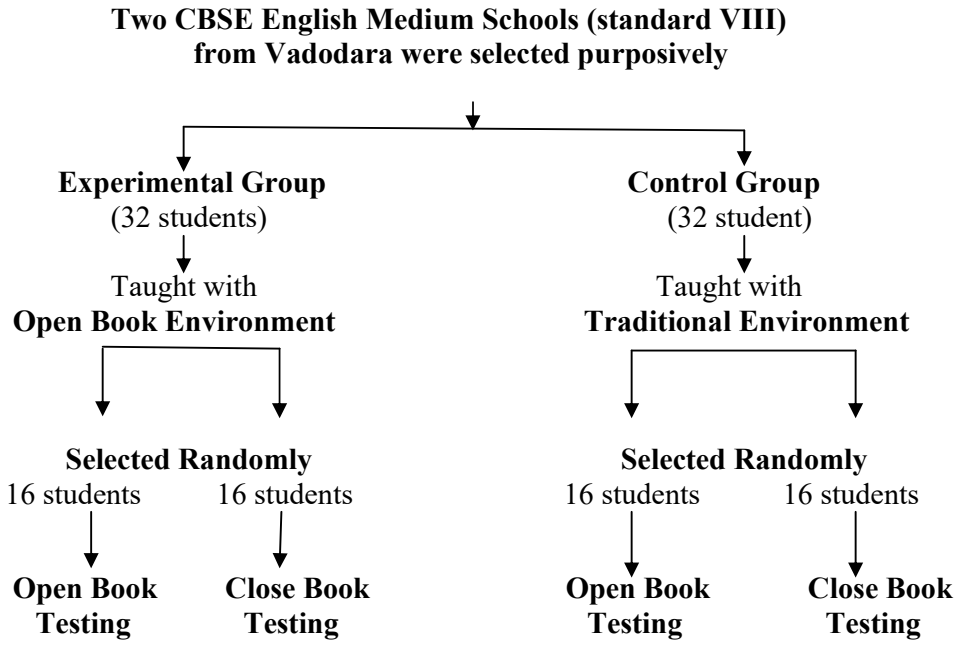
All the students studying in Standard VIII in English Medium schools during 2013-14 academic year affiliated to Central Board of Secondary Education (CBSE) in Gujarat constituted as the population for the present study. The population was confined to approximately 1100 standard VIII students of 280 English medium schools across Gujarat state affiliated to CBSE.

3.4.0 SAMPLE OF THE STUDY

Keeping the research design in mind and the nature of the study, sample was selected purposively. Two schools namely New Era Senior Secondary School and Ambe School, Manjalpur were selected from the Vadodara city those were ready to participate in the study. Both the schools were affiliated to Central Board of Secondary Education (CBSE). New Era Senior Secondary School was considered as the experiment group and Ambe School was considered as the control group. Standard VIII was selected from the both schools. After making the experimental and control groups equivalent 32 students from the each group were considered as the

final sample. Both the groups were made equivalent on the basis of the scores of the Intelligence test which was taken at the beginning of the academic year. Experimental group was taught English for the whole academic year with the developed OBEn and the control group was taught with traditional environment. In semester I and semester II the experiment group was randomly divided into two groups, each consisting of 16 students. One group of 16 students from the experimental group was administered with the achievement test in English as CBT and the other group of 16 students was administered with the achievement test in English as OBT in the respective semester. Similarly, in semester I and semester II the control group was also randomly divided into two groups, each consisting 16 students. One group of 16 students from the control group was administered with the achievement test in English as OBT and the other group of 16 students was administered with the achievement test in English as CBT in the respective semester. Hence, the sample size was 32 (16 + 16) for experiment group and 32 (16 + 16) for control group. The sample design is presented in figure 3.1.

Figure 3.1: Sample Design of the Study



3.5.0 TOOLS FOR THE DATA COLLECTION

In the present study data were collected using the following tools.

(i) Raven's Standard Progressive Matrices for making the group equivalent,

(ii) Achievement tests in English to measure the learning outcome of the students in English and

(iii) A Likert type five point reaction scale to measure the reaction of the students towards the developed OBEn and OBT.

3.5.1 Intelligence Test

Raven's Standard Progressive Matrices (SPM) was used to measure the intelligence of the students of experimental and control group**.** It is a non-verbal and individual intelligence test to assess logical reasoning of students. The test has 60 items and took 60 minutes to administer. The split-half-reliability of the test was r = 0.90. The retest-reliabilities of the test varying between r = 0.83 and r = 0.93. In terms of the validity of the test, inter correlations are the highest with arithmetic, technological and scientific abilities. Correlations between the SPM and school performances result in values up to r = 0.70. Correlations with other intelligence and ability tests vary between r = .20 and r = .80. Factor-analytical calculations show high values in the g-factor, often amounting up to r = 0.95.

3.5.2 Achievement Tests

Both the selected schools were following CBSE syllabus but for standard VIII the schools have different text books for the English subjects. Having different text books in English in both the experimental and control group, the researcher constructed four parallel achievement tests in English. In the experimental group for the semester I and semester II, two achievement tests in English were conducted. Similarly, in the control group for the semester I and semester II two achievement tests in English were prepared. Hence, a total of four achievement tests were prepared taking all the chapters prescribed for standard VIII for the whole year i.e. 2013-14 in both Experiment and Control Group. In the achievement tests all questions asked from the content were based on higher order thinking skills including understanding, application, analysis, synthesis and evaluation to measure the achievement of students in English along with other abilities of the students like, use of suitable logic, use divergent thinking while answering questions and the comprehension ability of the students. Hence, all the achievement tests were designed covering the dimensions like, overall Achievement (A), Content Knowledge (CK), Logic (L), Divergent Thinking (DT) and Comprehension in English. The above mentioned dimensions were discussed in detail as follow.

- **Overall Achievement (A):** It can be defined as student's ability to present an answer based on the developed skill or knowledge learned in the classroom following the prescribed text of English. Academic achievement of the student is measured in an interval scale. The quality of the answer is considered including proper content knowledge of the prescribed text, divergent thinking and a spontaneous flow of the thought and suitable logic used for writing the answer altogether. However, it is not the sum total of the marks obtained in different components like, content knowledge, logic, divergent thinking and comprehension.
- **Content Knowledge (CK):** Content knowledge in English of a student refers to the ability to produce or handle the learned content or information in an appropriate way while answering the question and it also refers to the student's sound knowledge in terms of understanding of a particular chapter in English. To answer the higher order thinking questions, only content knowledge is not enough. Content Knowledge is used as a reference along with the logic, divergent thinking, and imagination power of the students. Content Knowledge of the student is measured in an interval scale.
- **Logic (L):** Logic or logical thinking refers to one individual's thinking process in terms of causes and consequences or in other words it is sequential thinking that follows a train of thought. Thus, it is the cognitive ability of a student to reproduce the answer of a question in a comprehensive manner. For answering a higher order thinking question from story, poetry or drama proper and sound logic can add meaning to the answer of a question. Ironically, a poor logic with in-depth and adequate content knowledge may lead an answer for poor understanding by the readers. It is also measured in interval scale.
- **Divergent Thinking (DT):** Divergent thinking is the ability to generate creative ideas by exploring multiple solutions. In other words, it is the 'thinking outside the box'. It is the cognitive ability of the mind that generates new ideas beyond the prescribed way or the rote learning. For answering the higher order thinking question the most effective way is to think in different direction using content knowledge, logic and divergent thinking in an innovative and non-traditional way. It indicates the novelty and flexibility of

the students. It helps to think spontaneously in any topic and situation irrespective of any subject. It was also measured in interval scale.

- **Comprehension (C):** Comprehension especially in English is the ability to read the given text, process it and understand its meaning. It is the cognitive ability of a student to understand the given passage and write the answer of a question using their own language in a meaningful and precise manner. One's ability to comprehend text is influenced by their traits and skills which leads them to make inferences. This ability may help students to create new solutions in an easy way for maximum applications. It was also measured in interval scale.

The blue prints were prepared for the construction of achievement tests in English for both semester I and semester II examination considering the dimensions like, distribution of contents, type of questions (multiple choice question, very short answer type, short answer type and Essay type), weightage to testing abilities (Overall Achievement, content knowledge, logic, divergent thinking and comprehension) and the distribution of marks (blue prints of both semester I and semester II examination are given in Appendix-I). The blue prints of both semester I and semester II in English were of 50 marks each in terms of achievement test. Component wise distribution of marks in achievement Tests of different subjects is given in table 3.1.

Table 3.1: Component wise Distribution of Marks of Achievement Tests in English

Achievement test in English	Achievement	Content Knowledge	Logic	Divergent Thinking	Comprehension	Total Marks
Semester I Exam	50	35	35	35	5	160
Semester II Exam	50	35	35	35	5	160
Total Marks	100	70	70	70	10	320

In the Achievement tests of English for both semester I and semester II examination seven subjective questions were asked having 5 marks in each question. So, 7×5 = 35 marks were allotted for each components namely content knowledge, logic and divergent thinking. One unseen passage was given having 5 marks to measure the

comprehension of students in English achievement tests in both semester I and semester II examination.

Following the prepared blue prints, the achievement tests were constructed by the researcher. The prepared achievement tests were shown to English subject expert for the purpose of finding content validity. The suggestions of the expert were duly incorporated in all the achievement tests. After determining the content validity, the tests were administered for the purpose of testing. The achievement tests are given in Appendix II. New Era School was following the textbook 'Celebrate: Literature Reader' published by Pearson Longman and Ambe School was following the textbook 'New Broadway: Literature Reader' published by Oxford University Press. Name of the chapters semester wise of both the school are given below.

- **Semester I of Experimental Group:** All the chapters prescribed for semester-I were taken i.e. Grandfather and Toto by Ruskin Bond; Adventure of Isabel by Ogden Nash; A Day's Wait by Ernest Hemingway; The Attic by Satyajit Ray; My Date with Greybeard by Robin Collins; Birds of Paradise by Christina Rossetti.
- **Semester II of Experimental Group:** All the chapters in English subject for semester II were The Neighbour by Sigrun Srivastav; The Gift of India by Sarojini Naidu; The Wolves of Cernogratz by Saki; The Fish Are All Sick by Anne Stevenson; The Gold Frame by R. K. Laxman; Julius Caesar by William Shakespeare.
- **Semester I of Control Group:** All the chapters prescribed for semester I were taken i.e. After Twenty Years by O. Henry; The Listeners by Walter De La Mare; Chasing the Rainbow by Manoj Das; Geography Lesson by Zulfikar Ghose; The Maths Teacher, Mr. Pink and Tipu by Satyajit Ray; The Village Schoolmaster by Oliver Goldsmith; A Tiger in the School by R. K. Narayan.
- **Semester II of Control Group:** All the chapters prescribed for semester II were taken i.e. My elder Brother by Munshi Premchand; Harry Pushed Her by Peter Thabit Jones; Cricket for the Crocodile by Ruskin Bond; The Louse and the Mosquito by Vikram Seth; The Little Prince by Antoine De Saint Exupery; The Quality of Mercy by William Shakespeare; Woman Work by Maya Angelou.

3.5.3 Reaction Scale

A Likert type five point reaction scale was prepared by the researcher to measure the reaction of the students of the experiment groups about the developed OBEn in the classroom of English teaching learning and OBT. Thirty statements related to the development and implementation of the OBEn and OBT were stated in the reaction scale where the students were asked to show their reaction in the form of putting a tick mark (√) in the appropriate box where the range of reactions were Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree. All the 30 statements were positive statements. The reaction scale was shown to teacher educators having expertise in construction of educational tools and their suggestions were also duly incorporated in the reaction scale. The reaction scale is given in Appendix III.

3.6.0 DEVELOPMENT OF OPEN BOOK ENVIRONMENT

In the present study an attempt was made to create an environment for open book test in the classroom for teaching of English. The major purpose of it was to provide more freedom and scope to the students to exercise the LSRW skills along with the ability to think beyond the book independently having sound logic and divergent thinking. In this environment practices would help students to answer the questions in an OBT as most of the questions in an OBT are of higher order thinking. Considering this aspect, the OBEn was planned and developed to create critical thinking and divergent thinking among students being within the prescribed syllabus of the school. To create a suitable OBEn in the classroom for English teaching learning two days training programme was arranged by researcher for English teacher. Lesson plans of all chapters were provided to the teacher and the teacher was asked to follow the developed steps for the implementation of the OBEn. All the activities were observed and necessary modifications were done by the researcher from time to time with the help of the teacher. The following factors were kept in mind for preparing the OBEn.

3.6.1 Factors for preparation of open book environment

The concept of the OBEn is very different from the traditional examination. The questions of the open book examination and traditional examination are not similar in nature. The questions asked in the traditional examination are mostly of knowledge level and few questions are of understanding level, on the other hand most of the questions asked in an OBT are of higher order thinking i.e. application, analysis,

synthesis and evaluation levels. Only few questions are asked from understanding level and there are no questions based on knowledge level. Thus, the answers of the OBT are not merely based on memorization of the text. Students need to have knowledge and understanding of the contents as well as the ability to apply logic and divergent thinking to get the answers. Considering the nature of questions asked in the OBT or nature of expected answers, a long preparation is needed for the students. Hence, in the present study to create an OBEn, ample opportunity was given to the students for enhancing their cognitive abilities, not limiting their thinking only in the prescribed text book of English whereas the traditional teaching learning environment is spoon feeding in nature and only limited to the contents. In the present study, the following steps were followed to develop an open book environment in the classroom of English teaching learning to prepare students for OBT. The traditional examination was also kept in mind to avoid any negative impact of the research in their regular academic achievement. The students had to appear in the traditional examination of the school along with the OBT meant for the research.

- With the help of the technology the teacher taught the content elaborately. So that the students were able to get more and better understanding of each chapter. PPT was prepared for each chapter by the researcher and was provided to the teacher.
- At the end of each chapter or unit of the content, teacher discussed every probable questions of the content that could be asked in their traditional examination. This component was kept as a part of the lesson plan to avoid any negative impact of the research in their regular classroom practices.
- It was the most important step for enhancing their language skills. The cognitive question was given to each group for discussing among the groups members to come out with the possible answer and they were asked to take the help of the teacher in case of any difficulty to understand the question.
- Next step was followed by the presentation of their group work in front of the whole classroom.

In this way, the concept of OBEn was developed without changing the existing practices of English teaching learning.

3.6.2 Development of teacher orientation programme

For creating the OBEn in the classroom and to implement other component of the experiment a comprehensive teacher orientation programme was prepared by the researcher to orient the English teacher of the experimental school.

- Two days orientation programme were designed for orienting the English teacher at the beginning of the academic year (Detailed schedule of the two days orientation programme is given in Appendix V). After semester I, again another one day orientation programme was organized to provide corrective measures during the implementation of the OBEn and various components of the OBEn.

- The orientation programme was followed by practical presentation of a model lesson plan and the use of power point presentations and the multimedia materials designed by the researcher.
- On the basis of the classroom observations, necessary modifications were done with the help of the teacher from time to time throughout the whole year.

3.6.3 Preparation of lesson plans

In the classroom, creation of an environment for English teaching learning was the most important component of the OBEn. English texts were taught in such a way that it would help the students to enhance LSRW skills and also to develop ability for higher order thinking skill that would be helpful to face OBT and also it would be easy for the students for appearing at their traditional examination also. Hence, attempt was made by the researcher to have a balance between these two components. Therefore, a specific type of lesson plan was designed including all the chapters of English following the prescribed syllabus of standard VIII of the control group (Lesson plans are given in Appendix IV). Following were the major components of the lesson plans.

i. Content to be covered

It includes the points of discussion in English teaching learning for a specific content which would be covered by the teacher in the classroom.

ii. Learning objectives

It refers to the expected outcome of a content of teaching in terms of change in students' behavior both in a short period of time and a long span of time. Hence, both general as well as specific educational objectives were achieved after completion of a specific chapter in terms of knowledge, understanding, reflections and skills were placed in the lesson plans.

iii. Content presentation in brief by the use of technology

It was one of the very important aspects of the OBEn where attempt was made to prepare certain teaching learning materials like, power point presentation, video clips, and audio clips as per the availability of the materials in the open and free source from internet. Major purpose behind the development of such material was to make the students thoroughly understand the topic. On the other hand, the developed material helped the English teacher to present and explain the content briefly by saving some time for doing other activities that would help to enhance students' cognitive ability and their thinking process.

iv. Questions of cognitive conflict/ cognitive reflection: Five / Six questions were prepared from the each chapter based on higher order thinking like synthesis and evaluation. These questions were designed to make the students work in groups to have thinking among themselves through brain storming using the acquired understanding and perception of a particular chapter. Questions like cognitive conflict are the questions to create a conflicting situation in the mind of the students and to find the possible answers to the questions. These are the best type of questions at the evaluation level to develop logic and divergent thinking among students. In some cases where questions of cognitive conflicts were not possible, the questions of cognitive reflection were prepared. These were mostly of analysis and synthesis level questions.

Examples of cognitive question

- If you would have the four fears like Isabel, how do you like to remove these fears in your own way? (Adventure of Isabel)

- If you were in place of Anthony, how would you represent yourself in front of the audience? (Julius Caesar)
- Why do you think, some important paintings should be restored? (The Gold Frame)

v. **Collaborative learning activities/intra-group discussion:** At the end of each lesson the whole classroom was divided into five or six small groups consisting five or six students and one cognitive question was assigned to each group. Fifteen minutes were given to each group to come out with the answer of the assigned cognitive question after discussing among themselves. The purpose of this activity was to have more thinking when working with group using more brains, a habit of working in group and to provide opportunity to enhance LSRW skills, and to allow the group to come across the social norms. After the brainstorming and discussion among the group they would prepare a write up which would be presented by the member/s of the group in front the whole class.

vi. **Inter-group sharing**

At this stage, whatever the group had prepared, one or more members of each group would present their answer of the cognitive question and discussion points in the inter group discussion or sharing. Maximum five minutes were provided to each group for this presentation. The purpose of this activity was to make the whole class know about the different cognitive questions and their answers and have a learning session. In this activity, the role of the teacher was not to evaluate the answer of the groups, rather to support, encourage and appreciate the groups for thinking in different ways. As there was no right or wrong answer for any cognitive question and the degree of rightness of an answer depends on the use of proper reference of content knowledge and the suitable logic, teachers were advised not to evaluate the answers of the cognitive questions rather the teacher would modify the direction of thinking of the group, if it was found that any group was going with wrong idea or thinking. During the presentation, members of other groups were allowed to add some new ideas in their line of thinking. At the end of this session after all the groups presented their answers, the teacher was advised to conclude the session taking the main concepts of the whole presentations in brief.

vii. Question-answer session

In the present research, though the attempt was made to develop an open book environment to prepare students for open book examination, the tradition of close book examination was not ignored as it may had affected their academic achievement for which the students had to appear in the traditional examination of the school along with the open book examination. So, it was planned to have a question answer session in the process to discuss the exercises of the book. Hence, at the end of each chapter of the content, teachers were asked to discuss each and every probable questions of the content that could be asked in the close book examinations.

viii. Concept mapping

In the present research, students were supposed to do well in their traditional examination along with open book testing. Though maximum emphasis was given on developing and enhancing LSRW skills and higher order thinking skills, the lower order thinking skills like knowledge and understanding were not ignored totally. As more questions in the close book examination were of knowledge based and students required to memorize a lot of the contents, the concept of concept mapping was introduced in the lesson plan that would help to sharpen their memory for memorizing factual information. Hence, at the end of each chapter, the students were asked to prepare a concept-map by their own on the basis of their understanding of different components and to cognitize it. Through this concept map, whatever the teacher taught in the class and whatever was understood by the students about the contents, students needed to prepare a pictorial figure like line diagram or a flow charts of events of a story, drama or important points related to a central theme of a poem or rule of the grammar as a whole content in a compact way which could be kept in the mind in such a way that it could be visualized and could be retrieved at any point of time. As very less emphasis was given to memorization in the open book environment, the concept mapping was used to make the process of remembering the factual facts easier.

ix. Individual assignments

At the end of every chapter, a provision of giving individual assignment was kept in the OBEn through the lesson plan which was of application in nature related to the surrounding environment including news papers, TV, internet etc. This component was designed to have more insight on their own thinking which could have some relevance in the society and the surroundings. Like homework, teachers were asked to check the assignments of each and every student and to provide feedback accordingly.

x. Sample questions for Open Book Testing

OBEn was designed to prepare each and every student to perform well in the OBT. To get representative questions for OBT from different chapters easily and to make students aware about different types of questions which could be asked in an OBT, open book questions were prepared for every lesson and had a place in the lesson plan. Hence, four / five open book questions of different length were kept in each and every lesson plans and teacher was asked to discuss the questions during the regular teaching learning process.

3.7.0 IMPLEMENTATION OF THE OPEN BOOK ENVIRONMENT

After taking permission from the school authority of both New Era School and Ambe School the present study was conducted for the whole academic year 2013-14 on standard VIII in English. New Era School was taken as Experiment group and Ambe School was taken as Control group. The concept of the OBEn was implemented in standard VIII of the New Era School. For this purpose, training programmes, lesson plans, tools for data collection and teaching learning content-materials were prepared by the researcher. At the beginning of the session i.e. April 2013, two days teacher orientation programme was conducted with the practical demonstration taking a model lesson plan by the researcher. Lesson plans and study materials were provided to the teacher time to time and the teacher was supposed to follow the steps which were designed by the researcher to create the desired environment for the English teaching learning. Physical setting of the standard VIII was little modified to provide the facilities for the group work by the students.

Figures 3.2: Teacher taking class using technology

Figures 3.3: Teacher-student interaction

Figures 3.4: Class divided in several small groups for group activity

Figures 3.5: Students working in the group

Figures 3.6: Presentation of the assigned cognitive question by the group

Figures 3.7: Question answer session

The teaching learning activity and other activities were supervised and observed by the researcher on the regular basis. The teachers were advised to provide full freedom to the students in the classroom activities. Students were guided to maintain self discipline during different activities of the classes. In the month of October 2013 achievement test for semester I was taken in both experimental and control group. After semester I, second phase teacher orientation programme was organized bringing little modification and refinement to improve the implementation of the OBEn. The class was observed by the researcher and feedback was provided to the teacher as per the requirement. The teacher was able to complete all the prescribed chapters following the given lesson plans designed for OBEn smoothly in time. Sample images of the implementation of the OBEn have been given in the figure 3.2 to figure 3.7. In this way the designed OBEn was implemented upon the experiment group.

3.8.0 PROCEDURE OF DATA COLLECTION

In the present study data were collected both quantitatively and qualitatively throughout the academic year. Quantitative data were collected through intelligence test, achievement tests and the reaction scale. Qualitative data were collected through the observation of the classes throughout the year.

Four sets of achievement test were constructed in the subject English following the text books of respective school. Though the both schools follow the syllabus of the CBSE but in case of the language subject the school has the opportunity to choose the text book of the standard VIII. The contents of the English text book of the experimental group were different from the control group. Therefore, parallel achievement tests were constructed maintaining the same standard. The achievement tests were validated by the subject expert. Both semester I and semester II were of fifty marks each and the results of semester I and semester II were taken combined for the data analysis. A reaction scale was also prepared with 30 statements related to the development and implementation of the open book environment for English teaching learning and OBEn, to measure the reaction of the students of the experiment groups about the developed OBEn and OBT.

In the beginning of the experiment the intelligence test i.e. Raven's Standard Progressive Matrix was administered on both the experimental group and control group students to measure their intelligence for the purpose of making the groups

equivalent. The experiment and the control group were made equivalent and 32 equivalent students were selected as sample in both the groups. Then the OBEn was developed and implemented in teaching English throughout whole academic year on the experiment group and similarly, in the control group English was taught by their teacher using their traditional method as usual.

In semester I, the experiment group was divided into two groups randomly consisting of 16 students in each group as per the design of the study. One group appeared for OBT where they were allowed to access their text book and class notes. The other group appeared for CBT where they were not allowed to access any material.

In the similar way, in semester I the control group was divided into two groups randomly consisting of 16 students in each group as per the design of the study. One group appeared for OBT where they were allowed to access their text book and class notes. The other group appeared for CBT where they were not allowed to access any material.

Again, in semester II, the experiment group was divided into two groups randomly consisting of 16 students in each group as per the design of the study. One group appeared for OBT where they were allowed to access their text book and class notes. The other group appeared for CBT where they were not allowed to access any material.

In the similar way, in semester II, the control group was divided into two groups randomly consisting of 16 students in each group as per the design of the study. One group appeared for OBT where they were allowed to access their text book and class notes. The other group appeared for CBT where they were not allowed to access any material.

At the end of semester II, the developed five point reaction scale was administered on the experimental group to know their reaction on the OBEn for English teaching learning, and OBT. Throughout the whole academic session, the experiment group was observed by the researcher. On the basis of the observations qualitative data were collected for the further improvement study.

3.9.0 PROCEDURE OF DATA ANALYSIS

The collected data obtained through achievement tests were analyzed by employing quantitative data analysis techniques. The data collected from semester I and semester

II were taken together for the analysis. Mean, Standard Deviation, Standard Error of Mean and Mann-Whitney U-test were used to analyze the quantitative data. The non-parametric Mann Whitney U-test was used to analyze the data as the sample was taken purposively as it is considered as the most powerful non parametric equivalent of t-test of parametric family. Data collected through reaction scale were analysed quantitatively with the help of percentage and Intensity Index (II). Data collected through observation were analyzed qualitatively using content analysis.

Intensity Index (II) is used in the present study to get the intensity of reaction of the respondents for each statement and the average intensity of reaction for the total programme in a five point scale. The following formula was used to calculate the Intensity Index (II) for a given statement.

II for Statement A=[(F1×5)+(F2×4)+(F3×3)+(F4×2)+(F5×1)]/(F1+F2+F3+F4+F5)

Where, the scale values of 5,4,3,2 and 1 are assigned for the scale points of Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA) and Strongly Disagree (SDA) respectively on a given statement "A".

And Frequencies for SA, A, UD, DA and SDA are F1, F2, F3, F4 and F5 respectively.

Average Intensity Index (II) is the sum of intensities for all the statements divided by the total number of statements. The detailed analysis and interpretation of the data is given in chapter IV.