CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

Once the research problem is identified and review of the related literature is carried out, it is time to develop a research design. Research design refers to the systematic scheduling of the time at which treatments are administered to the subjects and performance of the subjects is observed. Research design is a blueprint of any research just like an architectural plan for a contractor. In this the researcher requires all the minute details to work out the line of action. This chapter comprises of selection of research design, sample, tools of data collection and preparation and implementation of a teaching learning programme based on Multiple Intelligences approach.

3.2 MEANING OF RESEARCH

Research in common parlance refers to a search of knowledge. In fact research is an art of scientific investigation.

“We all possess the vital instinct of inquisitives for when the unknown confronts us, we wonder and inquisitiveness makes us prove and attain full and fuller understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method, which man employs for obtaining the knowledge of whatever the unknown, can be termed as research.”(Kothari, 1990, Pg 1)

Research is more systematic activity that is directed towards discovery and development of an organized body of knowledge.

3.2.1 Definitions of research

Research may be defined as “The systematic and objective analysis and recording of controlled observation that may lead to the development of
generalizations principles of theories, resulting in prediction and possibly ultimate control of events.” (Best, 1978, Pg 18)

“The systematic and scholarly application of the scientific method, interpreted in its broadest sense, to the solution of educational problems can be considered as educational research.”(Mouly, 1963, Pg 2)

D. Slesinger and M. Stephenson in the encyclopedia of social sciences defines research as, “the manipulation of things, concepts or knowledge, whether that knowledge aids in construction of theory or in the practice of an art.”(Kotari, 1990, Pg 2)

3.2.2 Definitions of educational Research

According it Traverse-

Educational research is that activity which is directed towards development of a science of behaviour in education. The ultimate aim of such a science is to provide knowledge that will permit the education to achieve his goals by the most effective methods. (Travers, 1995, pg5)

According to Whitney-

Educational research aims to make contributions towards the solutions of problems in the field of education by the scientific philosophical method. (Whitney, 1946, Pg 21)

3.2.3 Importance of Educational Research

Today’s era is known as information era. It is said that after every 10 seconds one page is being published. It shows that area of knowledge increasing very fast. But progress in science and technology is giving birth to many new problems. The solution of the problems can be found out with systematic study .For this research plays an important role. It is on the bases of research that the function of education has been broadened. Educational research has a great bearing on the role of education in introducing social and economic changes. Research adds new knowledge to its existing store.
CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

Educational research is important because it is said to be a quest for answers to unsolved problems. It helps in better understanding of the teaching learning process and the condition under which it is most successfully carried out. (Best, 1978, pg23)

Importance of educational research can be listed as follows:

(i) Educational research brings dignity to the work of the teacher.
(ii) Educational research leads to the adaptation of new method.
(iii) Educational research brings sense of awareness.
(iv) Educational research develops a better understanding of the teaching learning process.
(v) Educational research promotes educational reform.

Therefore it is necessary for a teacher to do various researches in the field of education to improve teaching and learning process. In the present research, researcher is doing research on a different teaching method than traditional one i.e. learning by using Multiple Intelligences based teaching.

3.2.4 Steps of research

(i) Formulating the research problem
(ii) Extensive literature survey
(iii) Developing the hypothesis
(iv) Preparing the research design
(v) Determining sample design
(vi) Collecting the data
(vii) Execution of the project
(viii) Analysis of data
(ix) Hypothesis testing
(x) Generalization and interpretation
(xi) Preparation of the report

Researcher has followed all the steps of research
3.3 RESEARCH DESIGN

"A research design is the arrangement of conditions for collection and analysis of data in a manner that aims with economy in procedure" (Kothari, 1990, Pg 39)

In fact the research design is the conceptual structure within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data. As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data.

In brief research design must, at least, contain-(a) a clear statement of the research problem (b) procedures and techniques to be used for gathering information(c) the population to be studied and (d) methods to be used in processing and analyzing data.

3.3.1 Need for Research Design

Research design is needed because it facilitate the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money. Research design stands for advance planning of the methods to be adopted for collecting relevant data and the techniques to be used in their analysis, keeping in view the objectives of the research and the availability of staff, time and money. Research design, in fact, has a great bearing on the reliability of the results arrived at and as such constitutes the firm foundation of the entire edifice of the research work.

3.3.2 Types of research:

There are three types of research.
**FIGURE 3.1 TYPES OF RESEARCH**

**Fundamental or basic research** – Basic research is usually carried on in a laboratory situation, often with animals as subjects. This type of research has been primarily the activity of psychologists rather than educators.

**Applied research** – The purpose of applied research is improving a product or a process testing theoretical concepts in actual problem situations.

**Action research** - Action research is focused on immediate application, not on the development of theory or on general application its findings are to be evaluated in terms of local applicability, not universal validity.

The present research falls, into the category of applied research whose purpose is to improve process of teaching and learning.
3.3.3 Methods of research:

**FIGURE 3.2 METHODS OF RESEARCH**

<table>
<thead>
<tr>
<th>Historical</th>
<th>Descriptive</th>
<th>Experimental</th>
</tr>
</thead>
</table>

**Historical research** - The process involves investigating, recording, analyzing and interpreting the events of the past for the purpose of discovering generalizations.

**Descriptive research** - The process involves describing, recording, analyzing and interpreting conditions that exists.

**Experimental research** - It describes what will be when certain variables are carefully controlled or manipulated. The focus is on variable relationship.

The present research falls into the category of experimental research. Deliberate manipulation is a part of experimental method. The immediate purpose of experimentation is to predict events in the experimental settings.

**3.3.4 Experimental method:**

“Experimentation consists is the deliberate and controlled modification of the conditions determining an events and the observation and interpretation of the ensuring changes in the event.” (Dalen, 1966, pg 221)
In the context of scientific research, an experiment is a procedure for investigating cause and effect relationship by randomly assigning subjects to groups in which one or more independent variables are manipulated. A key element in experimental research is that the investigator deliberately sets up conditions in which different groups of subjects have different experiences.

### 3.3.5 Characteristics of experimental method:

1. Purpose of experimentation is to identify functional relationship among phenomena through staging the occurrence of certain outcomes under controlled conditions designed that is the experiment i.e. the self contain.

2. The basic element of experimentation is control. The experiment must be organized so that the influences of the extraneous factors that are not included in the hypothesis are prevented from operating and confusing the outcome which is to be appraised.

3. Experimentation provides a method of hypothesis testing.

4. Experimentation is the classic method, where elements manipulated and effects observed can be controlled.

5. An experiment involves the comparison of the effect of a particular treatment with that of a different treatment or of no treatment. The present research has these characteristics.

### 3.3.6 Steps of experimental method

1. Identify and define problem

2. Formulate hypothesis and reduce their consequences.

3. Construct an experimental design that represents all the elements, conditions and relations of the consequence.
   a. Selection of sample to represent a given population.
   b. Grouping or pairing subjects for homogeneity
   c. Identifying and controlling non-experimental factors.
   d. Selecting or constructing and validating instruments to measure the outcomes of the experiment.
   e. Conducting pilot studies to perfect the instrument or design.
   f. Determining place and time and duration of the experiment.
4. Conduct the experiment
5. Analyze raw data to study the effect which is presumed to exist.
6. Apply an appropriate list of significance to determine the credence one can place on the results of the study.

In the present study all the steps of experimental method except grouping subject for homogeneity were taken.

3.3.7 Experimental design:

Experimental design is the procedure that enables a researcher to test the hypothesis by reaching valid conclusions about relationship between dependent and independent valuables. Selection of a particular design is based upon the purpose of experiment, type of variables to be manipulated and the conditions of the limit factors under which it is conducted. The adequacy of an experimental design is judged by the degree to which it eliminates or minimizes threats to experimental validity.

Three main categories of experimental design are:

**FIGURE 3.3 CATEGORIES OF EXPERIMENTAL DESIGN**

<table>
<thead>
<tr>
<th>Pre-experimental design</th>
<th>Quasi experimental design</th>
<th>True experimental design</th>
</tr>
</thead>
<tbody>
<tr>
<td>• It provides either no control group or no way of equating the groups that are used.</td>
<td>• It provides less satisfactory degree of control, used only when randomization is not feasible.</td>
<td>• It provides randomization to control the equivalence of the group and exposure of the treatment.</td>
</tr>
</tbody>
</table>

The research design for present study can be categorized as “Quasi-experimental design”. A quasi-experiment is one where the treatment variable is manipulated but the groups are not equated prior to manipulation of the
independent variable. Of different Quasi-experimental design, the researcher selected, ‘Pretest- Posttest Non Equivalent- Group Design.’

The design selected for the present research is represented as follows:

Experimental Group  \[O_1 \quad X \quad O_2\]
Control Group \[O_3 \quad C \quad O_4\]  (Best, 1986, Pg129)

\[O_1 \quad O_3 = \text{Pretest}\]
\[O_2 \quad O_4 = \text{Posttest}\]

\[X = \text{MI - based Teaching}\]
\[C = \text{Non- MI - based Teaching}\]

This design involves three steps.

(i) Administration of pretest(measuring the dependent variable)
(ii) Administration of the experimental treatment.
(iii) Administration of posttest( again measuring the dependent variable)

FIGURE 3.4 DIAGRAMMATIC REPRESENTATION OF ‘PRETEST-POSTTEST NON EQUIVALENT- GROUPS DESIGN.’
CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

Researcher chose this design for the following reasons.

- Though true experimental design which requires randomization is the best choice, the researcher required a school which would grant access to mediums like OHP, LCD etc. and allowed a wide range of activities to be conducted. So randomization was not possible. Hence quasi-experimental design was the best option.

- According to Koul (1986, p. 470) The reactive effects of the experimentation are more easily controlled using intact classes or preassembled groups because subjects are less aware of the fact that they are subjected to experimentation. This is an advantage over the true experimental research where subjects are selected at random and are aware of being subjected to experimentation.

- As the pre-test-post-test control group design provides control over factors like history, maturation, pretesting and instrumentation, the researcher used this design.

3.3.8 Variables

“Variables are the conditions or characteristics that the experimenter manipulates, controls or observes.” (Best; Khan, 1986, pg.114)

1. Independent Variable - These are the conditions or characteristics that the experimenter manipulates or controls in his or her attempt to ascertain their relationship to observed phenomena.

2. Dependent Variable- These are the conditions or characteristics that appear, disappear or change as the experimenter introduces, removes or changes independent variables.

3. Confounding Variable- These are those aspects of study or sample that might influence the dependent variable and whose effect may be confused with the effect of the independent variable.

4. Controlled Variable- A control variable is a variable that is held constant in a research analysis.
Variables in the present research are-

**Independent variable**- Multiple intelligences based teaching

**Dependent variable**- Achievement of the students

**Controlled variable**- Students of VI std.

**Confounding variable**- Extraneous variables such as teacher’s competence or enthusiasm exists but it was controlled by the researcher by herself teaching in both the classes.

**Threats to internal validity**-

Internal validity refers to the condition that observes differences on the dependent variable are a direct result of manipulation of the independent variable, not some other variable.

Campbell and Stanley have discussed the various threats to internal validity. The researcher tried to minimize these threats.

1. **Maturation**: Subjects change in many ways over a period of time, and these changes may be confused with the effect of the independent variable. Duration of present research was 6 months and the students were in the 6th standard so this threat was minimized.

2. **History**: Specific external events occurring between the first and second measurement and beyond the control of the researcher may have a stimulating or disturbing effect upon subjects. Though the duration of the present research is 6 months, the presence of the control group minimizes this threat.

3. **Testing**: The process of pretesting at the beginning of the experiment may produce a change in subjects. To minimize this threat, the researcher collected the question papers back and did not tell the students that she is going to take the same test at the end of the teaching. Apart from this the test was given to both the groups.
4. **Unstable Instrumentation**: Unreliable instrument used to describe and measure aspects of behavior are threats to the validity of an experiment. In the present research, the test was thoroughly checked and the same printed papers were given on posttest.

5. **Statistical regression**: Subjects, who score very high on a pretest, will most likely lower (nearer the mean) on a subsequent testing. In the present research the groups are not selected on the basis of the scores, so this threat is controlled.

6. **Selection bias**: Selection bias is represented by the nonequivalence of the experimental and control groups. In the present research though two intact classes were used, divisions were not formed on the basis of marks. Assignment to experimental and control group was done randomly.

7. **Experimental mortality**: Mortality, or loss of subjects, is more likely during a long term experiment. Because the attendance in the school was compulsory, this threat was minimize.

According to the research design the researcher selected the sample.

### 3.4 SELECTION OF SAMPLE

All items in any field of inquiry constitute a ‘Universe’ or population. A population is any group of individuals/units that have one or more characteristics in common that are of interest to the researcher, for a particular research. A population may include all the individuals of a particular type or a more restricted part of that group

The primary purpose of research is to discover principles that have universal application, but to study the whole population to arrive at generalizations would be impracticable. Some population is so large that their characteristics cannot be measured.

Population of the present research was students of VI standard studying in SSC board.
Sample:

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

3.4.1 Methods of sampling

Because of small sample group the quality of the research study would improve, it also saves time, energy and money. Sampling methods can be classified into two divisions.

**FIGURE 3.5 TYPES OF SAMPLING**

**Probability sampling** - In this sampling, sampling units are selected by means of certain procedures, which ensure that every unit of the population has fixed probability of being included in the sample.
Non probability sampling- In this technique the sampling units are selected not according to a random selection scheme. They are selected at the discretion of the researcher based on convenience.

In the present research, incidental sample comprising of two intact classes of 6th grade students from the same school i.e. Sinhgad Springdale School, Narhe, Pune have been chosen by the researcher. This study was performed amongst 110 elementary school students. 55 students from one division formed the experimental group and 55 students from another division formed the control group of the study.

- List of the students is presented in Appendix A

3.4.2 Reasons for using incidental sampling:

The school from which sample was taken was convenient for the researcher for the following reasons:

(i) The school to be chosen for the research should be one which grants access to mediums like OHP, LCD etc. and which allows a wide range of activities to be conducted. This school fulfills all above conditions.

(ii) The researcher found this school convenient as she herself teaches at the D.Ed College of the same institute.

The researcher sought the permission to conduct the tests and programme from the authorities. Thus the sample is chosen as per the convenience, need and resources available to the researcher.

3.4.3 Characteristics of present sample:

1. All of the students in the study were about 11 years old.
2. Sample consisted of both girls and boys.
3. The families of the students in both groups had similar socio-economic backgrounds.
3.5 DEVELOPMENT OF TOOLS FOR DATA COLLECTION

Tools are the necessary devices used for the collection of data. Collection of data is very important for testing the effectiveness of activities. For this the researcher can collect quantitative as well as qualitative data.

Quantitative data or Quantification has been defined as a numerical method of describing observations of materials or characteristics.

Different data collection tools are:

Observation, interview, questionnaire, achievement test, rating scale, opinionnaire, standardized test etc.

In the present research, researcher has used following tools for data collection:

1. Achievement test prepared by the researcher on selected units

2. Multiple Intelligences Inventory for identifying predominant intelligences of students prepared by Ranade, M.D

3. Rating Scale prepared by the researcher to know the activities that are liked or not liked by the students. Rating scale had three points viz. liked most, liked less and not liked.

4. Observation of the students in the voluntary participation in various MI based activities

5. Opinionnaire prepared by the researcher for obtaining reactions of the students to MI based teaching.

3.5.1. Achievement test:

Achievement test scores are used in placing, advancing or retaining students at particular grade levels. They are used in diagnosing strength and weakness and as a basis for awarding prizes, scholarships or degrees. “Frequently, achievement test scores are used in evaluating the influences of courses of study, teachers, teaching methods and other factors considered being significant in educational practice” (Best, 1986, pg 150)
Preparation of achievement test:

1. Preparation of design
2. Preparation of blue print
3. Designing of questions
4. Preparation of the marking scheme and scoring key
5. Experts opinion
6. Editing the question paper

Characteristics of present achievement test:

1. This achievement test is self made.
2. The test is based upon the content of the research study.
3. The questions are taken on each part of the content.
4. Questions are based upon the objectives of knowledge, understanding, application and skill.
5. The language of the present test is easy to understand.
6. The test includes objective type and short answer type questions.
7. A question like crossword puzzle is given to add variety in the test.
8. The time allotted to solve the test was one and half hour.

The researcher prepared 40 marks (with options 44 marks) achievement test on the selected eight chapters. Division of marks is as follows:

**TABLE NO 3.1 DIVISION OF MARKS ACCORDING TO OBJECTIVE**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>15</td>
</tr>
<tr>
<td>Comprehension</td>
<td>16</td>
</tr>
<tr>
<td>Application</td>
<td>05</td>
</tr>
<tr>
<td>Skill</td>
<td>08</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
</tr>
</tbody>
</table>
### TABLE NO 3.2 DIVISION OF MARKS ACCORDING TO THE CONTENT

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>The need for history</td>
<td>4</td>
</tr>
<tr>
<td>Sources of history</td>
<td>6</td>
</tr>
<tr>
<td>The life of the ancient man</td>
<td>5.5</td>
</tr>
<tr>
<td>The Harappa civilization</td>
<td>6</td>
</tr>
<tr>
<td>Life in the Harappa period</td>
<td>6</td>
</tr>
<tr>
<td>The Vedic civilization</td>
<td>5</td>
</tr>
<tr>
<td>Life in the Vedic period</td>
<td>5.5</td>
</tr>
<tr>
<td>New religious trends</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
</tr>
</tbody>
</table>

### TABLE 3.3 DIVISION OF MARKS ACCORDING TO THE QUESTIONS

<table>
<thead>
<tr>
<th>Type of question</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short answer</td>
<td>16</td>
</tr>
<tr>
<td>One line answer</td>
<td>05</td>
</tr>
<tr>
<td>Objective type</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
</tr>
</tbody>
</table>
Blue print of test was prepared as follows:-

### TABLE NO 3.4 BLUEPRINT OF TEST

<table>
<thead>
<tr>
<th>Unit name</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Skills</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>S</td>
<td>L</td>
<td>O</td>
<td>S</td>
</tr>
<tr>
<td>The need for history</td>
<td>2(1)</td>
<td>2(1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sources of history</td>
<td></td>
<td></td>
<td></td>
<td>1(4)</td>
<td>1(1)</td>
</tr>
<tr>
<td>The life of the ancient man</td>
<td>1(1)</td>
<td></td>
<td></td>
<td>1(4)</td>
<td>1(1/2)</td>
</tr>
<tr>
<td>The Harappa civilization</td>
<td>1(1)</td>
<td>1(1)</td>
<td></td>
<td>1(4)</td>
<td></td>
</tr>
<tr>
<td>Life in the Harappa period</td>
<td>2(1)</td>
<td></td>
<td></td>
<td>1(4)</td>
<td></td>
</tr>
<tr>
<td>The Vedic civilization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3(1)</td>
</tr>
<tr>
<td>Life in the Vedic period</td>
<td>1(1)</td>
<td>2(1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New religious trends</td>
<td>3(1)</td>
<td></td>
<td></td>
<td>1(1)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>5</td>
<td></td>
<td>16</td>
<td>5</td>
</tr>
</tbody>
</table>

- The number outside the bracket indicates no. of questions.
- The number inside the bracket indicates the marks for the question.
This test consisted of following types of questions:

**TABLE NO 3.5 DIVISION OF MARKS ACCORDING TO THE TYPES OF QUESTION**

<table>
<thead>
<tr>
<th>Type of question</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill in the blanks</td>
<td>5</td>
</tr>
<tr>
<td>State whether true of false</td>
<td>5</td>
</tr>
<tr>
<td>Match the following</td>
<td>5</td>
</tr>
<tr>
<td>Answer in one sentence</td>
<td>5</td>
</tr>
<tr>
<td>Answer in two three lines</td>
<td>12</td>
</tr>
<tr>
<td>Find the appropriate words and circle them in</td>
<td>08</td>
</tr>
<tr>
<td>the given puzzle</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

**Validity and Reliability of achievement test:**

In using any measuring instrument the researcher has to first establish its validity and reliability. Whenever a test or other measuring device is used as part of the data collection process, the validity and reliability of that test is important.

**Test Validity:**

Validity refers to the degree to which our test or other measuring device is truly measuring what we intended it to measure. There are different types of validity like content validity, criterion validity, construct validity etc.

Content validity in this research was established with the help of subject teachers. According to the blueprint the researcher prepared the achievement test and got it checked by experts. One teacher educator, who was teaching
History methodology at a college of education and one school teacher teaching History to 6th standard, checked the achievement test. The researcher followed some valid suggestions of experts and finalized the test to use for measuring achievement in History of 6th standard students.

**Test Reliability.**

Reliability is synonymous with the consistency of a test, survey, observation, or other measuring device. A reliable instrument is one that is accurate and free of error and when the same measure applied to the same individual or object in the same way, should yield the same value from moment to moment.

There are four procedures in common use for computing the reliability coefficient of a test. These are

1. Test-retest
2. Alternate or parallel forms
3. Split half technique
4. Rational equivalence (Garrett, 2006, pg. 337)

In the present research reliability coefficient of the test was established by the ‘Test Retest method.’

**Test-Retest Reliability:**

Test-Retest reliability refers to the test’s consistency among different administrations. To determine the coefficient for this type of reliability, the same test is given to a group of subjects on at least two separate occasions. If the test is reliable, the scores that each student receives on the first administration should be similar to the scores on the second.

In the present research the achievement test was administered to 10 students of std.VI. The same test was given after one month and reliability was established.

The reliability coefficient and index of reliability was as under
TABLE NO 3.6 RELIABILITY OF ACHIEVEMENT TEST

<table>
<thead>
<tr>
<th>Achievement Test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability coefficient</td>
<td>0.89</td>
</tr>
<tr>
<td>Index of reliability</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Table no. 3. Shows high correlation which indicates that the test is reliable.

- The achievement test is given in Appendix B

3.5.2. Multiple Intelligences Inventory:

There are many inventories available on the internet to test the various types of intelligences present within children. From the various tests available, the researcher has made use of an inventory prepared by her guide, Dr. Mridula Ranade. The test was prepared in the following manner.

All the MI tests available on the internet were collected. Statements related to each intelligence were compiled, from which, those suitable for Indian students were selected. Some statements were modified and simplified and some were added anew. Then the test was given to number of people and their feedback about the test was obtained, whether their predominant intelligences on the test matched their perceived predominant intelligences.

A pilot study of the MI test was conducted. Following aspects were studied:

- Statements not understood by the students.
- The total time required for the test.

Since students understood the test well, no changes needed to be made. However, the test is not standardized.

The test evaluates 8 types of intelligences and comprises of a set of 10 questions for each type of intelligence. Depending on the preferences given by the students to the questions, the degree of intelligence amongst the mentioned 8 types of intelligences can be evaluated. Based on the preferences given by
the students, the researcher calculated the dominant type of intelligence present in each of the individual student of the experimental group.

**Benefits of Multiple Intelligences Inventory:**

Following are the benefits of evaluating the students by using MI inventory

- It assists in finding the dominant intelligences present within a student.
- Depending on the dominant type of intelligence prevalent within the student, special attention can be paid
- The teacher can know the weaknesses/strengths of the student and can guide the student accordingly.
- The intelligence of all the students not being the same, the teacher can adopt different ways of teaching the students so has to make the teaching learning process more effective
- The students can be grouped into various intelligence groups
- Depending on the predominant intelligence present in the student, work tasks, home work, lessons can be prepared specific to the student.

- The Multiple Intelligence inventory is given in Appendix C

3.5.3. Opinionnaire:

After conducting a research, a questionnaire is given to the subjects in order to know their opinions. In the present research, an opinionnaire has been prepared to collect the required data.

**Merits of the Opinionnaire:**

1. Personal opinions of the subjects can be discerned immediately.
2. More responses can be obtained in a short period of time.
3. It proves to be useful for qualitative analysis.
4. The researcher comes to know of his/her weaknesses and strengths.
5. The researcher can present this opinionnaire as evidence for having conducted the experiment.
CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

Features of the Present Opinionnaire:

1. Subjective and objective question types have both been included and place to answer has been provided just below.
2. Objective questions have been asked more frequently and place to answer has been provided just below.
3. Enough time has been given to the students to answer the questions.
4. The language used is such that the students can understand it.

- Opinionnaire is given in Appendix D

3.5.4. Rating Scale:

The researcher prepared a 3 point rating scale to see which activities the student liked or disliked. The 3 options were liked, liked less and not liked. The researcher taught a total of 8 chapters and the activities taken in each chapter were listed on the rating scale.

- Rating scales are given in Appendix E

3.5.5. Observation Schedule:

The researcher prepared a matrix of the activities as per each chapter against the names of the students who would participate in the activity and used this as a tool to record her observations.

3.6 SELECTION OF UNITS

In the present research the researcher selected the subject history of std. VI. It was observed that the syllabus of std. VI included ‘The history of ancient India’ as its subject content, whereas in std. VII and std.VIII the subject content is ‘History of the medieval period’ and ‘History of modern India’ respectively. It was found by the researcher that in order for the student to understand the history of medieval and modern India in depth, it was very necessary for the student to grasp the content of history of ancient India thoroughly along with a parallel developed keen interest. For achieving this the researcher selected the first eight lessons of the std.VI namely, The need for history, Sources of history, The life of the ancient man, The Harappa

3.6.1 Content analysis:

Content analysis is the analysis of content into subunits. It gives the overall picture about the units to be taught. Based upon the content analysis and the time allotted, planning of the lesson was done.

**TABLE NO 3.7 CONTENT ANALYSIS**

<table>
<thead>
<tr>
<th>Periods</th>
<th>Unit</th>
<th>Subunit</th>
<th>Content analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The need for history</td>
<td>What is history, The need for history</td>
<td>Past, division of history into periods, various questions about past, progress made by our ancestors</td>
</tr>
<tr>
<td>2</td>
<td>Chronology in history</td>
<td>Time line</td>
<td>Correlation between various events, methods of measuring time, AD, BC, Century</td>
</tr>
<tr>
<td>3</td>
<td>Sources of history</td>
<td>Types of sources, Material Sources</td>
<td>Material sources, written sources, oral sources, Artifacts, buildings, caves, temple, weapons, historical remains</td>
</tr>
<tr>
<td>4</td>
<td>Written sources, Oral sources</td>
<td>Incription on stones, pot, bricks, walls, metals, boorjapatra, papyrus, literature, Folk tales, folk songs, owls</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Sources of ancient Indian history, Precautions to be taken in writing</td>
<td>Archaeological excavation, relics of towns, Vedic, Jain, Buddhist literature, coins, inscriptions, Verification of excavated evidence, use of scientific method, exact period</td>
<td></td>
</tr>
<tr>
<td>Chapter</td>
<td>Title</td>
<td>History</td>
<td>Objectivity</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>6</td>
<td>The Life of the Ancient Man</td>
<td>Stone age, Food, Agriculture</td>
<td>Paleolithic, Neolithic, Hunting, fishing, use of fire, Division of work, cultivation of cereals and legumes</td>
</tr>
<tr>
<td>7</td>
<td>Domestication</td>
<td>Domestication of animals, technology of making tools, weapons and implements, Use of stones, bones, wood, Use of ivory, horns for making needles, fish hooks</td>
<td>Use of animals for agriculture, Use of stones, bones, wood, Use of ivory, horns for making needles, fish hooks</td>
</tr>
<tr>
<td>8</td>
<td>Art and craft</td>
<td>Art and craft, Village settlement, Emergence of urban civilization</td>
<td>Painting, ornaments, clay models, invention of wheel, Stable life, protection and convenience, Trade, development of towns, civilization on the bank of rivers-Indus valley</td>
</tr>
<tr>
<td>9</td>
<td>The Harappa Civilization</td>
<td>Discovery of Indian civilization, Town planning, Roads</td>
<td>Mohen-jo-daro, harappa civilization, characteristic features of Harappa civilization, Structure of town, Structure of roads</td>
</tr>
<tr>
<td>10</td>
<td>Houses</td>
<td>Houses, Sewage disposal, The great bath</td>
<td>Structure of houses, material used, System of sewage disposal, Size of the great bath, structure of the</td>
</tr>
</tbody>
</table>
### CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

<table>
<thead>
<tr>
<th></th>
<th>Summary of Harappa civilization</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11</strong></td>
<td>Life in the Harappa period</td>
<td>Food, Clothing, Ornaments, Recreation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main food like wheat, rice, barley, other food; meat, fish, fruits, vegetables</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use of woolen cloths, pattern of dress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use of gold, silver, copper, stones, shells, different types of ornaments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Important means of recreation - dance, music, board games, clay toys</td>
</tr>
<tr>
<td><strong>12</strong></td>
<td>Religious ideas</td>
<td>Nature worship, worship of pashupati, fire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shape, size, appearance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agriculture, trade</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Various crops cultivated, animal husbandry</td>
</tr>
<tr>
<td><strong>13</strong></td>
<td>Pottery, Textiles, Trade</td>
<td>Red terra-cotta, designs, colours, uses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large scale industries, spinning, weaving and dying cloth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Import and export of goods, means of communication</td>
</tr>
<tr>
<td><strong>14</strong></td>
<td>The Vedic civilization</td>
<td>Meaning, remarkable feature, composition of Vedas</td>
</tr>
</tbody>
</table>
### CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

<table>
<thead>
<tr>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigveda</td>
<td>Yajurveda</td>
<td>Samaveda</td>
<td>Atharvaveda</td>
<td>Brahmanas</td>
</tr>
<tr>
<td>Deities, poetic description of nature</td>
<td>Yajna, mantra</td>
<td>Rhythm, tune</td>
<td>Philosophy, medicinal herbs</td>
<td>Rituals</td>
</tr>
</tbody>
</table>
### CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

<table>
<thead>
<tr>
<th>Trends</th>
<th>Vardhaman Mahavir</th>
<th>Mahavir</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Panchmahavrata</td>
<td>Ahimsa, Satya, Asteya, Aparigraha, Brahmacharya</td>
</tr>
<tr>
<td></td>
<td>Triratna</td>
<td>Samyak Darshan, Samyak jnyan, Samyak Charitra</td>
</tr>
<tr>
<td></td>
<td>Teaching of Mahavir</td>
<td>Love all living things, have mercy, live and let live</td>
</tr>
<tr>
<td>21</td>
<td>Gautama Buddha</td>
<td>Birth, childhood, enlightenment, meditation, bodhivriksha, dhamma-chakra-pavattan</td>
</tr>
<tr>
<td></td>
<td>Life of Buddha</td>
<td>Dukkha, trisha, dukkha nirodh, pratipad</td>
</tr>
<tr>
<td></td>
<td>Arya Satya</td>
<td>Ahimsa, satya, asteya, indriya samyam, no intoxicants</td>
</tr>
<tr>
<td></td>
<td>Panchasheel</td>
<td>Right view, concept, action, lively hood, efforts, memory, speech, concentration</td>
</tr>
<tr>
<td></td>
<td>Ashtangmarg</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Bouddha sangha</td>
<td>Sangha, bhikkus, rules of conduct</td>
</tr>
<tr>
<td></td>
<td>Language used</td>
<td>Pali</td>
</tr>
<tr>
<td></td>
<td>Message</td>
<td>Bahujan hitay, bahujan sukhay</td>
</tr>
</tbody>
</table>

#### 3.6.2 Development of Programme:

While preparing the programme, all 8 intelligences (Verbal/Linguistic, Logical/Mathematical, Visual/Spatial, Musical, Bodily/Kinesthetic, Intrapersonal, Interpersonal, and Naturalistic) were kept in mind. Activities were planned in such a way that each lesson will include activities related to all 8 types of intelligences. A checklist list prepared by Ranade. M.D. (2008) was used to plan the activities.
Chapter wise activities are listed in the following table

**TABLE NO 3.8 CHAPTERWISE ACTIVITIES**

<table>
<thead>
<tr>
<th>LESSON</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The need for History</td>
<td>Prepare own definition, Use of quotation, Writing events in the chronological order, Use of poem, slide show, Draw a time line, Group discussion.</td>
</tr>
<tr>
<td>Sources of History</td>
<td>Use of cooperative method, collecting and reading newspaper cuttings on archeological excavation, slide show, singing folk song, telling folk tale, pair and share activity, sharing the thoughts, video of papyrus</td>
</tr>
<tr>
<td>The life of the Ancient Man</td>
<td>Etymology of words, Use of flow chart, Singing poem, Use of chart, Drawing picture on the blackboard, slide show, Brainstorming, Careful observation of different types of gems, pearl, shells, Creating environmental awareness.</td>
</tr>
<tr>
<td>The Harappa Civilization</td>
<td>Mathematical calculations, Use of map, Drawing pictures according to descriptions, Group discussion, Use of pictures, making comparisons, slide show.</td>
</tr>
<tr>
<td>Life in the Harappa Period</td>
<td>Use of crossword puzzle, Use of pictures, making of malas, thought provoking questions, Use of quotations, Drawing pictures, Self learning material, Slide show, making comparison.</td>
</tr>
<tr>
<td>The Vedic Civilization</td>
<td>Use of maps, Use of tape recorder, flow chart, Use of poem, Scope for classification, thought provoking questions, Mathematical calculations, Etymology of words, Dumb charades, Use of charts, Graphic organizers, Game- Find your partner.</td>
</tr>
<tr>
<td>Life in the Vedic Period</td>
<td>Use of pictures, thought provoking questions, Debate, slide show, Use of poem, Scope for classification, Playing sounds of musical instruments, demonstration of Havi.</td>
</tr>
</tbody>
</table>
CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

<table>
<thead>
<tr>
<th>New Religious Trends</th>
<th>Use of pictures, Etymology, use of maps, Storytelling, Use of tape recorder, Slide show, Use of puzzle, Mnemonic, Identification of own memories, Use of charts.</th>
</tr>
</thead>
</table>

Detailed description of various activities based on all the eight intelligences are as follows:

**Verbal Intelligence**

- The students compared between the modern urban civilization and the Harappa urban civilization.
- To identify the food of the Harappa people the students were given a crossword puzzle to solve. A crossword puzzle was shown on a chart and the students were asked to find the food item and encircle it.
- To explain religious ideas a quotation was written on the board—‘Religion is the clearest telescope through which we can behold the beauties of creation and good of our creator—William Downey.’ Students were asked to read a loud and explain the meaning of it.
- Harappa trade was explained with the example of current Indian trade.
- The poem on Vedas was recited.
- The students were asked to construct two questions on the creation of the universe and the nature of God.
- The meaning of the Barter system was explained.
- A debate was conducted on the pros and cons of the patriarchal society.
- The meaning of Tirthankar was explained.
- A story of Mahavir was narrated.
- Meaning of Jin was explained.
- Mnemonic technique to remember Ashtang marg—calm vest was given.
- Meanings of the terms—Sangha, Bhikku were explained.
A quotation was written on the board to explain the need for history. The students were asked to read it aloud and explain the meaning. Quotation was as follows:

- Concept of AD and BC was explained with the help of a poem.
- Reading newspaper cuttings on archaeological excavation.
- Students told folktales.
- Precautions to be taken in writing history were explained with the help of various examples.
- Meaning of Stone Age was explained to the students.

**Visual Intelligence**

- The map of Harappa civilization was shown.
- The students were asked to draw their idea of Harappan cities according to the given information.
- Pictures of the Great Bath were shown.
- The chapter was revised by showing PowerPoint presentation of Harappa Civilization.
- Pictures of clothing of Harappan people were shown.
- Students were asked to draw pictures of seals.
- Slide show on pottery was shown.
- A map of India was shown to inform about the Vedic civilization.
- The political system is explained with the help of a chart.
- Pictures of various occupations were shown to explain the varnas.
- A slide show on the Ashrama system was shown.
- A slide show on the life of Buddha was shown.
- Picture of Ardhamagadhi was shown.
- Birthplace of Mahavir was shown on the map.
- Picture of Mahavir was shown.
- Different patterns in nature in the form of pictures e.g. Day and night, seasons, thunder and lightning were shown.
- Message on the wall in the form of flashcards was shown.
- Time line was shown on the slide.
• Slide show on written material sources of history was prepared and displayed by the students.
• Chart of food and agriculture process was displayed on the wall.
• The students were asked to draw the pictures of tools on the blackboard.
• Slide show on invention of wheel.
• Photographs on musical instruments were shown to the students.
• The students were asked to draw a concept map on the sources of history.
• The students were asked to sketch the ancient cave paintings.
• Video on the preparation of Papyrus was shown.
• Liberal use of blackboard was done.

**Mathematical/Logical Intelligence**

• The students were asked to calculate the number of years that have passed form the time the seals were excavated in 1922
• Demonstration of the vedas with the help of a flowchart was done.
• Mathematical question to explain the tax system was asked.
• Logical puzzle to find out name of the noble truths was given- (Trisha)
  My 1\textsuperscript{st} letter is in tea but not in coffee.
  My 2\textsuperscript{nd} letter is in crying but not in weeping.
  My 3\textsuperscript{rd} letter is in spin but not in wheel.
  My 4\textsuperscript{th} letter is in mass but not in crowd.
  My 5\textsuperscript{th} letter is in brother but not in sister.
  My 6\textsuperscript{th} letter is in Africa but not in India.
• Based on the definitions of the ‘past’ and the ‘present’ the students were asked to define the ‘future’.
• Students were asked to write the major events in their life in a chronological order
• The students were asked to prepare a flow chart on the two periods- Neolithic and Paleolithic on the blackboard
CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

Musical/Rhythmic Intelligence

- The Sanskrit shlokas were played on the tape recorder
- Poems on the Vedas were recited.
- Poems were recited on day to day life of Vedic period.
- Sounds of mridanga, damru and conches were played on the tape recorder.
- The topic was introduced by playing a shloka of Buddha on the tape recorder.
- Navkar mantra was played on the tape recorder.
- Concept of AD and BC was explained with the help of a poem.
- Student sang folk songs.
- Poem on technology of making weapons was sung.

Bodily/Kinesthetic Intelligence

- Students were asked to find out food items from the crossword puzzle.
- The beads were distributed among the students to prepare malas.
- The students were asked to recognize the occupations in the Vedic period by playing dumb charades.
- A game was played wherein two groups were formed. The students in one group were given some words written on cards, and the students in the other were given cards with the meanings of the words. Each student had to find the student from the opposite group whose card had the same meaning of the word given to him.
- The demonstration of havi was done.
- The time line was chalked out on the board and the students were asked to come in front and mark the given events on it.
- The students were asked to draw the pictures of tools on the blackboard.
- Ball game- The class was divided into two groups for Panch Mahavratas and tri ratnas. One team says the word and passes ball to another team which has to say the meaning of it.
- The student shows Mohen-jo-daro in the map.
CHAPTER III: RESEARCH DESIGN AND METHODOLOGY

Interpersonal Intelligence

- Pair and share activity: Why were the houses built on raised plinths
- Group discussion was carried out on: What would have happened if the sewage disposal was not proper?
- Students were asked about their means of recreation.
- Self-learning material was given to the students to read.
- Pair and share activity: on the material provided by the researcher.
- Sources of history were mainly taught by using cooperative method. The students were asked to collect the newspaper cuttings on the archaeological excavation and read it in the class.
- Students were asked to prepare a slide show on written sources of history.
- Student sings folk songs.
- Student tells folk tales.
- Pair and Share activity was taken on the sources of ancient Indian history
- Students were asked to share their thoughts about importance of sources of ancient Indian history
- Group of four students were made and Group discussion on the need of history was taken

Intrapersonal Intelligence

- The students were given self learning material on occupations of Harappan to read
- Question was asked: What do you think people of the lower castes suffered during this period of social inequality
- The students were asked to construct two questions on the creation of the universe and the nature of God.
- The students were asked to think about religious tolerance in India and questions were asked like what they think about the current situation.
- Students were asked to remember any incident actually witnessed or read or seen on TV about violence and asked for their opinions.
Naturalistic Intelligence

- Some leaves of medicinal plants like Tulsi, Neem, Hibiscus, lemon grass etc. were shown to the students to recognize them. Teacher also made the students aware of the preservation of these plants
- Students observed different types of gems, pearls and shells and understands different characteristics of it
- The sample of food was displayed on the table and the students were asked to classify them into cereals, pulses and milk products.
- Students were made aware of the river pollution.
  - Lesson plans are given in Appendix F

3.7 TRY OUT

Try out is a small scale preliminary study conducted in order to evaluate feasibility, time, cost, adverse events in an attempt to predict an appropriate sample size and improve upon the study design prior to performance of a full-scale research project. A try out is a small experiment designed to test logistics and gather information prior to a larger study, in order to improve the latter’s quality and efficiency. A try out can reveal deficiencies in the design of a proposed experiment or procedure and these can then be addressed before time and resources are expended on large scale studies. A try out is usually carried out on members of the relevant population, but not on those who will form part of the final sample. This is because it may influence the later behavior of research subjects if they have already been involved in the research

Need for Try out:

1. It permits preliminary testing of the hypotheses that leads to testing more precise hypotheses in the main study. It may lead to changing some hypotheses, dropping some, or developing new hypotheses.
2. It often provides the researcher with ideas, approaches, and clues you may not have foreseen before conducting the Try out. Such ideas and clues increase the chances of getting clearer findings in the main study.
3. It permits a thorough check of the planned statistical and analytical procedures, giving you a chance to evaluate their usefulness for the data. You
may then be able to make needed alterations in the data collecting methods and therefore, analyze data in the main study more efficiently.

4. It can greatly reduce the number of unanticipated problems because you have an opportunity to redesign parts of your study to overcome difficulties that the pilot study reveals.

5. It may save a lot of time and money.

Try out was conducted in the present research to validate the training programme. Try out of the programme was conducted on a sample of 48 students of std.VI of Mahesh Vidyalaya. One chapter of History was taught by using Multiple Intelligences based teaching method.

To take the Try out for achievement test, a sample set of 8 students were chosen near the researcher’s house. The selection was done by using incidental sampling method.

The main aim of the Try out was to find out the problem areas associated within the research process, in which the researcher studied the language comprehension and time duration.

3.8 MODIFICATION OF THE PROGRAMME

Modification of the programme was done by taking into consideration the critical comments of some experts and try out of some activities of the programme.

The experts were provided with the objectives and details of each session of the programme. The experts were requested to give comments and suggestions regarding adequacy and relevance of the content and the language used. The comments were personally discussed with them and noted down. Based on the critical comment by experts and try out conducted, the programme was modified in the following way:

- Language of the programme was refined and modified.
- Information which seemed irrelevant was deleted.
3.9 IMPLEMENTATION OF THE PROGRAMME

After completing all the above steps, the program was implemented. The stepwise implementation of the program was as follows:

**Administration of MI inventory:**

First and foremost, the students of the experimental group were asked to fill the MI inventory as to ascertain their predominant intelligence. A time period of 30 minutes was given to them to fill it in. Before giving the inventory to them, they were briefed about it so as to instill some curiosity in them. Each and every sentence was explained to the students as they were small. Also they were told to tick only the answers which were applicable to them.

**Administration of Pretest:**

To test the previous knowledge both the groups had about the respective content, an achievement test was used as Pretest for both the groups. They were given one hour to complete it. Both the groups appeared for the test.

**Implementation of the programme:**

The researcher herself taught both the groups. The control group was taught by the non MI based teaching methods. Appropriate use of pictures, maps and blackboard was used by the researcher.

The researcher used MI based teaching method to teach the experimental group. 23 periods of 35 minutes each per class were taken, accounting to a total of 46 periods. This programme was carried out between the time span covering July to December.

**Observation of MI during teaching:**

While teaching the experimental group, the researcher wanted to see which activities the students participated in. But it was difficult for the researcher to observe the students’ participation while teaching. So a teacher from the school was requested to work as observer. The researcher explained to the teacher how to observe the students. After every period, her observations were discussed with the researcher. These observations helped the researcher to
determine whether the students participated in the activities in accordance to their predominant intelligence.

**Administration of rating scale:**

To see which activities the students liked or not disliked, the researcher administered a rating scale. At the end of each chapter, the students were asked to rate the activities taken.

**Administration of Posttest:**

To compare the effectiveness of MI based teaching method and non MI based teaching method, a posttest was conducted for both the groups. The same achievement test was given. Time given to solve the test was one hour.

**Administration of Opinionnaire:**

To know the answers to various questions like whether they noticed any difference between traditional and MI based teaching methods, did they like the new teaching method, did they benefit from this teaching approach and many more, the students were asked to answer an opinionnaire. Only the students from the experimental group were given this opinionnaire. The time given to them to answer it was 30 minutes. This was given to them on the next day of posttest.

**Administration of Retention test:**

To compare the retention capacities of the students after the application of MI based teaching method and the non MI based teaching methods, retention test was conducted for both the groups after one month of posttest. The same achievement test was given to them to solve. Time given to solve the test was 60 minutes.
3.10 TIME TABLE

<table>
<thead>
<tr>
<th>Programme</th>
<th>Date</th>
<th>Time allotted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration of MI test</td>
<td>6 July, 2010</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Administration of Pretest</td>
<td>13 July, 2010</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Implementation of the programme</td>
<td>15&lt;sup&gt;th&lt;/sup&gt; July – 19&lt;sup&gt;th&lt;/sup&gt; November, 2010</td>
<td>1 period was of 35 minutes</td>
</tr>
<tr>
<td>Administration of Posttest</td>
<td>22&lt;sup&gt;nd&lt;/sup&gt; November, 2010</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Administration of Opinionnaire</td>
<td>23&lt;sup&gt;rd&lt;/sup&gt; November, 2010</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Administration of Retention test</td>
<td>21&lt;sup&gt;st&lt;/sup&gt; December, 2010</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

The details about the analysis and interpretation of the data are given in chapter IV.